# GENERALIZED DEPENDENCIES:

# DESCRIPTION, REFERENCE, AND ANAPHORA

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I want to dedicate this thesis to my parents who are probably still wondering what the heck a linguist does. Köszönök mindent, --azt is, amit nem lehet megköszönni.

# ABSTRACT

## GENERALIZED DEPENDENCIES:

## DESCRIPTION, REFERENCE, AND ANAPHORA

A dissertation presented to the Faculty of the Graduate School of Arts and Sciences of Brandeis University, Waltham, Massachusetts

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Any computationally and psychologically viable theory of discourse and anaphora must crucially answer at least the following questions: What different types of anaphoric relations need to be distinguished in an adequate theory of anaphora? How are discourse referents introduced? What textual clues are available in a discourse to facilitate the resolution of anaphora? What is the relation between the introduction of event and individual discourse referents? What are the accessibility conditions for anaphora as in relation to the modal structure of a discourse? This dissertation puts forth a new

theoretical framework for the representation of anaphoric relations, which makes strong predictions for the behavior and interaction of different types of anaphoric elements.

The proposal of the dissertation consists in three substantial, but related, modifications to current theories of anaphora and discourse referents. First, I show the necessity of two representational levels of discourse. The two levels are motivated by the existence of two empirically distinguishable types of anaphoric relations, the so-called Descriptional anaphora (e.g., *one*-anaphora, VP-anaphora) and Referential anaphora (e.g., pronominal anaphora). This novel distinction between the two types of anaphoric expressions contrasts with the current practice of treating of all types of anaphora uniformly. The Descriptional Tier of the proposed framework contains functions, which comprise the descriptional content of a sentence together with function argument relations; anaphoric relations that are not subject to accessibility conditions hold betweenthe elements of the Descriptional Tier. The Referential Tier, on the other hand, contains the discourse referents well known from the universes of the DRSs in Discourse Representation Theory, with the same accessibility conditions. Second, I demonstrate that, strikingly, discourse referents are not introduced independently of each other; instead they get introduced in `clusters' in a neo-Davidsonian fashion, where the introduction of the event discourse referent drives the introduction of discourse referents for event participants. Finally, I show that elements requiring contra-identity, such as *different*, *other*, and *else* are subject to the same anaphoric conditions as anaphoric elements requiring identity. This then necessitates extending the notion of anaphoricity to elements requiring contra-identity on a par with elements requiring anaphoric identity.

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## CHAPTER 1: Introduction

Anaphoric elements play a central role in creating the cohesion found in a natural language text. Because of this, anaphoric elements and the anaphoric relations holding between them have been studied extensively not only in core linguistic areas but in applied fields, such as discourse analysis, rhetorics, and computational linguistics as well. Computational linguists soon found out that the automatic resolution of anaphora greatly adds to the computational complexity of analyzing a natural language text.

To help untangle the issue of anaphoric reference, and to thus aid the parsing of natural languages, any computationally and psychologically viable theory of discourse and anaphora must crucially answer at least the following questions: What different types of anaphoric relations need to be distinguished in an adequate theory of anaphora? How are discourse referents introduced? What textual clues are available in a discourse to facilitate the resolution of anaphora? What is the relation between the introduction of event and individual discourse referents? What are the accessibility conditions for anaphora as in relation to the modal structure of a discourse? In general, what constrains the interaction of anaphoric elements? In this thesis I attempt to give a partial answer to some of these questions.

In particular, I put forth a new framework for the representation of anaphoric relations, which makes strong predictions for the behavior and interaction of different types of anaphoric elements. The departure for the formal proposal is Kamp and Reyle's (1993) version of Discourse Representation Theory.

The proposal of the dissertation consists in three substantial, but related, modifications to current theories of anaphora and discourse referents.

To lay down the empirical foundations, in Chapter 2 I show the necessity of two representational levels of discourse. The two levels are motivated by the existence of two empirically distinguishable types of anaphoric relations, the so-called Descriptional anaphora (e.g., *one*-anaphora, VP-anaphora) and Referential anaphora (e.g., pronominal anaphora). In particular, Chapter 2 presents the empirical tests that set the two anaphoric types apart. This novel distinction between the two types of anaphoric expressions contrasts with the current practice of treating all types of anaphora uniformly. The Descriptional Tier of the proposed framework contains functions, which comprise the descriptional content of a sentence together with function argument relations; anaphoric relations that are not subject to accessibility conditions hold between the elements of the Descriptional Tier. The Referential Tier, on the other hand, contains the discourse referents well known from the universes of the DRSs in Discourse Representation Theory, with the same accessibility conditions. A first, partial, formal framework is presented in Chapter 3. An extension of this model to elements requiring contra-identity, such as

*different*, *other*, and *else* is presented in Chapter 4. Such elements requiring contra-identity turn out to be subject to the same anaphoric conditions as anaphoric elements requiring identity. This then necessitates extending the notion of anaphoricity to elements requiring contra-identity on a par with elements requiring anaphoric identity.

After extending the Descriptional v. Referential distinction to anaphoric relations between token events and event types in Chapter 5, in Chapter 6 I demonstrate that, strikingly, discourse referents are not introduced independently of each other; instead they get introduced in `clusters' in a neo-Davidsonian fashion, where the introduction of the event discourse referent drives the introduction of discourse referents for event participants. This chapter contains the crux of the formal proposal. Finally, Chapter 7 provides a comparative look at other theories about anaphoric elements and their relations.

But since the journey is long, let us get on the way.

## PART I: NOMINALS AND ANAPHORA

This part of the thesis looks at nominal anaphora, which includes both pronominal anaphora, *one*-anaphora, anaphora through definite descriptions (all expressing anaphoric identity), as well as so-called contra-identity anaphora indicated by *other* and *else*. The aim of this first part of the thesis is to establish empirical tests for distinguishing two, essentially different types of anaphora, namely Descriptional anaphora and Referential anaphora. After motivating the tests, and showing their results on a variety of nominal expressions, I will lay down the basics of a representation which is designed to give and adequate account of the distinction between the two anaphoric types, Descriptional and Referential anaphora. Part II of the thesis will extend the results of the tests and the representation to the domain of events.

## CHAPTER 2: The Two Types of Nominal Anaphora

Natural language texts and discourses exhibit a rich cohesive structure, which facilitates the constancy of information flow. Among its many facets, a major component of this overall texture is provided by anaphoric relations. In this chapter I look at what possibly constitutes the great majority of anaphoric elements (antecedents and anaphors), namely nominal expressions.

From the earliest days of transformational grammar till today pronominal anaphora and reflexives have played a central role in the development of the theoretical framework. This is evidenced by a long series of influential works including Karttunen (1976), Chomsky (1981), Reinhart (1983), Fiengo & May (1994), just to name a few. These works concentrated on the intrasentential syntactic constraints on the antecedent-anaphor pair. From a wider point of view, several recent linguistic approaches to discourse (such as Webber:1979, Kamp:1981, Heim:1982, Groenendijk & Stokhof:1990, 1991) set out to unravel the behavior of anaphoric elements in their larger context, the text. What is nevertheless common to the above frameworks is that they all concentrate (almost exclusively) on how to represent different kinds of pronominal anaphora (E-type

pronouns, bound variable readings, donkey-anaphora, paycheck pronouns) and reflexives as below[1]:

(1) *Ed* would like to resolve the situation one way or another before *he* leaves office... WSJ

(2) *Felix* hates *his* neighbours, and so does Max. (Reinhart:1983)

(3) Every *farmer* who has a donkey beats *it*. (Geach:1962)

(4) The man who gives *his paycheck* to his wife is wiser than the man who gives *it* to his mistress. (Karttunen:1969)

(5) *Zelda* bores *herself*. (Reinhart:1983)

In contrast, very few attempts have been made in the linguistic literature to examine other types of nominal anaphora. For example, very little attention has been paid to regular definite DP anaphora (as in (6)), epithets (as in (7)):

[1] All anaphoric elements (antecedent and anaphors) will be italicized throughout the dissertation.

(6) *A dog* was chasing *a squirrel* in our backyard. *The squirrel* was getting desperate trying to flee from *the dog*. Eventually *it* managed to run up a tree. *The dog* was barking up the tree where *the squirrel* had disappeared.

(7) Irving was besieged by a horde of bills, and *the poor guy* couldn't pay them.

(Jackendoff:1972)

It is even more striking to what extent indefinite nominals containing anaphoric expressions (sometimes referred to as indefinite pronouns, see (8)) and other non-referential anaphoric expressions (as in (9)) have been neglected:

(8) The company opened its *procurement office* here last fall (another *one*, its first, is in San Francisco)... WSJ

(9) *Red wine* from Chile is usually bad, but *that* from Hungary, frequently good.

(Webber:1979)

This chapter focuses on these less studied (although equally common and important) anaphoric expressions. I will use these expressions to motivate a new, two-level representation of nominal phrases and anaphoric relations. I am going to show first that the anaphoric relations between the italicized elements in (1), (6), and (7) as opposed to (8) and (9) exemplify two, markedly different types of anaphora. Intuitively it is clear

that the difference between the two anaphoric types consists in (a) whether the anaphoric element in question reactivates the discourse referent or token introduced by the nominal expression construed as the antecedent (as in (1), (6), and (7); or (b) whether it reactivates the descriptive content or type or sense introduced by that nominal expression as with *one*-anaphora in (8)[2]. I will call these two types of anaphoric relations Referential and Descriptional anaphora, respectively.

But is there anything more than an ill-defined intuition to this contrast? Beyond intuition, can we distinguish these two types of anaphora? Section 2.2. answers this question positively by offering the following six empirical tests for setting the two types apart:

(a) whether the anaphor can occur in predicative positions;

(b) whether the antecedent needs to match the anaphor in number;

(c) whether the antecedent and anaphor are extended projections (cf. Grimshaw:1991);

(d) whether the anaphor can access an indefinite antecedent appearing in the scope of negation or a modal;

(e) whether an E-type reading of the anaphor is available;

(f) whether bound reading of the anaphor is available.

[2] Obviously, I will attack the problem of anaphora by introducing discourse markers or discourse referents (following Karttunen:1976) as mediators between linguistic entities (DP's) and their interpretation, as it has been done in all recent discourse oriented approaches to anaphora.

Based on these six tests, Chapter 3 introduces a novel two-tiered representation for nominal phrases in general, in order to express the distinction between Referential-anaphora and Descriptional-anaphora. The new framework I am going to propose can be conceived of as a substantial modification of standard Discourse Representation Theory (see Kamp & Reyle:1993). DRT has the power to accommodate and represent what I call Referential-anaphora. I will complement this with tolls that have the power to accommodate *one*-anaphora and other types of Descriptional anaphora. In doing so, of course the traditional DRT representation of Referential-anaphora will be modified somewhat as well. The overall moral of this section, however, states that (no matter what framework we consider) all anaphoric expressions cannot be treated uniformly, as the different behavior of pronominal anaphora and *one*-anaphora demonstrates.

## 2.1. The proposed distinction: Referential v. Descriptional anaphora

As is well known, English predicative and referential DP's show the same syntactic composition[3]. In other words, the same DP can act as a predicative phrase in a given sentential position, while acting as a referential phrase in a different position:

(10) Marc is considered *a wonderful photographer.*

[3] In the thesis I will use both NP and DP interchangeably as referring to the maximal nominal projection. The mixture of terminology reflects the eclectic usage in linguistic literature, and should not be viewed as taking a stand for or against the existence of functional categories; in particular the mixed terminology should not be taken as a schizophrenic stand on the issue.

(11) Marc visited *a wonderful photographer* yesterday.

In the case of (10) the indefinite description only contributes a predicate to the discourse, a predicate that is thought to be an attribute of Marc[4]. On the other hand, in the case of (11) the indefinite's contribution is twofold: not only does it provide a predicate to describe the person that Marc visited, but it sets up a `character to talk about'. This is evidenced by the fact that subsequent pronominalization is possible with (11), but not with (10):

(10') Marc is considered *a wonderful photographer*, but Bill is not considered *#him/#it.*

(11') Marc visited *a wonderful photographer* yesterday. *She* gave him several of her pictures.

At least since Karttunen (1976) the difference between the two occurrences of the indefinite has been expressed by assuming that the indefinite in (11) introduces a discourse referent or discourse marker in addition to its predicative function, which serves as the antecedent for the pronominal expression.

[4] Section 2.2.1 will give a short list of syntactic environments which are referred to as predicative positions (i.e. syntactic positions where predicative DP's appear) as opposed to referential positions (i.e. positions in which a DP introduces a discourse referent).

The distinction that underlies the difference between the two types of anaphora (the topic of this chapter) parallels the two roles that a DP can play in discourse. To see this, consider the following examples:

(12) Karl showed up in *a leather jacket* at the theater.

a. ...He wore *the same thing* for Jill's birthday party. /same **token**/

b. ...By sheer coincidence, Joe was wearing *the same thing*. /same **kind**/

(13) Bill brought *a ham sandwich with pickles* for lunch today.

a. ...It was *the same sandwich* he brought yesterday. /same **token**/

b. ...Joe brought *the same sandwich* as well. /same **kind**/

The sentences in (12)-(13) exemplify a systematic ambiguity. Namely, they show that a single linguistic expression (with the exact same phrase as antecedent) can appear with two distinct readings, depending on its context[5]. In the (a) sentences the italicized phrase acts as anaphoric on the **token** introduced by its construed antecedent, while in the (b) sentences it is anaphoric on the **kind** introduced by that antecedent. For example, given the continuation in (13a), Bill is assumed to have brought the same **token** sandwich for

[5] A similar ambiguity holds for phrases expressing contra-identity (i.e., so-called contra-indexing phrases), as in:

(i) Bill drives *the Honda over there*.
a. ...His wife drives *another car*, which is also a Honda. /different **token**/
b. ...His wife doesn't like Hondas, and drives *another car*. /different **kind**/

For a discussion of these examples, see Section 4.1.

lunch today as he did yesterday, let's say because yesterday he did not have time to eat it. With the continuation in (13b), however, pragmatic factors tell us that Joe's and Bill's sandwiches are different tokens of the same **kind** of sandwich[6].

The two readings in examples (12) and (13) therefore arise depending on whether the antecedent is taken to be the **discourse referent** introduced by the italicized nominal, or the **description** introduced by the antecedent phrase of the anaphoric expression.

(14) **Definition:** Consider an anaphoric link between an anaphoric expression and its construed linguistic antecedent. If in such an anaphoric link it is the discourse referent (token) introduced by the antecedent phrase that acts as the semantic antecedent, let us call the anaphoric relation REFERENTIAL ANAPHORA. If, on the other hand, it is the description (type or kind) introduced by the antecedent phrase that acts as the semantic antecedent, let us call such an anaphoric relation DESCRIPTIONAL ANAPHORA.

The most important point to make here is that, since the anaphoric expressions in (12) and (13) exhibit a systematic ambiguity, the distinction between the two types of anaphora (that is, the distinction between Referential v. Descriptional anaphora) is not always determined by the appearance of a given linguistic expression, an antecedent or an

[6] For an indefinite DP to be anaphoric on an antecedent token the anaphoric relation has to be a contra-identity relation (generally represented as contra-indexing), as opposed to an identity relation (which is normally represented by co-indexing). For arguments that contraidentity-anaphoric relations indeed show the characteristics of anaphoric relations see Chapter 4.

anaphor.[7] In other words, we cannot simply lexically mark every linguistic expression as participating solely in Descriptional anaphoric links, or alternatively, as participating solely in Referential anaphoric links. Although *one*-anaphora will always involve anaphoricity on kind (i.e. participates only in Descriptional anaphoric links), expressions such as *the same sandwich* or *another car* can act either as Referentially anaphoric, or as Descriptionally anaphoric, and therefore cannot bear any lexical marking pertaining to the type of anaphoric link they participate in. Instead, the status of an anaphoric link containing *the same sandwich* or *another car* (i.e. whether the link is Descriptional or Referential) cannot be determined without respect to the given context.

The situation is in fact even more serious. Sometimes even the context cannot determine unequivocally whether a Descriptional or Referential anaphoric relation is assumed:

(15) Karl showed up in *a leather jacket* at the theater. He wore *the same thing* for Jill's birthday party.

Even though the preferred reading for (15) is the `same token' reading (i.e. the reading which Karl wore the same leather jacket to the theater and to Jill's birthday party), it is also conceivable that the intended reading is the `same kind' reading (i.e. the reading under which Karl wore two different leather jackets to the two occasions.) The ambiguity

[7] If the anaphoric expression alone specified whether the anaphoric relation was Referential or Descriptional, the resolution of anaphoric expressions would be one degree less complicated.

in the given anaphoric link is therefore genuine, it cannot be eliminated. Such expressions therefore pose a potentially serious problem for anaphora resolution.

The Referential v. Descriptional distinction put forth in this dissertation closely resembles two earlier proposals. In particular, it is parallel to the distinction between **identity-of-reference** v. **identity-of-sense anaphora** proposed by Grinder & Postal (1971), as well as the distinction between **concrete entity** v. **concept anaphora** advocated by Asher (1993). The present proposal, however, is clearly different from the most well-known distinction among different anaphoric types, the distinction between **deep** and **surface** anaphora suggested by Hankamer & Sag (1976) (which was later recast in Sag & Hankamer:1984 as a distinction between model interpretive anaphora and ellipsis). I will compare Referential v. Descriptional anaphoric distinction with these distinctions made in the literature in Chapter 7. For now, let us keep our eyes on the prize, and let us charge ahead in exploring the bifurcate distinction proposed here.

## 2.2. The tests

Given an intuitive grounding for the Referential vs. Descriptional distinction, it is time now to turn to the actual empirical tests that can distinguish the two types of anaphora. For the purposes of this dissertation I present the tests below as independent tests which happen to circumscribe the same (or at least very close to the same) two types of

anaphoric relations. Ideally all the tests reveal different manifestations of the same underlying phenomena, namely the distinction between Referential and Descriptional anaphora, and can be derived from the given distinction. If that is the case, the tests cannot be considered independent tests of the Referential v. Descriptional anaphoric distinction. It might turn out though, that the test results do not perfectly align with the Referential/Descriptional distinction, as it was discovered for the case of the battery of tests used to pinpoint unaccusativity. If this case, of course, one will need to figure out what the tests actually test, if not the Referential/Descriptional distinction. With this caveat, let us proceed to the actual tests and their results.

For ease of exposition, as I introduce the different tests for the Referential vs. Descriptional distinction, I will use only pronominal anaphora (straight E-type) and *one*-anaphora as representatives of Referential and Descriptional anaphora, respectively. In later sections, however, I will examine several other instances of anaphoric elements.

However, I want to make explicit at the outset two generally accepted assumptions that underlie the study of anaphora:

(16) **Assumption on Constituency:** The antecedent of an anaphoric element is a constituent at some level of (syntactic/semantic) representation.

(17) **Assumption on Category:** The (syntactic/semantic) category of an anaphor is identical to that of its antecedent.

These two assumptions are accepted basically as axioms in syntactic and semantic theory nowadays. This is so much so that one of the main tests for establishing a string of words as a (syntactic) constituent is the test of pronominalization combines these two assumptions:

(18) **Pronominalization test for constituency:** If a string of words can act as an antecedent to a pronoun (or another proform), that string of words must be (represented as) a constituent.

I will accept the above two assumptions as basic to the theory of anaphora I will develop in later chapters of this thesis[8]. And now, on to the individual tests.

### 2.2.1. Predicative positions

As mentioned in Section 2.1 already, certain uses of nominal phrases in English are used strictly predicatively, that is, the nominal phrase does not introduce a discourse referent. First of all, what are these predicative positions, as opposed to the referential positions?

[8] One has to bear in mind that, for example, discourse referents basically act as semantic constituents in a Discourse Representation Theory-style (see Kamp & Reyle:1993) representation.

The predicative versus referential contrast is based on the intuition that certain occurrences of a nominal phrase contribute only a predicate to the meaning of a sentence, while in other cases the same nominal phrase introduces a new character to talk about (a discourse marker, cf. Karttunen's discourse referents), in addition to its predicative content. Thus *a superb photographer* in the sentences in (19) acts as a predicative DP, while it acts as a "referential" NP in the sentences in (20):

| | | | |
|---|---|---|---|
| (19) | a. | Marc is *a superb photographer.* | (predicative sentence) |
| | b. | Jane considers James *a superb photographer.* | (complement of V) |
| | c. | He died *a superb photographer.* | (depictive) |
| | d. | They brought Joan up *a superb photographer.* | (resultative) |
| | e. | Eve joined the firm *a superb photographer.* | (free adjunct) |
| | | | /cf. Jackendoff (1977)/ |

| | | | |
|---|---|---|---|
| (20) | a. | *A superb photographer* entered the room. | (subject) |
| | b. | I met *a superb photographer* the other day. | (direct object) |
| | c. | Ian showed *a superb photographer* my photo. | (indirect object) |
| | d. | Kate bumped into *a superb photographer.* | (object of preposition) |
| | e. | I saw *a superb photographer*'s portfolio. | (possessive) |

Languages such as English do not make a morphological distinction between a predicative and a referential DP, they both typically show up with determiners (predicative nominals typically with an indefinite determiner)[9].

From the point of view of anaphoric relations, it follows then that if either the antecedent DP or the anaphor DP is such a strictly predicative DP (i.e. it occurs in a predicative position), the anaphoric link is doomed to be restricted to Description.

Now consider the following examples:

(21) Gal is an experienced *motorcyclist*, but Roni is an even more experienced *one*.

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[9] A number of languages, however, seem to mark this distinction in morphological terms. When a nominal is used predicatively in Hungarian, for example, the determiner of the nominal is dropped, either obligatorily, or it is at least strongly preferred to be dropped.

(i) Kati *(??egy) kiváló fényképész*.
Kate-NOM (an) excellent photographer
'Kate is an excellent photographer.'

(ii) Péter *(?*egy) kiváló fényképésznek* tartja Marit.
Peter-NOM (an) excellent photographer-to hold-PRS-3Sg Mary-ACC
'Peter considers Mari an excellent photographer.'

(iii) Adams *(?*egy) híres fényképészként* halt meg.
Adams-NOM (a) famous photographer-as die-PST-3Sg PERF
'Adams died a famous photographer.'

(iv) *(?*Egy) kiváló fényképésznek* nevelték Andrást.
(an) excellent photographer-to bring up-PST-3Sg Andrew-ACC
'Andrew was brought up an excellent photographer.'

(v) Áron *(?*egy) kiváló fényképészként* lépett be a vállalatba.
Aaron-NOM (an) excellent photographer enter-PST-3Sg in the firm-into
'Aaron joined the firm an excellent photographer.'

(22) Although a lot of people are considered *superb photographers*, I have only managed to meet *one* in my life.

(23) I have only read about *broccoli farmers* in the Utne Reader, although I heard that my cousin Ken supposed to have become *one*.

(21) shows a case where both the antecedent and the anaphor appear in predicative positions, in (22) the antecedent is in predicative position, but not the anaphor, while in (23) the anaphor appears in a predicative position, but not the antecedent. Therefore the *one* appearing in examples (21)-(23) must participate in a Descriptional anaphoric link.

Of course this does not mean that for each instance of *one*-anaphora either the antecedent or the anaphor must appear in a predicative position:

(24) Annette bought a black *hat*, and Carla bought a red *one*.

Even though both the antecedent and the anaphor appear in non-predicative positions, the anaphoric link is clearly not Referential, since the two girls bought different hats.

Compare, however, the above sentences with examples along the same pattern of predicative positions, but containing pronouns instead of *one*:

(25) a. Gal is *the most experienced motorcyclist in his town*, but Roni wants to be *#him/#it*.

b. George was elected president, even though Mike should have been elected *#him/#it/#that*.

(26) I heard that Sharon became *the most famous MRI researcher of her lab*. I hope she's earning as much as *#her/#it*.

(27) a. I want to interview *the mayor of this town*. In fact I heard rumors that a distant relative of mine might have been elected *#him/#it*.

b. Bill started dating *the main soprano of the Met*. Now his old girlfriend got it into her head that she wants to be *#her/#it* too.

Again, (25) shows a case where both the antecedent and the anaphor appear in predicative positions, in (26) the antecedent is in predicative position, but not the anaphor, while in (27) the anaphor appears in a predicative position, but not the antecedent. These examples therefore show that (as a first approximation at least) E-type pronominal anaphora in English does not participate in Descriptional anaphoric links[10].

[10] There are two remarks to be made here. First of all, even though the examples seem to demonstrate that pronouns do not enter into Descriptional anaphoric links, in Csúri (in progress, a) I argue that paycheck pronouns are in fact instances of Descriptional pronominal anaphora. However, throughout this dissertation I will refer to pronominal anaphora as the quintessential Referential anaphora.

The other remark concerns the availability of anaphoric demonstratives in the contexts mentioned. It seems that in English as well as in Hungarian the examples improve considerably if a pronoun is replaced by an anaphoric demonstrative:

To sum up then:

(28) **Test of Predicative Position:** If for an antecedent-anaphor pair [α,β] either α or β or both appear in a predicative position, that instance of the anaphoric link is a Descriptional anaphoric link.

Note, that this formulation of the test classifies only that particular instance of the [α,β] anaphoric link as Descriptional. In other words, this test positively identifies some instances of Descriptional anaphoric links. But in particular, it does not rule out that in a different context the same anaphoric element β might act as a Referential anaphor. Nor does this formulation rule out Descriptional anaphoric links with both the antecedent and the anaphor appearing in non-predicative positions. This scenario can indeed arise as we saw earlier in (24).

Intuitively it is clear what the basis of this test is. Simply, if either of the two given linguistic expressions (namely, one of the antecedent and the anaphor) appears in a position in which no discourse referent is projected for the DP, the anaphoric link

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(i) George was elected president, even though Mike should have been elected *#him/?that.*
(ii) Gal is *the most experienced motorcyclist in his town*, but Roni wants to be *#him/?that.*
(iii) Peter *a szülővárosának leghiresebb szülöttje*, és úgy tudom, János is *#ő/az.*
'Peter is *the most famous son of his hometown*, and I seem to know that John is *him/that* too.'
(iv) Antallt választották meg *elnöknek*, holott Petőt kellett volna megválasztani *#neki/annak.*
'Antall was elected *president*, even though Pető should have been elected *him/that.*'

This, I will claim, shows that, contrary to popular belief, a demonstrative is not necessarily a prototypical referential expression, rather it can be used descriptionally as well, as deictic reference to a description.

obviously cannot involve discourse referents, that is the anaphoric link must be a Descriptional anaphoric link.

### 2.2.2. Number agreement

Another easy test to distinguish Referential and Descriptional anaphora involves the presence or lack of number agreement between the antecedent and the anaphoric expression.

Pronominal anaphora in general agrees with its antecedent in number:

(29) Roni bought a *bike*. Barbara likes to ride *it/#them*.

(30) Roni bought two *bikes*. Barbara likes to ride *#it/them*.

If the antecedent of the pronoun is a singular DP which is not interpreted as a variable bound by a quantified expression, then the pronoun anaphoric on the antecedent will be singular as well, as in (29). Similarly, if the antecedent is a plural DP, the anaphor must be plural also, as in (30).

There is an exception to this generalization, however. Consider examples where the antecedent itself is interpreted as a variable bound by, let us say, a universal quantifier:

(31) Every Harvard student has *a powerful bike*. Barbara likes to ride *#it/them*.

(32) Every Harvard student owns *a powerful bike*. He takes *it/#them* for rides on the weekends.

In (31) the antecedent for *them* is not *a powerful bike*, rather it is the collection of bikes owned by Harvard students. Therefore the apparent number mismatch of the antecedent-anaphor pair is easily explained. On the other hand, (32) exhibits number agreement between the antecedent and the anaphor. This phenomenon, called telescoping, has been studied by Poesio and Zucchi (1992), among others. The reason why we get number agreement between the syntactic antecedent-anaphor pair here is because, `in effect', the universal quantifier is understood to take scope over the whole discourse.

Now turning to *one*-anaphora, it is obvious immediately that there is no obligatory agreement between the two DP's containing *one* and the antecedent of *one*:

(33) Gal bought a red *bike*. Dani wants to buy a blue *one*, but Roni wants two black *ones*.

(34) Gal bought two red *bikes*. Dani wants to buy a yellow *one*, but Roni wants two blue *ones*.

(35) a. Every Harvard student has a powerful *bike*. When Barbara wants to ride *one*, she asks Roni to take her.

b. Every Harvard student has a powerful *bike*. I have only ridden very small *one*s in my life.

(36) a. Every Harvard student has powerful *bike*s. When Barbara wants to ride *one*, she asks Roni to take her.

b. Every Harvard student has powerful *bike*s. I have only ridden very small *one*s in my life.

These examples show all possible scenarios: where the DP containing the antecedent of *one* is singular, and the DP containing the anaphoric *one* is singular or plural; when the DP containing the antecedent of *one* is plural and the DP containing the anaphoric *one* is singular or plural. These scenarios are shown both with indefinite antecedents that are bound by a universal quantifier, and with antecedents that are not.

Let us then formulate our second test to distinguish Referential anaphora from Descriptional anaphora:

(37) **Test of Obligatory Number Agreement:** If for the anaphoric link [α,β] the smallest DP dominating the string β does not obligatorily agree in number with the smallest DP dominating α, then the anaphoric link is Descriptional.

The fact that the DP containing the antecedent of *one* and the DP containing *one* do not have to agree in number of course should come as no surprise. As it is well-known, and as we will discuss it in the next section, *one*-anaphora does not take a full DP as its antecedent, therefore the antecedent is unmarked for number, which is singular as a default in English.

Again, the intuitive foundation of this test is obvious. Descriptions (types) are linguistic entities that have no number marking. That is, for a Descriptional anaphoric link number marking is simply irrelevant. On the other hand, for a Referential anaphoric link, which is in fact established between discourse referents, identity conditions require that the antecedent and the anaphor agree in number. Number agreement between linguistic expressions is simple a syntactic reflection of these essentially semantic requirements. The expression of number, in turn, is intrinsically tied to the notion of extended projections, which is our next test.

### 2.2.3. Extended projections

It is widely accepted that *one*-anaphora takes an antecedent which is smaller than the maximal nominal projection. Based on the assumption that antecedents to anaphoric elements form constituents, Radford (1981) uses *one*-anaphora as evidence to show the need for a projection level between N and full nominal projection:

(38) I like this *very tall girl* better than that *one*. one=very tall girl

Since *one* in (38) substitutes for a string of words that is smaller than an NP, but larger than just a lexical N, we need to introduce a new constituent between N and NP to represent the antecedent of *one*. He calls the syntactic category of *one* N'[11].

Contrast this with the observation that pronouns, as in (39), act as full nominal projections as well as take antecedents that are full projections:

(39) On that day, *the philosopher and naturalist* moved into the cabin that *he* had built on the side of Walden Pond in Concord,... [NYT, 7/5/95]

In the earlier days of generative grammar the relevant projection was an NP, while nowadays pronouns are referred to as pro-DP's.

How can the distinction between the categorial status of *one* and pronouns be formulated in current terminology? In setting up the test to distinguish Referential and Descriptional proforms I will rely on Grimshaw's (1991) definition of extended projections.

[11] Csúri and Johnston (in progress) takes a different tack on this issue. There, in fact, we argue that introducing N' and V' as syntactic categories is a misguided effort to 'syntacticize' differences in the semantic properties of anaphoric relations. That argument, however, does not undermine the maximal projection v. non-maximal projection distinction, and its relevance in diagnosing anaphoric relations as Descriptional or Referential.

Grimshaw (1991) introduced the following notion of **extended projections**, to distinguish them from the **perfect projections** (i.e. traditionally defined, or `unextended' projections) outputted by X-bar theory:

(40) $x$ is the extended head of [a phrase -PC] $y$, and $y$ is an extended projection of $x$ iff:

(a) $y$ dominates $x$;

(b) $y$ and $x$ share all the categorial features;

(c) all nodes intervening between $x$ and $y$ share all categorial features;

(d) if $x$ and $y$ are not in the same perfect projection, the F value of $y$ is higher than the F value of $x$;

where $n$ intervenes $x$ and $y$ if $y$ dominates $x$ and $n$; $n$ dominates $x$, and $n$ does not dominate $y$.

This definition is based on the assumption that N's and D's share their categorial feature, but differ in their value for the F feature, which expresses the functional or lexical nature of the head: N has {0} as the value of its F feature (i.e. it is a non-functional head), while D has {1} as the value for its F feature (i.e. it is a functional head). Similarly, V and I share all features except their F feature: V is specified as {F0}, while I is specified as {F1}. Intuitively, a given projection in a syntactic tree is an extended projection of a head just in case the categories strung along the path leading from the head in question

to the given projection share categorial features all along. With the help of this notion, one can make the distinction between maximal extended projections and those that are not maximally extended as usual.

In Grimshaw's theory therefore, a DP is a maximal extended projection, but an NP or an N' is not. Let us then formulate our test the following way:

(41) **Test of Extended Projections:** If for the anaphoric link [α,β], the antecedent α is not a maximal extended projection, then the anaphoric link between the anaphor and antecedent is a Descriptional anaphoric link.

This test positively identifies certain anaphoric links as Descriptional links. The test also insures that all Referential anaphoric links involve maximal extended projections as antecedents and anaphors[12]. However, it does not claim that all anaphoric links with maximal extended projections as antecedents and anaphors are Referential links. In fact, if all we know is that the antecedent and anaphor are maximal extended projections, the burden of showing whether the given anaphoric link is Referential or Descriptional rests on the remaining tests to decide. Indeed we have seen in Section 2.1 that anaphoric links involving *the same thing* can be Descriptional, even though *the same thing* is syntactically

[12] It is not clear why this should be a priori the case. Nevertheless, one can hypothesize that the canonical realization of discourse markers or discourse referents is that of a maximal extended projection, the same way, let us say, events are canonically realized as IP's. One can conceive of this as a general cognitive strategy. It would be interesting to explore what a relation this strategy would bear to the model interpretive anaphora vs. ellipsis contrast suggested by Sag & Hankamer (1984).

a maximal extended projection. I will further argue in Csúri (in progress, a) that both paycheck pronouns and donkey anaphora are actually instances of non-referential anaphoric links where the antecedent is a full maximal projection. I will claim that paycheck pronouns and donkey anaphora were probably misanalyzed as Referential anaphora **because** they take extended projections as their antecedents; nevertheless they should be analyzed as a special case of Descriptional anaphora. This, however, explains why they were (mis)analyzed as Referential anaphora, or why one is tempted to analyze these instances of pronominal anaphora as Referential.

One further remark is in order here. In setting up the test I used Grimshaw's notion of maximal extended projections instead of the traditional maximal projection vs. non-maximal projection contrast. At this point, both approaches can easily derive the desired contrast between DP's and N's. However, it will become clear in Chapter 5 why the notion of extended projection should be used.[13]

The intuitive basis for this test is again easy to see. In general, only maximal extended projections can have corresponding discourse referents. Anything smaller than a maximal extended projection, therefore has to be a purely descriptional expression. Descriptions, on the other hand, project no corresponding `referential representations'. That is, if in the

[13] As a very short preview, using maximal extended projections in the test renders VP-anaphora (such as *do so*) Descriptional anaphora, while using simply full projections would categorize VP as potentially Referential anaphora. As we will see from other tests though, VP-anaphora clearly behaves as Descriptional anaphora in other respects. That is why I chose the formulation of the test given above in (41) (using extended projections), which would give this unequivocal result. I will return to this question in Section 5.3.

anaphoric link the antecedent or the anaphor is proven to correspond to something smaller than an extended maximal projection, the anaphoric link can only be a Descriptional anaphoric link. On the other hand, when the (linguistic) antecedent and the (linguistic) anaphor are both identified as maximal extended projections, the actual anaphoric relationship might either hold between the descriptions expressed by those projections, or between the discourse referents associated with those maximal extended projections.

### 2.2.4. Accessibility

The next anaphoric test involves issues of accessibility of indefinite antecedents when the antecedent is embedded under negation or a modal operator, and the anaphoric expression does not appear in the scope of the same negative operator, nor does it appear in a context modally subordinated to the context the antecedent appears in. These observations are well-known for cases of pronominal anaphora. But first of all, what is accessibility, and what is modal subordination?

Data concerning the effects of negation and modal operators on the accessibility of antecedents of anaphoric links has been known since at least Karttunen (1976). He discussed this phenomenon under the terminology of short term discourse referents. This topic was later taken up and generalized by Roberts (1987) within the DRT framework centered around the notion of MODAL SUBORDINATION. From the point of view of

anaphora, modal subordination simply stands for the effect that modal contexts exercise on the licitness of anaphoric links. In particular, if a (non-specific) indefinite antecedent is introduced in a non-factual context (e.g., within the scope of a modal operator, or negation), it is INACCESSIBLE for a subsequent pronominal or definite DP anaphor, unless the anaphor appears in a sentence that is a modal continuation of (i.e., is modally subordinated to) the sentence in which the antecedent appeared, or, in the case of negation, if the anaphor appears in the scope of the same negative operator. To be more precise, consider the examples in (42) and (43):

(42) a. If Joe bought *a book*, he'll be home reading it by now.

b. *It*'ll be a murder mystery.

(43) a. If Joe bought *a book*, he'll be home reading it by now.

b. #*It*'s a murder mystery.

(44) a. John managed to find *an apartment*. *The apartment* has a balcony.

b. Bill ventured to ask *a question*. The lecturer answered *it*.

(45) a. John didn't manage to find *an apartment*. #*The apartment* has a balcony.

b. Bill didn't dare to ask *a question*. The lecturer answered #*it*.

In (42) (which is Roberts' ex.4) *a book* is introduced within the scope of a conditional operator. Because of the presence of Future Tense in (42b), it is interpreted as continuing the conditional modal context induced by *if*. Given this the antecedent clause of (42a) is part of the common ground (or presupposed material) for (42b). On the other hand, when the second sentence introduces factive mood, as in (43) (which is Roberts' ex.3), the picture looks different. Even though the conditional itself (43a) is presupposed (part of the common ground), its antecedent clause is not presupposed. Therefore the existence of *a book* is not presupposed (not part of the common ground for (43b)), and pronominal anaphoric reference to it is illicit.

