Representativity – Weak Interpretations of Definite Plural Noun Phrases

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Chapter 1

Introduction

1.1 *The Romans built this bridge.*

What does it take to make 1.1 true? It is evident that we do not require that every single Roman participated in the building of the bridge. In other words, we do not regard 1.1 as equivalent to 1.2. It seems more appropriate to translate *the Romans* in 1.1 with the existential quantifier, i.e. as 1.3.

1.2 *All the Romans built this bridge.*

1.3 *Some Romans built this bridge.*

Yet sentences with definite plural noun phrases have traditionally been represented with the universal quantifier. This treatment may work well for some sentences, such as 1.4 below, but apparently not for all cases.

1.4 *The soldiers slept.*

To see that the phenomenon exemplified by 1.1 applies to a variety of sentences with definite plural noun phrases, consider the examples below.

1.5 *The colonel spotted the enemy soldiers.*

1.6 *The colonel killed the enemy soldiers.*

1.7 *The drawings are inaccurate.*

1.8 *The drawings are accurate.*

1.5 can be true in a situation where the colonel spotted some of the enemy soldiers, and can thus be represented with the existential quantifier. On this interpretation, the enemy soldiers who were spotted function as "representatives" of the whole group of soldiers. For 1.6 to be true, however, it is not sufficient that the colonel killed only some of the enemy soldiers.
Rather, the sentence seems to require that all the soldiers were killed, and it can thus be represented appropriately by using the universal quantifier.

A similar contrast is seen between 1.7 and 1.8. 1.7 may be uttered truthfully in a situation where some of the drawings are inaccurate, but 1.8 seems to require that every drawing is accurate.

Let us try to summarize what the interpretations we have sketched of 1.1, 1.5 and 1.7 have in common.

- Some member or subset of the noun phrase denotation satisfies the predicate.
- The rest of the individuals in the noun phrase denotation do not satisfy the predicate.
- The predicate is used to characterize the whole group referred to by the noun phrase. In other words, the predicate property is projected from the active member(s) that satisfy the predicate to the plurality the member(s) belong to.

We will use the term **representativity** to refer to the phenomenon characterized by the above criteria. This term is chosen because the subgroup which satisfies the predicate can be regarded as a "representative" for the whole group. Note, however, that the "representativity" we speak of here is rhetorical, not actual. In other words, the representative interpretation does not require that the individuals in the plural noun phrase denotation have a common goal or are in agreement with respect to the property described by the predicate. Take for example 1.9 below.

1.9 *The demonstrators set fire to the shop.*

Imagine a large demonstration with hundreds of people marching in the streets. Some of these set fire to a shop, others proclaim that they are non-violent and proceed peacefully through town. In such a context, 1.9 may well be used characterize the situation, even by speakers who know that some of the demonstrators were against the violent action.

And in 1.7 above, where the drawings are non-sentient entities, it is clear that they cannot have a common goal or agree on anything. Still, the speaker might choose to project the inaccuracy of some onto the whole group of drawings.

It is thus a rhetorical move on the part of the speaker to make certain individuals representatives of the group. Whether these individuals can be said to function as representatives in the actual world, is another matter.

As the examples above have shown, the representative interpretation is only possible with certain sentences. We will see that representativity depends on properties of the predicate as well as characteristics of the context. In accounting for the factors which license the representative interpretation,
three types of representativity are distinguished. Below is a preliminary survey of these three types which will be fleshed out in chapter 6.

1. Type 1: Sentences which convey that the focus is on the result or success of some action rather than the individuals that perform it. Examples:

1,10 The Romans built this bridge.
1,11 The demonstrators set fire to the shop.

2. Type 2: Sentences which convey that members of the noun phrase denotation are seen as a mass of indistinguishable individuals, i.e. individuals which are so similar that they are interchangable. Examples:

1,12 The colonel spotted the enemy soldiers.
1,13 The monster hid behind the garbage cans.

3. Type 3: Sentences which describe an undesirable property which may be changed/change to a desired property. Examples:

1,14 The drawings are inaccurate.
1,15 The little girl dirtied her clothes.