Similar facts hold for negation, as illustrated by the contrasts between (44) and (45), taken from Karttunen (1976). If a (non-specific) indefinite, such as *an apartment* in (44a), is introduced in an affirmative context, it is available for anaphoric reference by a definite description later in the discourse. On the other hand, if the non-specific indefinite is introduced in the scope of negation, as in (45a), it is unavailable as an antecedent for an anaphoric definite description from a subsequent declarative sentence as well, because the existence of an apartment is not presupposed. The contrast between (44b) and (45b) thus shows the inaccessibility effect of negation for the case of pronominal anaphora. Nevertheless, if the antecedent-anaphor pair appear within the scope of the same negative operator the intended anaphoric reference is licit:

(46) a. John didn't manage to find *an apartment* and buy *the apartment* the same day.

b. Bill didn't dare to ask *a highly sensitive question* and insist on an answer for *it*.

Other contexts that exhibit similar inaccessibility effects include modal verbs, explicit modal operators such as *possible*, future tense, etc. But to sum up for now, examples (42)-(45) therefore show that pronominal anaphora (as well as definite DP anaphora) exhibits inaccessibility effects.

Contrast the examples above with those in (47)-(50), which involve *one*-anaphora:

(47) a. If Joe bought *a book* at Wordsworth, he'll be home reading *it* by now.

b. *He*'ll buy the next *one* at Barnes and Noble.

(48) a. If Joe bought *a book* today, he'll be home reading it by now.

b. He went to buy *one* at Wordsworth today.

(49) a. John managed to find *a new apartment. The one he has had for the last four years* has no bathtub.

b. Bill ventured to ask *a question.* He really had to muster his courage to come up with *one*.

(50) a. John didn't manage to find *an apartment. The one he has had for the last four years* has no bathtub.

b. Bill didn't dare to answer a single *question* in class, although the lecturer keeps asking easy *ones* in order to encourage class participation.

One-anaphora, as these examples demonstrate, does **not** show inaccessibility effects: Whether the antecedent of *one* appears inside the scope of the same modal operator (if any) as the anaphor (e.g., in (47)) or not (e.g., in (48)), the anaphoric link is still felicitous[14]. The same holds for the contrasting environments of (49) and (50), which shows the accessibility of the antecedent from inside negation.

Based on these observations we can formulate the following test:

(51) **Test of Accessibility:** An anaphoric link between the antecedent $\alpha$ and anaphor $\beta$ is a Referential link if it shows inaccessibility effects when the antecedent is embedded under negation or modal operator, while the anaphor is not embedded under the same operator. Otherwise, the link is a Descriptional anaphoric link.

Intuitively this test states the following: Discourse referents are set up with regards to modal contexts. They are only accessible inasmuch as the anaphor appears in a context or world in which the discourse referents is supposed to exist. Descriptions, on the other

[14] Here I argue that the modal structure of the discourse does not constrain *one*-anaphora in any way. For a suggestion that modality might pose certain restrictions on *one* see Merchant (1994).

hand, are accessible without regards to any possible worlds. Simply mentioning a description in the discourse makes it available as the antecedent of a later anaphoric reference, irrespective of the (modal) context in which the antecedent description and the anaphor appear in.

To hint at things to come, notice that the data supporting this test already forecasts the important conclusion, that Referential and Descriptional anaphora have to be treated differently in any framework, no matter what the representation of the embedding contexts is. But for the moment let us turn to the next test.

### 2.2.5. E-type readings

The fifth test in line concerns the availability of E-type and non-E-type readings for an anaphoric element.

First of all, what do we call an E-type reading? Evans (1980) lists four distinct types of pronouns:

(i) deictic pronouns:

(52) He's up early.

(ii) pronouns co-referential with a referring expression:

(53) John loves his mother.

(iii) bound pronouns:

(54) Every man loves his mother.

(iv) E-type pronouns:

(55) *Few MPs* came to the party but *they* had a good time.

(56) *Few congressmen* admire Kennedy, and *they* are very junior.

(57) John owns *some sheep* and Harry vaccinates *them* in the spring.

As Evans explicates it, E-type pronouns cannot be collapsed into any of the other three types. E-type pronouns behave neither like deictic pronouns, nor like bound pronouns or pronouns co-referential with referring expressions. In particular, as (58)-(61) show, pronouns co-referential with referring expressions can be substituted by a copy of their construed antecedent without a change in interpretation[15]:

[15] Of course this is only true modulo Grice's (1975) Conversational Maxims and the restrictions imposed by the Binding Principles of the grammar.

(58) *The spider plant in the shop window* was outrageously expensive. Still, I decided to buy *it* anyway.

(59) *The spider plant in the shop window* was outrageously expensive. Still, I decided to buy *the spider plant in the shop window* anyway.

(60) I thought *Chris* gave a brilliant job talk. Two weeks later *he* was indeed offered the job.

(61) I thought *Chris* gave a brilliant job talk. Two weeks later *Chris* was indeed offered the job.

E-type pronouns, however, exhibit an obvious change in meaning with a similar substitution:

(62) *Few MPs* came to the party but *few MPs* had a good time.

(63) *Few congressmen* admire Kennedy, and *few congressmen* are very junior.

(64) John owns *some sheep* and Harry vaccinates *some sheep* in the spring.

Instead of simply referring to `objects' evoked by their antecedents, E-type pronouns seem to refer to all the `objects' that verify the clause containing the construed antecedent. Accordingly, E-type pronouns can be substituted by a definite description in the following manner without a change in interpretation:

(65) **Construction algorithm for paraphrase of E-type reading of a pronoun:**

(i) take the description (i.e., common nouns) of the construed antecedent;

(ii) turn rest of the clause (i.e., clause minus DP) into a relative clause with the description as its head;

(iii) add all the modifiers (adjectives, PP's, relative clauses, etc.) and quantifiers of the construed antecedent;

(iv) to substitute for the definiteness of the pronoun, stick *the* as the determiner of the paraphrase.

For (55)-(57) this construction method gives the paraphrases below:

(66) *Few MPs* came to the party but *the few MPs that came to the party* had a good time.

(67) *Few congressmen* admire Kennedy, and *the few congressmen that admire Kennedy* are very junior.

(68) John owns *some sheep* and Harry vaccinates *the sheep John owns* in the spring.

Such a paraphrase substitution does not affect the meaning of a given sentence.

Let us now consider examples with *one*-anaphora now:

(69) Jill went to a *photography exhibit* yesterday. I went to *one* today.

(70) Michael likes color *photographs*, but Mariano prefers black-and white *ones*.

(71) I have already seen five Norwegian *plays*, but I have never seen a single Portuguese *one*.

In all of the examples with *one*-anaphora, *one* is construed as anaphorical on the italicized nominal projection, and every instance of *one* can be replaced by that nominal projection:

(72) Jill went to a *photography exhibit* yesterday. I went to *a photography exhibit* today.

(73) Michael likes color *photographs*, but Mariano prefers black-and white *photographs*.

(74) I have already seen five Norwegian *plays*, but I have never seen a single Portuguese *play*.

In this respect then the antecedent of *one* in each case behaves like a referring phrase: the antecedent can literally substitute for *one*, similarly to what we saw in (58)-(61) for the case of referring phrases and pronouns anaphoric on them.

More importantly, however, let us try an E-type substitution for instances of *one*. What would be the equivalent of an E-type reading for *one*? Parallel to the paraphrases given for (definite) pronouns, try the following construction algorithm:

(75) **Construction algorithm for paraphrase of E-type reading of *one*:**

(i) take the description (i.e., common nouns) of the construed antecedent;

(ii) turn rest of the clause (i.e., clause minus DP) into a relative clause with the description as its head;

(iii) optionally, add all those modifiers of the construed antecedent (adjectives, PP's, relative clauses, etc.) which do not contrast with modifiers of the anaphoric *one*[16];

(iv) to substitute for the indefiniteness of *one*, stick *a* or ∅ as the determiner of the paraphrase, depending on the number of the DP containing the anaphoric *one*, unless the DP containing the anaphoric *one* bears the definite article.

[16] Since *one* can never substitute for a quantifier, I did not include that in the proposed E-type paraphrase here.

This algorithm would give us the following intended paraphrases for (69)-(71):

(76) Jill went to a *photography exhibit* yesterday. I went to *a photography exhibit that Jill went to* today.

(77) Michael likes color *photographs*, but Mariano prefers black-and white *photographs that Michael likes.*

(78) I have already seen five Norwegian *plays*, but I have never seen a single Portuguese *play that I have already seen.*

These sentences are obviously not appropriate paraphrases of the original sentences in (69)-(71), with (78) actually resulting in a contradictory sentence[17]. From this I conclude that *one*-anaphora does not allow for E-type readings constructed in the proposed way.

[17] In the following example *one* seems to accept an E-type reading in addition to a straight non-E-type reading:

(i) Jill went to three *photography exhibits* last week. I am going to *one* tomorrow.

That is, *one* could be understood as standing for *photography exhibit that Jill went to last week*. Such a reading is apparently not expected to arise with *one*-anaphora under the assumptions that I am making. However, I will also assume that such a reading is due to the contextual restriction on the universe. In particular, an E-type reading (which is actually here identical to a partitive reading) arises if the universe of discourse is understood to be restricted or narrowed down by the first sentence to only the photography exhibits that Jill visited last week, instead of talking about any photography exhibit in general.

This way we get a further contrast between Referential and Descriptional anaphora, as represented by pronominal and *one*-anaphora, which leads to the formulation of a new test for the Referential v. Descriptional distinction:

(79) **Test of E-type readings:** If the anaphor β of the anaphoric link [α,β] accepts an E-type paraphrase as defined by the appropriate construction algorithms above, the anaphoric link is Referential. Otherwise the anaphoric link is Descriptional.

This test, again, positively identifies Referential anaphora, and leaves Descriptional anaphora as the `elsewhere' case of the condition.

Again, just to say a couple of words about the intuitive grounding of this test. As discourse referents are introduced into the discourse with indefinite descriptions, the indefinite description does not anchor a suitable discourse referent alone, rather with the help of the description available in the rest of the sentence. Hence the E-type reading of the anaphoric elements, which in fact `reactivates' the discourse referents introduced by the indefinite with the help of its sentential context. Descriptions, on the other hand, are introduced into the discourse on their own right, as descriptions, without essential interference from its sentential context, and without relying on introducing a discourse referent. Thus the anaphoric element reactivating the descriptional antecedent will not register the effect of its antecedent in the sense that the anaphor will not be interpreted as an E-type anaphoric expression.

### 2.2.6. Bound variable readings

The previous section showed how *one*-anaphora (Descriptional anaphora) differs from E-type readings of pronominal anaphora (Referential anaphora). The coming section examines the differences between *one*-anaphora and another reading of pronouns, namely the bound variable reading. For this, consider the following examples:

(80) *An old woman in a black hat* insisted that one of the young writers be introduced to *her* that night, as did a man with a champagne glass.

(81) It's amazing how vain men at my company are. After the director announced that Cindy Crawford accepted the invitation to our annual Christmas Party, *every guy* was convinced that *he* should be her date for the party.

(82) The publisher of *each national bestseller* boasts that they reaped a large profit from *it*, as does the publisher of each popular magazine.

These examples show two environments which make bound instances of pronouns are easily detectable: VP-ellipsis environments that reveal sloppy identity readings, and pronouns bound by a quantified DP. In all three examples the intended reading is the bound variable reading. For (80) then, the intended reading is the so-called sloppy

identity, where the man with the champagne glass insisted that one of the young writers be introduced to him, as opposed to the strict reading, in which the man with the champagne glass would also have insisted that one of the young writers be introduced to the woman in the black hat. In (81) the intended reading is that where the reference of the pronoun *him* `co-varies' with the choice of the person insisting, that is the reading under which each of the guys insisted that he himself, and none else was supposed to be Cindy Crawford's escort for the night. Both in (80) and (81) the antecedent of the pronoun is outside the governing category of the pronoun. Finally, (82) gives an example where the pronoun again co-varies with the choice of the bestseller we are talking about, that is the publisher of each bestseller reaped a large profit from the one bestseller it published. In addition to the co-variance, the bound variable reading is in this case also made explicit by the VP-elided clause. Notice that in this instance the pronoun is not c-commanded by its (intended) antecedent.

Contrast these examples with the following examples containing *one*-anaphora:

(83) An old *woman* in the black hat insisted that a younger *one* be introduced to her that night, as did an old man with a champagne glass.

(84) It's amazing how much people are unable to step out of their professional lives. Every *senior lawyer* I invited brought another *one* to the party, as did every senior accountant.

(85) The publisher of each national *bestseller* wants to make sure that they get the publishing rights for the next *one*, as does the publisher of every popular magazine.

The intended bound reading for (83) is the reading where the old woman wanted to be introduced to a younger woman (possibly with a black hat), and the old man with the champagne glass wanted to be introduced to a younger man (possibly with a champagne glass). For (84), the intended reading I am interested in is again the bound reading which unravels as 'Every senior lawyer I invited brought a younger lawyer, and every senior accountant brought a younger accountant'[18]. Finally, the intended reading for (85) is the reading under which the publisher of every popular magazine wants to assure that they

[18] For the example (84) I needed to add VP-ellipsis to clarify what the intended bound variable reading is. Notice the following example:

(i) It's amazing how much people are unable to step out of their professional lives. Every senior *lawyer* I invited brought a young *one* to the party.

This example, apparently, has a bound variable reading, namely the reading under which every senior lawyer brought along a different young lawyer to the party. What is crucial for the argument here is that the bound interpretation here is not due to a binding of Descriptional anaphora, namely the binding of *one* to *lawyer*. Rather, the bound interpretation is due to the universal quantifier taking scope over the existential quantifier of the indefinite. If *one* was indeed bound in this case, sloppy identity would show up with (84). The fact that the binding in (i) is not due to the binding of *one* is further corroborated by the following example, which contains *one*-anaphora inside a definite:

(ii) It's amazing how much people are unable to step out of their professional lives. The top *lawyer* of the company brought the second *one* in seniority to the party, [as did the most senior accountant].

This sentence again, obviously lacks a bound variable interpretation for *one*, whether the elliptic clause is added or not.

get publishing rights over the next popular magazine. In all three cases the intended bound readings are unacceptable[19].

But what can be the reason for the unacceptability of the bound readings with *one*? A good first guess is to say that maybe *one* in the above examples violates one of the three Binding Principles of the Binding Theory, the same way as we get a Binding Principle B violation with a regular pronoun whose intended antecedent is inside the governing category of the pronoun:

(86) *The old woman in the black hat*$_i$ admires *her*$_{*i/j}$.

But be it a good first guess or not, we can quickly prove the unacceptability of (83)-(85) is not due to a Binding Principle violation. Let us see why. The examples in (87)-(89) below show a full array of syntactic positions, from the point of view of possible anaphoric behavior: (87) gives an example where *one* can be felicitously replaced by a reflexive (which falls under Principle A), in (88) *one* can be licitly replaced by a pronoun (which falls under Principle B), while in (89) *one* can be replaced by an R-expression (which falls under Principle C):

[19] It is actually not clear if the strict readings are available for the given sentences. The least one can say is that the strict reading is heavily dependent on pragmatic factors. Some people, however, find such examples altogether unintelligible, whether the strict or sloppy reading is considered.

(87) It's amazing how much people are unable to step out of their professional lives. *Every senior lawyer* I invited brought only *himself* to the party, as did every senior accountant.

(88) *An old woman in a black hat* insisted that *she* be introduced to the guest of honor, as did a man with a champagne glass.

(89) It's amazing how much people are unable to step out of their professional lives. *Every senior lawyer* I invited brought only *the smartest lawyer* to the party, as did every senior accountant.

That is, to account for the behavior of *one* in terms of the Binding Principles we would need to assume that *one* must simultaneously violate all three Principles of the Binding Theory. This boils down to the conclusion that *one* cannot be accommodated to any of the three anaphoric types that we know of for the case of English. Rather, we must conclude that *one* simply cannot occur with a bound variable reading[20]. The sentences

[20] I want to make a precautionary note here: Even though the bound variable reading is unacceptable in the examples I gave in this section, certain modifications to a sentence can probably make the bound reading available. For example, even if a bound variable reading is unavailable in an episodic sentence such as (i), still, a generic sentence with the same structure (cf ex.ii) seems to accept the bound variable reading more readily:

(i) Last month an old, well-established *writer* went on a publicity tour with a young, but very talented *one*, and so did a famous distinguished singer.
/intended reading: #writer toured with writer, singer toured with singer/

(ii) Old, well-established *writers* always like to go on publicity tours with younger *ones*, as do many famous, distinguished singers.
/intended reading: ?writers tour with writers, singers tour with singers/

in (83)-(85) therefore show that *one*-anaphora, our representative for Descriptional anaphora, cannot have bound occurrences no matter whether the intended antecedent is contained in a referential expression or in a quantificational expression. On the other hand, earlier we saw examples of pronouns accepting bound variable interpretations in the exact same environments. Given that pronominal anaphora is our example for Referential anaphora, we derive the following contrast and test concerning bound readings:

(90) **Test of Bound Variable Readings:** If for the anaphoric link [α,β] the antecedent α cannot receive a bound variable interpretation in any of the appropriate environment (under VP-ellipsis, for example), then the anaphoric link is a Descriptional anaphoric link. Otherwise the anaphoric link is a Referential anaphoric link[21].

Since this was our last test to distinguish the two anaphoric types, a short summary is in order.

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We will further see more examples in Section 5.3 which show that certain instances of VP-anaphora can also receive a bound variable interpretation.

[21] This test is formulated so that the lack of bound variable readings signals that the anaphoric link is Descriptional. I chose this implicational direction in the formulation of the present test because of the questionable data included in the previous footnote. If it is indeed true that *one*-anaphora and sometimes VP-anaphora can get a bound variable reading, then it would not be true that every anaphoric relation accepting a bound variable reading is a Referential anaphoric relation.

## 2.3. Summary of tests

Based on the contrast between pronominal anaphora and *one*-anaphora I have provided six tests that can tell Referential and Descriptional anaphora apart:

(91)

| Anaphoric type \ Diagnostic test \ | **Referential anaphora** | **Descriptional anaphora** |
|---|---|---|
| Can appear in predicative positions | NO | YES |
| Number agreement between antecedent and anaphor obligatory | YES | NO |
| Non-maximal extended projection can act as antecedent | NO | YES |
| Shows inaccessibility effects if antecedent is embedded under negation or modal | YES | NO |
| Accepts E-type readings | YES | NO |
| Accepts a bound variable reading | YES | NO |

The main point to stress again is that even though *one*-anaphora, for example, is always Descriptional anaphora, not every linguistic expression can be uniquely categorized as participating only in one of the two types of anaphora. We saw in Section 2.1 that the same linguistic expression (*the same thing*, etc.) with the same syntactic antecedent can show two different readings, one of which seems to be a Referential reading, while the other is a Descriptional reading[22]. That is, we cannot always say that all appearances of an anaphoric expression β is, for example, Referential. Neither can we say that all appearances of the anaphoric link [α,β] are, for example, Referential. The only thing we can surely say is whether a certain instance of anaphoric link [α,β] is Referential or not. This is what the tests summarized above can help us decide.

[22] I will discuss this in detail in Chapter 3. There I will show how the tests can reveal the double nature of expressions such as *the same thing*.

## CHAPTER 3: Tiers and anaphora

In the previous chapter we have seen plenty of evidence for the distinction between Referential anaphora and Descriptional anaphora: the two anaphoric types clearly have different accessibility conditions. The question is, how does one explain the difference? There are two obvious ways to attack such a problem:

i) one can impose different well-formedness conditions on the two different types of anaphoric links, while maintaining a single, uniform representation of their antecedents and anaphors;

ii) one can give a representation in which the different accessibility conditions are a result of the different representation of the two anaphoric types.

The following sections and chapters of this dissertation explore the latter of the two possibilities. In particular, I will claim that the split between Referential and Descriptional anaphora is inherent to the semantic representation of nominal phrases. This approach to anaphora is in sharp contrast with the assumptions made by advocates of Transformational Generative Grammar (Chomsky:1957 and later developments), who regard anaphora as a phenomenon describable in strictly syntactical terms and tools. To this end, I introduce two parallel representational levels (Referential and Descriptional

Tiers) in the remainder of this chapter as the representation of nominal phrases. Chapter 5 will expand the representation to events and discourses.

In the split representation of nominal phrases the two tiers have the following role: The Referential Tier houses the discourse referent introduced by a nominal phrase, if any, while the Descriptional Tier contains the descriptive material that the nominal introduces. These two levels of DP-representation then induce a split in the representation of discourse phenomena such as anaphora. Both levels will host anaphoric links, and a given anaphoric link will behave as Referential or Descriptional anaphora depending on which of the two levels is implicated.

The present chapter answers the following preliminary questions: What minimum of information must be given in each of the two representational levels? What is the basic relationship between the two levels? Can one of the two levels be derived from the other? In particular, can the Referential level be derived from the information given on the Descriptional level?

To begin answering these questions, I have to start with reviewing the representation proposed for basic DP types.

### 3.1. Representation of basic DP types

As mentioned earlier (cf. Section 2.2.1) predicative and referential occurrences of DP's differ in their impact on discourse, even though they show the same syntactic composition in English. To be more precise, the predicative occurrence of a DP such as *a feminist* in (1) only introduces descriptive material, namely a predicate, into the discourse, but it does not introduce a new discourse referent. For a first approximation in a two-level representation we can represent predicative DP's schematically the following way:

(1) Anne is *a feminist.*

(2)

| Syntax | *a feminist* |
|---|---|
| Descriptional Tier (DT) | X |
| Referential Tier (RT) | |

In this representation there is no referential representation attached to the descriptional representation of the DP.

On the other hand, prototypical referential DP's (definite descriptions and specific indefinites) such as those in (3) and (4), as well as indefinites in referential positions and environments such as in (5), do introduce both descriptional content and a discourse

referent into the discourse. Therefore, such DP's will have a representation on both levels:

(3) I never got to talk to *thas guy from Albania* last night. (unstressed *thas*)

(4) Do you know *the man with the toupee*?

(5) Jim met *a feminist* at the Washington rally last week.

(6)

| Syntax | *the man with the toupee* |
|---|---|
| DT | X |
| RT | x |

Are there any DP's which, in turn, have a representation on the Referential Tier only, but not on the Descriptional Tier? There are a couple of candidates for such a representation. The most likely such elements would be empty categories posited by Transformational Generative Grammar, as represented in Chomsky (1981), for example. If you believe in the existence of such empty categories, *PRO* and *pro* are elements without phonetic form (and therefore no descriptional content), although they show referential properties similar to those of regular pronouns. Therefore they would have no representation on the Descriptional Tier, rather they would only show up on the Referential Tier.

Another good approximation of an element without a representation on the DT would be deictics, or more precisely, deictic uses of pronouns:

(7) *That one* [pointing] will have to go.

(8) *He* [pointing] shouldn't be here.

Although deictic pronouns do have some descriptional content (animacy, gender, number, etc.), they contain the minimal description possible. The deictic gesture itself, such as pointing, picks out the character to be discussed, and the pronoun reflects the grammatically relevant properties of that character. Still, for the purposes of this thesis I will represent deictic uses of pronouns similarly to other uses of pronouns:

(9)

| Syntax | *he* |
|---|---|
| DT | X |
| RT | x |

To return to the examples in (3)-(5), we must ask what the relationship is between the two representational levels when both levels contain some form of information? First of all, notice that the environment of the DP can determine whether a discourse referent is introduced by that DP, that is whether the DP has a corresponding representation on the

Referential Tier or not. Certain verbs such as *seem*, *look*, etc., take only predicative DP's, while others such as *buy*, *look at*, etc. take DP's that (can) introduce discourse referents. Furthermore, the same indefinite DP's that introduce discourse referents in affirmative contexts with verbs like *buy*, *look at*, etc., fail to introduce a discourse referent that would be available for anaphoric reference if they appear in a negative context. Since at this point I constrain the discussion to nominal expressions, and verbs and modal contexts are not included in the representation, we cannot address these questions adequately at this point. However, I will return to these questions in Chapters 5-7.

When the position in which the DP appears forces it to project a representation on both levels, we still have to ask what sort of representation is projected, and how are the two levels connected. Here I propose that the Descriptional Tier contains a type, indicated by capitalizing the corresponding predicate: *FEMINIST*, *BOOK*, etc[1]. The Referential Tier contains the discourse referent introduced by the DP, which is represented by a variable (as has been customary since the advent of Heim's (1982) File Change Semantics and Kamp's (1981) Discourse Representation Theory). The two levels, DT and RT are further connected by the instantiation relation, which I indicate as co-indexation of the elements of the two levels:

[1] In building up the DT I adopt a version of Jackendoff's Conceptual Structure representation to express modification relation (see Jackendoff:1983) by listing the modifiers of the head of a phrase underneath the head itself.

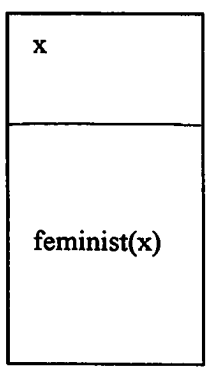
(10)

| Syntax | *a feminist* |
|---|---|
| DT | $\text{FEMINIST}_1$ |
| RT | $x_1$ |

The co-indexation is meant to express the intuition that the character introduced by the discourse referent *x* is an instantiation of the type *FEMINIST*. This serves to distinguish the instantiation relationship from argument-taking, which I will express with functional application of predicates to variables.

In a DRT representation (10) would look like this:

(11)




That is, the instantiation relationship basically takes over the role of the DRS condition *feminist(x)*, which appears in the body of the DRS. For now, let us leave our discussion of the instantiation relation at this level of informality; we will return to it in Section 6.1.3 in more detail.

Of course, information about the definiteness of the description should eventually also be encoded in the representation. However, in this thesis, as a rule, I will only be considering singular predicates for the sake of simplicity and clarity. Without considering in any more detail the exact form of the two representational levels take, let us turn to the advantages of such a split representation in the treatment of anaphora.

### 3.2. Anaphora in tiers

The separation of the two tiers now allows us to introduce anaphoric links on either or both of the two levels: an anaphoric expression might refer back to a previous element on either of the two levels. Representing the anaphoric link on a given level with an arrow pointing towards the antecedent, we get the following diagrams for the combinatorial possibilities [the x's are simply position holders, they stand for some overt representation at the given level]:

(12) a.

| | | |
|---|---|---|
| DT | X <— | X |
| RT | | |

b.

| | | |
|---|---|---|
| DT | X <— | X |
| | | x |

c.

| | | |
|---|---|---|
| DT | X <— | X |
| RT | x | |

d.

| | | |
|---|---|---|
| DT | X <— | X |
| RT | x | x |

e. DT X <— X

RT x <— x

f. DT X X

RT x <— x

g. ? DT X

RT x <— x

h. ? DT X

RT x <— x

i. ? DT

RT x <— x

Some of the above diagrams, although formally admissible, might not have corresponding linguistic manifestations. For example, the diagram in (i) does not include a descriptional representation for either the intended antecedent or the intended anaphor, both of them lack an overt syntactic equivalent. Even if such a relation is viable as a linguistic anaphoric relationship (such as between *pro* elements), I will not discuss them any further. Rather, in what follows I will only talk about anaphoric elements and relations where both antecedent and anaphor have overt phonetic form, and therefore overt descriptional content, even if only restricted to grammatical features.

Anaphoric links constrained to the RT, as in (12.f), will be the representation of Referential anaphors (or R-anaphors for short), while anaphoric links relegated to working exclusively inside the DT will be straight Descriptional anaphors (or D-anaphors for short), as in (12.a-c). The relevant portion of the diagrams for R-anaphoric and D-

anaphoric links will thus fall into the following schemata, respectively, ignoring the contents of the other representational level for the moment:

(13) **Descriptional anaphora** (D-anaphora)

DT X <——— X

RT

(14) **Referential anaphora** (R-anaphora)

DT

RT x <——— x

(13) will be exemplified by diagrams (12.a-d), while (14) will be represented by diagram (12.f). In turn, diagram (12.e) represents a mixed anaphoric type, which involves both a Descriptional and a Referential anaphoric link. In what follows I give examples for each of these three anaphoric types. Since I committed myself to only talking about anaphoric elements with syntactically overt realization for now, I will not be discussing diagrams (12.g-i) any further.

The question that immediately arises when looking at this diagram is of course how the arrows connecting the elements of a given tier should be interpreted. Without giving a formal semantical interpretation for these let me put forth the following.

In terms of the Descriptional Tier the anaphoric arrow simply boils down to a copying of the descriptive material from the antecedent over to the anaphoric expression. Imagine that the anaphoric expression is simply substituted for by another copy of its antecedent.

In the context of the Referential Tier, the arrow will be interpreted as a condition on embedding the discourse referents into a model. Imagine that the RT is given a Discourse Representation Theory-style structure and interpretation (cf. Kamp & Reyle:1993). In these terms then, the arrow means that the two discourse referents connected via an arrow should be mapped onto the same individual in the universe of the model that we are embedding our discourse into. With these preliminaries, let us delve into a more detailed elaboration of the Descriptional Tier.

### 3.2.1. D-anaphora and tiers

This section briefly looks at the representation of D-anaphora, through two representatives: *one*-anaphora and the anaphoric *the same thing/the same X*.

### 3.2.1.1. Representing *one*-anaphora

First consider the following example:

(15) We considered Dan an *idiot*. Later we found out that George was *one* too.

Since both indefinites are used predicatively, neither of them has a representation on the Referential Tier[2]. Both the antecedent and the anaphor are non-maximal projections within their respective DP's, that is the anaphor takes a descriptional constituent as its antecedent:

| (16) | Syntax | *an idiot* | | *one* |
|---|---|---|---|---|
| | DT | IDIOT | <— | ONE |
| | RT | | | |

We know that all cases of *one*-anaphora are Descriptional anaphora; it is only for the sake of clarity that the relevant indefinites in (16) were both obviously non-referential. But how do we represent cases of D-anaphora where either the antecedent and anaphor have

[2] Of course ideally one would have to account for the fact that a predicative DP serves as a predicate which predicates something of a character (discourse referent) mentioned in the discourse. Deriving this involves discussion of the finer details of the mechanism of argument taking and predication. Since this is beyond the goals of this thesis, presently I simply assume that this effect can be derived by embedding the DT/RT representation in a suitable theory of argument taking.

a representation on the RT, without the referent participating in the anaphoric process. For this consider the following:

(17) Jill wants to become a *belly dancer*, even though she is the daughter of a very famous *one*, and knows how hard a profession it is.

(18) Kate is good friends with a *belly dancer*. Her sister Jill actually wants to be *one*.

(19) Kate is good friends with a *belly dancer*. What's more, her sister Jill shares an apartment with *one*.

The given intended anaphoric links exemplify diagrams (20.a-c) in that order, which correspond to (12.b-d) respectively:

(20) a.

| Syntax | *a belly dancer* | | *one* |
|---|---|---|---|
| DT | BELLY DANCER | <— | $ONE_1$ |
| RT | | | $x_1$ |

| | | | | |
|---|---|---|---|---|
| b. | Syntax | *a belly dancer* | | *one* |
| | DT | BELLY DANCER$_1$ | <— | ONE |
| | RT | $x_1$ | | |
| c. | Syntax | *a belly dancer* | | *one* |
| | DT | BELLY DANCER$_1$ | <— | ONE$_2$ |
| | RT | $x_1$ | | $y_2$ |

Notice that this representation already derives important properties of *one*-anaphora. In particular, take the observation that the discourse referents introduced by the DP's containing the antecedent and the anaphor (if any) are not implicated in the anaphoric relation:

(21) Kate is very good friends with a *belly dancer.* What's more, Jill shares an apartment with *one*. Both of *them* are originally from well-to-do Turkish families. /them = the two belly dancers/

As the possibility of using a plural pronoun in (21) shows, two independent discourse referents must be available for the two DP's containing the antecedent and the anaphor. This property of *one*-anaphora is indeed expressed in the representation in (20.c), since

the type *BELLY DANCER* has two independent instantiations (two independent discourse referents) on the RT: one arising as the instantiation of the antecedent, and another one arising as the instantiation of the anaphor. For completeness' sake, at some point we will have to account for how exactly these discourse referents arise for the indefinite antecedent and anaphor. Since the explanation I give crucially relies on the behavior of events, I will not attempt to answer that question now. That will be the topic of Chapter 6. For the moment let us turn to the representation of other instances of D-anaphora.

### 3.2.1.2. *The same thing/the same X*

Another, less known type of D-anaphora is provided by the following sentences:

(22) Ray bought *a funny little gadget* to operate his train. Joan got so excited that she bought *the same thing* for Michael and Chris.

(23) Emile showed up in *a leather jacket* at the movies. By sheer coincidence, Steve was wearing *the same thing* as well.

(24) Federica brought *a ham sandwich with pickles* for lunch today. Michael brought *the same sandwich* as well.

As mentioned in Section 2.1.5., it is obvious that in the sentences above *the same thing/the same X* is not anaphoric on the token or discourse referent introduced by its antecedent: Federica and Michael could not have brought the same physical token of sandwich to lunch[3], but they both brought sandwiches that fit the same description, namely the description of *ham sandwich with pickles*. Thus *the same sandwich* in has to refer back to the description *HAM SANDWICH WITH PICKLES*. Similarly for (23), both Emile and Steve were wearing something that fits the description *leather jacket*; but they were not wearing the same physical objects, since they do not share their wardrobe, and would not be able to wear the same actual jacket at the same time.

Given this intuition, we have to see how this interpretation of *the same thing* fares with respect to the tests I proposed in Section 2.2. First consider the Test of Predicative Position:

(25) Beth realized how much money Elyse was making being *a musician*. She decided not to become *the same thing*.

[3] Of course whether we get a D-anaphoric or R-anaphoric reading with the anaphoric expression *the same thing* is heavily dependent on the context the DP appears in as well as on pragmatic factors. These factors include the verb whose argument *the same thing* is, whether the subjects are the same, whether the two eventualities expressed by the two clauses are contemporary, whether the action in question can be performed on the same token object repeatedly or simultaneously, etc. I do not intend to explore this question in any detail here other than using examples with pragmatics conducive to the reading to be examined.

(26) Giovanni has been always impressed by the *painter* living upstairs from him. So much so that he decided to become *the same thing.*

According to this test *the same thing* qualifies as D-anaphora, since it can be anaphoric on an antecedent appearing in a predicative position.

The Test of Obligatory Number Agreement yields the same verdict:

(27) For the last ten years Giovanni has been hanging out with *painters* all the time. Finally he decided to become *the same thing* himself.

(28) Károly got three *books* for his graduation. Attila got *the same thing.*
/the same thing = book or three books/

(29) Every kid brought a *bouquet of flowers* for Fathers' Day. Bill bought *the same thing* for his mother's birthday.

The expression *the same thing* can disagree with (the DP containing) its antecedent in number as in (27), it can optionally agree with it as in (28). Furthermore, unlike pronominal anaphora, it does not have to show plural agreement when its antecedent is (contained in) a bound indefinite.

The above examples already provide enough evidence for the third test, the Test of Extended Projection. *The same thing* can apparently take a non-maximal projection as its antecedent as in (26) and in (27). For the case of (26) the argument is particularly clear: Giovanni did **not** decide to become *the painter living upstairs from him*, simply he decided to become a painter. That is, *the same thing* under this reading again passes as D-anaphora, since it can take a non-maximal extended projection as its antecedent.

As far as the Test of Accessibility is concerned, take a look at the following:

(30) Tamar wants to build *a 20HP engine* from scratch. I don't know why she bothers, she could buy *the same damn thing* for $20 already assembled at Sears.

(31) If Kai decides to get *a 5-jet jacuzzi* for his house, he will ask Andreas which brand to get. Andreas had *the same thing* installed just last week, and he's happy as a clam with it.

These two examples show that under its Descriptional reading *the same thing* can take antecedents embedded in a modal context (such as the intensional verb *want* or the conditional) even though the context in which the anaphoric *the same thing* appears is not

modally subordinated to those contexts[4]. That is, the relevant reading of *the same thing* is classified as a D-anaphor according to the Test of Accessibility as well.

The Test of E-type Readings, however, does not give an unequivocal result. Let us construct an E-type reading for (22) and (23), repeated here as (32) and (33):

(32[=22]) Ray bought *a funny little gadget* to operate his train. Joan got so excited that she bought *the same thing* for Michael.

(32') Ray bought *a funny little gadget* to operate his train. Joan got so excited that she bought *the funny little gadget that Ray bought to operate his train* for Michael.

(33[=23]) Emile showed up in *a leather jacket* at the movies. By sheer coincidence, Steve was wearing *the same thing* as well.

---

[4] There is an apparent counter-example to this claim:

(i) Carla didn't get *a baby hippo* as a pet, but Mark bought *#the same thing*.

Even under the kind or Descriptional reading of *the same thing* this example is not acceptable, which seems to suggest that the intended anaphoric link does inaccessibility effects, which would in turn classify it as an R-anaphoric link. Although at this point I have no explanation as to why (i) is unacceptable, I think the clue is in the interaction negation and the definiteness of the anaphor. Apparently the sheer mention of the type within the scope of a negative operator does not license a definite D-anaphor. Since there is enough evidence from modal contexts to show that *the same thing* does not generally show inaccessibility effects, I will put the present example aside as a problematic case to think about without much further ado.

(33') Emile showed up in *a leather jacket* at the movies. By sheer coincidence, Steve was wearing *the leather jacket that Emile showed up in at the movies* as well.

According to this test therefore *the same thing* would qualify as an R-anaphor under the reading discussed, since it apparently accepts an E-type reading. Since all the other tests uniformly classify this reading as a D-anaphoric reading, I will assume for now that there is something special about this example that needs to be explained, and put the issue aside for further thought and consideration.

Finally, consider the last test, the Test of Bound Variable Readings. A suitable example to examine would be:

(34) The man eating (the) *antipasto salad* ordered *the same thing* last week, and so did the woman drinking (the) piña colada.

(35) Imagine what the world has come to! Every girl with a *strawberry icecream* gets *the same thing* from her mother for dinner, and so does every boy with a chocolate bar.

The intended bound variable reading for (34) is the one the woman drinking the piña colada ordered a piña colada last week as well; while under the relevant reading for (35) every boy holding a chocolate bar gets a chocolate bar for breakfast from their mother.

These readings, however, do not seem to be available; in fact, these sentences for the most part seem to be uninterpretable, unless *the same thing* is understood as referring to something in the context outside of the sentence, for example refers to mango yoghurt, because someone mentioned that Valeria gets a mango yoghurt for breakfast. Given that the bound variable readings do not seem to exist, this test again classifies the relevant reading of *the same thing* as a D-anaphor again.

Since with one exception all the tests positively identified *the same thing* as a D-anaphor under the relevant reading, let us conclude that it is indeed a D-anaphoric expression[5], and turn to the appropriate representation an anaphoric link in (36), with *the same thing* as the anaphor, should receive in the DT/RT notation:

(36[=25]) Beth realized how much money Elyse was making being *a musician*. She decided not to become *the same thing*.

| (37) | Syntax | *a musician* | | *the same thing* |
|---|---|---|---|---|
| | DT | MUSICIAN | <— | SAME THING |
| | RT | | | |

[5] To be completely convincing, one would also need to show that *the same thing* does not refer to kinds in the sense of Carlson (1977).

Since there are no discourse referents involved in this example, the RT does not contain any representation linked to the antecedent or the anaphor. As the case of (38) shows, this is accidental, and the two discourse referents that instantiate the antecedent and the anaphor are independent of each other, similar to the case of *one*-anaphora in (21) above:

(38[=23]) Emile showed up in *a leather jacket* at the movies. By sheer coincidence, Steve was wearing *the same thing* as well. One would not have been able to tell *the two leather jackets* apart, they were so similar.

| (39) | Syntax | *a leather jacket* | | *the same thing* |
|---|---|---|---|---|
| | DT | LEATHER JACKET$_1$ | <— | SAME THING$_2$ |
| | RT | $x_1$ | | $y_2$ |

This concludes the discussion of D-anaphora for now.

### 3.2.2. R-anaphora and tiers

Having looked at two instances of D-anaphora in detail (*one*-anaphora and *the same thing)*, it is time to turn our attention to the other major anaphoric type, R-anaphora. At

the beginning of Section 3.2. the following diagram gave a schema of Referential anaphora:

(40[=14]) **Referential anaphora** (R-anaphora)

DT

RT x <——— x

As I mentioned in Section 3.2., the arrow on the Referential Tier stands for a constraint on embedding the discourse referent onto objects in the universe of a model. In particular, the constraint requires that the two discourse referents connected via an arrow be mapped onto the same individual in the universe of the model.

Now let us see how specific examples of R-anaphora fit into this representation, and how the representation can explain the behavior of those examples when confronted with the tests delineating D-anaphora from R-anaphora. First let us consider pronominal anaphora, since that was the example through which the tests were demonstrated.

### 3.2.2.1. Representing pronominal anaphora

First of all, let us begin with the suggested representation of the pronoun *he* in the DT/RT notation:

(41) Syntax *he*

DT $HE_1$

RT <-- $x_1$

This representation expresses the intuition that a pronoun basically does not have any descriptional content other than the grammatical features, including a specification that expresses the fact that the pronoun is anaphoric The reference of the pronoun cannot be derived from its descriptive content, since it hardly has any, rather its reference is derived from another expression which is referential[6]. This is what is represented by the arrow on the RT. To give a specific example of what a full representation looks like for an R-anaphoric pronominal link, consider the following:

(42) ..., *President Yeltsin* appeared on television from his hospital room here tonight to prove that while *he* was sick, he was not as sick as the Kremlin had led people to believe by insisting that he was fine. [NYT 7/19/95]

(43) Syntax *President Yeltsin* *he*

[6] The representation given does not include Case features, since those (at least in English) are irrelevant for the anaphoric link: the anaphor and antecedent have totally independent Cases.

| | | | |
|---|---|---|---|
| DT | $YELTSIN_1$ | | $HE_2$ |
| RT | $x_1$ | <-- | $y_2$ |

First of all, notice the interpretation of the anaphoric link on the RT. If an anaphoric link holds between xi and yj, then the two discourse referents are supposed to be mapped onto the same individual in a model theoretic interpretation of the representation.

This derives a crucial difference between D-anaphora and R-anaphora. As we saw for *one*-anaphora in Section 3.2.1.2 (see example (21)), the antecedent and the anaphoric expression are co-indexed to different discourse referents, which licenses the appearance of a plural pronoun referring back to the two DP's containing the anaphor and the antecedent.

However, due to the anaphoric link between the two discourse referents, a parallel example involving pronouns is empirically ruled out, as well as expected to be ruled out by the proposed representation:

(44) Kate is very good friends with a *belly dancer*. What's more, Jill shares an apartment with *her*. Both of *#them* are originally from well-to-do Turkish families. /them = the two belly dancers/

| (45) | Syntax | *a belly dancer* | | *her* |
|---|---|---|---|---|
| | DT | BELLY DANCER$_1$ | | HER$_2$ |
| | RT | $x_1$ | <— | $y_2$ |

Before looking at how the representation explains basic properties of pronominal anaphora we need to consider one of those tests in advance, as it requires immediate adjustment of the representation. Recall the Test of Accessibility: It stated that if an anaphoric relation does not exhibit inaccessibility effects, it is a D-anaphoric link; while if inaccessibility effects are detectable, then the anaphoric link is an R-anaphoric link. The representation so far did not include negation or modal operators, but there were no accessibility constraints introduced for D-anaphora. Now, however, we have to improve the representation to encode restricted accessibility for R-anaphora, while leaving D-anaphora unaffected.

The structure I introduce on the RT is basically equivalent to the representation proposed by Roberts (1987) within Discourse Representation Theory, which is also presented in Kamp & Reyle (1993). Here I will in fact assume familiarity with DRT representation, and essentially incorporate it into the two-tiered representation as the RT. The substantial main difference between DRT and the present framework consists in the fact that the representation of modal structure of the discourse is restricted to the RT, and it does not extend to the DT. On the other hand, predicates, which were routinely included in the

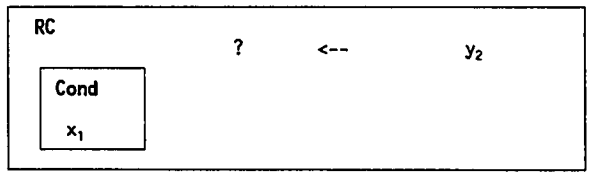
body of a DRS, remain on the DT, linked to the appropriate discourse referent through the instantiation relation indicated by co-indexing the elements of the two tiers. Given this, consider (46) as a representative example of inaccessibility effects[7]:

(46) If Jack borrowed *a detective story* from the library, he'll be home reading it by now. Marilyn returned *#it* to the library yesterday.

(47)

| Syntax | *a detective story* | *it* |
|---|---|---|
| DT | DETECTIVE STORY$_1$ | IT$_2$ |

RT




The RT of the representation now incorporates an ordered list of discourse referents introduced in different `boxes', the same way DRT does, and discourse referents in general will be interpreted in the standard DRT fashion (see Kamp & Reyle (1993)). The box marked *RC* in the representation simply marks the main, `background box'; discourse referents introduced in this box will carry a referential claim with them when mapped onto a model, hence the abbreviation, RC. The RC is in fact identical to the universe of

[7] For now I concentrate only the discourse referents relevant for the anaphoric link, and ignore the others. At this point, for example, I will not introduce discourse referents for *John*, *Marilyn*, *the library*, etc.

the main Discourse Representation Structure in a DRT representation. This box, however, does not contain the conditions that are normally introduced in the body of a DRS. Instead, discourse referents are in the instantiation relationship to the descriptions introduced on the DT. The DT does not mirror the modal structure introduced on the RT, rather it remains a `flat', unstructured representational level, with only linear precedence relevant to the availability of antecedents in anaphoric relations.

Within the *RC* box I introduced another box, labelled *Cond* for conditional. Discourse referents that are in the scope of the conditional operator *if* are introduced within this box, in linear order of appearance. Accessibility conditions between the boxes are identical to those of DRSs and embedded subDRSs of DRT:

(i) Discourse referents introduced in the *RC* box are accessible from any other box, the same way discourse referents in the universe of the main DRS are accessible across-the-board.

(ii) Discourse referents introduced in boxes other than the RC box, however, cannot be accessed as antecedents for anaphoric elements from outside that box, unless the box containing the intended anaphoric discourse referent is subordinated to the box containing the intended antecedent discourse referent. This notational convention then expresses inaccessibility effects.

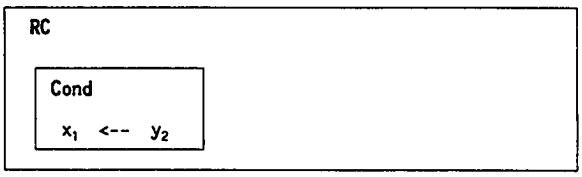
The representation in (47) contrasts with the representation for a licit anaphoric link:

(48) If Jack borrowed *a detective story* from the library, he'll be home reading it by now. *It*'ll keep him entertained for the rest of the day.

(49)

| Syntax | *a detective story* | *it* |
|---|---|---|
| DT | DETECTIVE STORY$_1$ | IT$_2$ |

RT




Here the discourse referent $x$ is available as an antecedent for $y$, since they are introduced in the same box.

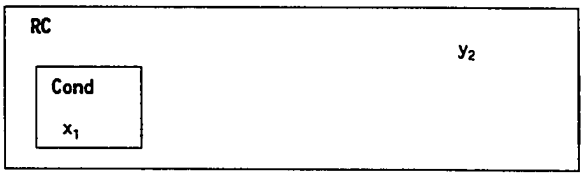
As I mentioned, the account of D-anaphora does not change with the introduction of the modal structuring on the RT. Therefore the sentence paralleling (46) in structure, but containing a D-anaphoric expression such as *one*, will have the following representation:

(50) If Jack borrowed *a detective story* from the library, he'll be home reading it by now. Marilyn returned *one* to the library yesterday.

(51) Syntax *a detective story* *one*

DT DETECTIVE STORY$_1$ <- ONE$_2$

RT




Since the DT does not contain anything but a linear list of the types mentioned in the discourse, accessibility of an antecedent is not restricted by intervening negative or modal operators.

For now consider this as the full power of the representation of anaphora in the DT/RT representation, and let us return to a question raised in Section 2.1.5, namely the ambiguity involving *the same thing*.

### 3.2.2.2. *The same thing/the same X* again

Now, as another example of R-anaphora let us return to an earlier example from Section 2.1.5:

(52) Emile showed up in *a leather jacket* at the movies. He wore *the same thing* for Henrietta's birthday party last week.

(53) Michael brought *a ham sandwich with pickles* for lunch today. It was *the same sandwich* he brought yesterday.

In these examples *the same thing/the same X* is anaphoric on the token or discourse referent introduced by its antecedent, instead of being anaphoric on the kind introduced by the antecedent. Emile was supposed to wear the same leather jacket for the two occasions, and Michael was supposed to have brought the same token sandwich today, because let's say he did not have time to eat it yesterday.

Intuitively, this characterizes these occurrences of *the same thing/the same X* as R-anaphoric on their antecedents. If that is indeed the case, *the same thing/the same X* should pass our tests as an R-anaphor.

To start with the first test, the Test of Predicative Position. According to this test, if the antecedent or the anaphoric element of an anaphoric link appears in a predicative position, then the link is D-anaphoric. Indeed, in a sentences such as (54), where the antecedent is a predicative DP, a token reading of *the same thing* as anaphoric on *outlandish idea* is impossible:

(54) Newt's suggestion about saving the rhino was considered an *outlandish idea* by many. Bob suggested #*the same thing*.

The next test is that of Obligatory Number Agreement. Indeed, if *the same thing* is does not agree in number with its antecedent, it cannot be interpreted with the token reading:

(55) At the weekly shooting training Sgt. Jones was shooting at *three male wooden figures* from a distance of 150 feet. The previous week he was shooting at *the same thing* from 120 feet.

(56) Ray saw *two beautiful suspension bridges for trains* at S&S. He saw *the same bridge* three days later in a thrift store.

In examples where the anaphoric expressions do not agree in number with the construed antecedent, as in (55) and (56), a token or referential reading is not available for *the same thing*; instead only a type or kind reading is available.

For the Test of Extended Projection the previous examples already gave the answer. A token or referential reading was not available when the antecedent was not a maximal extended projection, that is when the anaphoric expression disagreed with its antecedent in number.

If we turn to E-type readings, we can construct examples of the kind below:

(57) Ray found *two copies of Freud's Interpretation of Dreams* at a used bookstore. Noam had sold *the same copies* to a used book salesman the week before.

(58) Emile showed up in *a leather jacket* at the movies. He wore *the same thing* for Henrietta's birthday party last week.

The anaphoric expressions in these sentences allow for an E-type reading under the token reading, as in (59) and (60), as well as change meaning if they are simply substituted for by their `literal' antecedent, as in (61):

(59) Ray found *two copies of Freud's Interpretation of Dreams* at a used book store. Noam sold *the copies of Freud's Interpretation of Dreams that Ray found at a used bookstore* to a used book salesman the week before.

(60) Emile showed up in *a leather jacket* at the movies. He wore *the same jacket that he showed up in at the movies* for Henrietta's birthday party last week.

(61) Ray found *two copies of Freud's Interpretation of Dreams* at a used bookstore. Noam had sold *two copies of Freud's Interpretation of Dreams* to a used book salesman the week before.

(62) Emile showed up in *a leather jacket* at the movies. He wore *a leather jacket* for Henrietta's birthday party last week.

Given that substituting *the same thing/the same X* with an E-type description does not change the meaning of the sentence, this test once again confirms that this reading of *the same X* is an R-anaphoric reading.

Now consider a context that has been used to demonstrate inaccessibility effects for pronominal anaphora in Section 2.2.4, but substituting *the same thing* in the place of a pronoun:

(63) If Jack borrowed *a detective story* from the library, he'll be home reading it by now. Marilyn returned *#the same thing* to the library yesterday.

(64) John didn't manage to find *a four bedroom apartment with two fireplaces.* Michael rented *#the same apartment* last year.

The anaphoric reference between the antecedents and the anaphoric *the same X* fails in both cases[8]. Since only R-anaphoric links are blocked by modal operators or negation, again *the same thing/the same X* comes out as an R-anaphor.

Let us then turn to the final test, the Test of Bound Variable Readings:

(65) The man wearing the *tuxedo* wore *the same thing* at last week's wedding, and so did the woman wearing the blue evening gown.

(66) Today's kids have no imagination. Every girl playing with a *toy gun* brings *the same thing* to school every day, and so does every boy playing with a cabbage patch doll.

In both of these examples a sloppy identity reading is readily available, under which the woman in the blue gown wore the same blue gown at last week's wedding, and every boy playing with a cabbage patch doll brings the exact same doll to school every day. Since according to our test only R-anaphora can receive bound variable readings, the examples in (65)-(66) show that *the same thing* again behaves as an R-anaphor.

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[8] Although the two examples are unacceptable under the token reading, but they might be at least marginally acceptable under the kind reading:

(i) If Jack borrowed *a French detective story* from the library, he'll be home reading it by now. Marilyn returned ?*the same (kind of) thing* to the library yesterday.

(ii) John didn't manage to find *a four bedroom apartment with two fireplaces*. Michael rented *the same (kind of an) apartment* last year.

To sum up then, we have proved that *the same thing/the same X* allows a reading which is diagnosed as an R-anaphoric reading according to our tests. This means that *the same thing* should also receive the following schematic representation, which is similar to the representation assigned to pronouns:

(67) Emile showed up in *a leather jacket* at the movies. He wore *the same thing* for Henrietta's birthday party last week.

| (68) | Syntax | *leather jacket* | | *the same thing* |
|---|---|---|---|---|
| | DT | LEATHER JACKET$_1$ | | SAME THING$_2$ |
| | RT | $x_1$ | <-- | $y_2$ |

How can we reconcile this representation with the D-anaphoric representation of *the same thing* which we discussed in Section 3.2.2.3, repeated here:

(69[=25]) Beth realized how much money Elyse was making being *a musician*. She decided not to become *the same thing*.

(70) Syntax *a musician* *the same thing*

DT MUSICIAN <— SAME THING

RT

It seems that *the same thing* is simply an anaphoric expression, which is underspecified as to being D-anaphoric or R-anaphoric. As we have also seen, in some contexts both readings are available. Pragmatic factors will decide which reading is available in which context. From the point of view of Natural Language Processing then, it is clear that anaphoric expressions such as *the same thing/the same X* cannot be resolved unambiguously solely on the basis of syntactic cues. Such anaphora resolution must rely heavily on the semantic representation of the context in which such anaphora appears, as well as on general knowledge about the world.

### 3.3. Epithets as R-anaphors

Diagram (12.f) represents a purely R-anaphoric link: only the discourse referents on the RT are linked via an anaphoric link, while the description attached to the anaphoric discourse referent is not anaphoric on the description of the antecedent:

(71[=12.f]) DT X X

RT x <- x

I will propose that epithets such as those in (72)-(77) should be represented by this diagram:

(72) I don't know what to do with *my daughter.* Last night *the poor thing* blew up her entire chemistry kit during her science experiment.

(73) *John's son* went to the Museum of Fine Arts on a field trip. *The little brat* destroyed three Greek vases within twenty minutes.

(74) Although *the bum* tried to hit me, I can't really get too mad at *Harry*.

[Jackendoff:1972]

(75) After *John* walked in, *the idiot* sat down. [Lasnik:1986]

(76) Norb wants to buy *a lawn mower.* He needs *the damn thing* to keep tabs on his voluptuous front yard.

(77) George told Dan that hopefully Ross will compromise Bill in the debate. *The bastard* would not give up his chances to win the election.

(78) The night of the operation Jack was attended to by *a nurse on training. The angel* came to check upon him every half an hour.

Intuitively it is clear that while epithets indeed are anaphoric, they do not involve an anaphoric description. For example, for (77) the descriptional content *bastard* is not explicit in the context, nor is it derivable from the preceding context. So much so that, depending on your political beliefs, either of *George*, *Ross*, or *Bill* could be construed as the antecedent of the epithet[9]. Instead, since the anaphor and the antecedent are mapped onto the same individual in the universe of the model, the descriptional content of the antecedent in effect applies to the antecedent as well. As a first approximation, one could state that an epithet has two independent components: (i) the definite feature which gives rise to R-anaphoric interpretation; and (ii) a second component which consists in predicating the description provided by the epithet itself of the referent `recovered' or accessed by the definite feature through the R-anaphoric link[10].

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[9] While the definite feature acts the sole agent in locating a suitable antecedent for the epithet; with the proviso that the predication relationship should also be pragmatically plausible. For example, gender barriers cannot be crossed:

(i) *Holly* and Tom had a fight. ✓*The bitch*/#*the bastard* would not pay child support.
(ii) Holly and *Tom* had a fight. #*The bitch*/✓*the bastard* would not pay child support.

[10] It is normally assumed that anaphoric epithets must reveal a pejorative attitude of the speaker towards the referent of the epithet. Although this is true for the large majority of current day epithets, this attitude of the speaker is not required in the original literary definition of an epithet (see, for

Jackendoff (1972) already argues that epithets behave like special pronouns. Lasnik (1976) elaborates this by pointing out that, while an epithet does behave as an anaphoric entity, the damn thing cannot be c-commanded by its antecedent. This would leave epithets within the category of R-expressions, together with anaphoric definite descriptions. Here I will simply show that epithets pass the tests for R-anaphors presented in Section 2.2.

I will not go into detail about the first three tests (Predicative Position, Obligatory Number Agreement and Extended Projection), since their results are intuitively clear, and I do not want to get too repetitive. The remaining three tests I discuss in detail right below.

As for the Test of E-type readings, see the following pair of examples:

(79) *Two middle-aged men dressed as F.B.I. agents* entered the Oval Office hoping to interrupt the broadcast of the weekly presidential address. *The bastards* got through security by calling the guards' attention to a couple acting indecently on the White House lawn.

(80) *Two middle-aged men dressed as F.B.I. agents* entered the Oval Office hoping to interrupt the broadcast of the weekly presidential address. *The two middle-aged*

---

example the epithets appearing in the Odyssey), nor is it required in everyday speech, as the example in (78) demonstrates.

*men dressed as F.B.I. agents who entered the Oval Office to interrupt the broadcast of the weekly presidential address* got through security by calling the guards' attention to a couple acting indecently on the White House lawn.

Since a full E-type description can be substituted for the epithet *the bastards*, it behaves as other R-anaphoric expressions.

Embedding the antecedent in the scope of a modal operator limits accessibility to a non-specific indefinite antecedent when the anaphoric epithet is not introduced in a sentence that is modally subordinated to the sentence in which the antecedent was introduced:

(81) If Joe bought *some cheap romantic novel* today, he'll be home reading it now. He won't put *the damn thing* down for anything.

(81') If Joe bought *some cheap romantic novel* today, he'll be home reading it by now. *#The damn thing* has been on sale for three weeks now.

Similarly, when the non-specific indefinite is introduced within the scope of negation, the antecedent is inaccessible from a factive context:

(82) Mariano managed to find an apartment in Cambridge. *The damn thing* is outrageously expensive.

(82') Mariano didn't manage to find an apartment in Cambridge. *#The damn thing* is outrageously expensive.

Again, as only R-anaphoric links are subject to inaccessibility effects, hence epithets fare together with other of R-anaphoric expressions on this test.

Finally, while epithets occur as intrasentential (discourse) anaphors, as the above sentences show, at the same time they also have bound occurrences[11], as pointed out by Higginbotham (1983):

(83) The people of *every northern city* hate the traffic in *the damned place*, but the people of southern cities never seem to.

The presence of a bound variable reading in this sentence is detectable, since a sloppy identity reading of *the damned place* is available in the elided clause. Under the sloppy identity reading people of southern cities never seem to hate the traffic in southern cities

[11] Epithets behave as R-expressions with respect to c-command. In general, they cannot be c-commanded by their antecedent, as Lasnik (1976) pointed out:

(i) *#John*$_i$ realizes that *the sissy*$_i$ is going to lose.

That is why (83) had to embed the antecedent in an *of*-construction: a similar example with c-command relationship between intended antecedent and anaphor would have been ruled out not because of the lack of bound variable readings, rather due to a Binding Principle C violation:

(ii) *#Every northern city* struggles with too many traffic jams in *the damned place*, but southern cities never seem to.

(or possibly their own southern city); as opposed to the strict reading under which people of southern cities would hate the traffic in northern cities.

### 3.4. Anaphora through definite description

Consider one of our earlier examples, (79), and the following range of definite descriptions listed in (85)-(87), each of which can be used as anaphors instead of *the bastards* in the second sentence of this mini-discourse:

(84[=79]) *Two middle-aged men dressed as F.B.I. agents* entered the Oval Office hoping to interrupt the broadcast of the weekly presidential address. *The bastards* got through security by calling the guards' attention to a couple acting indecently on the White House lawn.

(85) a. the two middle-aged men dressed as F.B.I. agents who entered the Oval Office hoping to interrupt the broadcast of the weekly presidential address

b. the two middle-aged men who entered the Oval Office

c. the men hoping to interrupt the broadcast

d. the two men dressed as F.B.I. agents

e. the two men

f. the men

(86) a. the intruders

b. the unexpected visitors to the President's Office

c. the two males

d. the two persons

(87) a. the bastards

b. the two embittered postal employees

c. the two fierce-looking European terrorists

I grouped the possible anaphoric definite descriptions into three classes. The first class, under (85), gives definite descriptions ranging from a full E-type paraphrase in (85.a) through a definite description containing only a nominal head in (85.f). What unifies the definite descriptions in this group is that they do not include any descriptive material that is not explicitly mentioned in the base sentence (84). The second class, in (86), contains definite descriptions whose content can be inferred from the material expressed in the base sentence, sometimes using real world knowledge. These two classes should be distinguished from the third class, given under (87), which represents anaphoric definite descriptions in which the descriptive content of the definite expression is new information, that is, it is neither contained in the base sentence, nor is it inferable from it[12]. That is,

[12] Such definite descriptions are pretty common in the news media, in order to reach even higher plateaus in conciseness and the effective packaging of information. Instead of simply referring back to the characters of the news story, the anaphoric definite description reveals further information about them:

epithets are not unique in their behavior, since as I mentioned in the previous section, they operate this way as well.

How should we view these anaphoric definite descriptions? I suggest that in all of the above cases the definite article is interpreted as R-anaphoric, as opposed to simply expressing uniqueness of description. The description provided in the anaphoric definite DP can help in narrowing the possible antecedents of the anaphoric expression, and therefore the examples in (85) and (86) might in fact involve an additional, secondary D-anaphoric link, in which case they should be represented with anaphoric links parallel on the two representational tiers[13]:

(88=[12.e]) DT $X_1$ (<—) $Y_2$

RT $x_1$ <— $y_2$

The anaphoric definite descriptions in (87), however, only involve the R-anaphoric link, and should be represented as such, with the same representation as epithets:

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(i) ...At least that's what everyone thought before *Ludek Zakel Einstein* surfaced with a fistful of documents, a tale of babies switched at birth, and the sworn statement of the woman who raised him that he was in fact Einstein's son. Moreover, *the 63-year old physicist* (he is pursuing research based on Einstein's work) bears a striking physical resemblance and a temperamental similarity to the man who created the idea of the modern universe...
[NYT, 7/22/95]

[13] In the next chapter we will see examples which clearly involve two parallel anaphoric links on the two representational tiers. To see that, however, we need to extend anaphoric dependencies to contra-indexing elements.

(89=[12.f]) DT $X_1$ $Y_2$

RT $x_1 <- y_2$

Let us look at the three different groups in a bit more detail.

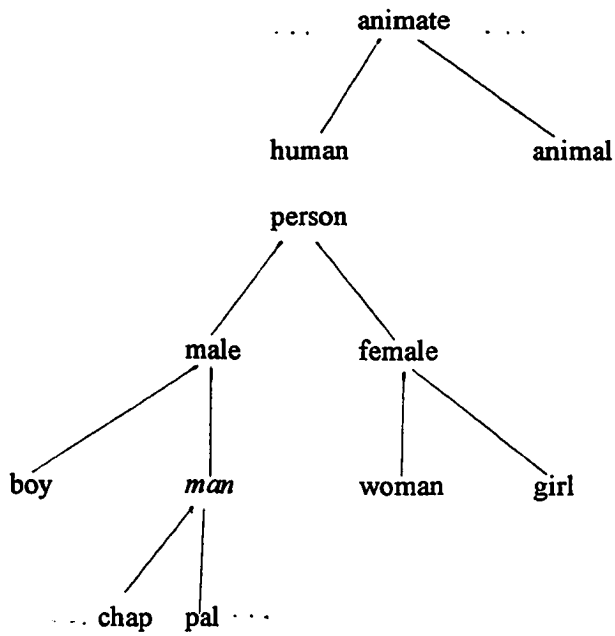
First of all, the examples in (87) show that a `guiding description', i.e. description repeated or inferable from the context of the antecedent, is not necessary for establishing the R-anaphoric link. These definite descriptions, including epithets, need an antecedent because of the presence of the definite articles, and the contents of the definite description is predicated of the antecedent[14]. In the case of (87.c), for example, we learn that the two people that have entered the President's office in fact are European terrorists. Formally speaking, the anaphoric relation holds between the two discourse referents; in addition to that, the two discourse referents are instantiations of types expressed by the descriptive content of the two DP's. This is how we derive the `predication' effect of the anaphoric definite description through a `detour' in the representation. Note that the only difference between epithets and such anaphoric definites is that in the case of epithets the speaker supposedly reveals his/her own (mostly negative) attitude towards the given character under discussion. But formally epithets behave in exactly the same way as this group of anaphoric definites.

[14] Such a use of the definite article contrasts with another use, which requires that the object mentioned fit the descriptional content of the definite description uniquely.

For the examples in (85), the explicit mention of (some of) the description mentioned explicitly in the previous context picks out the antecedent of the definite description uniquely. The anaphoric definite does not have to mention the full description of the antecedent, a partial mention is more than enough to narrow the range of possible antecedents for the R-anaphoric link.

But how do we arrive at the antecedent with the anaphoric definite descriptions in (86)? Let us look at (86.a) and (86.c) in a little bit more detail. For example, *the intruders* draws on some of the information expressed in the VP (they entered somewhere), as well as on the common sense knowledge that mere mortals cannot just walk into the president's office. From this we can arrive at the conclusion that the two men must be considered intruders. For (86.c), to infer that *the two males, the two persons* are anaphoric on *two middle-aged men dressed as F.B.I. agents* one has to employ an inference that involves a taxonomy of concepts. In such a taxonomy superordinate concepts dominate subordinate concepts. The relationship between the concepts can be expressed by a sortal lattice similar to the one just below:

(90)




The antecedent "enters the lattice" at a category-level node (*man* in this case), from which one can move up or down the lattice. Concepts superordinate to the term *man* can be inferred from the descriptional content in the antecedent, and can therefore act as an anaphoric expression. Note, however, if one moves to a subordinate category, that is, the anaphoric element includes a concept subordinate to the description included in the antecedent, we get a different type of anaphoric definite descriptions. Such anaphoric definite descriptions would be grouped with epithets (given in (87)) because the convey new information.

The examples involving descriptions inferred from the description in the antecedent, such as those back in (86), are similar to D-anaphoric expressions given by Webber (1979),

where the anaphoric expression contains (or refers back to) a description which is derivable through inference from the linguistic material given in the antecedent, or from the non-linguistic context:

(91) I have a '71 Ch. Figeac, a '76 Fleurie, a '71 Ockfener Bockstein and a '75 Durkheimer Feuerberg in the cellar. Shall we have the German *ones* for dinner tonight? *ones* = wines

This example contains *one*, an explicit D-anaphoric expression. The antecedent of *one* has to be inferred from the previous context, namely that we have been talking about types of wine. Even though anaphoric definites do not contain an explicit D-anaphoric expression, I keep the secondary D-anaphoric link in their representation only to express the effects of the inference process necessary for establishing the appropriate R-anaphoric link.

The question we need to address now is the implications of two anaphoric links that operate parallel on the two representational tiers. First of all, there is an apparent contradiction between conditions on the two different types of anaphoric processes. For example, D-anaphoric links are not constrained in contexts where the antecedent appears in the scope of negation or a modal operator, while R-anaphora is subject to inaccessibility effects in exactly those contexts. What do we expect for anaphoric definite descriptions, which seem to involve an anaphoric link on both tiers?

For this test, the following explanation should suffice. Since anaphoric definite descriptions involve an R-anaphoric link, we do not expect licit anaphora through definite descriptions when the antecedent appears in the scope of a conditional, for example:

(92) If John bought *a paperback* today, he'll be home reading it by now. *#The book* is a murder mystery.

Even though the D-anaphoric link can transcend over modal operators, the presence of the R-anaphoric link is necessary for the anaphoric definite description to be licit. Therefore the condition on an R-anaphoric link will override the condition over a D-anaphoric link, and anaphoric definite descriptions will be subject to inaccessibility effects.

Note that the following example is not a counterexample to this claim:

(93) If John bought a *paperback* today, he'll be home reading by now. The *one* he bought last week kept him busy for a mere two days.

Here the definite article does not act as an anaphoric definite. Instead it is a descriptional definite, which signals that the description *John bought _ last week* uniquely applies to a paperback, that is John only bought a single paperback last week.

For the remaining tests, I just quickly mention what result we expect. For Predicative Position, of course anaphoric definite descriptions will behave as R-anaphora, since a representation on the RT is necessary for the R-anaphoric link of the definite. For Obligatory Number Agreement again, we expect behavior of R-anaphora, that is the antecedent and the anaphoric definite will obligatorily agree in number. For Extended Projection, the two requirements are not in a clash, since different levels of constituents will count as the two antecedents. In terms of E-type readings and Bound Variable readings, we again expect anaphoric definites to behave as R-anaphoric expressions.

In theory therefore, we have to conclude that when an anaphoric element shows behavior typical of R-anaphors in some of the tests, this is not sufficient to decide whether the DT contains an anaphoric link as well or not. All we can conclude is that the RT does contain an anaphoric link. On the other hand, if we find that an anaphoric element shows behavior symptomatic of D-anaphors, then the RT cannot be involved in the anaphoric process, since R-anaphors are more restrictive than D-anaphors.

The final point I want to make is this chapter concerns the uniformity or non-uniformity of R-anaphoric expressions. It is obvious that R-anaphoric expressions observe somewhat different accessibility conditions in spite of the similarities expressed by the similarity revealed by the tests used to distinguish R-anaphoric links from D-anaphoric links. A well-known formulation of such differences are the Binding Principles of Chomsky (1981), or similar generalizations about possible c-command relations between antecedents

and anaphors. When we control for the effects of the Binding Principles, however, R-anaphoric expressions show an underlying similarity. I want to point out a single further variation among R-anaphoric expressions, which concerns anaphoric reference to implicit characters: Anaphoric definite descriptions are able to access such characters as antecedents, even though they are inaccessible for pronouns:

(94) Bill went to dine at an Indian restaurant tonight. *The food/#it* was delicious, but a bit too spicy for him.

(95) Joe set the day of his wedding. *The bride/#she* does not know about it yet.

(96) Sam is a college president. *The college/#it* is about half an hour from his house.

(97) Kip went elephant hunting last year. *The elephant/#it* was really hard to get close to.

In all these cases a pronoun fails to refer to a character implicitly introduced into the discourse, whether that character is introduced as an implicit argument of a verb such as *eat*, as a character in a frame or story introduced by *wedding*, as an implicit argument introduced by a compound such as *college president*, or as an incorporated argument introduced by *elephant hunting*. In all of the above cases, however, a definite description can access the character in question as its antecedent. In Section 4.3.6 I will briefly

return to a possible solution to this difference between anaphoric definites and pronouns. But for now, let us conclude.

### 3.5. Summary

In the present chapter I lay down the basics of a two level representation for nominals. The representation for nominals now includes a Referential Tier and a Descriptional Tier, connected via an instantiation function. Using this so far fairly simple representation, I offered representations for the two anaphoric types introduced in Chapter 2, Referential-anaphora and Descriptional-anaphora. The two types in the given formalism differ in terms of which of the two representational levels houses the anaphoric link, the RT or the DT. In Chapter 7 I will show how the difference in the representation of R-anaphora and D-anaphora derives the results of the tests proposed for distinguishing the two anaphoric types. This chapter also demonstrated how the expression *the same thing/the same X* conforms to the tests under its two different readings, the R-anaphoric reading and the D-anaphoric reading. Finally, I closed with taking a bit more detailed look at epithets and anaphoric definite descriptions as exemplars of R-anaphoric expressions. As the representation is enriched through the chapters to come, the reader will get a look at how the distinctions introduced in this chapter for the domain of individuals and their descriptions paves the way for making similar distinctions in the domain of events and event descriptions.

## CHAPTER 4: Tiers and Contra-Identity

In general, the introduction of a two-level representation (such as the DT/RT representation introduced in Chapter 3) can only be maintained if one can show that a single representational level would not suffice to account for the same breadth of data. Demonstrating that the two levels are complementary in some sense, and do not duplicate the same information (perhaps in different disguises) is part of showing the indispensability of the two levels. Illustrating that the two levels can account for different phenomena counts as evidence to the same effect.

In Section 3.4, in the discussion of anaphoric definite descriptions, we already saw that the two levels (RT and DT) can act more or less independently of each other. In that case both levels encoded identity conditions (i.e. co-indexing, in traditional terminology). In such a case the interaction of the two levels might not be apparent enough, since the D-anaphoric relationship might be (in some cases) derivable from the R-anaphoric relationship. This chapter will concentrate on more striking and more convincing examples, namely on expressions such as *another one*, *a different X*, and

*something/someone else*, to show the independent behavior of the two representational tiers:

(1) *The company lawyer* brought *another one* with him to the holiday party.

(2) Although Mary is living with *Jonathan*, she is in love with *a different guy*.

(3) *Jill* thought that the police suspected *someone else*.

Such expressions prove two separate points. First they necessitate the recognition of contra-identity as an anaphoric relation[1]. Second, they provide direct evidence for the interaction of the two representational levels: for example, *another one* requires "contradictory" specifications on the two levels: a relation expressing identity on the Descriptional Tier, and a relation expressing contra-identity on the Referential Tier[2].

A short note on terminology is in order here. Anaphoric elements that have been studied almost exclusively express identity, which is normally expressed with co-indexing the anaphoric element to its antecedent. In the current representation anaphoric relations have been expressed with an arrow, and co-indexing has been used for the instantiation relationship (as in Chapter 3). To avoid any confusion in terminology, in this thesis I will

[1] It is striking to what extent anaphoric elements expressing contra-identity have been neglected compared to elements expressing anaphoric identity. The handful of papers that do consider some such elements include Safir (1992), Saxon (1984), McCawley (1988), Culicover & Jackendoff (1995), Keenan (1988), Carlson (1987).

[2] Of course the two anaphoric links will turn out to be not absolutely independent of each other, since the antecedents of the two anaphoric links as well as the two anaphors of the links are co-indexed to each other through the instantiation relationship. Similarly to the case of anaphoric definite descriptions, the referential contra-identity constrains the D-anaphoric link.

use the terms *Identity anaphor* (I-anaphor) or *anaphoric element expressing identity* instead of the occasionally used term `co-indexing anaphor'. On a par with this new terminology, I will also introduce the term *Contra-Identity anaphor* (CI-anaphor) or *anaphoric element expressing contra-identity* instead of the term `contra-indexing' anaphor, which is sometimes used in the literature referring to the anaphoric expressions italicized in (1)-(3).

I will start this chapter with demonstrating that *other*, *different*, and *else* show the same ambiguity as *the same thing* did. Under their kind reading they behave as D-anaphors, while, under their token reading, such elements expressing contra-identity are subject much to the same formal dependency conditions as pronouns, our original example for R-anaphora. Based on English data, I will give support for a definition of Binding that dissociates contra-identity (commonly expressed by contra-indexing) from the formal binding relationship, along the lines of Enç (1989). I will also show that being subject to Binding Principles A and B, which is traditionally associated with anaphoric behavior itself, is independent of the identity requirement, while Principle C violations arise from identity requirement only, and not from the referential dependency between the antecedent and anaphor in question. Having completed all this, I will turn to the question of parallel anaphoric links on the two representational tiers in Section 4.7.