1.1 Previous work

Despite its prevalence, representativity has not received much attention in the semantic and pragmatic literature. The first attempt to give a comprehensive account of the phenomenon is the PhD thesis of Young Eun Yoon Kang, *Weak and strong interpretations of quantifiers and definite noun phrases in English and Korean*, 1994. The PhD thesis was followed up by an article in Natural Language Semantics, *Total and partial predicates and the weak and strong interpretations*, 1996. Although this article has been commented on by a number of linguists (cf. Krifka (1996), Brisson (1998), Bech and Sauerland (2000) and Geurts (2002)), only Brisson (1998) undertakes a thorough treatment of the issues Kang raise.

1.2 The focus of the thesis

The focus of the present thesis is to account for the linguistic factors which make representativity possible and show how these factors can be formalized. To do this, we must determine whether the representative interpretation is
triggered by lexical factors, contextual factors or both. Further, we need to give a description of the specific properties of lexical items or situations which give rise to representativity. Only when we have specified these properties, can we search for a suitable formal framework into which we may incorporate the representative interpretation.

1.3 Overview of the thesis

In chapter 2 we will review the main points presented in Kang (1994, 1996). Her work will serve as a point of departure for the later analysis. Kang distinguishes one class of predicates that come in pairs, total and partial predicates. Examples of such predicate pairs are clean:dirty, healthy:sick, accurate:inaccurate. Sentences with total predicates such as clean, healthy, accurate, require a strong reading (cf. 1.8), while sentences with partial predicates such as dirty, sick, inaccurate may trigger a weak reading (cf. 1.7). The strong reading is represented with the universal quantifier and the weak reading with the existential quantifier. In other words, Kang's weak interpretation is what we have termed the representative interpretation. Other predicates than the partial ones may also give rise to weak readings. For example, we have seen that build and spot in 1.1 and 1.5 can bring about the weak reading. Having observed these differences between predicates, Kang presents a number of semantic criteria to explain why certain predicates trigger the weak reading. She cannot, however, find one criterion which accounts for all weak readings.

In chapter 3 we will see that Cruse (1980) introduces a class of adjectives which is remarkably similar to total and partial predicates. His explanation criteria for the behaviour of these adjectives is different from Kang's. Some of his criteria will prove useful in our account of representativity in chapter 6.

While there has been few fully-fledged accounts of weak readings of definite plural noun phrases, the phenomenon has been mentioned in connection with various formal semantic frameworks. Chapter 4 gives a presentation of some of these frameworks and how they deal with weak readings.

In chapter 5, we compare representativity to the related notions non-maximality, collectivity, cumulativity and genericity. Although all these phenomena have points of resemblance with representativity, we will see that none of them are equivalent to it.

Chapter 6 is an attempt to give an account of representativity which brings together and assesses the discussion in the four preceding chapters. After an evaluation of the semantic criteria presented in the works of Kang and Cruse, we will venture on establishing our own prerequisites for the representative interpretation. We will suggest that representativity, though heavily influenced by the lexical properties of predicates, is context depen-
dent. Further, we find that we can distinguish three subtypes of representativity which have separate prerequisites. Some of the prerequisites we arrive at will be modifications of Kang and Cruses criteria, others will be independent observations.

Having established some prerequisites for representativity, we turn to look for a formal framework where these can be incorporated in chapter 7. We conclude that most of the frameworks presented in chapter 4 are not appropriate for our purposes since they are not context sensitive. The cover approach developed by Brisson (1998) is context dependent, and in addition it is claimed to account for representative interpretations. When taking a closer look at it, however, we see that it does not make use of context to the extent that is required to account for representativity. We conclude that what we need is a formal framework which provides access to the common ground, such as Discourse Representation Theory (DRT). In sections 7.3 and 7.4 we give a demonstration of how the prerequisites from chapter 6 can be operationalized and incorporated into DRT. The DRT account is at a preliminary stage, but sets an example for further work.

1.4 Restrictions

The thesis is restricted to sentences with a definite plural noun phrases beginning with the. In section 8.2 we discuss whether there are other syntactic constructions which also give rise to representative interpretations.