### 4.1. The two readings of *other*, *different*, and *else*

To start, let consider us consider the two possible readings of elements expressing contra-identity in (4):

(4) Bill drives *the Honda over there*. His wife drives *another car*,...

a. ...also a Honda, but a different model. /different **token**: referential/

b. ...because she doesn't like Hondas. /different **kind**: descriptional/

(5) Yesterday Michael bought *a recently published popular science book*. James bought *a different book*,...

a. ...but it is also on popular science. /different **token**: referential/

b. ...because he loathes anything but art books.

/different **kind**: descriptional/

(6) Lila saw a Buñuel film last night.

a. ...Mariano saw *something else*, but also from Buñuel.

/different **token**: referential/

b. ...Mariano saw *something else*, a film by Chabrol.

/different **kind**: descriptional/

The phrase *another car* in the two scenarios in (4) can be interpreted in the following two ways: *another car* can either refer to just a car other than the one I am pointing at, which gives the token-contraidentity reading of *other* as in (4.a), or it can refer to a totally different *kind* of car, for example an Isuzu, resulting in a kind-contraidentity reading, as it is the case with the continuation in (4.b). Similarly, the continuations in (5.a) and (6.a) force a token-contraidentity reading, while those in (5.b) and (6.b) bias towards a kind-contraidentity reading[3].

Parallel to the two readings of *the same thing* presented in Section 2.1.5, the first of these two readings I will call a Referential-anaphoric reading, or R-anaphoric reading for short, since *another car* there requires a different **token** of a car. The second reading I will call Descriptional-anaphoric (or D-anaphoric reading, for short), since *another car* there requires that the two cars be of different **kinds**, which should fit different descriptions. Since both readings express contra-identity, in what follows I will refer to such anaphoric expressions as CONTRA-IDENTITY ANAPHORA, or CI-ANAPHORA for short, as opposed to the IDENTITY-ANAPHORA, or I-ANAPHORA, discussed in the previous two chapters. Given this terminology, one can talk about DESCRIPTIONAL CONTRA-IDENTITY ANAPHORA, or

[3] As Bill Ladusaw pointed out to me, there is another logical possibility for interpreting the contrasts in (4)-(6): maybe *another car* simply requires token contra-identity in both continuations. In this case what I characterize as ambiguity would be accounted for by vagueness. As we will see in the discussion of the tests for distinguishing contra-identity D-anaphora from contra-identity R-anaphora (see Sections 4.2 and 4.3.1), such vagueness will not be enough to explain the behavior of these anaphoric elements expressing contra-identity. For example, cases in which the anaphoric element expressing contra-identity appears in a predicative position, as in (i), obviously could not be explained as involving underlying contra-identity of tokens:

(i) Pisti wants to become *a neurologist*, but Zoltán wants to become *something else*.

DCI-ANAPHORA, as opposed to DESCRIPTIONAL IDENTITY ANAPHORA, or DI-ANAPHORA, as well as talk about REFERENTIAL CONTRA-IDENTITY ANAPHORA or RCI-ANAPHORA, as opposed to REFERENTIAL IDENTITY ANAPHORA or RI-ANAPHORA. This terminology therefore will replace the corresponding terminology relying on contra-indexing and co-indexing, which are possible (but not the only possible) ways of expressing identity or strict non-identity between antecedent and anaphor.

For now let us start with the D-anaphoric reading, then we will turn to the R-anaphoric reading after that.

### 4.2. Elements expressing contra-identity as D-anaphors: the tests

Under the kind-contraidentity reading of *other*, *different* and *else* we expect full D-anaphoric behavior from these elements when subjected to the tests presented in Section 2.2. As it turns out, all these tests provide positive results.

For the test of Predicative Position, examine the examples below[4]:

[4] For some reason *other* does not seem to be happy in a predicative position:

(i) Pisti wants to become a *neurologist*. Zoltán wants to be ??*another/a different* doctor.

Although it is certainly a very interesting question why this contrast exists, in this dissertation I will not explore in much detail the differences between the three contra-identity elements I examine.

(7) Paul has always been *an unreliable person*. Since he started his new job, however, he's been a totally *different person*.

(8) Since Beth has realized how little Elyse is making as a *musician*, she decided to become *something else*.

Since the anaphoric expressions both in (7) and (8) occur in predicative DPs, the anaphoric link must be a D-anaphoric link.

The examples below demonstrate the behavior of these elements expressing contra-identity with respect to two tests, the Test of Obligatory Number Agreement, and the Test of Extended Projections:

(9) Paul and John are both *very unsafe drivers*. James, however, is a very *different driver*.

(10) Amy and Beth both decided to become *musicians*. Julia, however, wants to be *something else*.

In both these examples, the anaphoric expression and the antecedent disagree in number. That means that, on the one hand, they fail the obligatory agreement test, on the other hand, it also means that the syntactic antecedent must be smaller than a maximal extended

projection. On both accounts then, the examples show that *different* and *something else* again behave as expected of D-anaphors under their kind-contraidentity reading.

Next is the Test of Accessibility:

(11) Emil has no *well-to-do friends*. Mostly he is interested in *different people*.

(12) If John bought a *detective novel* today, he'll be home reading it by now. I really hope that he bought a *different book*.

(13) Like many other kids, in his early childhood Francesco wanted to become a *fireman*. Like most other kids, he became *something else*.

These three examples show clearly that embedding the antecedent under negation or under a modal operator does not affect the accessibility of the intended antecedents, even though the intended anaphoric links cross the given embedding contexts. This behavior is typical of D-anaphora in general, and thus supports the view that these are indeed genuine instances of DCI-anaphora.

Now consider the Test of E-type Readings for the given reading. There are two facets to this test, as we discussed it at the introduction of the test in Chapter 2. The first again

concerns whether an anaphor in general can be replaced by its literal antecedent, while the second concerns the acceptability of actual E-type paraphrases.

First, it is clear that a literal substitution of the construed antecedent instead of the DP containing the element expressing contra-identity would not do, because it would result in expressing identity, instead of the intended contra-identity; the least we have to maintain from the anaphoric DP is the element actually signalling contra-identity together with its modifiers, if any. For now I will include in this test the head of the anaphoric DP. This method results in the following paraphrases of the examples just above[5]:

(14) Emil has no *well-to-do friends*. Mostly he is interested in *people different from well-to-do friends*.

(15) If John bought a *detective novel* today, he'll be home reading it by now. I really hope that he bought a *book different from a detective novel*.

(16) Like many other kids, in his early childhood Francesco wanted to become a *fireman*. Like most other kids, he became *something else/other than a fireman*.

The first observation to make is that the substitutions in (14)-(16) do not change the meaning of the sentence. In this respect this reading of the elements indicating contra-

[5] It seems to be a purely syntactic accident of English that in such a paraphrase the modifiers *different* and *other* must appear after the head noun, even though otherwise they appear before the head.

identity behave similarly to *one*-anaphora and the kind reading of *the same thing*, both of which were presented in Chapter 3 as examples of D-anaphora.

For the other relevant property of the type reading of contra-identity elements now consider the quasi-E-type reading of the anaphoric elements:

(17) Emil has no *well-to-do friends*. Mostly he is interested in *people different from the well-to-do friends he does not have*.

(18) If John bought a *detective novel* today, he'll be home reading it by now. I really hope that he bought a *book different from the detective novel that he bought today if he bought a detective novel today*.

(19) Like many other kids, in his early childhood Francesco wanted to become a *fireman*. Like most other kids, he became *something else/other than the fireman he wanted to become in his early childhood.*

We can see the same thing as we saw for *the same thing* in Section 3.2.1.3: the approximate E-type reading does not essentially change the meaning of the sentences, provided that the given reading exists at all. For (17) and (18) the paraphrases are admittedly problematic though because of the negation and the conditional that contain the antecedent. Given this, and given the fact that under the kind-contraidentity reading

the substitution closest to the literal substitution of the antecedent does not change the meaning of the sentence, I think we have enough evidence to claim that the kind-contraidentity reading altogether passes the Test of E-type Reading as a D-anaphor.

For the Test of Bound Variable Readings consider the intended sloppy readings for the following examples:

(20) Every *hysterical person* grows into a *different person*, and so does every schizophrenic person.

(21) I am sure that every *undertaker* wanted to be *something else* as a kid, and so did every grave digger.

The intended sloppy reading for (21), for example, would be the reading under which the undertakers were dreaming of professions other than undertaking, while grave diggers were fantasizing about something other than grave digging. These readings are more than plausible pragmatically, and in fact the sloppy reading is readily available. Normally only R-anaphoric links do allow a bound variable reading, which is not the case for D-anaphors in general[6]. The result of this test therefore runs against the results of the previous tests. Without settling on the issue of this particular test, one still has to conclude that according

[6] One possibility is that professions do not really behave as genuine predicative DP's. Names of professions might behave as proper names, since possible common professions are pretty well known for the general public. This might put predicative DP's expressing professions somewhat closer to R-anaphors in a relevant respect - enough to allow for a bound variable reading in the given examples.

to the results of most of the above tests *different X* and *something else* can behave as D-anaphoric elements. And now let us move on to RCI-anaphora.

### 4.3. Elements expressing contra-identity as R-anaphors

Putting the Descriptional-anaphoric readings of *other*, *different*, and *else* aside for the rest of the chapter, I will concentrate on what I called their R-anaphoric reading, and provide detailed evidence for the anaphoric behavior of elements indicating contra-identity.

#### 4.3.1. The test results

It must be by now obvious that the token reading of *other*, *different*, and *else* cannot show up when either the antecedent or the anaphor are in a predicative position. Therefore let us immediately skip to the second test, the Test of Obligatory Number Agreement.

The Test of Obligatory Number Agreement poses a slight problem for our definition of D-anaphoric versus R-anaphoric links. Consider these examples:

(22) Mariano wanted to have dinner with *Victoria*, but he couldn't, because his girlfriend had already arranged for a dinner appointment with *some other people*.

(23) Chris was expecting some of *her students* to show up at her office hour. On Tuesday, however, *a different person* knocked on her office door.

(24) *Five men in ski masks* entered the bank through a tunnel at midnight. What they didn't expect happened: *someone else* had already robbed the bank an hour earlier, and the whole building was swarming with police.

In all of the above three examples, the antecedent does not agree in number with the anaphor. According to our test, that would categorize the intended anaphoric links as D-anaphoric, even though the intended reading of the anaphoric links is a token-contraidentity reading in all of these cases. How is this possible?

The original test was designed to work with anaphoric elements expressing identity. If two DPs are referentially identical, obviously, they must agree in number for sure. For contra-identity, however, different conditions have to hold. It is conceivable for a contra-identity R-antecedent to be plural, while the R-anaphor is singular. That simply means that the antecedent is understood to be strictly non-identical (or contra-identical) to all of the members of the group described by the antecedent. That is, one has to except contra-identity R-anaphora from the Test of Obligatory Number Agreement. The Test of Obligatory Number agreement is a viable test only for cases of identity, that is for cases where the discourse referents introduced by the antecedent and the anaphor are constrained to have the same referent.

This discussion then leads us to the next test, the Test of Extended Projections. If the antecedents in the intended anaphoric links in (22)-(24) do not agree in number with the anaphors, can we still say that the antecedent is a maximal extended projection? As in (24), for example, the anaphoric *someone else* is understood as contra-identical to all of the members of the group circumscribed by the antecedent *five men in ski masks*. The contra-identity, however, is not between two sets, one containing a single element, the other containing five. Two sets with different cardinality are obviously not identical, but the intended reading poses a much stronger constraint on non-identity, namely it requires contra-identity.

Without resolving the issue here, let me remark that this phenomenon strongly points to the fact that a purely syntactic approach to anaphoricity is doomed to failure; instead anaphoricity must be formulated in terms of the semantic representation of DPs as opposed to their `mortal syntactic shell'. Since I will not get into the interpretation of plurals in this thesis, I put this problem aside for further thought and contemplation.

The Test of Accessibility goes through without any complications for contra-identity elements, although the judgements are fairly subtle:

(25) If John bought *a murder mystery* today, he'll be home reading it by now. Last week he bought *#another/#a different murder mystery*.

(26) Mark decided not build *a house* this year. Next year he will build *#another/#a different house.*

(27) Mariano wanted to buy *some food* yesterday. Instead, he got to buy *something else.*

In all of these three sentences a token-contraidentity reading is impossible[7]. Take for example (26). The only reading that this sentence allows is a kind-contraidentity reading, under which next year he will build a house that looks different from the one he would have built this year - provided that he had already had plans for what the house would have looked like were he to build it. This point becomes clearer, if we provide E-type paraphrases for the intended anaphoric elements:

[7] On closer inspection, as Jane Grimshaw (pc) pointed out, some cases expected to produce inaccessibility effects under a token-contraidentity reading are in fact acceptable, contrary to what one might expect:

(i) Jane is looking for *a chair*, and Alan is looking for *another one/#it.*

Under a non-specific reading of *a chair* (its specific reading being irrelevant here), this context blocks pronominal anaphora to *a chair*, which is the expected inaccessibility effect. Nevertheless the context still allows for the phrase *another chair*, expressing contra-identity, to be anaphoric on *a chair*. Why this is the case is still not totally clear for me. This example seems to involve an 'output condition' on the search, namely that there be two distinct chairs as the result of the hunt for chairs.

(28) If John bought *a murder mystery* today, he'll be home reading it by now. #Last week he bought *a murder mystery other than the murder mystery he bought today if he indeed bought a murder mystery*.[8]

(29) Mark decided not build *a house* this year. #Next year he will build *a house different from the house that he decided not to build this year.*

(30) Mariano wanted to buy *some food* yesterday. #Instead, he got to buy *something else than the food he wanted to buy yesterday*.

Of these three examples, given the token-contraidentity reading, (28) constitutes the clearest inaccessibility effect due to embedding the antecedent under negation or a modal operator.

But do anaphoric elements expressing contra-identity accept E-type paraphrases at all in contexts that do not involve anaphoric links crossing modal contexts or negation? Here are some examples that indicate that they indeed do:

(31) If John bought *a murder mystery* today, he'll be home reading it by now. He'll be thinking about *another murder mystery*, which he will buy next.

[8] This is the closest paraphrase I could imagine to an E-type paraphrase. The presence of the conditional in the sentence containing the antecedent obviously causes considerable problem in constructing a paraphrase.

(31') If John bought *a murder mystery* today, he'll be home reading it by now. He'll be thinking about *a murder mystery other than the murder mystery he bought today*, which he will buy next.

(32) Mark visited *a national park* this year. Next year he will visit *a different national park*.

(32') Mark visited *a national park* this year. Next year he will visit *a national park different from the national park he visited this year.*

(33) Mariano bought *some food* yesterday. He also has *something else* in his fridge.

(33') Mariano bought *some food* yesterday. He also has *something else than the food that he bought yesterday* in his fridge.

These three pairs of sentences demonstrate that substituting an E-type paraphrase instead of the contra-identity elements does not induce a change in meaning. Summing up with the results of the accessibility test, both tests indicate that the above anaphoric links containing contra-identity anaphors behave as R-anaphoric links.

The last test to discuss is the Test of Bound Variable Readings:

(34) *Every man who was shadowed* thought that *another man* was the real suspect, and so did every man who was part of the line-up.

(35) *Carla* hoped that Chris fell in love with *a different woman*, and so did Joanne.

(36) *Bill* has always lived on *someone else*'s money, and so did Pat.

In all three of these case we get a sharp and clear sloppy identity reading. For (34) that reading says that each and every man in the line-up thought that a man other than himself was the real suspect, for (35) that reading is that Joanne's hope was that Chris fell in love with someone other than Joanne, and finally for (36) the sloppy reading says that Pat has always lived off of money that was not his own earnings. Since sloppy readings typically arise with R-anaphoric links, the availability of such readings for (34)-(36) once again corroborates the conclusion that the anaphoric links under discussion are R-anaphoric links.

Having looked at our six diagnostic tests in detail, let us now step back, zoom to a wider angle, and take a look at more general anaphoric properties of contra-identity elements.

### 4.3.2. Other evidence for anaphoric behavior

While previous section talked about six specific properties that elements expressing contra-identity (such as *other*, *different*, and *else*) share with pronominal anaphoric elements, the parallel does not stop there. Since in general this parallel is not very well documented in a systematic fashion with the exception of Culicover & Jackendoff (1995), I will go through further similarities, as well as some differences, between contra-identity elements and pronominal (identity) anaphora in a somewhat painstaking detail. If the reader so wishes, s/he can just proceed to Section 4.3.3 for the further development of the theoretical argument. As I mentioned earlier, for now I will only talk about the R-anaphoric reading of contra-identity elements.

When we talk about anaphoric elements such as reflexives and pronouns, we think of linguistic expressions that meet a certain set of criteria. I will present some of these criteria one by one, with parallel examples from pronouns and elements expressing contra-identity. In the end (see Section 4.6) I will propose that the whole collection of properties characteristic of pronouns are due to several different factors, and just a subset of them are a manifestation of an anaphoric dependency. Other properties, where pronouns and contra-identity elements will depart, I will attribute to additional independent factors, such as restrictions on the distribution of definites. Now let us start with the question of deictic instances.

Imagine that the following sentences are uttered in a context where a male person just appears on the scene where two other people are already present, one of whom uses a pointing gesture to draw attention to the person entering:

(37) Is *he* coming to the party too?

(37') I thought *another guy/a different person/someone else* was coming to the party with us.

(37) shows a deictic use of a pronoun, while (37') shows a parallel use of contra-identity elements. Apparently the perceptual astuteness or conspicuity of a person allows reference to a character whose only relevant property is to be non-identical to the person present, as well as allowing direct reference to the person present.

Now consider a pronoun or an element expressing contra-identity in a discourse initial position, where they are not used deictically:

(38) *#He* entered the recital hall.

(38') *#Another guy/#a different guy/#someone else in a red hat* entered the recital hall.

In this context the italicized elements sound odd, uninterpretable for the reader. The way to salvage them is to introduce them with another sentence as in (39) and (39'):

(39) *A man in a black raincoat* was standing in front of the Met. *He* entered the recital hall.

(39') *A man in a black raincoat* was standing in front of the Met. *Another guy/a different guy/someone else in a red hat* entered the recital hall.

In these cases an both the pronoun and the contra-identity elements are licit, and they are understood as requiring referential identity or contra-identity to the italicized DP. In other words, elements expressing contra-identity need an antecedent on which they are referentially dependent the same way as pronouns need one. In (39) and (39') the antecedents are discourse antecedents, they do not bear any structural syntactic relationship to the anaphor. This is obviously not necessarily so, since its antecedent, for example, can c-command the anaphor, but not the other way around:

(40) *Joe* told *Bobby* that *Ted* knew that *Jack* suspected that *he* was to be assassinated.

(40') *Joe* told *Bobby* that *Ted* knew that *Jack* suspected that *another guy/a different person/someone else* was to be assassinated.

(41) *#He* told *Bobby* that *Ted* knew that *Jack* suspected that *Joe* was to be assassinated.

(41') *#Another guy/#a different person/#someone else* told *Bobby* that *Ted* knew that *Jack* suspected that *Joe* was to be assassinated.

Furthermore, in (40) and (40') any of the italicized names can serve as an antecedent to the pronoun and the contra-identity elements. More than that, both pronouns and contra-identity elements can take split antecedents:

(42) *Bobby* told *Jack* that *they* were to be assassinated.

(42') *Bobby* told *Jack* that *another guy/a different person/someone else* was to be assassinated.

In these sentences the intended reading is that where *they* in (42) refers to the Bobby and Jack, while in (42') *someone else*, for example, refers to someone other than Bobby or Jack[9].

[9] It seems that the default interpretation for a contra-identity element is to be contra-identical to all of the characters mentioned. That is, under the default reading (40) should be understood as:

(i) Joe told Bobby that Ted knew that Jack suspected that someone other than Joe, Bobby, Ted or Jack was to be assassinated.

This effect might be due to 1) a general processing strategy, as opposed to having the status of a formal (semantic or syntactic) constraint, or it might be due to 2) *someone else* taking a split antecedent, as suggested by (42). Since the bound variable readings are available with contra-identity elements as the anaphor of the anaphoric link (as pointed out in Section 4.3.1), we know that, at least under certain circumstances, contra-identity elements have a well-defined, unique antecedent.

Moving on, the examples in (40) and (40') already show that a c-commanding antecedent and the anaphor do not obey a locality condition in a contra-identity anaphoric relationship, since they can appear arbitrarily far from each other. Although they cannot be c-commanded by their antecedents, both pronouns and other (contra-identity) anaphoric elements can precede their antecedent in a preposed adverbial clause:

(43) Although *they* cannot be c-commanded by their antecedents, both *pronouns* and other (contra-identity) anaphoric elements can precede their antecedent in a preposed adverbial clause.

(43') Although *another anaphoric element/a different anaphoric expressions/?something else* can be c-commanded by its antecedent, *a pronoun* can precede its antecedent in a preposed adverbial clause.

(44) Until *he* had come out with a definite plan, *Jones* was not eager to enter the competition.

(44') Until *another bank/a different bank/someone else* had come out with a definite plan, *Citibank* was not eager to enter the competition.

As our final similarity, let me point out that contra-identity elements, similarly to pronouns, can get a `donkey-interpretation'. In other words, that is, anaphoric contra-

identity elements can be bound by (i.e. bound by and contra-identical to) an indefinite that is within the scope of a quantifier, even though the anaphor itself is not within the scope of that quantifier:

(45) Every farmer who sold *an old donkey* at the fair, bought *it* back the next day.

(45') Every farmer who sold *an old donkey* at the fair, bought *another donkey/a different donkey/something else* instead.

In addition to the parallels between pronouns and contra-identity elements recall that in the previous section we also drew some parallels as we submitted elements expressing contra-identity to the tests diagnosing R-anaphora. Without repeating the examples here, recall that R-contra-identity elements also resemble pronouns in the following respects:

(a) they cannot appear in predicative positions;

(b) they take maximal extended projections as antecedents[10];

(c) they show accessibility effects when the antecedent is embedded;

(d) they admit of E-type paraphrases;

(e) they allow for bound variable readings, which leads to sloppy identity under VP-ellipsis.

[10] Recall the proviso in Section 4.3.1 that in this respect the lack of obligatory number agreement between antecedent and a CI-anaphor is inconclusive about whether the antecedent of the contra-identity element is a maximal extended projection or not.

After enumerating all these similarities, it is time to point out where pronouns and contra-identity elements diverge. Beyond the obvious, (that pronouns require identity, and contra-identity elements require contra-identity with their antecedent) there are at least three major differences.

The first difference was already mentioned back in Section 4.3.1, in the discussion of the application of the Test of Obligatory Number Agreement to contra-identity elements. While pronouns must obligatorily agree with their antecedents in number, the same does not seem to hold of contra-identity elements, as one of the original examples repeated here demonstrates:

(46[=24]) *Five men in ski masks* entered the bank through a tunnel at midnight. What they didn't expect happened: *someone else* had already robbed the bank an hour earlier, and the whole building was swarming with police.

As I mentioned there (Section 4.3.1), I assume that this phenomenon should be explained in terms of the interaction of the mechanism expressing contra-identity and the interpretation of plurals. Intuitively there is absolutely no doubt that elements expressing identity (such as pronouns) must agree with their antecedent in number[11]. Contra-identity, on the other hand, requires that the character(s) mentioned by the antecedent be non-

[11] Of course this does not apply to group denoting anaphoric expressions:

(i) *Bill*, *Hillary*, *Al*, and *Tip* went on a picnic. *The happy group* rented a pink limo for the secret getaway.

identical to the character(s) mentioned by the antecedent, and therefore no number agreement is necessary[12].

The next difference concerns Crossover effects. Consider the following Strong and Weak Crossover effects that show up with pronouns:

(47) a. * *Whose* plays did *he* write _ ?

b. * How many of *Shakespeare*'s plays did *he* write _ ?

c. * *Who* does *he* think _ will win?

(48) * *Who* does *his* mother love _ ?

As Culicover & Jackendoff (1995) already pointed out, both Strong and Weak Crossover effects with *else* are very strongly diminished, or altogether non-existent. The same judgement holds for other two contra-identity elements discussed here[13]:

(47') a. ? *Whose* plays did *another person/a different person/someone else* probably write _?

[12] There is again another possibility to explain this behavior: one could assume that contra-identity elements explain an implicit identity-anaphor. Under this view *another X* and *a different X* would be identical to *an X other than it* and *an X different from it*. I will discuss this approach to contraidentity-anaphora in Section 4.3.4 under the heading of the Complex Anaphor View.

[13] Examples in (47)-(48') are from, or based on, Culicover & Jackendoff (1995), who originally attributed them to Ivan Sag.

b. How many of *Shakespeare*'s plays did *another person/a different person/someone else* probably write _ ?

c. ? *Who* does *no other person/??no different person/no one else* think _ will win?

(48') *Who* does *another person*'s/*a different person*'s/*someone else*'s mother love _ ?

Finally, the last difference between expressions commonly studied for their anaphoric behavior (reflexives, pronouns, R-expressions) and contra-identity elements is that contra-identity elements do not seem to show any Binding Principle violations, no matter what syntactic environment they appear in:

Principle A:

(49) a. *Every kid*$_i$'s description of *himself*$_i$ is full of exaggeration.

b. * *Every kid*$_i$ thinks that *himself*$_i$ is an absolute genius.

(49') a. *Every kid*$_i$'s description of *some other kid*$_{j\neq i}$/*a different kid/someone else* is full of exaggeration.

b. *Every kid*$_i$ thinks that *some other kids*$_{j\neq i}$/?*different kids/someone else* is/are an absolute bore.

Principle B:

(50) a. *Every director*$_i$ thinks that *he*$_i$ is the most talented man on the face of the earth.

b. * *Every director*$_i$ made a documentary about *him*$_i$.

(50') a. *Every director*$_i$ thinks that *another director*$_{j\neq i}$*/a different director/someone else* is the most talented man on the face of the earth.

b. *Every director*$_i$ made a documentary about *another director*$_{j\neq i}$*/a different director/someone else*.

Principle C:

(51) a. *Billy*$_i$'s older sister thought that *Billy*$_i$*/the kid*$_i$ was a pain in the ass.

b. * *Billy*$_i$ thought that *Billy*$_i$*/the kid*$_i$ was a genius.

(51') a. *Billy*$_i$'s older sister thought that *another kid*$_{j\neq i}$*/a different kid/someone else* was a pain in the ass.

b. *Billy*$_i$ thought that *another kid*$_{j\neq i}$*/a different kid/someone else* was a pain in the ass.

As one tries to explain the behavior of contra-identity elements with respect to the Binding Principles, there are at least two possible venues, which pertain to two possible

general assessments of the contra-identity anaphoric relations. Let us look at them in a bit of detail.

### 4.3.3. Two approaches to contra-identity: The Primitive Anaphor View and the Complex Anaphor View

One of the two possible a approaches to contra-identity would maintain the following:

(52) **The Primitive Anaphor View on Contra-Identity:** The contra-identity anaphoric (CI-anaphoric) relation is a primitive in the sense that it complements identity relations as another possible type of anaphoric relation. Contra-identity is therefore not derivable from an identity relation implicit in the anaphoric expression itself.

Under this view one could argue that CI-anaphoric elements just do not distinguish between different types of anaphoric elements, which is simply a historical accident, and that is the sole reason why elements expressing contra-identity show up in the union of the environments in which different types of identity anaphors (I-anaphors) are licit[14].

[14] It would be interesting to see if cross-linguistically there is any example of a morphologically unanalyzable I(dentity)-anaphoric element which shows up in the union of environments defined by the Binding Principles. In other words, the question is whether there is an I-anaphor which does not show violations with respect to at least two of the Binding Principles.

This view would be committed to a direct (possibly long distance) contra-identity anaphoric relation.

Someone holding a different view on the contra-identity issue would argue the following:

(53) **The Complex Anaphor View of Contra-Identity:** The contra-identity anaphoric (CI-anaphoric) relationship observed is not a primitive relationship, rather it results from the complexity of the anaphoric element, which contains an implicit identity anaphor (I-anaphor).

Several people have embraced the latter view, including Culicover & Jackendoff (1995), Safir (1992), among others. This view would represent *other* as a complex anaphor including a pronoun, approximately as *[other than PRONOUN]*, at some representational level. The non-local anaphoric link would be an identity link with the implicit pronoun as its anaphoric element. In this case contra-identity would be a strictly local constraint which would require contra-identity of the implicit anaphoric pronoun with the constituent it is contained in. In other words, an implicit pronominal element would mediate the apparent non-local contra-identity relation. With respect to binding properties, this approach would derive the lack of Binding Principle violations from the fact that the anaphoric element is a pronoun, and since the pronoun is embedded, no violations are expected to arise.

At this point I am not aware of any really compelling arguments for or against either of the two views, although Section 4.3.3 will present an argument indicating that the Complex Anaphor View is possibly incorrect. However, for the remainder of this dissertation (culminating in Section 4.6) I will explore the first of the two options, (which makes the stronger, more controversial claim of the two), and I will side with the Primitive Anaphor View, and assume that contra-identity is a primitive, unanalyzable relationship. Therefore I suppose that the properties exemplified by (37)-(45) are diagnostic of an anaphoric relationship, and that is the reason why I(dentity)-anaphoric and C(ontra-)I(dentity)-anaphoric elements share these properties. The divergent behavior of pronouns and contra-identity elements demonstrated in (46)-(51), I maintain, is due partly to the different semantic interpretation elements expressing identity and contra-identity, and partly to accidental properties of the two types of elements.

Nevertheless, whichever of the above two options one chooses to account for CI-anaphoric elements, the evidence provided in the present section shows overwhelmingly that phrases containing contra-identity elements such as *other, different, else* induce full-fledged anaphoric behavior under their referential reading, and do possess all the essential properties of anaphoric elements. Given this conclusion, before formalizing the CI-anaphoric relation in Section 4.6, let us take a closer look at the contra-identity counterpart of some I-anaphoric, but non-pronominal, elements such as epithets and anaphoric descriptions.

### 4.3.4. Contra-identity epithets

As Section 3.3 showed, the definite article of epithets was sufficient to set up a R-anaphoric link between the epithet and a suitable antecedent which required identity of reference. Similarly, we have corresponding epithets with elements expressing identity, such as *other*.

(54) When Alec went to pick up *his son* from school, *the little brat* tripped him at the door.

(54') When Alec went to pick up *his older son* from school, *another little brat/the other little brat* tripped him at the door.

In this section of the thesis I will not go through the original diagnostic tests for the D-anaphoric versus R-anaphoric distinction in any detail. It is amply clear intuitively that epithets, whether they require contra-identity or identity, do not behave like D-anaphoric expressions. Section 3.3. provided formal evidence that identity epithets indeed pass the tests for R-anaphoric behavior with flying colors. Since Section 4.3.1. provided overwhelming evidence for the R-anaphoric behavior of contra-identity elements, I assume that for space and time considerations I need not repeat those tests here. Nevertheless let us look at those properties of contra-identity epithets that they do not share with their counterparts expressing identity.

In general, contra-identity epithets share all the distributional properties of other CI-anaphoric elements. For example, a contra-identity epithet can be c-commanded by its antecedent; by contrast, a run-of-the-mill epithet is subject to Principle C of the Binding Theory, and therefore cannot be c-commanded by its antecedent:

(55) *My son* asked if I would succumb to every whim of *#the little brat.*

(55') *My son* asked if I would succumb to every whim of *another little brat/the other little brat.*

Not only can contra-identity epithets be c-commanded by their antecedent, but they can be also bound by the antecedent[15]. This is obvious from the fact that a sloppy identity reading is available for the following sentences, even though such a reading is unavailable for regular epithets[16]:

(56) *Every nurse that has a heart patient to take care of* switched hours with *another /the other bitch in the Intensive Care Unit*, and so did <u>every doctor on call</u>.

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[15] Remember though that S-structure c-command is not a necessary relation for the availability of a bound variable reading:

(i) The people of *every northern city* hate the traffic in *the damned place*, but the people of <u>southern cities</u> never seem to.

In this example from Higginbotham (1983) a bound variable reading is available for the epithet *the damn place*, even though S-structure c-command does not hold.

[16] For the sloppy identity reading in (57) one has to assume that both Jill and Beata think of themselves as angels living in this valley of tears, and walking the doomed face of this earth.

(57) *Jill* denied that Mary works with *another angel/the other angel* every night shift, and so did Beata.

Furthermore, CI-anaphoric epithets do not induce Principle A or Principle B violations either:

(58) *Dan* convinced George to appoint **himself/him/another idiot/the other idiot* to the chair of the Gun Control Committee.

(59) *Every kid*'s description of *himself/*him/another little brat/?the other little brat* is full of exaggeration.

In other words, it seems that the anti-c-command behavior of traditional epithets is due to the anaphoric definite article (which requires anaphoric identity), and not to the fact that they only contain an R-anaphoric link. Note that the mere presence of a definite article does not create a Binding Principle C violation, as (54'), (55'), (56)-(59) show. The definites in those examples are not anaphoric, rather descriptive definites: the definiteness signals that the (contextually) unique availability of a character which fits, for example, the description *an idiot other than Dan* given in (58). For a Principle C violation to arise, apparently, definiteness itself must be interpreted anaphorically; the definite article when interpreted as expressing unique reference does not induce Principle C violations.

Looking at CI-anaphoric epithets, however, the question arises how one derives the fact that, for example, in (58) there are two alleged idiots mentioned: Dan on the one hand, and the idiot that George appointed to the Gun Control Committee. What is the status of these predicational relationships? Given the two options for assessing CI-anaphoric relations, namely whether it is a primitive relation (as assumed by the Primitive Anaphor View), or whether it involves an implicit pronoun (as supposed by the Complex Anaphor View), does either of these two options fare better with respect to deriving this phenomenon?

Suppose the Primitive Anaphor View for now. Given that approach we get the following representation for the anaphoric link in (58):

| (60) | Syntax | *Dan* | | *another idiot* |
|---|---|---|---|---|
| | DT | $DAN_1$ | | $IDIOT_2$ |
| | RT | $x_1$ | <-/- | $y_2$ |

The crossed arrow simply indicates that $y$ is anaphoric on $x$, but the anaphoric relation is that of contra-identity instead of identity. What should be semantic interpretation of the crossed arrow?

In Section 3.2.2 we briefly talked about the semantic interpretation of the arrow between two discourse referents on the Referential Tier. The arrow simply expressed a constraint on how to map the discourse referents connected with an arrow onto the individuals in the universe of the model. The arrow required that the two discourse referents it connects be mapped onto the same individual in the model. The crossed arrow, however, requires that the two discourse referents be mapped onto two individuals in the model that are not, and cannot be, identical. Note that this constraint on the mapping from the representation to the model is stronger than just requiring that there be two distinct discourse referents. The introduction of the two distinct discourse referents is just equivalent to the Novelty Condition of Heim (1982). The condition on mapping discourse referents connected with a crossed arrow in our representation requires a stronger non-identity than the Novelty Condition. Section 4.5 will discuss in detail why the Novelty Condition is not adequate in accounting for elements such as *other*, *different*, and *else*.

Now let us turn to the question how come that we know that the description *idiot* applies to Dan as a result of the use of the CI-anaphoric epithet *another idiot*. The representation was originally set up so that $y$ is interpreted as an instantiation of *idiot*. To make sure that $x$ inherits this property, we have to propose some form of an implicature. The implicature must state that in an anaphoric link, even if the link is a CI-anaphoric link,

the antecedent shares the description provided by the anaphor[17]. This implicature will be the topic of the upcoming Section 4.3.5.

Assuming the Complex Anaphor View, stating that I-anaphoric elements contain an implicit anaphor, we would get a representation something like this:

| (61) | Syntax | *Dan* | *another idiot* |
|---|---|---|---|
| | DT | $DAN_1$ | $IDIOT_2$ |
| | RT | $x_1$ | $[y$ = other than $z]_2$ |
| | | | $z=x$ |

In this representation the anaphoric element *z* is embedded in the constituent which instantiates (and is thus co-indexed with) the description *idiot*, namely *y*. How do we get the effect that the pronominal element itself is also interpreted as an instantiation of the type *idiot*? I assume that under this theory one would also need to propose an implicature, that the description *idiot* is `inherited' by the embedded anaphoric element *z* from the constituent it is embedded in, namely *y*. Finally, since the anaphoric element is I-anaphoric on its antecedent, in effect, the antecedent is attributed the property of being an idiot indirectly.

[17] Note the asymmetry of this assumption. The `share-the-description' relation is not symmetrical: the antecedent does not transfer its description to the anaphor. We will examine this relationship in more detail in the next section of the dissertation.

Although this discussion seems to lean somewhat in favor of the Complex Anaphor View of contra-identity, in Section 4.3.6 I will present evidence that this view cannot be correct. Given this I propose (60) as the representation of CI-anaphoric epithets instead of (61). With this I conclude this subsection, so that we can address the question of contra-identity anaphors and their descriptive content in more general terms.

### 4.3.5. On sharing and transferring description: the generous anaphor and the stingy antecedent

First of all, take one of our earlier examples from the closing part of Section 3.4 with a slight modification, and the range of CI-anaphoric indefinite and definite descriptions listed in (63)-(65):

(62) *Two middle-aged men dressed as F.B.I. agents* entered the Oval Office hoping to interrupt the broadcast of the weekly presidential address. *Three others* had diverted the guards' attention by acting indecently on the White House lawn.

(63) a. two other middle-aged men dressed as F.B.I. agents who entered the Oval Office hoping to interrupt the broadcast of the weekly presidential address

b. two other middle-aged men who entered the Oval Office

c. the other three men

d. another two men dressed as F.B.I. agents

e. two other men

f. the other men

(64) a. three other intruders

b. two other unexpected visitors to the President's Office

c. the two males

d. the two persons

(65) a. some other bastards

b. four other embittered postal employees

c. the other three fierce-looking European terrorists

All the phrases in (63)-(65) could be substitute for *two others* in (62), while being anaphoric on the subject of the first sentence.

The very first thing to notice is that while I-anaphoric descriptions were always definite descriptions, with CI-anaphors the phrase containing the anaphoric element (*other* in this case) can be either definite or indefinite. This is simply due to the fact that a CI-anaphoric relation obviously does not involve identity, therefore it does not require a definite phrase. The anaphoric phrase itself can introduce a new discourse referent at the same time as it is anaphoric. Furthermore, when the anaphoric phrase containing *other*

is a definite phrase, the definiteness is not due to anaphoricity, rather it signifies the unique applicability of the description of the anaphoric phrase. That is, for (63.c) this means that there are only three other men involved in getting to the President's office, not four or more.

Now let us take a little closer look at the relationship between the descriptive contents of the anaphor and the antecedent. For the cases in (63) and (64) the CI-anaphoric relation is facilitated, or is made possible, by a more or less explicit relation between the descriptions provided by the antecedent and the anaphor. What exactly is this relationship?

Similarly to I-anaphoric definite descriptions, CI-anaphoric expressions (whether definite or indefinite) draw on descriptions that activate their antecedent. As we saw in Section 3.4 already, the descriptive content of those in (63) invoke explicitly mentioned description of their antecedent. An overwhelming majority of the examples that I have used so far to demonstrate the anaphoric nature of CI-anaphoric phrases were of this kind. Those in the second class, in (64), contain descriptions which are not explicitly mentioned by or about their antecedent in the first sentence, but it can be inferred from it, sometimes employing real world knowledge. The pattern underlying the relation between the descriptions in the anaphor and the antecedent is again rooted in the taxonomy of concepts presented in Section 3.4.

As before, the two classes that draw on, or repeat, description previously introduced in the discourse should be distinguished from the third class in (65), which behave like epithets in that they introduce new descriptive material that applies to the anaphor and antecedent. In the previous section we gave a representation of epithets, which I assume carries on to other elements of this group straightforwardly.

So far CI-anaphoric descriptions do not seem to be so different from I-anaphoric descriptions in terms of the behavior of the descriptive content. However, note the following major difference: When the anaphoric link is an I-anaphoric link, the anaphor and antecedent share all of the descriptive content introduced by either the anaphor or the antecedent, as we saw in Chapter 3. In other words, in the case of I-anaphoric links, the object which the antecedent and anaphor of an I-anaphoric link are mapped onto will be instances of both kinds introduced, that is both the kind introduced by the antecedent of the I-anaphoric link and the kind introduced by the anaphor of the same I-anaphoric link.

On the other hand, when the anaphoric link is a CI-anaphoric link as opposed to an I-anaphoric link, the only description that the antecedent and the anaphor share is the description mentioned in the anaphor. For example, take (65.b): using the phrase *four other embittered postal employees* implies that both those that entered the Oval Office were dissatisfied employees of the mail carrier service, but it does not imply that the four postal employees also entered the Oval Office to cause trouble. That is, while the descriptive content of the anaphoric expression applies both to the anaphor **and** the

antecedent, the full (E-type) description of the antecedent does not transfer to the anaphor. Instead, sharing descriptive content between the antecedent to the anaphor is only possible to the extent that the anaphor explicitly mentions it. For example, (64.a) gives a case where the anaphor shares some descriptive content with its anaphor, but only because it mentions some descriptive content (*intruder*) which directly inferable from the explicit description given in (62). That is, to sum up briefly, the anaphor behaves generously towards its antecedent in that it shares its descriptive content with it. The antecedent, however, behaves stingily towards the expression anaphoric on it in that the antecedent only shares of its descriptive content the portion that the anaphor explicitly grabs.

### 4.3.6. Implicit arguments as antecedents

The last part of Section 3.4 pointed out a restriction on the availability of implicit arguments as antecedents, as the examples repeated here demonstrate:

(66) Bill ate at an Indian restaurant tonight. *The food/#it* was delicious, but a bit too spicy for him.

(67) Joe set the day of his wedding. *The bride/#she* does not know about it yet.

(68) Sam is a college president. *The college/#it* is about half an hour from his house.

(69) Kip went elephant hunting last year. *The elephant/#it* was really hard to get close to.

These examples show that normally implicit arguments are inaccessible as antecedents for pronouns, even though definite descriptions are licit as anaphors on implicit arguments.

Now consider the following examples which are comparable to those above, but they contain CI-anaphoric elements instead of I-anaphoric ones:

(70) Bill last ate at 7 o'clock last night. He should have eaten *?something else*, it's already 9 o'clock in the evening.[18]

(71) Joe set the day of his wedding for a month from now. He wants to talk to *some other brides* to see how women feel about the day of their wedding.

---

[18] This sentence would be perfect if it contained *more* instead of *other*:

(i) Bill last ate at 7 o'clock last night. He should have *some more food*, it's already 9 o'clock in the evening.

Since I have not been looking at *more* so far, I do not want to introduce it at this point. I simply want to remark that more is a mass counterpart of *other*, and that is what makes (i) better than (70). Notice, however, that *other* can in fact substitute for *more* in some cases:

(ii) [After walking for 20 minutes to find a suitable restaurant...] I am hungry, I am not willing to walk for *another thirty minutes/thirty more minutes* before we find a restaurant that you like.

(iii) When Mr. Jordan left Duff & Phelps, he owned *188 shares* and was making installment payments on *another 62*. WSJ

(72) Sam is a college president. *Another college* is about half an hour from his house.

(73) Kip went elephant hunting earlier this year. He *shot another elephant* last year.

The acceptability of these sentences show that CI-anaphoric elements can apparently access implicit arguments as their antecedents. But what is the relevance of this observation?

The importance of the acceptability of the anaphoric links lies in what they entail about the possible representation of CI-anaphoric elements. Recall the two possible views on the nature of CI-anaphoric relations, discussed in Section 4.3.4: the Primitive Anaphor View of Contra-Identity, and the Complex Anaphor View. These two views differ in terms of whether they posit CI-anaphoricity as a primitive anaphoric relation, or as a complex anaphoric relation mediated by an implicit pronoun. In particular, the data suggests that the Primitive Anaphor View is closer to the truth in this case. Let us see why this is so.

Under the Primitive Anaphor View the anaphoric antecedent is the implicit argument. Since the anaphor itself is an indefinite description (not a definite description as in the case of an I-anaphoric element) it is expected to be able to access the antecedent due to the descriptive content (*food*, *bride*, *college*, *elephant*) the anaphoric phrase contains.

On the Complex Anaphor View, we expect that the implicit arguments are not accessible for a CI-anaphoric element. This outcome is expected for the following reason. Under the Complex Anaphor View the CI-anaphoric phrase looks approximately like this: *[other than PRONOUN].* That is, the antecedent is accessed through an implicit (I-anaphoric) pronoun. In Section 3.4 we saw (and the crucial examples are repeated in (66)-(73)) that pronouns cannot access implicit arguments as antecedents.

In sum, the accessibility of implicit arguments for phrases containing CI-anaphors supports the Primitive Anaphor View of Contra-Identity. In Section 4.6 I will indeed give a formal extension of anaphoric relations to cover CI-anaphoric elements as well as I-anaphoric elements. Before that, let us take a short detour into the realm of subordinate and superordinate descriptions.

### 4.4. Superordinate and subordinate anaphoric descriptions: CI-anaphoric indefinites and definites

This section will discuss one aspect of the relationship between the description contained in the antecedent and the anaphor, but from a point of view different from the one taken in Section 4.3.4. Here I will consider how the descriptions can bias the anaphoric link to be an R-anaphoric link.

First of all, consider the sometimes subtle, sometimes not so subtle, contrasts in the following examples:

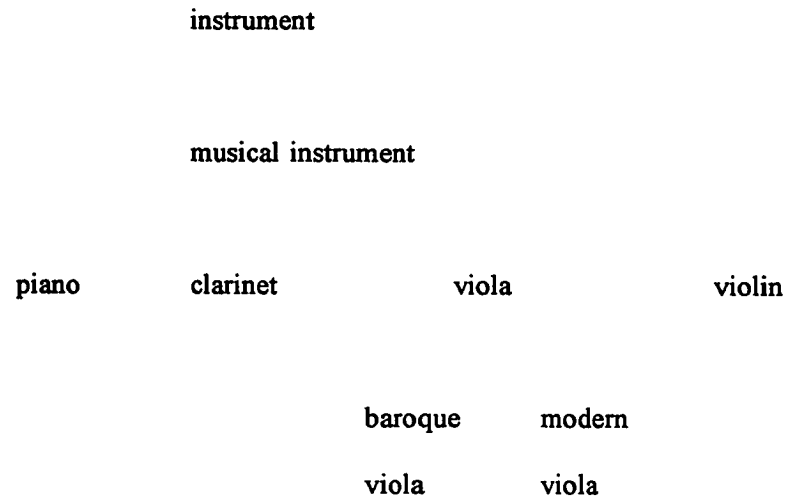
(74) If John bought a *French detective novel* today, he'll be home reading it by now. I really hope that he bought a *#different French detective novel/#a different one/✓a different detective novel/✓*a *different book.*

(75) Last year Leon decided not to write a *political manifesto*, but next year he will write *#another political manifesto/?#another one/?another manifesto/?another political document.*

(76) Although Beth was looking for a baroque *viola*, she found *#a different baroque viola/#a different one✓*a *different viola/✓*a *different instrument.*

The first observation to make is that the acceptability or unacceptability of the intended anaphoric links is correlated with the relationship between the descriptive content of the antecedent and the anaphor. When the anaphor and the antecedent share the same descriptive content, then the anaphoric link is unacceptable. When the anaphor contains less description than the antecedent, or possibly a concept superordinate to the concept in the antecedent, the anaphoric link is acceptable. For the example in (76) we are operating in the following taxonomy:

(77)




The second observation concerns the modal structure underlying the examples: all three of the examples in (74)-(76) are instances of contexts where the intended anaphoric link crosses modal boundaries. In each of the cases we have examples of an acceptable anaphoric link, and an illicit anaphoric link. Recall the Test of Accessibility. The test states that if an anaphoric link crossing modal contexts is illicit (i.e. the anaphoric antecedent is inaccessible for the anaphor when the antecedent appears in a modally subordinated context), then it is an R-anaphoric link. If, on the other hand, the link can cross modal contexts (i.e. accessibility does not degrade with embedding the antecedent in a modal context) then the link is a D-anaphoric link. Given the test we must conclude that the acceptable anaphoric links in (74)-(76) must be D-anaphoric links, while the unacceptable links are all R-anaphoric links.

Let us put the two observations together. It boils down to stating the following generalization:

(78) **The Biassing Effect of Copied Description:** If the anaphor of a Contra-Identity anaphoric link contains the same description as its antecedent, then the intended anaphoric link must be an R-anaphoric link.

It turns out that this generalization is deducible from properties that I have discussed. Consider the scenario when the descriptions of the antecedent and the anaphor are identical. Descriptional-Contra-Identity anaphora (DCI-anaphora) would mean that the two descriptions are different from each other. Since the two descriptions are identical, however, DCI-anaphora is meaningless in this case. In other words, the contra-identity in such a case must be interpreted as Referential Contra-Identity.

The generalization in (78) further predicts that when the unacceptable anaphoric links in (74)-(76) appear in a context where an RCI-anaphoric reading is available, the anaphoric links are supposed to be acceptable as R-anaphoric links. The prediction is indeed borne out, as the examples below show:

(79) John got *a French detective novel* out of the library last week. I really hope he that this week he got ✓*a different French detective novel*/✓*a different one*/✓*a different detective novel*/✓a *different book*.

(80) Last year Leon wrote *a political manifesto*, and next year he will write *another political manifesto/another manifesto/another political document.*

(81) Beth was practicing on *a baroque viola* all last year. This year she wants to get *a different baroque viola/a different viola/a different instrument.*

The R-anaphoric reading is made available for the intended anaphoric links in these three examples, since the anaphoric links do not cross modal contexts. As the D-anaphoric reading is ruled out, and R-anaphoric reading is the only acceptable reading here.

The next thing to point out is the relevance of the difference between *other* and *different*: There is a contrast in acceptability between anaphoric links with *other* and *different* when the descriptive content of the anaphor is a concept superordinate to the concept employed as the descriptive content of the anaphor. For a D-anaphoric link as in (76), *different* sounds somewhat better than *other*.

(82) Although Beth was looking for a *baroque viola*, she found ??*another*/✓a *different viola/instrument.*

On the other hand, when the descriptive content of the anaphor is simply an exact copy of the antecedent, as with the R-anaphoric link in (83), *other* wins out over *different*[19]:

(83) Beth was practicing on a *baroque viola* all last year. This year she wants to get ✓*another*/?*a different baroque viola.*

Although I do not have time to examine what aspect of the fine semantic composition of *other* and *different* can be made responsible for these subtle contrasts, I want to put forth the following hypothesis: The contrast between (82) and (83) suggests that purely R-anaphoric links prefer *other*, while purely D-anaphoric links prefer *different*. This means that, when both *other* and *different* are equally acceptable as in (84), we can take that as indicating that probably there are two parallel CI-anaphoric links involved: one on the RT, and another on the DT:

(84) Beth was practicing on a baroque *viola* all last year. This year she wants to get *another/different viola/instrument.*

---

[19] At this point a bit of cross-linguistic comparison comes handy. Hungarian apparently distinguishes the R-anaphoric v. D-anaphoric contrast among CI-anaphoric elements with two related morphemes, *más* cca. 'different' and *másik* cca. 'other'. Consider therefore the following contrast:

(i) Péter egy *barokk brácsát* akart venni Örzsének. Örzsének viszont egy *más*/**másik brácsa* kellett volna, mert éppen modern darabokat játszott.
'Peter wanted to buy a baroque viola for Liz. However, Liz would have needed a different/*another viola because she was playing modern pieces at the time.'

(ii) Péter *egy barokk brácsát* vett Örzsének. Örzse viszont vett *egy **más*/*másik barokk brácsát*, mert a Péter által vásárolt brácsának nem volt jó hangja.
'Peter bought a baroque viola for Liz. However, Liz bought *a different/another baroque viola because the viola bought by Peter did not have a good sound.'

| (85) | Syntax | *a baroque viola* | | *another/different instrument* |
|---|---|---|---|---|
| | DT | BARoque VIOLA$_1$ | <-/- | INSTRUMENT$_2$ |
| | RT | $x_1$ | <-/- | $y_2$ |

This conclusion is the counterpart of the conclusion I reached in Section 3.4 for the representation of I-anaphoric definite descriptions.

Finally let us very briefly look at cases which involve anaphoric descriptive content which is subordinate in a taxonomy of concepts to the descriptive content of the antecedent. For this, I simply reverse the descriptions between anaphors and antecedents in (74)-(75) and (79)-(80):

(86) If John bought a *book* today, he'll be home reading it by now. I really hope that he bought a *#different French detective novel/#a different detective novel/#a different book.*

(87) Last year Leon decided not to write a *public document*, but next year he will write *#another political manifesto/#another manifesto/#*another public document.

(88) John got *a book* out of the library last week. I really hope he that this week he got ??*a different French detective novel*/??*a different detective novel*/?a *different book*.

(89) Last year Leon wrote a *political document*, and next year he will write *another political manifesto*/*another manifesto*/another political document.

Notice that these examples show a striking pattern. When, due to modal subordination effects, only a D-anaphoric interpretation would be available for the anaphoric link, as in (86) and (87), the anaphoric relation is blocked if the description of the anaphor is at least as specific as the description provided by the antecedent[20]. However, when the R-anaphoric reading is made available as in (88) and (89) (because there is no intervening modal or negation here) the anaphoric link is acceptable even though the anaphor contains more specific descriptive content than the anaphor[21]. These examples therefore lead to another generalization about the nature of the anaphoric link relative to the descriptive content of the antecedent and the anaphor:

[20] As we saw back in (74)-(76), if the anaphor provides less specific descriptive content, the D-anaphoric reading is possible.

[21] These two examples in fact belong to the third group of R-anaphoric expressions identified in Sections 3.4. and 4.3.4. Anaphoric phrases in this group, which includes epithets, provide new descriptive information relative to the descriptive information provided by the antecedent.

(90) **The Biassing Effect of Increased Description:** If the anaphor of a CI-anaphoric link contains description more specific than its antecedent, then the intended anaphoric link must be an R-anaphoric link.

This generalization is explicable on independent grounds, just like our other generalization earlier. Here is how.

In Section 4.3.5 we discussed the difference between anaphors and antecedents in terms of whether they transfer their own descriptive content to the other element of the anaphoric link. Antecedents were stingy in this respect, they did not extend their descriptive content to the anaphor; at the same time anaphors were found to be generous in that whatever descriptive content they contained, they transferred that to their antecedent, as we saw in the case of epithets for example. Such a transfer is therefore possible in links that are RCI-anaphoric links, and the transfer is mediated through the CI-anaphoric discourse referents. How come that DCI-anaphoric links do not allow this kind of transfer?

The discussion of our previous generalization in (78) [The Biassing Effect of Copied Description] showed that if anaphor and antecedent contain the same description, D-anaphoric contra-identity is impossible: there is no available type which the anaphoric type should be contra-identical to. This is also true, if the description of the anaphor is more specific than the description of the antecedent: there is no type available for the

anaphor to be contra-identical to, since the antecedent did not introduce a range of available types. This then explains the generalization in (90).

With this remark I want to conclude the section on the relative richness of the descriptive content of the antecedent and the anaphor. Now, after discussing so much pure data, let us return to advancing the theoretical side of the argument.

### 4.5. Contra-Identity and the Novelty Condition

For now let us return where we left off at the end of Section 4.3.2. That section as well as the section preceding it provided ample evidence for the anaphoric behavior of elements expressing contra-identity. We must still ask at this point whether the behavior of elements such as *other*, *different*, and *else* is indeed due to a formal, anaphoric relationship, or if it is derivable from purely pragmatic considerations that concern reference.

We know that phrases containing elements expressing contra-identity, unless predicative, introduce characters (discourse referents) into our discourse that are referentially non-identical to characters (discourse referents) that have already been introduced. One well-known condition that accounts for such behavior of indefinites is the Novelty Condition of Heim (1982), given in (91):

(91) **Novelty-Familiarity Condition** [Heim (1982)]: Suppose something is uttered under the reading represented by $\Psi$, and the file prior to the utterance is F. Then for every $NP_i$ in $\Psi$, it must be the case that: $i \in Dom(F)$ if $NP_i$ is definite, and $i \notin Dom(F)$ if $NP_i$ is indefinite. Otherwise, the utterance is not felicitous under this reading.

Informally, for indefinites the Novelty-Familiarity Condition states that every indefinite must introduce a new character (a new referential index or a new discourse referent) with respect to the domain of the discourse introduced so far.

The question now is the following: Section 4.3.1 presented examples which showed that the token-contraidentity reading of elements expressing contra-identity such as *other*, *different*, and *else* behaves like an R-anaphor. Section 4.3.2 presented detailed evidence showing that these elements expressing contra-identity behave much like pronouns in a lot of other respects, including the availability of a deictic reading and a donkey-interpretation, and split antecedents. Can the parallel drawn between pronouns and CI-anaphors in these two sections be indeed explained by a basically pragmatic condition such as Heim's Novelty Condition? Can the examples and effects presented in these two sections be explained by requirement that the discourse referent introduced by a DP (or NP in Heim's terminology) containing *other*, *different* or *else* be novel to the discourse the same way as it is required for any indefinite?

One might claim that one does not need contra-identity as a formal relation, rather some novelty requirement such as Heim's might be sufficient to explain the introduction of a novel character or discourse referent. But this is about all that the Novelty Condition can in fact explain. Beyond this the Novelty Condition fails to explain the properties examined in the two sections mentioned above. Given that, we will have to conclude that the effects of elements expressing contra-identity are due to a formal link comparable to a pronominal anaphoric link. Now let us examine one by one the reasons why the Novelty Condition is insufficient in accounting for the basic data on contra-identity.

First of all, the Novelty Condition is a global requirement on the novelty of the discourse referent introduced, while contra-identity targets a specific DP with respect to which the discourse referent must be new.

Second, contra-identity applies to definite DPs as well (*the other X*, *something else*), as well as to indefinites. Since definites do not observe the Novelty Condition, we would remain without an explanation for the behavior of the definite phrases expressing contra-identity in (92):

(92) a. the other example

b. the other woman in a red hat

Third, if the only requirement on a phrase containing *other, different* or *else* was that it be novel to the discourse, there would be no explanation as to why (93') is bad, even though (93) is acceptable:

(93) One monday afternoon *a guy in a red hat* entered the recital hall.

(93') #One monday afternoon *another guy in a red hat* entered the recital hall.

Although in this discourse initial sentence (93') the discourse initial *other* indefinite introduces a new discourse referent, still the discourse is ill-formed. This must be a condition on top of the Novelty Condition, since *another guy in a red hat* does indeed introduces a new discourse referent.

Finally, the novelty requirement imposed on indefinites by the Novelty Condition is cancelable. This means that under certain circumstances, an indefinite that had been introduced into the discourse can be explicitly identified with a discourse referent that had been introduced earlier, as in (94):

(94) Last night I saw a movie at Coolidge Corner, and Bill saw one at the Janus. Guess what! We found out today that we saw *the same movie*.

On the other hand, if the indefinite contains an element expressing contra-identity such as *other*, there is one NP with which it cannot be accidentally co-referential, namely the NP that it is contra-identical to[22]:

(94') Last night I saw *a movie* at Coolidge Corner, and Bill saw *another/a different one/something else* at the Janus. Guess what! #We found out today that we saw *the same movie*.

To sum up, it seems that the Novelty Condition of indefinites is not strong enough to explain the behavior of phrases such as *other, different, else*. In lieu of a better explanation then we have to assume that the behavior of *other* is due to an anaphoric condition, by which a phrase containing *other, different*, or *else* is related to a previous discourse referent in a special way, namely that it is contra-identical to it.

Recall the two views on the nature of elements expressing contra-identity which I presented in Section 4.3.2: the Primitive Anaphor View of Contra-Identity and the Complex Anaphor View of Contra-Identity. Later, in Section 4.3.5, I presented some evidence against the Complex Anaphor View of Contra-Identity, the view that assumes

[22] Recall that CI-anaphoric elements, as well as I-anaphoric elements, can have split antecedents:

(i) Joe told Bobby that Ted knew that Jack suspected that someone other than Joe, Bobby, Ted or Jack was to be assassinated.

In such a case there would be several DP's in the discourse with which the indefinite cannot be identified, namely all of its split antecedents.

that contra-identity is composed of a non-local I-anaphoric link and a local CI-anaphoric relation. That left us with the Primitive Anaphor View of Contra-Identity. In this present section I showed that the contra-identity relation cannot be derived from such a basic discourse principle as the Novelty Condition. Given this, there is only one option left for us to do: to extend the notion of anaphoricity to subsume CI-anaphoric relations in addition to the I-anaphoric relations.

### 4.6. Redefining anaphoricity

Giving a new definition of anaphoricity implies at least two steps: extending the notion of anaphoricity itself, and examining what consequences such an extension has for the Binding Principles of the Binding Theory.

#### 4.6.1. Extending anaphoricity

Let us now see what it takes to capture the formal conditions on the distribution of phrases containing *other*, *different*, or *else* with a constraint that looks very much like the anaphoric condition on pronouns. Of course, for such phrases the relationship will be that of contra-identity instead of identity known from pronouns. (96) gives an definition of

R-anaphoricity which allows for both identity and contra-identity anaphoric links[23], at the same time eliminating reference to binding from the definition of anaphoricity:

(95) **Anaphoricity:**

A is anaphoric to B if A and B are referentially identical, and in a binding relation (e.g., B c-commands A)

(96) **Extended R-Anaphoricity (i.e., Referential Dependency):**

A is *R-anaphoric* on B in the extended sense (A is *referentially dependent* on B) iff the element of the model universe onto which discourse referent instantiating A is mapped is a function of the element of the universe onto which the discourse referent instantiating B is mapped, i.e. anchor(A) = F[anchor(B)];

if F is identity function → standard anaphoricity (I-anaphoricity)

if F is function where for all x: $F(x) \neq x$ →contra-identity dependency (CI-anaphoricity)

Which function in this definition F actually stands for in the case of a given anaphoric link is obviously determined by the dependent/anaphoric expression A. That is, if A is a pronoun, F must be the identity function, while if A contains a word such as *other*,

[23] Note that this extension of anaphoricity is not accepted by Keenan (1988), Safir (1992), Culicover & Jackendoff (1995), who all argue for different versions of the Complex Anaphor View of Contra-Identity, that is the view that maintains that contra-identity results from a complex anaphoric expression which contains a I-anaphoric element.

*different*, or *else*, the function F will be a function which never maps an individual onto itself[24].

This formal definition, however, will have to be complemented by some mechanism that transfers the description of the anaphor over to the antecedent, as we saw with both I-anaphoric and CI-anaphoric epithets as well as in the case of anaphoric descriptions that were more specific than the description contained in the antecedent: Therefore let us formulate the following condition on anaphoric links:

[24] These are the only two functions that can be defined over a set of individuals, provided there is no ordering or any operation defined over the elements of the set.

(97) **The Transfer of Description from the Anaphor:** Take the following anaphoric configuration, where F labels the anaphoric link as an I-anaphoric or CI-anaphoric link:

| | | | |
|---|---|---|---|
| Syntax | $\alpha$ | | $\beta$ |
| DT | $A_1$ | | $B_2$ |
| RT | $x_1$ | $<-^F-$ | $y_2$ |

Such a configuration entails that, in addition to the two instantiation relations indicated in the diagram (i.e., Inst(x,A) and Inst(y,B)) the following holds as well: Inst(x,B), that is x is an instantiation of type B, as well as of type A:

| | | | |
|---|---|---|---|
| Syntax | $\alpha$ | | $\beta$ |
| DT | $A_1$ | | $B_{2,3}$ |
| RT | $x_{1,3}$ | $<-^F-$ | $y_2$ |

First of all, it is clear that the effects of description-transfer are of course only detectable if the anaphor provides more specific description than its antecedent. When the anaphor provides more specific description than its antecedent, we need to examine the behavior of the two anaphoric types separately.

For a CI-anaphoric relation this simply means that the anaphor transfers its descriptive content to its antecedent. Since the `transfer-description' relation is not symmetrical, the anaphor does not receive the description of its antecedent in the case of a CI-anaphoric link.

Nevertheless, in the case of an I-anaphoric link the relationship is apparently symmetrical. How is that possible, given that the `transfer' relation itself is not symmetrical? This is due to the interpretation of I-anaphora: the `transfer' relation can be assumed to be the same. I-anaphora states that the two discourse markers are mapped onto the same individual in the universe of the model. Identity of course means that the description of both the antecedent and the anaphor are instantiated by the same character. The effect this gives is that in the case of I-anaphoric links, the transfer of descriptions between the antecedent and the anaphor appears to be bidirectional. As the behavior of CI-anaphoric elements testifies, this is simply an epiphenomenon.

Now returning to the formalization of anaphoric links, let us see what else is missing from (96). Having defined extended R-anaphoric relations, we have to give a definition related to (96) which would account for D-anaphoric relations. Since types do not map onto individuals in the model, we have to formulate the condition slightly differently, namely in terms of their instantiations in possible worlds:

(98) **Extended D-Anaphoricity (i.e., Descriptional Dependency)[25]:**

A is *D-anaphoric* on B in the extended sense (A is *descriptionally dependent* on B) iff in all possible worlds all the instantiations of A can be maintained as a function of the instantiations of B, ...A... = F[...B...];

if F is identity function → descriptional identity

if F is function where for all x: $F(x) \neq x \rightarrow$ contra-identity dependency

As before, the dependent expression will determine the nature of the anaphoric link, whether it is an I-anaphoric or a CI-anaphoric link.

As far as the R-anaphoric versus D-anaphoric ambiguity is concerned, we can say the following: In earlier parts of this chapter and in the previous two chapters we have seen contexts which force one of the two readings. For example, as one of our six original tests observes, a context forcing modal subordination effects will only allow for a D-anaphoric reading. In Section 4.4 we also saw that the relative specificity or richness of the descriptive content of the anaphor (as compared to the descriptive content of the antecedent) can bias the anaphoric link towards an R-anaphoric reading.

Extending the notion of anaphoricity as given in (96) means that in turn binding must be redefined so that I-anaphoricity is dissociated from the binding relation itself: we have seen instances of bound variable readings with CI-anaphoric elements, therefore binding

[25] The formalization of this condition needs some work obviously. For example, in D-anaphoricity the two types or concepts A and B are never unrelated.

is not an exclusive property of I-anaphoric relations. (99) gives a formulation of Binding along these lines:

(99) **Extended Binding:**

B *binds* A in the extended sense iff

(i) B c-commands A, and

(ii) A is R-anaphoric on B in the extended sense

This suggestion is in line with several other proposals in the literature. Take Saxon (1984), Higginbotham (1985), or Enç (1989). On the other hand, it contrasts with the proposal of Fiengo & May (1994), who, in effect, defend the position that binding is inseparable from I-anaphoricity.

At this point I cannot yet discuss formally why the definition of extended binding only allows R-anaphoric elements to be in a binding relation to their antecedent. In intuitive terms, leaving out D-anaphoric elements from the definition of binding is based on the systematic lack of bound variable readings for D-anaphoric links. In Chapter 7 I will suggest, that only the elements of the RT participate in relations such as binding. For now let us assume this definition without more explanation.

### 4.6.2. The Binding Principles and extended anaphoricity

Given that CI-anaphoric elements are now subject to binding under the revised notion of Binding, let us look at how these elements are fare with Principles A, B and C as formulated in a generic version of the GB Binding Theory and its descendants.

As is well-known, Binding Theory distinguishes between three different categories: reflexives, pronouns, and R-expressions (including proper names, anaphoric definite descriptions, epithets). These three types of expressions are subject to the three different principles of the Binding Theory, Principles A, B, and C respectively. The relevant paradigmatic contrasts for these cases are repeated from Section 4.3.2 in (100) through (102), followed by examples for Strong and Weak Crossover violations from the same section:

**I-anaphoric elements**

Principle A:

(100) a. *Every kid*$_i$'s description of *himself*$_i$ is full of exaggeration.

b. * *Every kid*$_i$ thinks that *himself*$_i$ is an absolute genius.

Principle B:

(101) a. *Every director*$_i$ thinks that *he*$_i$ is the most talented man on the face of the earth.

b. * *Every director*$_i$ made a documentary about *him*$_i$.

Principle C:

(102) a. *Billy*$_i$'s older sister thought that *Billy*$_i$/*the kid*$_i$/*the little brat*$_i$ was a pain in the ass.

b. * *Billy*$_i$ thought that *Billy*$_i$/*the kid*$_i$/*the little brat*$_i$ was a genius.

Strong and Weak Crossover:

(103) a. * *Whose* plays did *he* write _ ?

b. * How many of *Shakespeare*'s plays did *he* write _ ?

c. * *Who* does *he* think _ will win?

(104) * *Who* does *his* mother love _ ?

Section 4.3.2 also discussed the fact that CI-anaphoric elements in English do not split along the same lines as I-anaphoric elements do. Instead of showing the appropriate distribution for either one of the three anaphoric types, they occur in the union of all of the above environments; in other words, elements expressing contra-identity do not show a violations with respect to any of the three Binding Principles.

**CI-anaphoric elements**

Principle A: no effect

(100') a. *Every kid*$_i$'s description of *some other kid*$_{j\neq i}$/*a different kid*/*someone else* is full of exaggeration.

b. *Every kid*$_i$ thinks that *some other kids*$_{j\neq i}$/*?different kids/someone else* is/are an absolute bore.

Principle B: no effect

(101') a. *Every director*$_i$ thinks that *another director*$_{j\neq i}$/*a different director/someone else* is the most talented man on the face of the earth.

b. *Every director*$_i$ made a documentary about *another director*$_{j\neq i}$/*a different director/someone else*.

Principle C: no effect

(102') a. *Billy*$_i$'s older sister thought that *another kid*$_{j\neq i}$/*a different kid/someone else* was a pain in the ass.

b. *Billy*$_i$ thought that *another kid*$_{j\neq i}$/*a different kid/someone else* was a pain in the ass.

Moreover, CI-anaphoric elements show considerable improvement with examples that induce crossover violations with I-anaphoric elements such as pronouns:

Strong and Weak Crossover: diminished or no violation

(103') a. ? *Whose* plays did *another person/a different person/someone else* probably write _?

b. How many of *Shakespeare*'s plays did *another person/a different person/someone else* probably write _ ?

c. ? *Who* does *no other person/??no different person/no one else* think _ will win?

(104') *Who* does *another person*'s/*a different person*'s/*someone else*'s mother love _ ?

Given that I rejected the Complex Anaphor View of Contra-Identity in favor of the Primitive Anaphor View, the data concerning the binding properties of phrases containing elements expressing contra-identity drives us to the following conclusion: CI-anaphoric elements in English do not fall under the rubrics allowed by the Binding Principles for anaphoric elements[26].

Given this data, the obvious question to ask is whether it is a universal property of languages that I-anaphoric elements invoke Binding Principles A-C, but CI-anaphoric elements do not.

Enç (1989) gives examples for the behavior of the Turkish CI-anaphoric element *kendisi* which, like the English phrases with other, can be bound locally or non-locally. On the

[26] Proponents of the Complex Anaphor View would argue that the reason why phrases expressing contra-identity do not show Binding Principle violations is because the pronominal element is embedded in the phrase containing the element expressing contra-identity. Since the pronoun is embedded deeply enough, we do not expect Principle B violations. As for the other two Binding Principles, we do not expect violations since a pronoun is only subject to Principle B.

other hand, an oft-cited work on Dogrib (which also served as part of the motivation for Enç:1989), Saxon (1984) argues that the Dogrib morpheme *ye-* behaves as a disjoint reflexive: it is an element which shows the distribution of reflexives, but requires that it be contra-identical to its binder. The existence of such an element would indicate that languages have the option of subjecting CI-anaphoric elements to the Binding Principles. Saxon (1995), however, recanted her earlier analysis, and suggested that on closer inspection the morpheme cannot be recognized as a disjoint reflexive, and that the observed behavior of *ye-* is derivable from its morphological composition. Since the dust has not settled yet over this issue, I think this question cannot be decided unanimously, and has to be left open for future research.

I want to close this section with three further questions that this discussion raises:

i) Are there languages where I-anaphoric elements are insensitive to Binding Principles? Are Long Distance anaphors perhaps examples of this type?

ii) Are there languages where CI-anaphoric elements show the full array of binding possibilities, i.e. in addition to a disjoint element with the distribution of a pronoun.

iii) Are switch reference languages a good representative of CI-anaphoric pronouns maybe?

While I do not even attempt to answer these questions here, I think pursuing them would lead to fruitful and interesting discoveries. For now, however, let us move on to the long awaited discussion of parallel anaphoric links on the two representational tiers.

### 4.7. Parallel anaphoric links

In Sections 3.4 and 4.4 I proposed that I-anaphoric and CI-anaphoric (definite) descriptions involve two parallel anaphoric links on the two representational tiers. For those cases both links are of the same kind: either both links are I-anaphoric, or both are CI-anaphoric links:

| | | | | |
|---|---|---|---|---|
| (105) | Syntax | *a baroque viola* | | *the instrument* |
| | DT | BAROQUE VIOLA$_1$ | <-- | INSTRUMENT$_2$ |
| | RT | $x_1$ | <-- | $y_2$ |

| | | | | |
|---|---|---|---|---|
| (106) | Syntax | *a baroque viola* | | *another/different instrument* |
| [=85] | DT | BAROQUE VIOLA$_1$ | <-/- | INSTRUMENT$_2$ |
| | RT | $x_1$ | <-/- | $y_2$ |

One could possibly argue that one of the two anaphoric links in these cases are not really independent links, and one of the two links could be derived from the other (the D-anaphoric link derived from the R-anaphoric link, or vice versa). While this might be the case for these examples, there are expressions which clearly force two independent

anaphoric links on the two tiers. What could these two links be like? It would be hardly possible to find an instance of an RI-anaphoric link with a DCI-anaphoric link: identity of reference entails that the referent cannot instantiate two contradictory descriptions[27]. We have to look elsewhere. We need to find an RCI-anaphoric link that is parallel to a DCI-anaphoric link. *Another one* instantiates exactly this scenario.

### 4.7.1. The case of *another one*

Probably the most interesting data with *other* involves the combination of two, superficially contradictory anaphoric dependencies:

(107) Marilyn was sleeping with *one Kennedy brother*, while Jackie was sleeping with *another, younger one*.

*One* instantiates a DI-anaphoric link, as we have seen, while *other* can in principle introduce either a DCI-anaphoric or an RCI-anaphoric link. In this case it is clear that *other* introduces an R-anaphoric link, since DCI-anaphoricity would require that the anaphor contain less specific description than the antecedent. This is obviously not true in this case, since *one* is anaphoric on *Kennedy brother*. That is, the CI-anaphoric link

[27] Maybe examples of referential opacity could lead to such a situation. Representing referential opacity, however, requires a much richer representation, which would need to incorporate the possibly different belief states of different individual. This task is way beyond what I am trying to accomplish with this dissertation.

is an R-anaphoric link, which co-exists with a DI-anaphoric link. Combining the two links in a representation gives us a configuration represented by the following diagram:

| (108) | Syntax | *one Kennedy brother* | | *another, younger one* |
|---|---|---|---|---|
| | DT | KENNEDY BROTHER$_1$ | <-- | [ONE ]<br>[YOUNGER ]$_2$ |
| | RT | $x_1$ | <-/- | $y_2$ |

Of course the elements of the two tiers are not perfectly aligned; in other words, different constituents serve as antecedents of the two anaphoric links. The anaphor of the R-link instantiates a constituent of the DT which the D-anaphor is embedded in, rather than instantiating to the D-anaphor itself. That is, the anaphor of the R-link (the discourse referent introduced for *another, younger one*) instantiates the constituent *[$_{DP}$ YOUNGER ONE ]*, which **contains** the anaphoric element of the D-anaphoric link, *[ ONE ]*. Schematically this can be represented as follows, where W is D-anaphoric on V:

| (109) | DT | $[...[V]...]_1$ | | $[...[W]...]_2$ |
|---|---|---|---|---|
| | RT | $x_1$ | <-/- | $y_2$ |

What is important to notice is that both the antecedent and the anaphor of the D-anaphoric link are embedded in constituents corresponding to the respective elements of the R-

anaphoric link. In effect, the D-anaphoric link is embedded in the R-anaphoric link. The question we need to ask is whether this is always the case.

### 4.7.2. Principle of Anaphoric Embedding

Now consider the following example:

(110) Eleanor dug up *a yellow **gardenia*** from the flower bed, and planted *it* next to the bird bath. Phil bought a white **one** to replace *it*. After some convincing, he returned it, and bought *another yellow **one*** instead.