As for language range, the thesis pertains only to English. However, it seems appropriate to point out that I have not noticed any differences between my native language Norwegian and English as far as representative interpretations are concerned. Moreover, Kang (1994) observed weak readings of two types of Korean donkey sentences. Unfortunately she has not studied Korean sentences with definite plural noun phrases with regard to weak readings. It would be interesting to investigate if representative interpretations are also present in languages without grammaticalized definiteness, such as Russian.

1.5 Terms

Weak interpretation and representative interpretation are used with the same meaning in this thesis. Typically, though, I use weak in chapters 2–4 when presenting the work of others, and representative in chapters 5–8, when speaking of my own account.

Several of the linguists I refer to use the terms reading and interpretation interchangeably. Since some of them do not define either term, I could risk

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1We presuppose a basic knowledge of Discourse Representation Theory (DRT) as it is presented in Kamp and Reyle (1993).
violating their original intentions by choosing one of these. Therefore I generally follow their practise of mixing terms. When referring to my own account of representativity, however, I prefer the term *interpretation*, since it is less biased and often used with a more general meaning than *reading*.

I will speak of representative interpretations of a *sentence* as well as representative interpretations of a *definite plural noun phrase*. Strictly speaking, it is the definite plural noun phrase in context which has the representative interpretation, i.e. which is represented with existential instead of universal quantification. Thus, when I say that a sentence has a representative interpretation, I mean that one or more of the definite plural noun phrases in this sentence has a representative interpretation. Also, I will use the term *representative predication*, which should be taken to mean “conveying the representative interpretation”.

Central terms are listed in the index.
Chapter 2

Kang's weak and strong readings

2.1 Introduction

In her doctoral dissertation, *Weak and strong interpretations of quantifiers and definite NPs in English and Korean* (1994), Young Eun Yoon Kang proposes that there are two distinct readings of donkey sentences and sentences with definite plural noun phrases: a weak and a strong reading. On both readings a sum individual in the sense of Link (1983) is calculated. The difference between the two readings is the requirements on the sum individual. On the weak reading the predicate must be satisfied by at least one member of the sum individual, while on the strong reading the predicate must hold of every member. Kang claims that it is the predicate which determines whether a sentence is assigned the weak or the strong reading. Consequently, she divides predicates into two categories, weak and strong, depending on whether they allow the weak reading or not. She attempts to give an account of the difference between these two predicate types in terms of various semantic features.

Kang (1994) conducts two survey studies, which appear to confirm the existence of weak and strong readings and their dependence on specific predicates.

Kang's 1996 article *Total and partial predicates and the weak and strong interpretations* is essentially a presentation of the main points in her doctoral dissertation, except that it leaves out the Korean data and the survey studies. Also, there is a slight shift in the semantic features she relies on in her account of the difference between strong and weak predicates.

In this chapter I will introduce the phenomena Kang (1994, 1996) seeks to capture and the analysis she gives of them. The evaluation of Kang's account will mainly be presented in chapter 6, where we will have reached a better understanding of the semantic and pragmatic properties of the weak
reading.

Whenever I refer to Kang, I speak of elements which are common to Kang (1994) and Kang (1996). Thus, if I refer to Kang (1994) or Kang (1996), I speak of something which is unique to this particular work.

2.2 Weak and strong readings

Donkey sentences

2.1 *Every man who owns a donkey, beats it.*

Imagine a situation where we have five men, three of these own one donkey each, the other two own two donkeys. The first three all beat their donkeys, while the last two beat one of their two donkeys. Is 2.1 true in this situation? Kang claims that sentences such as 2.1 prefer the weak reading which can be paraphrased as 2.2. The weak reading stands in opposition to the strong reading, which corresponds to the paraphrase 2.3. In the situation outlined above, 2.1 is true on the weak reading and false on the strong reading. When Kang asserts that 2.1 favours a weak reading, she implies that speakers judge it to be true in this situation.

2.2 *Every man who owns a donkey, beats at least one donkey he owns.*

2.3 *Every man who owns a donkey, beats every donkey he owns.*

Sentences with definite plural noun phrases

2.4 *The children built the raft.*

Kang, along with Link (1983), argue that 2.4 has a weak interpretation, i.e. that it can be true even though only some of the children participated in building the raft.