In this mini-discourse the phrase *a yellow gardenia* provides antecedents for several anaphoric links at the same time: *gardenia* serves as an antecedent to *one*, while *a yellow gardenia* serves as an antecedent to *it* and to *another yellow one*. This scenario can be diagrammed as follows:

(111)

| Syntax | *a yellow gardenia* | | *it* | *a white one* | *another yellow one* |
|---|---|---|---|---|---|
| DT | ⌈ GARDENIA ⌉<br>⌊ YELLOW ⌋$_1$ | | $IT_2$ | ⌈ ONE ⌉<br>⌊ WHITE ⌋$_3$ | ⌈ ONE ⌉<br>⌊ YELLOW ⌋$_4$ |
| RT | $x_1$ | <-- | $y_2$ | $z_3$<br><-\- | $w_4$ |

Here a single expression serves as an antecedent of several different anaphoric links at the same time, both I-anaphoric and CI-anaphoric links. In other words, it is possible to construct several co-existing anaphoric links which access a given constituent (and its subconstituents) as their antecedent. In effect, the diagram in (111) shows a branching structure in that all anaphoric links access the whole or part of the same antecedent.

Anaphors themselves, on the other hand, do not seem to allow such branching. To see exactly what this means, consider the example in (112) with its two intended readings given in (113):

(112) Eleanor wanted to buy *a lilac bush*. To please Phil she bought *a myrtle* the next day. The day after, however, she went out to buy *another one*.

(113) a another one = another myrtle

b another one = another lilac bush

The two intended readings of this sentence would exemplify the diagrams below. (114.a) represents (113.a), while (114.b) represents (113.b):

(114) a.

| Syntax | *a lilac bush* | *a myrtle* | | *another one* |
|---|---|---|---|---|
| DT | [ LILAC BUSH ] | | | |
| | | [ MYRTLE ]$_1$ | <-- | [ ONE ]$_2$ |
| RT | | $x_1$ | <-\- | $y_2$ |

| b. | Syntax | *a lilac bush* | *a myrtle* | | *another one* |
|---|---|---|---|---|---|
| | DT | [ LILAC BUSH ] | <-- [ MYRTLE ]$_1$ | | [ ONE ]$_2$ |
| | RT | | $x_1$ | <-\- | $y_2$ |

Of these two intended readings only the first one is available, but the second is apparently impossible. What blocks such a configuration of anaphoric links? Above in (111) a phrase and its subconstituent served as an antecedent to several (therefore branching) anaphoric dependencies. By the same token, it is in principle conceivable that an anaphor be referentially CI-anaphoric one element, and be descriptionally I-anaphoric on a constituent that is not the instantiated by the antecedent of the RCI-anaphoric link[28]. That would create a branching anaphoric links at the anaphor's end of the anaphoric link, as represented in (114.b). For example, how would a computer know that such a configuration is inadmissible? How can we rule out such a configuration?

At this point at least there is nothing in the theory of anaphoric relations that would rule out the unacceptable reading (113.b) and the corresponding configuration in (114.b). Therefore we need to formulate an independent principle which constrains the relationship of links on the two representational tiers:

[28] As I mentioned earlier, such a configuration would not be possible with I-anaphoricity on both levels, since referential I-anaphoricity would entail descriptional I-anaphoricity.

(115) **Principle of Anaphoric Embedding:** If the anaphoric element of a D-anaphoric link is embedded in a projection which instantiates the anaphor of an R-anaphoric link, the same containment relationship holds of the antecedents of the two anaphoric links. That is, then the antecedent of the same D-anaphoric link is embedded in a projection that instantiates the antecedent of the same R-anaphoric link.

This principle can therefore be used to rule out the combination of parallel links given in (114.b), whether the links involved are I-anaphoric links or CI-anaphoric links. Although this configuration is logically possible, it is never realized as an the representation of an acceptable reading.

And this concludes the discussion of parallel anaphoric links. So let us quickly summarize the morals of this chapter.

## 4.8. Conclusion

Traditional approaches to anaphora almost exclusively study R-anaphors, and assume that the only available anaphoric relation is that of co-reference (i.e., I-anaphoricity), which is traditionally expressed with the device of co-indexing. I have shown plenty of evidence that phrases containing *other, different, else* are referentially dependent elements,

much the same way pronouns are. Based on this data I argued for an extension of the notion of anaphoric relations to include elements expressing contra-identity. Further I have shown that CI-anaphoric elements in English are indifferent to the Principles Binding Theory. I used this phenomenon to argue for dissociating anaphoricity itself from the binding relationship.

We have seen how the relative specificity of the anaphoric description in a CI-anaphoric link can bias the anaphoric link for an R-anaphoric interpretation. For these cases I posited two parallel anaphoric links on the two tiers. The interaction of the two representational tiers (DT and RT) further made it possible to easily represent more complex anaphoric relationships, such as instances of *another one*. This, I argue, provides further evidence for the necessity of splitting the representation into two levels.

Given all this, let us very briefly look at the Big Picture so far, and take a quick look at the new taxonomy of anaphoric elements in English as given in (116). The two orthogonal parameters that categorize an referentially dependent expressions are whether the dependent element can be descriptional or referential, and whether the anaphoric link is an I-anaphoric or CI-anaphoric link. Among the I-anaphoric elements we find a variety in terms of what Binding conditions they are subject to (such as reflexives vs. pronouns), while CI-anaphoric elements in English are neutral to the Binding Principles.

(116)

| | Referential | Descriptional |
|---|---|---|
| identity | reflexives<br>pronouns<br>anaphoric definite descriptions<br>epithets<br>etc. | *one* |
| | *the same thing* | |
| contra-identity | *other*<br>*different*<br>*else*<br>etc. | |

## PART II: EVENTS AND TIERS

We arrived to Part II of the thesis. But why have two parts?

Part I of the dissertation concentrated solely on nominal expressions, and the reference of DPs. I looked at the anaphoric behavior of several different nominal anaphoric elements. In particular, I examined the distinction between D-anaphora and R-anaphora within the domain of individuals.

The D-anaphoric v. R-anaphoric distinction, however, is not restricted to nominal expressions, rather it is an independent phenomenon. Part II of the thesis will discuss the relevance of this distinction in the domain of events and event types, and motivates further innovations in the representation of anaphoric elements in a discourse.

In the following chapter (Chapter 5) I introduce the D-anaphoric v. R-anaphoric distinction in the domain of events. This distinction will motivate the introduction of event discourse referents and event types on the two parallel representational levels discussed in Chapter 3. The extension of the representation is the topic of Chapter 6.

In addition to incorporating token events and event types into the representation, Chapter 6 will point to a more complex organization of the two representational levels introduced. In particular, it will show evidence for the interdependence of the discourse referents introduced for events and individuals. This will involve expanding on the idea of the two-level representation introduced in Chapter 2 by introducing a dependency structure between discourse referents represented on the Referential Tier. The representation will yield a new representation of specificity. Finally, Chapter 7 gives a comparative look at the two level representation (DT/RT) from the point of view of Discourse Representation Theory.

But first let us look at the connection between events and indefinites.

## CHAPTER 5: Anaphora and Events

In the previous three chapters I examined anaphoric relations between DPs and smaller nominal projections, as well as anaphoric relations between discourse referents of the individual type, which (in the theory presented here) are instantiations of DPs. In this chapter I lay the foundations for a theory that allows dependency relations between discourse referents of a single sentence. Let us start this with looking at the necessity of introducing event variables, and the R-anaphoric versus D-anaphoric distinction between token events and event descriptions.

### 5.1. Why do we need event variables? Extending the representation

Event variables have been introduced into some form of representation in wildly different frameworks. The earliest mention of this idea seems to have been in Reichenbach (1947), which was then taken up by the much-cited Davidson (1967), introducing event variables into the linguistic limelight.

There are several phenomena that show the necessity for the introduction of event variables into the semantic representation:

-events as arguments

-pronominalization over events

-the categorial status of expressions of events

-quantification over events

-logical inferences

-metaphysical considerations

I will take each of these in turn.

Before starting out, however, I want to make a point on the terminology I will be using. The term *event* has often been used in a rather loose, pre-theoretical sense in the semantic literature. This is partially due to the existence of several co-existing, but incompatible conceptions of events. In one sense of the word (as used by Mourelatos:1978)), an event contrasts with a state and a process. Events happen, culminate in time[1]. States and processes either persist or continue, but lack a culminatory aspect. In another, still looser sense of the word, the term *event* acts as a superordinate category comprising of all four of the Vendlerian types: states, activities, achievements, and accomplishments (cf. Vendler:1967). This is the sense of the term *event* for which Bach (1981) and (1986) introduced the term *eventuality*. Mentioning *eventualities* therefore does not commit us to talking about any one particular Vendlerian type. Since the term *event* is often used

[1] In Vendler's (1967) terminology events would consist of accomplishments and achievements.

in this sense, and I find eventuality a somewhat cumbersome term, I will keep using *event* in its non-discriminatory sense throughout the rest of thesis. This is only a matter of convenience for me and for the reader, but it should not lead to any confusion or misunderstanding. The discussion will always be about eventualities in general. Having cleared this up, let us proceed to see why we need to introduce variables for events, or more precisely, for eventualities.

### 5.1.1. Events as arguments

Part I of the thesis talked about entities of the individual type, whose canonical syntactic realization is a DP. A large majority of verbs in English, and probably in most languages, take DPs or PPs as arguments. These arguments are typically represented by individual type variables and (locative) relations defined on pairs of individuals in the semantic representation of the given utterance. That is the reason why Part I of the thesis dealt with anaphoric relations between nominal expressions and discourse referents of the individual type. Other verbs, however take events as their semantic arguments. What is the canonical syntactical realization of events?

Canonically events are realized in the form of IPs/CPs, possibly depending on the syntactic repertoire available for the given language[2]. In the simplest case, a full sentence supposedly stands as the expression of the existence of some state of affairs, or stating the occurrence of an event, etc.:

(1) The students in the class know German.

(2) The model plane crashed into a pole and broke into pieces.

(3) The baby started crying at 11pm because she was hungry.

Events, states, etc. however, can appear as arguments as well. Verbs of perception and attitude verbs typically take some form of an eventuality as their argument:

(4) I heard that the car crashed into the shop window.

(5) Louise saw Bill fall off the roof.

(6) Henrietta believes that diapers should be discarded very carefully.

[2] As Bill Ladusaw pointed out to me, a third possible canonical realization of an event would be a VP. Basically this position is reflected in syntactic approaches that assume a VP-internal subject at some representational level. In Chapter 7 I will briefly discuss Diesing's (1992) version of the VP-internal subject hypothesis, and how it relates to her version of Existential Closure. For now, however, I will put aside VPs as canonical realizations of events.

(7) I want Victoria to teach me Spanish.

On the other hand, it is not even close to true that the only possible way to syntactically realize an event is through an IP or CP. Take the following sentences:

(8) *The earthquake* shook the houses of Northridge, and woke up all the residents.

(9) *The painting of this picture* took seven months for Vermeer.

These two sentences exemplify two different ways of realizing an event in the form of a DP. The first example, (8) shows *the earthquake*, an event denoting, non-derived nominal. Such nominals inherently refer to events, as it is evident from their ability to combine with predicates expressing duration:

(10) *The earthquake* lasted for thirty seconds.

(11) *The earthquake* was over in twenty five seconds.

Another way to mold an event in the form of a DP is to pack it into a deverbal nominal, as in (9). Even though syntactically both are nominal, it is clear (as argued at length in Grimshaw:1990, for example) that these DPs refer to events. As Grimshaw points out, among others, a deverbal nominal still possesses an argument structure closely related to

the argument structure of the verb from which the nominal is derived, in addition to exhibiting aspectual properties similar to the aspectual properties of the verb.

In the semantic representation of verbs argument places are represented as variables. These variables then get a certain value (often the value of a constant, or that of a variable) when the semantic representation of the sentence is built up from its parts. Since events can substitute for arguments of verbs, events must be interpreted as variables or as constants as well, similarly to the way individuals are represented.

### 5.1.2. Pronominalization and anaphora over events

The previous section already showed that events are very similar to other entities in terms of what place they can occupy in the semantic representation of argument structure: they can appear as arguments of verbs just like individuals can. As is also well known, both events (just like individuals) and event types (just like kinds) can be referred to by the use of a deictic expression:

(12) [on seeing Arnold doing a bungee jump into a ball of fire]
Did you see *that*?! I want to try *the same thing* too!

(13) [on seeing your child approach the wall plate with a screwdriver]
I have told you not to do *that*, it is extremely dangerous. Entertain yourself with *something else*.

In addition to deictic reference, events can act as antecedents to pronouns the same way individual type entities do:

(14) *Ray was dancing lambada with Joan.* Edgar was watching *it* in a rage of jealousy.

(15) *Ray* was *dancing lambada with Joan.* Edgar was dying to try *it* too.

The latter two examples were often discussed under the terminology of `sentential *it*' in the literature. In general, the discussion of using pronouns to refer to entities of the event type goes at least as far back as Davidson (1967) and Akmajian (1973).

How does this observation bear on the issue of the existence of event variables? Following the proposals of Kartunnen (1969) and McCawley (1968), pronouns have been represented as variables in the semantic literature. More recently, as in File Change Semantics and in Discourse Representation Theory, indefinites themselves have been represented as syntactic entities introducing so-called discourse referents into the semantic representation of the discourse, which are variables themselves. Anaphoric links in such frameworks are then expressed as declaration of identity over the values of two variables.

Given that events can be referred to by pronouns, they should be represented with variables as well.

In addition, notice that the above uses of expressions referring to events split into two types. The first type consists of instances where the expression refers to a specific token event that took place or is taking place. This is the use we see in the first sentence of (12), and in (14). On the other hand, the same expressions can refer to types of events, or descriptions of events that did not necessarily take place. The uses in the second sentence of (12), in (13) and (15) are such. This distinction will be the R-anaphoric versus D-anaphoric distinction in the event domain. We will discuss this in length in later sections of this chapter.

### 5.1.3. Quantification over events

A further piece of evidence for the existence of an event variable comes from sentences that require quantification over events.

In the most intuitive sense, a simple affirmative sentence such as (16) expresses existential quantification over an event, by stating just the occurrence of that event:

(16) A dog chased a squirrel up the tree in our backyard.

$\exists t\ \exists e\ \exists x\ \exists y$ (dog(x) & squirrel(y) & chase(e) & Agent(e,y) & Patient(e,y))

Other cases point to the effects of universal quantification over events:

(17) Bhuvana always visits Bourbon Street when she travels to New Orleans.

(18) Ariel always goes to the Met when they perform a Verdi opera.

In these two instances, informally, we get the following readings: On each occasion when Bhuvana is in New Orleans, she goes to visit Bourbon Street; and, on each occasion when the Met performs a Verdi opera, Ariel goes to see that performance. In informal formal notation we get the following representation for (17):

(19) $\forall e_1$ (traveling($e_1$) & Agent($e_1$,bhuvana) & Goal($e_1$,new_orleans) ->

--> $\exists e_2$( visiting($e_2$) & Agent($e_2$,bhuvana) & Goal($e_2$,bourbon_street))

In this representation the existentially quantified $e_2$ is within the scope of, and therefore bound by the universally quantified $e_1$. This is similar to cases where an existentially quantified individual variable is within the scope of a universally quantified individual variable.

The final piece of evidence concerning quantification I am going to mention comes from Krifka (1990). He pointed out that the following sentence has two different readings:

(20) Four thousand ships passed through the lock.

The first reading involves, what he calls *object related quantification*. Under that reading there are four thousand different ships which passed through the lock. The other reading involves *event related quantification*. Under this reading there were four thousand events of a ship passing through the lock, but these four thousand instances of a ship passing need not involve four thousand different ships; a single ship might have crossed several times, and would still count towards the four thousand `ship-passings'. It is obvious therefore that without quantification over an event variable the second reading could not be expressed.

### 5.1.4. Logical inferences over events

Davidson in his influential 1967 paper argues for the introduction of an event variable into the semantic representation of `action sentences'. The introduction of the event variable is in part designed to account for logical inferences of the following kind:

(21) I flew my spaceship to the Morning Star.

---

I flew my spaceship.

(22) I flew my spaceship to the Morning Star

the Morning Star = the Evening Star

---

I flew my spaceship to the Evening Star.

In his system, the sentence

(23) I flew my spaceship to the Morning Star.

would have the following representation:

(24) $(\exists x)$(Flew(I,my spaceship,x) & To(the Morning Star,x))

Given the representation the inference presented in (23) is almost trivially true, since it simply involves dropping one of the two conjuncts. For the inference in (22), we would only need to invoke principles of extensionality. Since the Morning Star turned out to be extensionally identical to the Evening Star, substituting one for the other in an

extensional context such as (22) will not make any difference for truth conditional meaning.

Davidson further argues that it would be extremely hard to explain the apparently wildly variable polyadicity of verbs without using an event variable. This can be seen from the following short argument. In principle every action sentence can take an unlimited number of modifiers:

(25) Jones buttered the toast slowly, deliberately, in the bathroom with a knife by holding it between the toes of his left foot.....

If we assume that the modifiers in (25) all add an argument to semantic relations or functions serving as the semantic representation of this utterance, we are left with very little to say about the exact number of arguments of the function representing an action verb. However, if we use an event variable in the semantic representation as in (26), and consider each modifier as adding another conjunct which modifies the existentially quantified event variable (similarly to what Davidson indeed would have proposed for the case of (23)), verbs will maintain the number of arguments (with certain limits, of course), and the problem of uncontrollable variable polyadicity disappears.

(26) (∃e)(Buttered(Jones,the toast,e) & Did(Jones,e,slowly) & Did(Jones,e,deliberately) & Did(Jones,e,in the bathroom) & Did(Jones,e,with a knife) & ...

Such a representation introduced by Davidson has given way to a somewhat different, neo-Davidsonian representation (originally attributable to Parsons:1990). In such a representation the event variable appears independently, and the arguments of the verb that serves as the basis of the event description appear in separate conjunctive clauses:

(27) ∃e (flying(e) & Agent(e,I) & Patient(e,my spaceship) & Goal(e,the Morning Star))

Still, this representation grew out of the original Davidsonian representation, which first introduced event variables in a semantic representation.

### 5.1.5. Metaphysical considerations

Let us now step back a little bit to look at the range of entities that must exist in our metaphysics. No one would question that objects or individuals should be considered as existing atomic entities, such that a theory could make reference to them. Objects and individuals persist in time, maintain their identity at least through some period of time. They can be referred to through linguistic expressions, sometimes with the help of names or deictic pronouns, or with the help of different definite or indefinite descriptions.

However, these intuitive criteria also call for recognizing the existence of other kinds of entities, namely those of events. Events can be directly observed or witnessed as they are

happening. They happen in time, even though some of them do not seem to take up a period of time, rather appear to be punctual. They can be referred to with deictic expressions as we saw above in Section 5.1.2. They can also be referred to via definite descriptions as we saw it back in (9) *the painting of this picture* and (10) *the earthquake*, and sometimes they can be referred to via names, as it is the case with *the Big Bang*, for example.

In fact, often objects or individuals are identified only inasmuch as we observed them as participating in an event:

(28) Two minutes before the end of the game, a lanky, blonde guy from the Boca Juniors scored a goal against the opposing team.

(29) *The lanky blonde guy from the Boca Juniors who scored a goal to the opposing team two minutes before the end of the game* was brought up in Boston.

In these properties again, events resemble objects or individuals, which provides one more piece of evidence for treating events similar to objects and individuals. This therefore involves introducing an event (or eventuality) variable in the representation of the discourse.

### 5.1.6. Do we need both time and event variables?

Semantic or logical representations often include a time variable, frequently in addition to an event variable. The introduction of the time variable into the representation is motivated by argumentation similar to that normally presented for the necessity of the event variables: pronominalization, and existential and universal quantification. While I will not elucidate the arguments for introducing a time variable, the question arises whether a single representation would need to include both an event variable and a time variable, or one of them is redundant. If redundancy were to be established, which variable would we retain? Are the two variables maybe interchangeable? There have been some suggestions that the two variables (time and event) should be reduced to a single variable, form which the other one can be derived. However, there are some very simple arguments that show that the two variables cannot be reduced to one.

Consider the following: A certain token event happens at a certain point in time or spreads out over a certain period of time, possibly with interruptions. However, that certain token event happens only once: it cannot be repeated at a different time. The painting of the Mona Lisa, for example, took place over a certain time period, interrupted occasionally. This token event of painting will never occur again. Events of the same *type* might occur again at a different time, but not the same *token* event. For instance, suppose that Leonardo painted a replica of the Mona Lisa, slavishly mimicking all his actions during the painting of the original. The painting of the replica will be an event

of a sufficiently similar *type* to the event of painting the original, although taking place at a different time, but it will not be the same token event. Without the specification of the time when these two events happened we would not be able to tell them apart, since they belong to the exact same event type. Therefore we cannot eliminate the time variable in favor of a lonely event variable taking all the burden in the semantic representation of token events.

To consider why event variables cannot be derived from time variables alone, imagine the following situation. Let us say, yesterday from 3pm to 4pm I was preparing seviche. In the same period of time, someone could have prepared the first stock of vaccine against H.I.V. infection. Given the situation, the two events (the cooking and the vaccine preparation) took place at exactly the same time. It is pretty obvious though that the two events have to be distinguished as separate events beyond the time at which they both took place, as it is attested by their differing potential impact on the future of mankind, for example. That is, a time variable cannot sufficiently individuate an event.

Because there is no one-to-one correspondence between events and points of times or intervals, we can safely conclude that the two variables cannot be reduced to one variable in any immediately obvious way.

## 5.2. Anaphora on token events and event descriptions

Chapters 2 and 3 showed that nominal anaphora comes in two different guises: Descriptional anaphora and Referential anaphora. In particular, Chapter 2 put forth tests that distinguish the two types. In one of the previous sections (Section 5.1.2) I argued that token events (as in (30)) and event types (as in (31)) can act as antecedents to an anaphoric relation:

(30[=14]) *Ray was dancing lambada with Joan.* Edgar was watching *it* in a rage of jealousy.

(31[=15]) Ray was *dancing lambada with Joan.* Edgar was dying to try *it* too.

The anaphoric links in the above two sentences will actually turn out to be quite different. The anaphora on event token (which is sometimes called 'factive *it*') as in (30) will pattern with R-anaphora, while anaphora on event type as in (31) will pattern with other instances of D-anaphora.

The type of contrast between these two examples is indeed crucial to the goals set out by this thesis. In this section I will support in detail the claim that *it*, a pronoun, can act either as a D-anaphor or as an R-anaphor. If this claim is indeed true (and this is what I will show), that means that even pronouns, which have been assumed to only participate

in referential anaphoric links, can be ambiguous, and used as the anaphoric element of a descriptional anaphoric link as well. Furthermore, it also means that at least certain lexical items with anaphoric properties, such as *it*, cannot be lexically designated as an exclusively D-anaphoric or exclusively R-anaphoric item. Instead the nature of the anaphoric link (whether it is a descriptional or referential link) will have to be somehow derived from the syntactic, semantic, and pragmatic properties of the context in which the anaphoric expression appears. Therefore this is our first instance of pronominal anaphora acting as either D-anaphora or R-anaphora, depending on the antecedent in the anaphoric link. For now let us see how the tests confirm the `schizophrenic' behavior of *it*.

When we proceed to the actual tests, there is one very important thing to bear in mind though. The tests presented in Chapter 2 were primarily designed to test nominal projections for the D-anaphoric versus R-anaphoric distinction. As such, some of the tests might not fit perfectly for projections in the event domain. What we can do in cases of such misfit is either recast the test in some way to cover event-like entities, or simply find the closest parallel phenomenon for event-like projections, and accept that as evidence for the diagnostic test. Since we have plowed through the tests with a couple of distinct examples already, I will assume that they are sufficiently familiar to the reader, and I do not have to repeat them here. For the same reason, I will keep the discussion of the tests as they pertain to events and event types at a rather informal level.

### 5.2.1. Event type anaphora as D-anaphora: the tests

The first test we need to consider for event type anaphora is the Test of Predicative Positions. The first question is whether there are any anaphoric links involving an event type where either the antecedent or the anaphor can occur as non-predicative. As it turns out, it is not a very easy question to answer whether an event type is ever in a predicative position. If one considers IPs and CPs antecedents, the answer could be yes or no depending on what structure one attributes to affirmative sentences. The only instance of an event type that definitely counts as appearing in a predicative position is when an event type shows up as a nominal projection in a predicative position:

(32) Bill never thought that he might *live a secluded life*. But when he started telling his new girlfriend about his life, he realized that in fact he was doing just *that*.

(33) Bill never thought that he might *live a secluded life*. Someone reminded him, however, that only stepping out of his house one day every week, and not accepting phone calls counts exactly as *that*.

It seems that this might be as close as we can get to placing the anaphoric element in a predicative position. If we accept these instances of the anaphors as anaphors appearing in a predicative position, we can say that with respect to our first test event type anaphora behaves as D-anaphora.

Next is the Test of Obligatory Number Agreement. The first thing to clarify about this test is that, unlike nominals, events (at least in English) are not explicitly marked for plurality. If we want to describe, let us say, that the same event occurred on several occasions we need to use either a quantifying adverbial (e.g. *every day*), and adverbial expressing recurrence (e.g. *five days in a row*), a quantified subject, or some other means of pluralizing the event:

(34) Within the last week *Barbara fell off the ladder three times. #This event/ /✓these events* left a lasting mark in her unconscious.

The question is, could we get singular anaphoric element as an event type anaphor for such a scenario. This does not seem to be hard at all:

(35) Within the last week *Barbara fell off the ladder* three times. Now she is thinking about how to prevent *it/this event* when she is painting the porch again.

*It/this event* in this example stand for not a specific token event; instead it stands for an event type *Barbara fall off the ladder*, which hopefully will not be instantiated in the future again. The antecedent is a 'plural event', the anaphoric element is a singular anaphor, therefore the antecedent and the anaphor obviously do not agree in number. This property of the anaphoric link involving event type anaphora again puts it in the domain of D-anaphora.

In terms of examining the categorial status of the antecedent of an event type anaphora, we have to consider several factors. Take the examples below:

(36) Ray *danced lambada with Joan.* Edgar wanted to try *it* too.

(37) Ray didn't get to *dance lambada with Joan.* Edgar, however, was sure he would get to do *it.*

What exactly are the antecedents in these two examples? For both cases the antecedent is something like the event type *x dance lambada with Joan.* Even though there is no syntactic constituent that would strictly correspond to this construed antecedent, in semantic terms something like this must act as the antecedent of *it*[3]. In semantic terms, however, this antecedent is not a `full projection', since it is not tensed. In Grimshaw's terminology, a tensed event would correspond to/would be mapped onto a maximal extended projection, but obviously an untensed event would not be. One has to admit that there is a problem here with the mismatch of the syntactic categories of the anaphor and its assumed semantic antecedent. For the purposes of this argument, however, it is clear enough that event types should not count as, and should not correspond to, maximal extended projections. Given that event types therefore take antecedents that are definitely not maximal extended projections, we can conclude that event type anaphora once again shows a property characteristic of D-anaphora.

[3] See Akmajian (1973) for evidence concerning the position that the antecedent in this case is not a VP, rather an expression containing a variable.

Now let us look at contexts in which the antecedent appears in the scope of an operator (modal or negative), and let us determine how event type anaphora behaves in such contexts:

(38) Ray was hoping to *dance lambada with Joan*. Edgar wanted to try *it* too.

(39) Ray didn't get to *dance lambada with Joan*. Edgar wanted to try *it* though.

In both sentences the anaphoric element *it* is contained is outside the scope of the operator taking scope of its antecedent. The anaphoric links, however, are acceptable in both cases. Given our test involving accessibility then, the examples in (38) and (39) show that event type anaphora in this respect behaves the same way D-anaphora normally behaves, namely that operators cannot block such an anaphoric link.

As for the Tests of E-type Readings, it seems extremely hard to construct anything that would be considered an appropriate E-type paraphrase for an event type. For this reason, I will trust constructing possible examples for this test to the curiosity and diligence of the reader.

For the Test of Bound Variable Readings, consider the following sentence:

(40) The man who wanted to see *Jack get assassinated by a fanatic* read about *it* in the newspaper the next day, but the woman who wished to see Fidel get run over by an American tank did not.

(41) The woman who expected *Newt to win the primaries* was excited about *it*, but the man who predicted Bob to win the nomination was not.

The question is if these sentences can have a sloppy identity reading. The sloppy identity reading for the sentence in (40) would be that the woman who wished to see Fidel get run over by an American tank did not read about Fidel being run over by an American tank; for (41) the relevant reading would be that the man who predicted Bob to win the nomination was not excited about Bob winning the nomination. First of all, note that the intended anaphoric links could not be an R-anaphoric dependency, since the antecedents are embedded in a modal context, and appear within the scope of the modal verbs *want* and *expect*. On the other hand, the anaphoric elements are not within the scope of the same operator. Therefore, if a bound variable reading were available for these cases, it would have to be due to a D-anaphoric link.

The sloppy identity readings again do not seem to be available for the above two sentences. As with the other tests, then, such anaphoric links prove to be D-anaphoric links.

### 5.2.2. Token event anaphora as R-anaphora: the tests

Now let us look at the behavior of what I called event token anaphora, which sometimes appears under the terminology of `factive *it*'. Anaphoric links involving token events will behave as one expects R-anaphora to behave.

Elements anaphoric on event tokens will never appear in predicative positions. Whenever a pronoun or other anaphoric element in a quasi-predicative position refers back to something event-like, the antecedent will be an event type, and never a token event:

(42) *David* finally *confessed his love to Jill* last week. Jill did not seem surprised at all. As far as she was concerned, his giving her a hundred roses for her birthday already counted as *that*. [that = David confessing his love to Jill]

*That*, in such a configuration could never refer to the token event expressed in the previous sentence; rather it always has to be anaphoric on the event type. In other words, an element anaphoric on a token event can never appear in a predicative position, which puts token event anaphora among other instances of R-anaphora.

In terms of number agreement, token events and expressions anaphoric on them have to agree in number:

(43) *A long sought-after member of the local mafia was finally arraigned on Friday. It/this event/#they/#these events* sent the whole community into a joyous celebration.

(44) Every year for the last 30 years *a house collapsed in some neighborhood of New York*. By some miracle of fate, I have witnessed all of *#that event/✓those events* ever since I moved to New York 15 years ago.

From these two examples it is clear that event tokens also observe the obligatory number agreement requirement on R-anaphora. The only deviation that we must point out concerns a plural token event antecedent: While a singular pronoun can be anaphoric on a singular token event, as it is shown in (45), for whatever reason, a plural pronoun cannot be anaphoric on a plural token event:

(45) Every year for the last 30 years *a house collapsed in some neighborhood of New York*. By some miracle of fate, I have witnessed all of *#it/#them* ever since I moved to New York 15 years ago.

This holds even though plural pronominal anaphora would be acceptable as anaphoric on the collapsed houses:

(46) Every year *a house collapsed in some neighborhood of New York* for the last 30 years. By some miracle of fate, I have visited all of *them/these houses* before they actually collapsed.

At this point I have no explanation as to why plural pronominal anaphora is unacceptable as anaphoric on token events, even though singular pronominal anaphora is acceptable in the appropriate case, as well as a plural definite description is acceptable for as a plural token event anaphor. The only thing that really matters now is that, at least with the definite description *the event(s)* as the anaphor, number agreement is obligatory. Obligatory number agreement is characteristic of R-anaphora in general, which supports the emerging result that token event anaphora is R-anaphora.

Now consider the following examples:

(47) Ray was hoping that *Alan* would *dance a lambada with Joan*. Edgar was watching *#it* in a rage of jealousy.

(48) Ray didn't get to *dance lambada with Joan*. Edgar was watching *#it* in a rage of jealousy.

As the examples show, "factive" occurrences of sentential *it* show inaccessibility effects in the appropriate contexts, that is, the anaphor is illicit if the anaphor is not in the scope

of the same operator as its antecedent. On the other hand, *it* is licit across modal operators just in case it stands for an event type instead of an actual event, as the (b) sentences above show.

Next in line is the Test of E-type Readings. For this, consider the following two examples:

(49) *A long sought-after member of the local mafia was finally arraigned on Friday.* The news of *it* sent the whole community into a joyous celebration.

(50) News agencies reported that *an earthquake which measured 7.6 on the Richter scale shook the houses of Northridge, CA*. First accounts of *it* reached the news agencies late last night.

The second sentence in both these examples contains pronominal reference to the event mentioned in the first sentence of the example. The pronouns in both cases can be replaced with a paraphrase almost identical to E-type paraphrases provided for nominal anaphora:

(51) *A long sought-after member of the local maffia was finally arraigned on Friday.* The news of *the event that a long sought-after member of the local mafia was finally arraigned on Friday* sent the whole community into a joyous celebration.

(52) News agencies reported that *an earthquake which measured 7.6 on the Richter scale shook the houses of Northridge, CA*. First accounts of *the earthquake which measured 7.6 on the Richter scale, which news agencies reported* reached the news agencies late last night.

These paraphrases employ *the event...* as he head noun, since the anaphoric element appears in a DP position, but substituting the paraphrases for the pronouns does not change the meaning of the sentences. Since token event anaphora is immune to meaning change under these substitutions, it proves to behave along the lines expected of R-anaphora again.

Finally we get to the question whether token event anaphora allows for bound variable readings. To examine this, consider the following examples, with an intended sloppy identity reading:

(53) The man who saw that *O.J. killed Nicole* testified about *it*, as did the man who saw that **O.J.'s white Ford Bronco sped away from Nicole's house**.

(54) Every accountant who witnessed that *the boss fired his secretary* felt furious about *it*, as did every janitor who overheard as **the boss made lewd remarks to his press agent**.

The sloppy identity readings for these two sentences are as follows. For (53), the man who saw O.J. kill Nicole testified about the event of O.J. killing Nicole, while the man who saw O.J.'s car speed away from the house, testified about that event. For (54), the intended reading is the one where each of the accountants felt furious about the boss firing the secretary, while the janitors were furious about the boss making lewd remarks to the poor harassed press agent. Both these readings are easily available, which is what we expect from an anaphoric link that has shown all other properties of R-anaphora.

Having confronted token event anaphora with all the tests concerning R-anaphora and D-anaphora, we can safely conclude that token event anaphora is indeed an instance of R-anaphora. Now, as the last result of this chapter, I want to demonstrate the status of VP-anaphora within the current proposal.

### 5.3. VP-anaphora as D-anaphora: the tests

Even though VP-anaphora has been studied extensively, only a couple of researchers have gotten to the point of explicitly acknowledging the fact that VP-anaphora belongs an anaphoric type radically different from pronominal anaphora[4]. Although VP-anaphora was never assumed to be subject to any of the Binding Principles of the GB Binding Theory,

[4] These couple of people include Grinder & Postal (1971), Hankamer & Sag (1976) and Sag & Hankamer (1984), and Klein (1987).

the interpretation of VP-anaphora still depended on the same theoretical device as the interpretation of pronominal anaphora, namely on co-indexing.

It is easy to see intuitively that VP-anaphora (such as *do so*, or VP-ellipsis) can never be interpreted as R-anaphora: VPs never refer in any sense of the word; instead, they are conceived of as prototypical predicates. As such, we expect VP-anaphora to be subject to the constraints of D-anaphora, and thus pattern with *one*-anaphora. Now let us see the actual tests.

First of all, both the antecedent of VP-anaphora and the anaphoric expression itself can appear in a predicative position. Since VPs are prototypical predicates, both the antecedents and the anaphors behave so "by definition":

(55) Although Bill has wanted to *move to the South* all his life, his wife would not *do so*.

Second, the antecedent of VP-anaphora and the anaphoric expression do not have to agree in number or person, nor do they have to agree in tense:

(56) Claudia and Saeko *defended their theses* two years ago. I will *do so* in about a month.

The lack of obligatory agreement between antecedent and anaphor is a diagnostic property of D-anaphora. Therefore this property strongly points towards the suspected result that VP-anaphora is an instance of D-anaphora.

It has to be noted though that in current syntactic theory at least VPs are not marked for number the same way as Ns are. Instead of the tense, person, and number simply showing up on the V within the VP, the agreement with the subject and the tense of the VP are assumed to head their own syntactic projections. If such a syntactic difference is assumed between number marking on nominal and verbal projections, the parallel between non-referential nominal and verbal anaphora with respect to number agreement is in principle untestable[5]. Nevertheless, the rest of the tests provide ample evidence for VP-anaphora (*do so*) as D-anaphora.

When we look at the example in (56), the result of the third test (the Test of Extended Projections) is already clear. This test delineates D-anaphora from R-anaphora in terms of the categorial status of the antecedent and the anaphor: If either the anaphor or the antecedent can be a non-maximal extended projection, then the anaphoric link is a D-anaphoric link. If both antecedent and anaphor are maximal extended projections, then we have to let the other tests lead us to a conclusion. How does this apply to the example in (56)?

[5] With nominals the number is supposed to be part of the head, copied from the Determiner through Spec-Head agreement. With verbs, number and other grammatical features are supposed to be marked in separate morpheme, for example AgrS.

At the introduction to the Test of Extended Projections (see Section 2.2.3) I already alluded to the fact that I was setting up the test so that it would yield appropriate results for the distinction between token event-anaphora and VP-anaphora. As I mentioned in Section 5.2 as well, IPs and CPs are maximal extended projections in Grimshaw's (1991) system. At the same time, VPs are non-maximal extended projections. In a more traditional casting of syntactic projections the same distinction could not be made so easily, since all three projections (IPs, CPs and VPs) are maximal projections. Given that this test was formulated in Section 2.2.3 as distinguishing between maximal and non-maximal extended projections, VP-anaphora comes out as D-anaphora, as opposed to token event anaphora, which passed this test as R-anaphora earlier in Section 5.2.

Moving on to the next test, let us see how VP-anaphora behaves in contexts where the antecedent is in the scope of a modal or negation:

(57) If Joe bought a car yesterday, he is *driving down to Yosemite* now. He'll *do so* again within a couple of months, and then again, and again....

(58) Emil always *cleans the bathtub after his shower.* He also strongly encourages Francesco to *do so.*

(59) If Joe bought a car yesterday, he is *driving down to Yosemite* now. He has wanted to *do so* for years now.

(60) Emil never *takes out the garbage*, but Francesco often *does (so)*.

The first two examples simply show that if no modal contexts are crossed by the anaphoric link, then the anaphoric reference is acceptable. The structure of these two examples contrasts with the second two, where the intended anaphoric link does cross into the scope of a modal or negation, that is the antecedent is embedded under an operator (modal or negative) that does not take scope over the anaphor. If the anaphoric link were an R-anaphoric link, we would expect inaccessibility effects. Since the anaphoric links are acceptable both in (59) and (60), the link has to be a D-anaphoric link in both of these cases.

Now let us very briefly see the results of the Test of E-type Readings. But what could be an E-type reading for a VP? Take the following examples:

(61) Roni never once *played in a band with Jerry*. George, however, *did so* for years.

(62) Jill *cleaned her filing cabinet* last week. Janet will *do so* next week.

Let us attempt giving *do so* an E-type reading for these sentences. It is obvious that we cannot use the exact same algorithm as we used for nominals to create the E-type reading. The intuition, however, is clear: we basically have to turn the sentence containing the antecedent `inside out' by leaving out the construed antecedent of *do so*, turn the sentence

into a relative clause with an N head, stick the definite article on it, and substitute that for the anaphoric *do so*:

(63) Roni never once *played in a band with Jerry*. George, however, did for years *the thing that Roni never once did*.

(64) Jill *cleaned her filing cabinet* last week. Janet will do next week *the thing that Jill did last week*.

This is probably as close as we can get to an E-type reading for a VP. The sentences acquired through the substitution, seem pretty much acceptable, even though they are somewhat clumsy. This would suggest that VPs do allow for an E-type reading, which would label VP-anaphora as R-anaphora. Note, however, that when introducing the Test of E-type Readings, we also relied on a contrast between so-called E-type readings and literal substitution of the antecedent. For a pronoun, which was used as the exemplar for R-anaphora, there was a sharp contrast between substituting the literal antecedent and an E-type paraphrase:

(65) John owns *some sheep* and Harry vaccinates *them* in the spring.

(66) John owns *some sheep* and Harry vaccinates *some sheep* in the spring.

(67) John owns *some sheep* and Harry vaccinates *the sheep John owns* in the spring.

The latter two sentences have meanings (and truth conditions) clearly different from the meaning (and truth conditions) of the sentences containing the anaphoric form. On the other hand, with *one*-anaphora, which was our exemplar for D-anaphora, the two different substitutions do not lead to a contrast:

(68) Jill went to a *photography exhibit* yesterday. I went to *one* today.

(69) Jill went to a *photography exhibit* yesterday. I went to *a photography exhibit* today.

(70) Jill went to a *photography exhibit* yesterday. I went today to *a thing that Jill went to yesterday*.

Similarly, literal substitution of the antecedent VP does not result in a meaning change when compared to the sentences containing the anaphoric *do so*, or when compared to the E-type paraphrase substitutions:

(71) Roni never once *played in a band with Jerry*. George, however, *played in a band with Jerry* for years.

(72) Jill *cleaned her filing cabinet* last week. Janet will *clean her filing cabinets* next week.

VP-anaphora, therefore, does not show the contrast between the two conceivable substitutions, the same way *one*-anaphora is immune to such a contrast. Both VP-anaphora and *one*-anaphora are unlike pronominal anaphora in this respect, since the two different substitutions for a pronominal anaphor do give sentences with sharply contrasting meanings. In other words, even though it is far from crystal clear what an E-type reading for a VP-anaphora is, VP-anaphora behaves like D-anaphora, and unlike R-anaphora, in the lack of contrast with the two substitutions discussed here.

The final test for the D-anaphoric versus R-anaphoric distinction concerns the availability of a bound variable reading. With nominals, there are two possible ways of eliciting a bound variable reading: either by putting the anaphoric element in the scope of a quantified expression, for example a universally quantified DP as in (73), or by creating an environment for a sloppy identity reading, as in (74):

(73) *Every visitor to the Trotsky museum* put *his* name in the guest book.

(74) *Lila* drives *her* daughter to school every day, and so does **Monika**.

Since it is not immediately clear how one would quantify over VPs (and make sure that the quantification is not over event types or such), I will rely on a sloppy identity context for examining the existence of bound variable readings. The examples therefore will need to contain elided VPs, where the construed antecedent of the VP contains a VP-anaphor such as *do so*[6]:

(75) The woman who *spilled coffee on the president at the reception* warned Al that *doing so* might be dangerous, as did the man who **insulted the guest of honor**.

The sloppy identity reading for this sentence is that the woman warned Al that spilling coffee on the president might be dangerous, while the man supposedly warned Al that insulting the guest of honor might be dangerous. This sloppy identity reading does not seem to be available, which suggests that VP-anaphora passes as D-anaphora with respect to this test as well.

However, there are sentences which apparently allow for a sloppy identity reading of *do so*:

(76) Every man who *danced with Marilyn* paid to *do so*, and so did every woman who **kissed Elvis**.

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[6] Kehler & Ward (1995) showed that *do so* as a VP-anaphor can appear in positions that do not serve as VP's in the syntax. The example in (75) is such an example: *do so* is anaphoric on a VP (or a VP-type interpretation), but in the syntax it is embedded in projection that syntactically acts as a DP.

The intended sloppy identity reading for this sentence describes a situation in which all the men who danced with Marilyn paid to dance with her, and all the women who kissed Elvis, paid to kiss him. This sloppy identity reading seems available for most speakers.

Why is the sloppy identity reading not available in one case, but available in the other? At this point I have no answer to this question, and I will have to put it aside without any explanation. All we can say here is that the Test of Bound Variable readings gives a controversial result in terms of the status of VP-anaphora. Note however, that the first clause of the original test simply said that: `If ... the anaphor cannot receive abound variable interpretation..., then the anaphoric link is a Descriptional anaphoric link.' (cf. Section 2.2.6). Suppose we only keep this clause of the test, and omit the final clause, which states that: `Otherwise the anaphoric link is a Referential anaphoric link.'; then the result of this test would not contradict the results of our other tests. The other tests showed that VP-anaphora behaved as D-anaphora, and given the omission of the last clause of the test, the availability of a bound variable reading would not necessarily categorize VP-anaphora as R-anaphora either.

All in all, our tests show that VP-anaphora follows the behavioral patterns of D-anaphora, as opposed to R-anaphora. Although this result was expected, showing it through empirical tests gives further support to the distinction between D-anaphora and R-anaphora as an empirically decidable question.

## 5.4. Conclusion

This chapter proceeded with extending the notion of D-anaphora and R-anaphora by including anaphoric links that involved an event, an event type, or a VP as its antecedent. Presently the classification of anaphoric elements looks like this:

(77)

<table>
<tr><th></th><th>Referential</th><th>Descriptional</th></tr>
<tr><td rowspan="2">identity</td><td>reflexives<br>anaphoric definite descriptions<br>epithets<br>token event anaphora<br>certain pronouns (she, he,...)</td><td>one<br>VP-anaphora (do so)<br>event type anaphora</td></tr>
<tr><td colspan="2">the same thing<br>it<br>that</td></tr>
<tr><td>contra-identity</td><td colspan="2">other<br>different<br>else<br>etc.</td></tr>
</table>

Token event anaphora came out as R-anaphora, while event type anaphora proved to behave as D-anaphora, as did VP-anaphora. The only further change in the table with respect to what it looked like at the end of Chapter 4 concerns the placement of *it* and *that*. Earlier in this chapter (see Section 5.2) we saw that both these items can be used either for token event anaphora or for event type anaphora. That is, they are ambiguous between an R-anaphoric and a D-anaphoric reading, the same way as *the same thing* was shown in Chapter 3 to be ambiguous between these two readings.

## CHAPTER 6: Tiers and Event Anaphora

Chapter 3 showed how the two distinct types of nominal anaphora, Referential and Descriptional nominal anaphora, should be represented in a two level representation. After somewhat of a detour in Chapter 4 to anaphoric elements expressing counter-identity, in Chapter 5 I extended the Referential versus Descriptional distinction to the domain of events. Now the question is what the representation must look like to accommodate event type anaphora parallel to the DRT-style representation of the Referential Tier, which takes care of representing token event anaphora. Finally, this chapter will introduce a dependency relationship between the discourse referents populating the Referential Tier. This dependency relationship will account for the fact that discourse referents representing participants of events are always introduced at the same level of embedding as the event discourse referent itself.

In this chapter I will proceed somewhat similarly to what the reader has seen in Chapter 3. First I will provide the representation on the two tiers, and then connect up the two levels with the help of the instantiation relation. The explanation of how the results of the tests distinguishing Descriptional anaphora from Referential anaphora can be derived from the proposed representation will follow in Chapter 7, the last chapter of this dissertation.

## 6.1. The representation of events: description and reference

Chapter 5 established the existence of the two possible kinds of anaphoric relations in the domain of events: those holding between linguistic expressions standing for token events (as in (1)) on the one hand, and those between event types (as in (2)), on the other:

(1) *Ray was dancing a lambada with Joan.* Edgar was watching *it* in a rage of jealousy.

(2) Bill never thought that he might *live a secluded life.* Someone told him, however, that stepping out of his house only once every week, and not accepting phone calls or visitors counts as *that.*

Similarly to what I did with individuals and nominal type anaphora in Chapter 3, I will use these examples as motivation for extending the two tiered representation to events. The intuitions and arguments will ring very familiar from the discussion regarding nominal anaphora in Chapter 3. Given this, here I will make the discussion a bit shorter and sweeter -- for the reader's sake as well as for my own.

### 6.1.1. The internal structure of the DT

Every mention of a token event or an event type introduces an event description that is accessible for Descriptional anaphora. Certain mentions of an event (type), however, also introduce an event discourse referent along with the event description. These two complementary facets of events will be represented in the split between the Descriptional and Referential Tier representation of events in general, similarly to the split representation introduced for nominals.

First consider the following example:

(3) *A man sent a woman a rose* for her birthday last week. As far as she was concerned, this counted as him confessing his love to her.

The italicized expression introduces some form of an event description on the DT. Depending on the relationship of the event description itself and the descriptions of the arguments, there are two substantially different representations possible for the italicized expression:

(4) DT SEND [ MAN , WOMAN , ROSE ]

(4') DT SEND, MAN, WOMAN, ROSE

The fact that the expressions in (4) and (4') are capitalized simply signals that those expressions are descriptions, and stand for types, as opposed to tokens. In the case of (4) the arguments of the event are listed in brackets, as is common practice in semantic notation. This expresses the intuition that, in some sense of the word, individuals or objects bearing the descriptions MAN, WOMAN, and ROSE are arguments of the descriptional predicate SEND. In the case of (4'), however, the relationship of argument taking is not expressed explicitly among the descriptions, rather the descriptions are listed independently in a list.

For the purposes of this dissertation I will accept the representation put forth in (4). I do so simply for the reason that argument taking relations have to be represented at some level of the semantic representation. If I adopted (4'), argument taking adjectives, such as *proud of*, would not be represented as bearing any relation to their argument: unlike their argument, adjectives in general do not project any representation onto the Referential Tier. Therefore, if the argument taking relation between the adjective and its argument is not expressed on the Descriptional Tier of the representation, it will not be expressed in the representation at all. Without arguing any more in favor of, or against, either of these two representational options, let me simply adopt (4) as the representation to be used in the remainder of this dissertation.

Similarly to (4), the expression *him confessing his love to her* also introduces an event description on the DT:

(5) DT CONFESS [ HE , HIS LOVE , TO HER ]

The Descriptional Tier therefore contains an event description for each mention of an event type. Some of these mentions of events, however, will also introduce an event discourse referent on the Referential Tier of the representation.

### 6.1.2. The introduction of discourse referents: a first pass

Now consider for a moment how mentions of events can differ in their corresponding representation on the Referential Tier. While *him confessing his love to her* in (3) does not introduce an event discourse referent on the DT (since it occupies a predicative position), *a man sent a woman a rose* does introduce an event discourse referent on the RT, alongside the event description present on the DT:

(6) DT SEND [ MAN , WOMAN , ROSE ]

RT e, x, y, z

In Chapter 5 I spelled out several arguments for introducing an event variable into the semantic representation of linguistic expression. The event discourse referent *e*, as introduced in DRT as well as here, is exactly that variable, which varies over the set or

class of possible events. It is meant to represent the possibility of referring back to the token event by an anaphoric expression later in the discourse (see Section 5.1.2). Here I will not spend time explaining exactly which occurrences of event descriptions introduce an event discourse referent as well. Let it suffice for me to say that an event discourse referent is introduced in all cases unless the event description appears in a predicative position, as in one of our earlier examples:

(7) Bill never thought that he might *live a secluded life*. But when he started telling his new girlfriend about his life, he realized that in fact he was doing just *that*.

Otherwise, an event discourse referent is introduced in exactly those cases into the representation when Discourse Representation Theory would include an event discourse referent in the universe of one of its Discourse Representation Structures (see Kamp & Reyle:1993).

At this point then the RT includes simple lists of discourse referents. In Section 6.2, I will return to the internal structure of the Referential Tier in more detail. There I will introduce a more elaborate structure for the arrangement of discourse referents, which will be the final touch on the representation. For now let us turn to the relationship between the two representational levels, DT and RT.

### 6.1.3. The instantiation relationship

The event description and the event discourse referent introduced for a given event mention on the two representational tiers, DT and RT, are obviously not totally independent of each other. Instead, they are linked via the instantiation relation first introduced in the treatment of nominal anaphora in Chapter 3. That is, for the event mentioned in the first sentence of (3) we get roughly the following representation:

(8[=3]) *A man sent a woman a rose* for her birthday last week. As far as she was concerned, this counted as him confessing his love to her.

(9) DT $SEND_1$ [ $MAN_2$ , $WOMAN_3$ , $ROSE_4$ ]

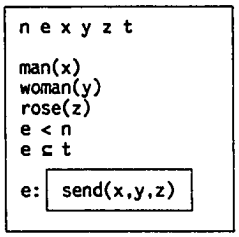
RT $e_1$, $x_2$, $y_3$, $z_4$

We encountered in Chapter 3 the co-indexation between descriptions for individuals and discourse referents introduced for individuals as the formal expression of the instantiation relationship introduced there. Similarly to that co-indexation, the event description and the event discourse referent introduced by the same linguistic expression mentioning the event are co-indexed with each other. The instantiation relation is thus indicated by co-indexing an event description appearing on the Descriptional Tier with an event discourse referent appearing on the Referential Tier. In a model theoretic approach, this relationship

would boil down to stating that the token event represented by the event discourse referent belongs to an event type with the given description.

In DRT the approximate representation of the same sentence would look as follows[1]:

(10)




The instantiation relationship in the DT/RT representation then in effect takes the place of two kinds of DRS conditions. On the one hand, the instantiation relation takes the place of the predication relationship that is responsible for attributing individual discourse referents to a given type conforming to the given description, as we already saw it in Chapter 3. On the other hand, it also substitutes for the condition listed in the body of the DRS categorizing $e$ as belonging to the class of events that are sendings with the characters corresponding to $x$, $y$, and $z$ as the appropriate participants of that sending event.

[1] One thing that is not clear from such a DRT representation is how the event type could be available for event type anaphora. I will elaborate on this point in Chapter 7 in comparing the DT/RT representation to DRT.

## 6.2. The internal structure of the RT

The previous section (Section 6.1.1) introduced event discourse referents and event descriptions within the split DT/RT representation. We briefly talked about the internal structure of the DT in the section preceding that. The question arises, what is the internal structure of the other representational tier, the Referential Tier? I will explore the arrangement of event discourse referents with the help of non-specific indefinites.

In a nutshell, I will show that the discourse referents of the RT are not introduced independent of each other, rather they cluster together. Event discourse referents bring together with them discourse referents for the participants of that particular event. The discourse referents introduced for the event participants will show up as linked (in a technical sense to be discussed later) to the event discourse referent. The clusters of discourse referents thus created, headed by an event discourse referent, will always be introduced into the representation as a group of discourse referents. All the discourse referents thus will be introduced at the same level of (modal) embedding as the event discourse referent.

Note that on occasion in this section I will not include the Descriptional Tier in the representation. This is simply a matter of convenience and space considerations. The arguments here pertain solely to the Referential Tier, therefore focussing on that tier alone will make the argumentation more transparent. In the last section of this chapter I will

assemble the representation in its full power, and show on a couple of examples what the full representation looks like, how it operates. Finally, Chapter 7 will show how the representation derives the behavior of the tests distinguishing D-anaphora from R-anaphora.

### 6.2.1. Event discourse referents and subordination

Recall the Test of Accessibility from Chapter 2. It stated that if an anaphoric link showed accessibility effects it was a Referential anaphoric link. Accessibility effects with Referential anaphors arise in contexts where the indefinite antecedent is embedded in the scope of a negative or a modal operator. When the anaphoric element is not within the scope of the same negative operator or, in the case of a modal, not within a sentence modally subordinated to the clause in which the antecedent appeared, the indefinite is not accessible as a viable antecedent for the anaphoric expression..

For the case of events, the inaccessibility effect with Referential anaphoric links (i.e., links involving token events) were exemplified by such sentences:

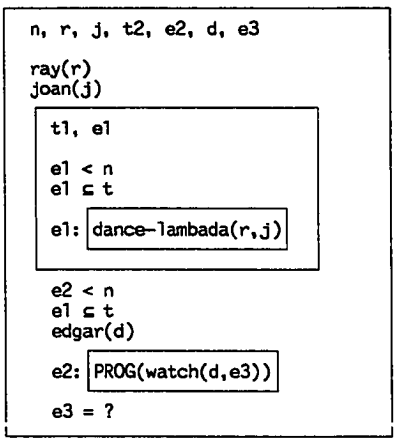
(11) Ray didn't *dance lambada with Joan.* Edgar was watching *#it* in a rage of jealousy.

(12) Ray hoped that *Alan* would *dance a lambada with Joan*. Edgar was watching *#it* in a rage of jealousy.

In these cases the antecedent is embedded either inside a negative operator as in (11), or in the scope of the modal operator implicit in *hope* as in (12), while the anaphoric expression is outside of the scope of the negative operator, or the anaphoric expression appears in a context that is not modally subordinated to the clause its antecedent appears in.

As we have seen it in Chapter 3, examples of a similar structure were the motivation for Roberts (1987) to introduce a modal structuring of DRSs, even though she was only considering anaphoric links between individual expressions. Updating her theory with the introduction of event discourse referents, as in Kamp & Reyle (1993), the sentence in (11) would have the following representation in DRT:

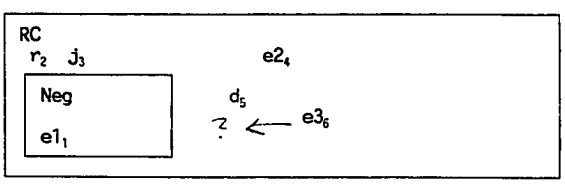
(13) *Ray* didn't *dance lambada with Joan.* Edgar was watching *#it* in a rage of jealousy.




In the DT/RT notation the corresponding representation (ignoring time specifications as well as the progressive) looks like this:

(14) DT $DANCE\text{-}LAMBADA_1[RAY_2,JOAN_3]$ $WATCH_4[EDGAR_5,IT_6]$

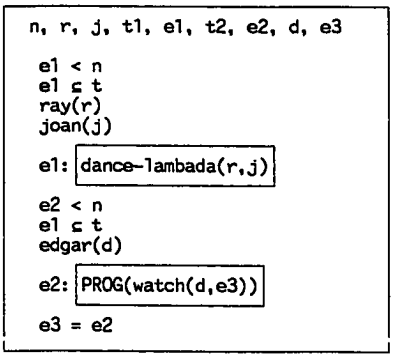
RT




In this representation the event discourse referent *e3* cannot access *e1* as its antecedent: *e1* is embedded in a box created by a negative operator, which makes it unavailable for antecedency, much the same way it is done in the DRT representation in (13). This therefore explains the unacceptability of the sentence in (11).

These examples and configurations, of course, contrast with the following case, which shows the accessibility of an antecedent when there is no intervening negative or modal operator between the antecedent and the anaphor:

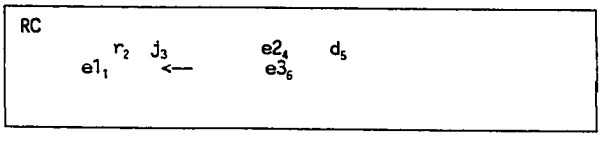
(15) *Ray danced lambada with Joan.* Edgar was watching *it* in a rage of jealousy.




Again, in the DT/RT notation the corresponding representation (again ignoring time specifications as well as the progressive) looks like this:

(16) DT $\text{DANCE-LAMBADA}_1[\text{RAY}_2,\text{JOAN}_3]$ $\text{WATCH}_4[\text{EDGAR}_5,\text{IT}_6]$

RT




In this representation *e1* is accessible for *e3* as an antecedent, since there is no intervening modal or negative operator.

From now on I will simply assume that the internal modal structure of the Referential Tier is essentially identical to the version of DRT put forth in Kamp & Reyle (1993)[2].

### 6.2.2. Correlation between discourse referents

As a final touch to the DT/RT representation, let us look at what I will call clusters of discourse referents. To really see why discourse referents should be represented as clustered, we must quickly take a look at what are non-specific indefinites as opposed to specific indefinites. Here my goal is not to discuss the nature of specificity or non-specificity. Rather, this is a necessary detour for showing the necessity for clusters of discourse referents in the representation.

First of all, how can we tell if an indefinite is specific or non-specific? The many definitions proposed for specificity (e.g., Fodor & Sag:1982, Pesetsky:1987, Enç:1991, Diesing:1992) agree on a number of tests[3]. Fodor & Sag (1982) lists several ways of biassing an indefinite towards a specific or a non-specific reading, given here:

---

[2] In fact the Referential Tier only employs the Universe of the DRS's from Kamp & Reyle (1993)'s, along with the modal structuring of DRS's. All the descriptive material that is included in the body of a DRS is listed in the Descriptional Tier of the DT/RT representation, and the tiers are linked through the instantiation relationship, instead of representing this linking directly with a copy of the discourse referents themselves.

[3] An indefinite with a non-specific reading is sometimes called a narrow scope reading of the indefinite, or a non-presuppositional indefinite. On the flip side of things, an indefinite with a specific reading is sometimes called a wide scope indefinite, or a presuppositional indefinite.

(17)

| SPECIFIC | NON-SPECIFIC |
|---|---|
| *certain, particular*, unstressed *thæs* | *some... or other*, bare numerals |
| Topicalization or Left Dislocation | there-insertion contexts |
| richness of descriptive content | sparseness of description |
| relative clauses, especially non-restrictive appositives | |

/selected from Fodor & Sag:1982/

Accordingly, the italicized phrase in (18) will be interpreted as a specific indefinite, while the italicized indefinite in (19) is most likely interpreted as a non-specific indefinite:

(18) Every professor failed *a certain procrastinating student from Massachusetts, who has been my neighbor for three years.*

(19) Every professor failed *a procrastinating student.*

In the rest of chapter I will concentrate solely on intended non-specific readings. I will indicate this by using an unmodified indefinite noun, as in (20) below. If, occasionally, the intended reading is specific, I will make this clear by using either *certain*, or unstressed *thæs*. In all other cases throughout the rest of this chapter the indefinites are to be read as non-specific.

Now consider the well-known pronominalization contrasts in (20):

(20) Charles danced a lambada with *a singer* last night. *She* was quite boisterous, so she wanted to do it again and again.

(21) Charles did not dance a lambada with *a singer* last night. #*She* was quite boisterous, so she wanted to do #it again and again.

(22) If Charles danced a lambada with *a singer* last night, he is very happy now. #*She* is quite boisterous, so she wanted to do #it again and again.

The first sentence in (20) contains a non-specific indefinite in an affirmative context, while in (21) the same indefinite shows up in a negative context. The possibility of pronominalizing on this indefinite in (20) shows that the indefinite introduces an accessible discourse referent, unless it appears in a negative environment, as in (21), where pronominalization on the indefinite fails. Similarly, if the indefinite antecedent is embedded inside the conditional, and the continuation containing the anaphoric expression is not modally subordinated to the clause introducing the indefinite, as in (22), pronominalization on the indefinite again fails. So far nothing is new, this is exactly what we observed in connection with the Test of Accessibility beginning in Chapter 2. What is relevant is that the possibility of pronominalization on the indefinite parallels the possibility of the pattern of pronominalization on the event. An accessible event discourse referent is introduced by the affirmative sentence in (20), but not by negative

sentence in (21), or by the conditional clause in (22): We can pronominalize on the event in (20), but not in (21) or (22).

Notice further, that the anaphoric expression (whether anaphoric on the individual or the event) is again licit if the anaphor is within the scope of the same negative operator, or, in the case of a modal operator, modally subordinated to the clause containing its intended antecedent:

(23) Charles did not dance a lambada with *a singer* last night and give *her* a ride home afterwards talking about it.

(24) If Charles danced a lambada with *a singer* last night, he is very happy now. He might be dreaming about *her*, and wondering about when they could do it again.

Summing up all these facts we can conclude the following:

(25) A *non-specific* indefinite introduces an accessible individual discourse referent exactly in those contexts where an accessible event discourse referent is introduced.

The next section shows how this correlation can be used to argue for the introduction of discourse referents as clusters, as opposed to independently introduced discourse referents.

### 6.2.3. Event-dependency and the introduction of discourse referents

Let us see two logically possible ways of deriving the observation in (25), which states the correlation between the introduction of discourse referents for events and non-specific indefinites. In principle, we could either assume (26a) or (26b):

(26) a. Discourse referents are introduced independently of each other, and the correlation in (25) is derived through a well-formedness filter.

b. Discourse referents are introduced in clusters, with the introduction of one discourse referent triggering the introduction of the other, thus deriving the effect mentioned in (25).

While there is no a priori reason to decide between these two possibilities, I am now going to argue for the latter option. In particular, I claim that introducing an accessible discourse referent for a non-specific indefinite as in (20) earlier is conditional on introducing an accessible event discourse referent, and the indefinite's discourse referent is dependent -in a technical sense- on the event discourse referent. In other words, I will claim that the introduction of the event discourse referent forces the introduction of the discourse referents for its participants.

What kind of further evidence can we enlist in support of this claim?

First of all, asserting that a given event occurs implies that the participants in that event exist. That is, if the event in question is *x invited y*, then there has to be someone who invited another, and someone who got invited. If no assertion is made about the existence of an event, then, obviously, there is no assertion made about the existence of the event participants either.

Second, as is known, the actual event (and the discourse referent for the event) is partially determined by the time specification provided, and by the choice of event participants: (27) talks about two separate attempts at getting a Supreme Court justice approved, while (28) talks about two separate instances of invasion:

(27) Bill nominated a Democrat for the Supreme Court last week, and he is nominating one (=a Democrat) today.

(28) George invaded a small defenseless country, and Bill invaded one (=a small defenseless country) too.

Accordingly, when different events are mentioned, the event participant expressed by the `same' non-specific indefinite (i.e., a descriptionally identical indefinite) assumes different

discourse referents in the different events. This is evident from the fact that one can use plural pronouns to refer back to the indefinites, as in:

(29) Bill nominated *a Democrat*$_i$ for the Supreme Court last week, and he is nominating *one*$_j$ (=a Democrat) today. **They both**$_{i+j}$ are friends of Bill.

We can easily show that the discourse referents for two separate events introduce two separate discourse referents for parallel indefinite event participants:

(30) Immanuel was fascinated by *an ancient treatise on morality*$_i$, and Rene was mesmerized by *one*$_j$ (=an ancient treatise on morality) too. As a prominent scholar just managed to prove, **the two books**$_{i+j}$/**they**$_{i+j}$ were in fact one and the same treatise by Aristotle.

The two discourse referents for the indefinites are indeed <u>different</u>, even though the final assertion says that the actual objects are referentially identical in (the model of) the real world. This is apparent from the fact that we can (and must) use the plurals *the two books* or *they* to refer back to the indefinites. That is, the final assertion dynamically collapses the two separate discourse referents into one (by, for example, unifying the file cards opened for them, as in Heim's File Change Semantics), because the two books turn out to have the same real world referent.

Finally, we can introduce an event discourse referent together with a discourse referent for an event participant, even though the appropriate description of the event is questioned or debated. Thus think about an exchange such as (31):

(31) A: *A man* jumped out from the crowd and fell in front of the car.

B: **He** didn't jump, he was pushed.

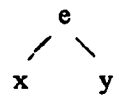
(from Heim:1982)

Speaker A establishes the (discourse) referent for the event of *x jumped out of the crowd*, and through that a discourse referent for a man. Speaker B uses the same discourse referent in using the pronoun to refer to the same man, although he is denying that the relevant event was jumping out of the crowd[4].

This much evidence intuitively grounds the idea that introducing a discourse referent for an event participant expressed by a non-specific indefinite is directly dependent on the introduction of the event discourse referent itself. One can conceive of this claim the following way: An event discourse referent is part of a dependency structure, with discourse referents for event participants 'attached to it'. A discourse referent for a non-specific indefinite is a dependent element, which has to attach itself to another discourse referent. In (32) the indefinite's discourse referent is shown as dependent on an event discourse referent for an event such as *x dance with y*, or *x dream about y*:

[4] It would be very interesting how far one can stretch this example. In particular, how much similarity is required between the event description originally introducing the individual discourse referent for *a man* and the event description that maintains that individual discourse referent, but, in effect overrides the original description of the event.

(32)



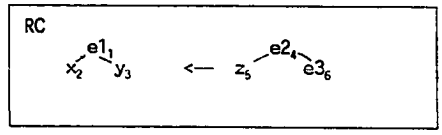

From here on I will thus simply notate such a dependency between the discourse referents as in (32) above.

The existence of this configuration has the effect that if an event referent is introduced, automatically a separate discourse referent will be introduced for each event participant expressed by a non-specific indefinite, and they will be ntroduced within the scope of the same operator where the event discourse referent is introduced. That is, we get the following representation for some of our earlier examples, of course in a somewhat simplified form[5]:

(33) Charles danced a lambada with *a singer* last night. *She* loved it.

(34) DT DANCE-LAMBADA$_1$[CHARLES$_2$,SINGER$_3$] LOVE$_4$[SHE$_5$,IT$_6$]

RT

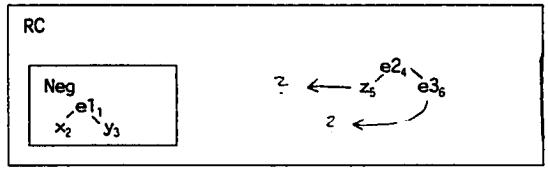



[5] The vertical arrangement of the discourse referents within the RC box of the RT does not bear any theoretical relevance, it is just meant to make drawing the arrows expressing anaphoric dependency easier.

(35) Charles did not dance a lambada with *a singer* last night. *#She* didn't like #it.

(36) DT DANCE-LAMBADA$_1$ [ CHARLES$_2$ , SINGER$_3$ ] LIKE$_4$ [ SHE$_5$ , IT$_6$ ]

RT




In (36) the intended anaphoric links are illicit because the intended antecedents are inaccessible, since they are introduced within the box labelled with *Neg*[6].

A representation similar to (36) would be constructed for the example containing the conditional, except that the inaccessible embedded box would be labelled as a conditional subordinator, and would include a representation of the contingent clause of the conditional sentence.

On the other hand, when the anaphoric expressions are inside the scope of the same negation, the clustering introduction of the discourse referents again gives us the desired accessibility results[7]:

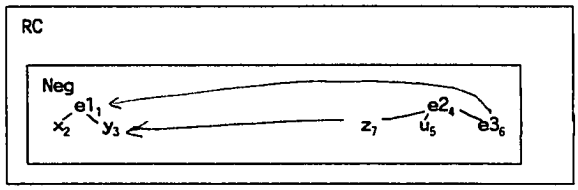
[6] Here I deliberately ignore the issue that the discourse referent introduced for *Charles* is accessible from outside the negation. This is of course due to the semantics of proper names. The solution that I propose in Csúri (in progress,b) introduces a separate discourse referent for proper names in the main box of the RT, and equate the discourse referent introduced within the event cluster with that. A more detailed discussion of this question, however, would take us too far afield here.

[7] There are two things to be noted here. One is that in the representation I did not use conjoined VPs, rather, in effect, treated the sentence in question as if there were two conjoined clauses, by adding *HE* and a discourse referent corresponding to that in the representation. I did this simply because here I am not providing a representation of VP-ellipsis, and this change is irrelevant for the progression of the argument. The other, related point simply concerns the fact that $e_2$ (standing for ***he boasted to her about it***) is represented as having three event participants, the boaster $z$, the boastee $u$, and the event boasted about $e_3$.

(37) Charles did not dance a lambada with *a singer* last night and boast to *her* about it.

(38) DT DANCE-LAMBADA$_1$[CHARLES$_2$ SINGER$_3$]
BOAST-TO-ABOUT$_4$[HE$_7$,SHE$_5$,IT$_6$]

RT




Again, our earlier example involving the conditional would involve a similar representation in terms of accessibility: the discourse referents introduced for the anaphoric elements in a clause that is modally subordinated to the conditional itself would be able to access the antecedent discourse referents appearing in the antecedent clause of the conditional.

The structure in (32) therefore imposes the following constraints on the representation: the structure can never be introduced in pieces. If an event discourse referent is introduced in the scope of negation, all its participant will also be introduced within the scope of that negative operator. Similarly, in the case of other operators (such as the conditional, possibility operator, Future, etc.) all the event participants of that event will introduce discourse referents within the scope of the same operator.

This essentially provides us with the full power of the DT/RT representation. Nevertheless, as a final exercise, I will introduce the dependency relation between individual discourse referents as well.

### 6.2.4. Dependence between indefinites

Dependency between discourse referents is not limited to individual discourse referents being dependent on event discourse referents. Here I will give a quick example of dependence between individual discourse referents.

Not only can a non-specific indefinite be dependent for its discourse reference on an event, but it can be dependent on another nominal phrase as well. Consider sentences such as those in (39) and (40):

(39) a. Roni wrote *a book about a unicorn*$_i$. **It**$_i$ got to the stores today.

b. Roni wrote a book about *a unicorn*$_i$. **It**$_i$ lives in a faraway land.

(40) a. Roni did not write *a book about a unicorn*$_i$. #**It**$_i$ got to the stores today.

b. Roni did not write a book about *a unicorn*$_i$. #**It**$_i$ lives in a faraway land.

We already know that the indefinite *a book about a unicorn* is dependent on the event expressed; but, apparently, so is the indefinite *a unicorn*. This is evidenced by the fact that one can pronominalize on *a unicorn* in the same environment as one can pronominalize on *a book about a unicorn*.

The dependency between the event and the embedded DP *a unicorn*, however, is not a direct dependence; rather, the dependency is mediated through the direct object DP *a book about a unicorn*. We can deduce this from the following fact: If we make the larger DP specific as in (41), *thəs critical biography of a politician*, the pronominalization on *a politician* is possible in both affirmative and negative contexts. That is, we can say either (41a) or (41b):

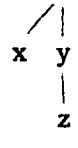
(41) a Barbara praised *thəs critical biography of* ***a politician***$_j$. **He**$_j$ denounced her in public anyway.

b Barbara did not praise *thəs critical biography of* ***a politician***$_j$. **He**$_j$ denounced her in public.

In other words, the indefinite *a politician* is no longer dependent on the event; instead, it is dependent on the specific indefinite containing it.

I will informally notate the dependency between the discourse referents for the event and the indefinites of (39) as in (42), similarly to the dependence represented between event discourse referents and discourse referents introduced for participants of that event:

(42)




e = Roni wrote a book about a unicorn

x = Roni

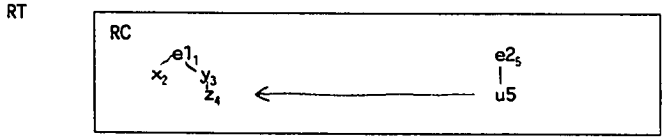
y = a book about a unicorn

z = a unicorn

When this whole dependency structure is introduced in an affirmative context, anaphoric reference to *a unicorn* is licit:

(43) Roni <u>wrote</u> a book about *a unicorn*$_i$. **It**$_i$ lives far.

(44) DT WRITE$_1$ [ RONI$_2$ , BOOK-ABOUT$_3$[ UNICORN$_4$ ] ] LIVE-FAR$_5$ [ IT$_6$]

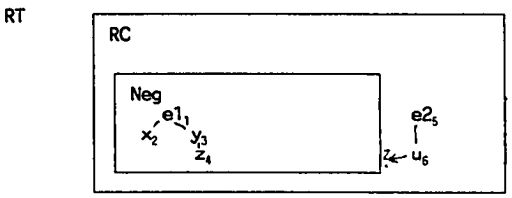



However, when the event discourse referent is introduced within the scope of negation, through the dependency structure between the discourse referents, the discourse referents *x*, *y*, and *z* will all be introduced within the scope of the same negative operator as well,

and thus made inaccessible for anaphora from outside the scope of the negative operator:

(45) Roni did not write a book about *a unicorn*$_i$. #**It**$_i$ lives faraway.

(46) DT WRITE$_1$ [ RONI$_2$ , BOOK-ABOUT$_3$[ UNICORN$_4$ ] ] LIVE-FAR$_5$ [ IT$_6$]




In introducing the dependence between indefinites I used the arguments relating to a correlation between possible pronominalization patterns. I was following the exact same logic as the reader has seen in establishing the dependence relationship between an event discourse referent and the discourse referents introduced for event participants. The dependency between individual discourse referents, furthermore, is represented in the same fashion in the DT/RT framework as the dependence between an event discourse referent and its participants.

## 6.3. Conclusion

This chapter built on the empirical results obtained in the previous chapter. Using those observations I extended the DT/RT representation to include event discourse referents on the RT as well as event descriptions on the DT. D-anaphora is now represented

uniformly on the DT, irrespective of whether it holds between descriptions that are instantiated by individuals, or between descriptions that are individuated by token events in the model. Similarly, R-anaphora holds uniformly between discourse referents, regardless of whether the discourse referents in question are individual discourse referents of event discourse referents. Furthermore, this chapter introduced the notion of *discourse referent clusters*, which expresses fundamental properties of events, while accounting for pronominalization facts. This takes us then to the final chapter of the thesis, which compares the present representation to certain other theories of anaphoric behavior.

## CHAPTER 7: Relationship to other frameworks

We have finally arrived to the last chapter of the dissertation. It is time to put the complete picture together, and merge the advances in the representation that I proposed in the previous two chapters. This is what I will do first. Later in this chapter I will highlight on differences between the theory of Referential/Descriptional Tiers with its predictions and other recent theories that have been proposed as solutions to the individual problems discussed in previous chapters. I will concentrate on the following two topics:

-the nature of anaphoric relations;

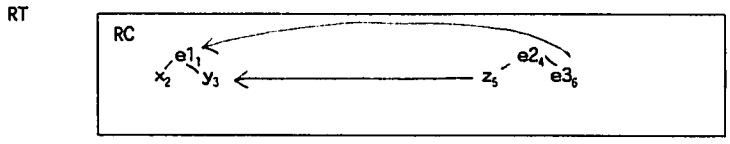
-the introduction and arrangement of discourse referents and the status of existential quantification;

### 7.1. The full power of the representation

At the end of the previous chapter we saw the full power of the DT/RT representation at work. Here is an example, just to sum up the most important properties of the representation:

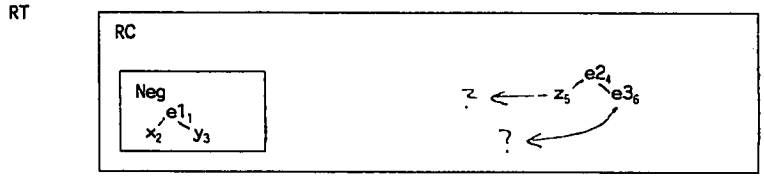
(1) Charles danced a lambada with *a singer* last night. *She* loved it.

(2) DT DANCE-LAMBADA$_1$[CHARLES$_2$,SINGER$_3$] LOVE$_4$[SHE$_5$,IT$_6$]




(3) Charles did not dance a lambada with *a singer* last night. #*She* loved #it.

(4) DT DANCE-LAMBADA$_1$[CHARLES$_2$,SINGER$_3$] LOVE$_4$[SHE$_5$,IT$_6$]




Recall the following properties of the representation: the DT includes descriptions of individuals and events, with function-argument relation reflected. This level of representation does not reflect the modal structure of the discourse. On the other hand, the RT includes discourse referents introduced by the same linguistic expressions. Descriptions and discourse referents are co-indexed via the instantiation relationship. The discourse referents, furthermore, appear in clusters headed by an event discourse referent, and they are in a modally structured RT representation, similar to the modal structuring known from DRT. D-anaphora holds between elements of the DT, and in effect copies the description from the construed antecedent. R-anaphora, on the other hand, holds between elements of the RT, and imposes conditions on how to anchor these discourse

referents in the model in which the representation will be embedded. The two elements of an antecedent-anaphor pair linked via an Identity-anaphoric link will be mapped onto the same individual in the universe of the model; at the same time the two elements of an antecedent-anaphor pair linked via a Contra-Identity link (as discussed in Chapter 4 at length) will be anchored to distinct individuals in the universe of the model. The clustering of the discourse referents further represents the fact that discourse referents standing for an event and its participants are always introduced at the same level of modal embedding in the representation.

Now let us see how the representation derives the results of the original tests (introduced in Chapter 2) for distinguishing the two types of anaphora, Descriptional and Referential anaphora.

### 7.1.1. The representation of D-anaphora, R-anaphora, and the tests

It is now easy to see how the representation we assigned to D-anaphora in general derives the results of our Test of Predicative Positions (see Section 2.2.1.) for distinguishing D-anaphora and R-anaphora:

(5) **Test of Predicative Position:** If for an antecedent-anaphor pair [α,β] either α or β or both appear in a predicative position, that instance of the anaphoric link is a Descriptional anaphoric link.

Individual and event expressions in a predicative position only project a representation on the Descriptional Tier, but not on the Referential Tier. Since R-anaphora holds between discourse referents, and D-anaphora holds between descriptions present on the DT, this means that expressions in predicative positions can only support Descriptional anaphora, but not Referential anaphora. This of course does not mean that expressions in referential (i.e. non-predicative) positions cannot support Descriptional anaphora. Although expressions in a non-predicative (i.e. referential) position have a corresponding discourse referent on the RT, the all or part of descriptive content that this discourse referent instantiates might be provided by a D-anaphor, such as *one*, for example.

Next is the Test of Obligatory Number Agreement:

(6) **Test of Obligatory Number Agreement:** If for the anaphoric link [α,β] the smallest DP dominating the string β does not obligatorily agree in number with the smallest DP dominating α, then the anaphoric link is Descriptional.

Since so far I have not included number in the representation, it is not immediately clear how the formal representation would derive the Test of Obligatory Number Agreement.

On intuitive grounds, however, the argument is very clear. Number agreement can only hold between DPs since these are the smallest (and largest) nominal projections that are marked for number. Discourse referents instantiate only maximal extended projections, including DPs. On the other hand, D-anaphora holds between elements of the DT, which are not necessarily maximal extended projections, or maybe not even maximal projections. The elements of the Descriptional Tier are descriptions, which simply indicate what conglomerate of predicates applies to the discourse referent which instantiates this given description. D-anaphora therefore will always have the option of `disregarding' number: D-anaphora takes descriptions as antecedents, which are inherently unmarked for number.

On the other hand, it is also clear intuitively why Referential anaphoric links do show obligatory number agreement. First, recall the embedding constraint on R-anaphoric links. This required that, in the case of an Identity-anaphoric link, the antecedent and the anaphor be mapped onto the same individual in the model. Given this condition, it is obvious that whether the antecedent discourse referent is singular or plural, the anaphoric expression must act as the same with respect to plurality. Notice further that now it is clear why this test did not work for contra-identity anaphoric expressions. In the case of elements expressing contra-identity the anchoring constraint on the antecedent-anaphor pair was that the individuals corresponding to the antecedent and the anaphor had to be non-identical in the model. Given this, it is clear that they do not both have to be singular or plural at the same time.

Turning to the next test, we can also derive the results of the Test of Extended Projections easily:

(7) **Test of Extended Projections:** If for the anaphoric link [α,β], the antecedent α is not a maximal extended projection, then the anaphoric link between the anaphor and antecedent is a Descriptional anaphoric link.

In Section 2.2.3 I mentioned a likely and plausible cognitive strategy that states that the (canonical) syntactic realization of discourse referents is in the form of a maximal extended projection. In the proposed representation then the elements of the RT, which are discourse referents, are always connected to maximal extended projections. Only the DT contains constituents (the descriptions) which can be expressed by something smaller than a maximal extended projection. The linguistic expressions corresponding to descriptions can also act as antecedents in anaphoric links. Therefore if an anaphoric link contains an antecedent and anaphor that a non-maximal extended projection, the link must be solely constrained to the DT. On the other hand, each R-anaphoric link will be manifested by an anaphoric link where both the antecedent and the anaphor are expressed by maximal extended projections.

Let us now move on to the Test of Accessibility:

(8) **Test of Accessibility:** An anaphoric link between the antecedent $\alpha$ and anaphor $\beta$ is a Referential link if it shows inaccessibility effects when the antecedent is embedded under negation or modal operator, while the anaphor is not embedded under the same operator. Otherwise, the link is a Descriptional anaphoric link.

The anaphoric relation introduced on the DT so far has had no restrictions on accessibility other than the obvious restriction that D-anaphora solely acts within the DT, and takes a description from the DT as its antecedent. Since the DT does not involve the modal operators that structure the RT, D-anaphora is not restricted by the modal structure of the discourse. This is how we can derive the across-the-board accessibility of D-anaphoric antecedents. Note that sometimes this property of D-anaphora is captured as stating that antecedents of D-anaphora, namely descriptions, behave as proper names with respect to their accessibility (cf. Asher:1993). In the DT/RT notation this is derived differently, namely from putting descriptions on the DT, in a modally unstructured environment.

Unlike the DT, the RT of the representation does indicate the modal embedding structure of the discourse. The RT looks basically identical to a stripped down DRT representation, where only the DRS universes containing discourse referents are left behind; all DRS conditions are either exiled to the DT, or are instead expressed by the instantiation relation linking up the DT and RT levels. Since the embedding structure of DRSs in Discourse Representation Theory was specifically designed to represent potential accessibility between discourse referents, it needs not explanation that the RT trivially

inherits this property as a result of the structural similarity to the modal structuring of DRSs. In other words, R-anaphoric links (i.e., anaphoric relations between discourse referents) will always show accessibility effects, while D-anaphoric links (i.e., anaphoric links between descriptions) do not.

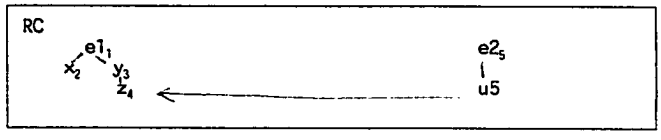
Now consider one of the remaining two tests, namely the Test of E-type Readings, and the sample representation given below:

(9) **Test of E-type readings:** If the anaphor β of the anaphoric link [α,β] accepts an E-type paraphrase as defined by the appropriate construction algorithms above, the anaphoric link is Referential. Otherwise the anaphoric link is Descriptional.

(10) Roni wrote a book about *a unicorn*. *It* lives faraway.

(11) DT $\quad WRITE_1\ [\ RONI_2\ ,\ BOOK\text{-}ABOUT_3[\ UNICORN_4\ ]\ ]\quad LIVE\text{-}FAR_5\ [\ IT_6]$

RT




The representation above explains how the pronoun *it* gets its E-type interpretation, that is how come that the pronoun *it* can be substituted by *the unicorn that Roni wrote a book about*, without any change in the intended meaning of the sentence:

(12) Roni wrote a book about *a unicorn*. *The unicorn that Roni wrote a book about* lives faraway.

The discourse referent *z*, which was introduced for the indefinite *a unicorn*, will be mapped onto an individual in (the universe of) the model which satisfies all the requirements of being a unicorn, and having been the subject of Roni's œuvre. The discourse referent *u* is anaphoric on *z*; as such, it is be mapped onto the same individual in the model that *z* is mapped onto. Given this, the discourse referent introduced for the anaphoric *it* will be a mapped onto an individual that is a unicorn and at the same time fits the description *an (individual) Roni wrote a book about.* Since this is the only such individual mentioned in our minuscule discourse, this individual will be unique in this respect as well, and therefore in this gem of a discourse will also fit the description *the unicorn that Roni wrote a book about*, which is exactly the E-type paraphrase expected for the given pronoun.

Finally let us turn to our last test, the Test of Bound Variable Readings:

(13) **Test of Bound Variable Readings:** If for the anaphoric link [α,β] the antecedent α cannot receive a bound variable interpretation in any of the appropriate environment (under VP-ellipsis, for example), then the anaphoric link is a Descriptional anaphoric link. Otherwise the anaphoric link is a Referential anaphoric link.

Recall that this test was formulated with a directionality so that the lack of bound variable readings signals that the anaphoric link is Descriptional. I chose this implicational direction in the formulation of the present test because apparently VP-anaphora and possibly *one*-anaphora can sometimes get a bound variable reading:

(14) Every man who *danced with Marilyn* paid to *do so*, and so did every woman who **kissed Elvis**.

/intended sloppy reading: every woman who kissed Elvis paid to kiss him/

(15) Old, well-established *writer*s always like to go on publicity tours with younger *one*s, as do many famous, distinguished **singers**.

/intended sloppy reading: ?writers tour with writers, singers tour with singers/

If the sloppy identity reading is indeed available for either of these sentences, and if it indeed arises from a bound variable reading of the anaphoric elements *do so* and *one*, it would not be true that every anaphoric relation accepting a bound variable reading is a Referential anaphoric relation. What the representation would look like for the given sentences could be answered only after giving a formal account of VP-anaphora and VP-deletion. Accomplishing all this would go beyond the scope of this dissertation, and thus answering this question has to be postponed to a later date.

## 7.2. The distinction between the two anaphoric types

This dissertation proposed a distinction between two anaphoric types, Referential and Descriptional anaphora. The intuitive distinction between them was supported by empirical tests, which were presented in Chapter 2. The previous section showed how the proposed representation derives the effects of the empirical tests. The question now is how the Referential versus Descriptional anaphoric distinction fares when compared with other anaphoric distinctions proposed.

D-anaphoric links so far have gained limited attention, the bulk of research has been done on pronominal anaphora, and occasionally on VP-deletion. Different types of D-anaphoric processes have been given sporadic attention, but almost exclusively as individual, unconnected phenomena. For example, Sag (1976) gave a thorough description of VP-ellipsis (which I have shown to be an instance of D-anaphora), but without tying it in with other Descriptional anaphora, or contrasting it with R-anaphoric dependencies. The following sections contain an overview of some important contributions to the exploration and treatment of D-anaphora, and compares the current distinction to a couple of them.

### 7.3.1. Identity-of-reference versus Identity-of-sense anaphora: Grinder & Postal (1971)

Grinder & Postal (1971) distinguishes the so-called *Identity of Sense* anaphora from *Identity of Reference* anaphora. Identity of Sense (or IOS) anaphora expresses 'identity of meaning', as opposed to Identity of Reference (or IOR) anaphora. The distinction between IOS- and IOR-anaphora is indeed the same essential distinction as the distinction that I am making here between Descriptional and Referential anaphora. The main difference, however, is that, while Grinder & Postal in its entirety did not go much beyond simply observing the distinction between the two types, the DT/RT approach can give a formal account of one of the defining properties of IOS-anaphora, namely the missing antecedent phenomenon.

According to Grinder & Postal (1971) IOS anaphora displays several phenomena which distinguish IOS-anaphora from IOR-anaphora. One such phenomenon is the so-called MISSING ANTECEDENT phenomenon:

(16) Harrison doesn't have a wife, but Bill does, and *she* is a nag.

(17) Harry sank a destroyer and so did Bill and *they* both went down with all hands.

In both these examples the italicized pronouns reveal that, even though there is no syntactically expressed antecedent for them, somehow a referent is available. In the first sentence, obviously, *she* refers to Bill's wife, therefore *a wife* appearing in the first clause cannot be its antecedent. In the second example, *they* refers to the sum of two destroyers:

the destroyer that Harry sank together with another destroyer, namely the destroyer that Bill sank. In this case again, there is no explicit antecedent for the destroyer Bill sank.

My claim is that the DT/RT framework can in general explain the behavior just outlined. However, since the DT/RT approach at this point does not have the capability of representing VP-anaphora, instead I will use parallel examples involving *one*-anaphora and event type anaphora to demonstrate how the `missing antecedent' can be found in the representation.

Consider the following examples:

(18) Roni didn't write *a book about a unicorn*, but Barbara did write *one*. **It** lives faraway. /it = the unicorn Barbara wrote a book about/

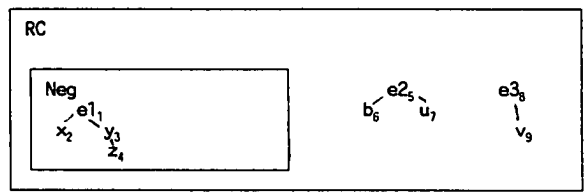
(19) Jack is such a reckless driver, that disaster has been waiting to happen. Although yesterday *he* did *not get into an accident*, but *it* did happen today; - but thank heavens **it** was not very serious. /it = the accident Jack got into today/

In both these examples the anaphoric expressions have no explicit antecedent, but still they are licit. Let us look at the representations of these examples in the DT/RT framework:

(20) Roni didn't write *a book about a unicorn*, but Barbara did write *one*. **It** lives faraway.

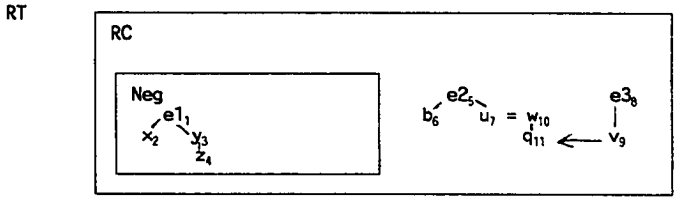
DT $\text{WRITE}_1$ [ $\text{RONI}_2$ , $\text{BOOK-ABOUT}_3$[ $\text{UNICORN}_4$ ] ]
$\text{WRITE}_5$[$\text{BARBARA}_6$,$\text{ONE}_7$] $\text{LIVE-FAR}_8$ [ $\text{IT}_9$]

RT




The question of course is how *it* can access an appropriate antecedent. Recall that *one*-anaphora essentially copies descriptional information from the preceding discourse. The antecedent of *ONE* is then *BOOK-ABOUT[UNICORN]*, without the co-indexing that would indicate the instantiation relationship between descriptions on the DT and discourse referents on the RT. Once this description is explicitly copied into the representation, it is easy to see why and how the given description projects new discourse referents: Since the anaphoric phrase occupies a non-predicative (i.e., referential) position in the sentence, it projects its own discourse referents, independent of the discourse referents projected by the description that served as the antecedent. With these projected discourse referents, the situation becomes clear immediately:

(21) DT $\text{WRITE}_1$ [ $\text{RONI}_2$ , $\text{BOOK-ABOUT}_3$[ $\text{UNICORN}_4$ ] ]
$\text{WRITE}_5$[$\text{BARBARA}_6$,$\text{ONE}_7$=$\text{BOOK-ABOUT}_{10}$[$\text{UNICORN}_{11}$]]
$\text{LIVE-FAR}_8$ [ $\text{IT}_9$]



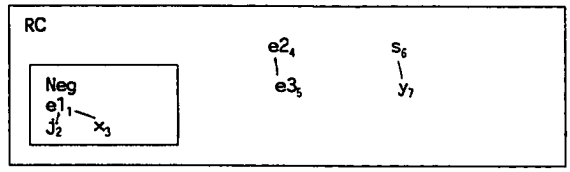

The antecedent of the anaphoric expression *it* will be *q*, which is introduced through the D-anaphoric relation between *ONE* and *BOOK-ABOUT[UNICORN].* This D-anaphoric link obviously does not show inaccessibility effects, since Descriptional anaphora in general is not subject to inaccessibility effects, even when the description serving as the antecedent is introduced within the scope of a negative or a modal operator. That is, through D-anaphora we found an appropriate antecedent to an anaphor that has a `missing antecedent' in purely syntactic terms.

Let us look at our parallel example, which involves a D-anaphoric link between event descriptions this time:

(22) Jack is such a reckless driver, that disaster has been waiting to happen. Although yesterday *he* did *not get into an accident*, but *it* did happen today, and it was serious.

DT GET-INTO$_1$[JACK$_2$,ACCIDENT$_3$] HAPPEN$_4$[IT$_5$] SERIOUS$_6$[IT$_7$]

RT

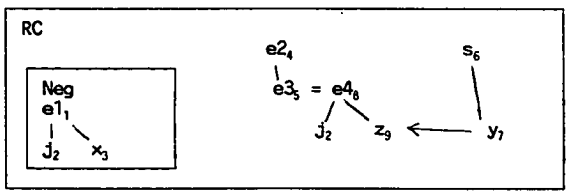



The question is how *y* finds an antecedent. Recall that event type anaphora, the same way as other types of D-anaphora, copies descriptive material. The descriptive material copied by *it* in the case of *It did happen today* is *GET-INTO[JACK,ACCIDENT]*, without the co-indexing indicating instantiation[1]. Given that this description is copied, the event description will set up its own discourse referents in the RC box, since the event type anaphor *it* appears in a non-predicative (i.e., referential position). That is, the representation now looks like the following:

[1] The only phrase whose instantiation index survives the anaphoric copying is the index of *JACK*. This is simply a short-cut device here to insure that in the representation the semantics of the proper name *Jack* are somewhat adequately represented. Since the point of this representational example does not concern proper names, I will use this apparently sloppy device for the purposes of this section.

(23) DT GET-INTO$_1$[JACK$_2$,ACCIDENT$_3$]
HAPPEN$_4$[IT$_5$=GET-INTO$_8$[JACK$_2$,ACCIDENT$_9$]] SERIOUS$_6$[IT$_7$]

RT




This way the *it* of *It was serious* finds an antecedent in the form of *z*. Since the anaphoric link projecting the `missing antecedent' was a D-anaphoric link (a Descriptional link between event descriptions, negation did not block the accessibility of the event description as antecedent.

With this then we have seen two examples of the missing antecedent phenomenon explained in the DT/RT framework.

### 7.2.2. Deep/Surface anaphora and Model interpretive anaphora/Ellipsis: Hankamer & Sag (1976) and Sag & Hankamer (1984)

Earlier in the thesis (see Chapter 2) I already mentioned the most well-known distinction among different anaphoric types, proposed by Hankamer & Sag (1976), which was later revised in Sag & Hankamer (1984). The distinction made by them is that between **deep**

and **surface** anaphora, while the later distinction is between **model interpretive anaphora** and **ellipsis**. Let us see their earlier, more widely known distinction.

Sag & Hankamer (1984) summarize the following three tests to distinguish deep anaphora from surface anaphora:

(a) only deep anaphora can be used deictically, can be `pragmatically controlled';

(b) only surface anaphora requires parallelism in syntactic form between anaphor and antecedent;

(c) only surface anaphora exhibit the `missing antecedent' phenomenon.

In S&H's system pronominal anaphora and sentential *it* are instances of deep anaphora, while VP-ellipsis, gapping, sluicing, and stripping instantiate the ellipsis type of anaphora.

Assuming the tests given above, *one*-anaphora exhibits certain properties of both types of anaphora. First of all, *one* can be used deictically (pragmatically controlled), as the following example shows, which is assumed to be characteristic of model interpretive anaphora:

(24) [...walking up to a balloon vendor...]

Could I have a purple *one*? *one* = balloon

On the other hand, *one*-anaphora seems to require some sort of syntactic parallelism (or semantic contrast) between the antecedent and the anaphor, a property which supposedly characterizes ellipsis type anaphora:

(25) I like the blue *balloon* more than the yellow *one*.

(26)?# Our *dog* mated with a black *one*.

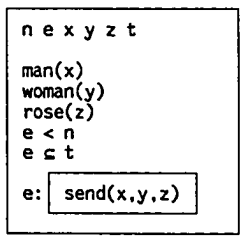
It has been noted that so-called paycheck pronouns require syntactic parallelism, and it is easy to see as well that *one*-anaphora patterns with VP-anaphora in that they both involve reactivation of descriptive material. Given these facts and arguments (showing *one*-anaphora as well as pronominal anaphora as sharing certain properties of both deep and surface anaphora), I take that the Referential v. Descriptional anaphoric distinction is orthogonal to the deep v. surface anaphoric distinction.

### 7.2.3. DRT and D-anaphora

Although DRT set out to account for anaphoric phenomena in general, it seems to lack an appropriate mechanism to handle D-anaphora. In the following comparison to DRT I will take Kamp & Reyle's (1993) exposition of Discourse Representation Theory as my basis, but to my knowledge, all existing versions of DRT share the `architectural design' that I will discuss.

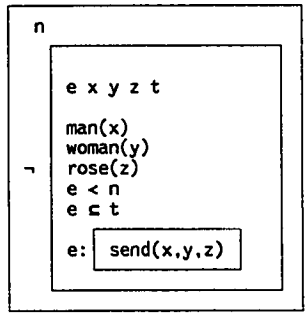
First of all, in DRT predicates and event types are not available as antecedents for D-anaphoric elements such as *one* or sentential *it*. There are no discourse referents introduced for predicates, only for individual type entities (individuals and token events); instead, predicates only appear as inaccessible components of the conditions of the Discourse Representation Structure (DRS):

(27) *A man sent a woman a rose* for her birthday last week.




Furthermore, discourse referents introduced in a subordinate DRS (except for those introduced for proper names) appear under some operator, and thus exhibit inaccessibility effects in the sense of Roberts (1987). Accordingly, the predicates introduced in the form of conditions are introduced within the scope of the same operator as the event discourse referent, which should make them inaccessible as well:

(28) *A man didn't send a woman a rose* for her birthday last week.




Descriptional anaphora, however, does **not** show inaccessibility, as we have seen on many occasions. That is, if the predicates are introduced within the scope of a modal operator, they will be unavailable as antecedents for D-anaphora under the normal conditions of anaphoric accessibility. I can see three alternative approaches to this problem.

i) One could assume that D-anaphora is not a true anaphoric phenomenon, and it does not deserve to be represented in a discourse oriented model. I find this view uninteresting on the one hand, and also objectionable on theoretical grounds. There is overwhelming evidence, that even in the case of `well-behaved' referential anaphora, the role of the descriptional content of the anaphoric expression and of the antecedent is a crucial factor in locating the antecedent of the anaphoric expression:

(29) Jimmy and George met at the Oval office last month. The bastard told the president that China's human rights record was improving.

For example, in the case of anaphoric definites or epithets as in (29) above (cf. also Sections 3.3 and 3.4), the proper antecedent cannot be identified from among the potential (definite) antecedents without the help of the description. Because of this, I think this venue is not worth taking.

ii) Another possible take on this issue would say that even though D-antecedents and D-anaphors are introduced within the scope of modal operators the same way as discourse referents for individuals are, they do not respect the same anaphoric conditions as discourse referents for individuals do. This, I think would in effect mean an unprincipled way of weakening of the theoretical apparatus, and is therefore undesirable.

iii) Alternatively, one can say that discourse referents should be introduced for functions or predicates as well as for referential items. The introduction of these sense discourse referents then has to happen at the main universe of the discourse, together with proper names, since descriptions are available as antecedents from any context, just like proper names.

Such a configuration can be still implemented in one of two ways: by explicitly introducing discourse referents for all properties and functions, or by allowing constituents of an already existing level or (semantic) representation to fulfill this role. In the first case, massive redundancy will result in the sense discourse referents introduced: for every syntactic constituent and all of its subconstituents one would need to introduce a separate

sense discourse referent. So for example, for an anaphoric link as in (30) one needs to introduce at least those sense referents listed in (31):

(30) Yesterday I saw a red two-seat Harley Davidson with a black seat cover that is displayed at Moe's. The week before they did not have *one*.

(31) a. a Harley Davidson

b. a two seat Harley Davidson

c. a red two-seat Harley Davidson

d. a red two-seat Harley Davidson with a black seat cover

e. a red two-seat Harley Davidson with a black seat cover that is displayed at Moe's

etc...

This redundancy would certainly not be desirable.

Alternatively, one could designate a semantic representation (for example, Conceptual Structure) as the level at which Descriptional-anaphora would operate. What would be the role of a DRS from here on? It seems that at that point the descriptional information need not be the part of the machinery accounting for inaccessibility phenomena; rather it could be a stripped down representation, identical to the Referential Tier introduced in Chapters 3 and 6.

### 7.2.3. Hardt and Dynamic Montague Grammar

Hardt (1993) represents an attempt to give a uniform treatment of VP-anaphora and pronouns displaying sloppy identity in a dynamic semantic framework. He extends the semantics of Groenendijk & Stokhof's (1990) Dynamic Montague Grammar and (1991) Dynamic Predicate Logic (DPL) in two ways: First by introducing property variables which can take VP's as their denotations, second by allowing variables to denote senses (instead of referents only). Given this he aims at a unified account of VP-anaphora and nominal anaphora. Here I will only concentrate on the first part if his proposal (pertaining to property variables), and show that accommodating VP-anaphora to pronominal anaphora in such a way is impossible.

While static model theoretical approaches assume static assignment functions that assign denotations to logical variables, dynamic semantic approaches commit to an ever changing assignment function or discourse universe. In this spirit, Groenendijk & Stokhof (1990) and (1991) in their dynamic semantic account of pronominal anaphora make use of pairs of assignment functions to express the dynamic effect of an existentially quantified indefinite DP in a discourse. Existentially quantified sentences are conceptualized as programs with assignment functions as inputs and outputs. Since existentially quantified indefinites introduce discourse referents or variables available for subsequent intrasentential nominal anaphora, their appearance is expressed in Groenendijk & Stokhof

as updating the assignment function the following way: The output assignment function differs from the input assignment function at most in its value assigned to the existentially bound variable. In particular, given a sentence such as

(32) A man walks in the park.

$\exists x$ [man(x) & walk_in_the_park(x)]

the output assignment function differs from the input assignment function in the value assigned to the variable x. Since the output assignment function will be the input for any subsequent discourse, pronominal anaphora can access the value assigned to variable x as an antecedent. The semantic value or effect of existential quantification over individual variables is thus interpreted as:

(33) $[\![\exists x\ Man(x)]\!] = \{ \langle g,h \rangle \mid h[x]g \ \&\ h(x) \in F(Man) \}$

Informally, the semantic value of existential quantification is defined as the set of pairs of assignment functions in which the output assignment function differs from the input assignment function in its value for x, and the value assigned to x under the output assignment function is within the extension of the predicate *Man*.

Property variables (second order variables) as possible antecedents in Hardt's account are introduced into the discourse the same way as Groenendijk & Stokhof introduced

variables for individuals. That is, a property variable will get assigned a certain VP-denotation if the VP appears in a declarative sentence, that is if the property variable is existentially quantified. Thus a sentence such as (34) is represented (in Hardt's terms) by a "program" which alters the input assignment function by assigning property variable X the value *walking* in the output function h, as in (35):

(34) John walked.

$\exists X$ [walking(X) & did(John,X)]

(35) $[\exists X$ [walking(X) & did(John,X)] =

$= \{ \langle g,h \rangle \mid h[X]g$ & walking(h(X)) & did(John,h(X) $\}$

Although a unified treatment on nominal anaphora and VP-anaphora would be clearly desirable, Hardt's approach fails on a most crucial point. He introduces property variables so that VP-denotations behave identical to denotations of indefinite nominal referents. [2]While the parallel between VP-denotations and nominal denotations might hold for declarative contexts and contexts without modal operators, it clearly breaks down when negative contexts and modal operators are considered.

Groenendijk & Stokhof set up their system of DPL to assure that occurrences of indefinite DPs inside negative contexts do not have a lasting effect on the assignment function that

[2] In Hardt's (1993) terms: `...The simplest way of doing this in dynamic semantics is to treat VP's as indefinite property expressions...' (p.334)

serves as the input to a negative sentence. Given their definitions, even though variables temporarily gain a certain denotation within the scope of negation (as a test, as they put it), `at the end of' the scope of negation or a modal operator the variables are reset, and they all regain their values prior to the interpretation of the negative or modal sentence:

(36) $[\neg\phi] = \{ \langle g,h\rangle \mid h = g \ \& \ \neg\exists k, \langle h,k\rangle \in [\phi] \}$

In other words, indefinites appearing in the scope of negation or a modal operator ultimately do not change the assignment function, and are thus unavailable for subsequent anaphora.

If property variables are introduced to mirror the behavior of indefinite DPs in all respects (as apparently Hardt intends them to), we expect that property variables introduced in the scope of negation or a modal operator are not available for subsequent intrasentential anaphora: Since the assignment function's value to the given property variable is reset at the end of the scope of negation or the modal operator. That is, we expect the VP-anaphors in sentences in (37) to be illicit:

(37) a. John didn't *walk*. Bill, on the other hand, did ∅.

b. John has wanted to *go deep sea diving* all his life. His more agile friends already *did it* five times.

However, as I showed earlier in Section 2.2.4, one has to distinguish two different types of anaphora (R-anaphora and D-anaphora) with respect to accessibility across negative and modal operators. Referential pronominal anaphors (which are instances of R-anaphora) are subject to inaccessibility effects, while VP-anaphors (which are instances of D-anaphora) are not subject to modal subordination effects, rather they can access antecedents which appear inside the scope of negation or modal operators. This was one of the results of Section 5.3. In other words, Hardt's approach fails in that the representation he sets up does not yield the results of the Test of Accessibility, as introduced in Chapter 2.

### 7.3. The arrangement of discourse referents and the status of Existential Closure

Now let us briefly look at our last topic, which concerns the arrangement of discourse referents in the formal representation.

The DT/RT framework gives a central role to events. Discourse referents are introduced in clusters, with an event heading the cluster, and bringing with itself discourse referents to be introduced for event participants. The reference of a non-specific indefinite is therefore dependent on the existential claim over the event. Events therefore serve a primary role in the introduction and interpretation of discourse referents. Let us see how other theories approach these topics.

### 7.3.1. Discourse Representation Theory

Discourse Representation Theory (as outlined in Kamp & Reyle:1993) does not explicitly structuring of discourse referents. The discourse referents are introduced in an ordered list.

In terms of accounting for the existential quantification over event and individual discourse referents, DRT takes care of the effects of Existential Closure at the stage when a Discourse Representation Structure (DRS) is interpreted in a given model. Existential Closure is implicit in the interpretation of the model in the sense that variables listed in the universe of a DRS get interpreted as existentially quantified within the scope of any operator that would subordinate the given DRS, if any. At this level there is no distinction between the interpretation of event discourse referents and individual discourse referents, they are embedded in the given model on an equal footing.

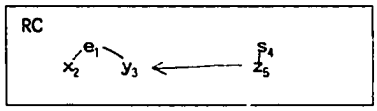
However, notice a useful corollary of introducing discourse referents in clusters headed by events. Recall the discussion of implicit arguments in Sections 3.4 and 4.3.6. The observation revealed that implicit arguments cannot serve as antecedents to pronominal anaphora, but anaphoric definite can take implicit arguments as antecedents. Whatever the difference in accessibility conditions turns out to be, one still needs to introduce some discourse referent into the representation so that at least anaphoric definites can access

them as antecedents. Introducing implicit event participants within clusters headed by events would do exactly that:

(38) Bill ate at a restaurant tonight. *The food* was delicious.

DT $EAT_1[BILL_2,(FOOD)_3]$ $DELICIOUS_4[FOOD_5]$

RT




Without going into more detail about this issue, it is clear that DRT thus fails to make the necessary distinction between the status of discourse referents introduced for events and their participants. Deriving the dependency relationship between the discourse referents would require either a structured discourse universe, or, alternatively, always introducing the discourse referents for event participants in a box subordinate to the box containing the event discourse referent.

### 7..3.2. Diesing (1992)

Finally, I want to very briefly glance at Diesing's (1992) theory relating to the interpretation and specificity of indefinites, and its relation to syntactic movement. The relevance of her proposals for us lies in the implicit assumptions she makes about the role of events in Existential Closure.

In part to explain contrasts such as in (39) below, Diesing (1992) proposed a mapping between the syntactic structure of a sentence and its semantic interpretation:

(39) a. Who did you see a picture of _ ?

b. *? Who did you see a picture of _ that was on display at the Museum of Fine Arts?

The Mapping Hypothesis assumed by Diesing maps the LF-representation of a sentence into a Heimean tripartite structure (operator, restrictive clause, nuclear scope) the following way:

(40) **Mapping Hypothesis:**

Material from VP is mapped into the nuclear scope.

Material from IP is mapped into a restrictive clause.

Material mapped into the restrictive clause is interpreted as restrictive quantification, while material mapped into the nuclear scope is bound by default Existential Closure.

In deriving these facts, alongside other syntactic contrasts concerning German words order, Diesing makes several assumptions:

(i) Crucially, Diesing assumes the VP-Internal Subject Hypothesis first proposed by Koopman and Sportiche (1982);

(ii) Concerning specificity, she assumes that specific phrases are presuppositional, and that presuppositional indefinites undergo Quantifier Raising (LF-movement) to adjoin to IP to acquire their proper interpretation.

(iii) She assumes a constraint on Extraction (somewhat more modern version of Wexler & Culicover's (1980) Freezing Principle) which states that one cannot move a constituent out of a moved or non-base constituent:

(41) **Revised Extraction Constraint:** Extraction cannot take place out of an NP that must raise out of VP before tree splitting. (Diesing, p.128)

These assumptions together yield the following explanation to the movement contrasts in (42):

(42) a. Who did you see a picture of _ ?

b.*? Who did you see a certain picture of _ ?

The properties of subextraction depend on the interpretation of the indefinite we are extracting out of, not an independent syntactic difference. Extraction out of a specific indefinite is impossible for the following reason: The specific indefinite we are extracting from must be joined to IP at LF to get a presuppositional interpretation. Extraction is then blocked out of such a DP by the Revised Extraction Constraint.

What is interesting for us here is what role events play in Diesing's theory. In fact, in her theory events do not enjoy any explicit theoretical status, even though events should unquestionably be represented for purposes of quantification and anaphora in any semantically minded theory. On the other hand, her Mapping Hypothesis, coupled with the VP-Internal Subject Hypothesis derive some of existential quantification over clusters of discourse referents headed by an event discourse referent. Since under the VP-internal subject Hypothesis all arguments of a verb (such as a subject or object) originate within the VP, in the case of a non-specific subject or object Existential Closure over VP gives the same existential interpretation to subject and object as they would get under an account that assumes Existential Closure over an event which has arguments (event participants) dependent on it for their reference. By assuming VP-internal subjects **and** mapping VP-internal material into the nuclear scope of the tripartite structure, Diesing in effect introduces Existential Closure over events, which is exactly the effect that the clusters of discourse referents in the DT/RT framework exhibits.

Although this section did not strictly discuss discourse referents or descriptions, I think it served its purpose. I intended to convince the reader that event variables permiate not only semantics, but other areas as well. I hope the reader agrees with me on what an important role event variables (or event discourse referents) might play in seemingly innocent-looking, syntactic contrasts.

## 7.4. Epilogue

And this brings us to the end of our excursion into the land of description, reference and anaphora. Throughout the dissertation I argued for the introduction of a disctinction between two anaphoric types, the Descriptional v. Referential anaphoric distinction. This long excercise in often subtle grammatical judgements hopefully served to convince the reader that the Descriptional/Referential-anaphoric distinction cannot be overlooked. The two types show strikingly different empirical behavior, robustly differentiating the different anaphoric links. The tests I provided serve as compelling evidence for the necessity of distinguishing the two anaphoric types, irrespective of what framework one chooses to work in.

For the computer scientist, I hope, it is evident by now the main problem the Descriptional/Referential anaphoric distinction imposes. While one can fairly easily implement two different ways of accessing antecedents. What seems to be the main challenge with this distinction is that certain elements, such as *the same thing*, or *it* seem to be ambiguous between the two possible interpretations. As I mentioned earlier, the problem certainly deserves ample attention:

(43) Bill brought *a ham sandwich with pickles* for lunch today. It was *the same sandwich* he brought yesterday.

Since the same context can support both a Descriptional and a Referential anaphoric interpretation possible, as in (43) for example, this puts considerable burden on the already burdensome task of anaphora resolution in Natural Language Processing.

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