2.5 *The glasses are dirty.*

Consider a scenario where a couple is hosting a party. Half an hour before the guests are due, the wife inspects the wine glasses in the cupboard. Finding spots on some of them, she says 2.5 to her husband. Kang asserts that in this situation the wife speaks truthfully even though only some of the glasses are dirty. In other words, she claims that 2.5 has a weak reading.

Not all sentences have a weak reading. Kang mentions 2.7 and 2.6 as examples of sentences which require a strong reading, i.e. that all the children are eight years old and that all the glasses are clean.

2.6 *The children are eight years old.*

2.7 *The glasses are clean.*
Earlier observations of weak readings

Kang (1996) suggests that the phenomenon of weak and strong interpretations in donkey sentences was first observed by Heim (1982). Weak interpretations have since been confirmed in many linguistic works, such as Rooth (1986), Chierchia (1992), Barker (1993) and Kanazawa (1994). All these works have primarily been concerned with unbounded indefinites and anaphora in donkey sentences. As I will confine my discussion to simple sentences with definite plural noun phrases (like 2.4 - 2.6 above), I will not go into their accounts of donkey sentences. There is, however, a large literature on the semantics of plural noun phrases which Kang has not reviewed. Here the semantics of definite noun phrases have received substantial attention. Chapter 4 will therefore be devoted to an overview of some important accounts of definite plural noun phrases with a special emphasis on weak readings.

2.3 Weak and strong predicates

Total and partial predicates Kang asserts that it is mainly the predicate which determines whether a sentence is assigned the weak or the strong interpretation. In particular, she claims to have identified a class of predicates that come in pairs: total and partial predicates. The total predicates require a strong reading, while the partial predicates normally trigger the weak reading. Examples of such predicate pairs are clean:dirty, healthy:sick, closed:open, where the first element in each pair is a total predicate and the second element is a partial predicate.

2.8 The tablecloth is clean.

2.9 The tablecloth is dirty.

2.10 The tablecloths are clean.

2.11 The tablecloths are dirty.

Kang observes that the partiality or totality of a predicate relates to both individuals with parts and groups consisting of several individuals. For 2.8 to be true, every (relevant) part of the tablecloth needs to be clean. 2.9, on the other hand, may be true even if only some (relevant) part of the tablecloth is dirty. Likewise, 2.10 requires that every tablecloth is clean while 2.11 demands only that some of the tablecloths are dirty.\(^1\)\(^2\)

\(^1\)According to my intuition, it is easier to perceive the weak reading of 2.9 than of 2.11. Kang does not seem to share this intuition.

\(^2\)One may object that even sentences such as 2.10 can be judged true in a case where nearly all the tablecloths are clean and a few exceptional ones are dirty. The relationship
Note that most adjectives do not qualify as neither total nor partial predicates. Take for example *beautiful*. For a person to be beautiful, it is neither necessary that every part of him or her is beautiful (we may disregard an ugly arm or toe) nor sufficient that a part of him or her is beautiful (beautiful hair, or even a beautiful face, may not be enough if the rest does not satisfy our demands). Consequently, *beautiful* does not qualify as total or partial.

As seen in the definition of total and partial predicates below, Kang emphasizes that only predicates with a lexicalized antonym can be classified as total or partial. For example, Kang (1996) notes that the predicate *own* seems to qualify as a total predicate since if you own something, like a house, you have to own all parts of it, and if you own a plurality of things, houses, you need to own every individual in the plurality. But *own* does not have a lexicalized opposite, and consequently it is not a total predicate. Kang does not give a reason for restricting the labels "total" and "partial" to predicates with a lexicalized antonym.

The definition Kang gives of total and partial predicates is as follows:

If P and Q are a pair of lexicalized antonyms, and it holds that
a. if $P(x) \land y \subseteq x \rightarrow P(y)$,

b. if $Q(x) \land x \subseteq y \rightarrow Q(y)$,

then P is a total predicate and Q is a partial predicate, where $\subseteq$ is the semantically relevant part relation. (Kang, 1996, p. 224)

The semantically relevant part relation $\subseteq$ is due to Moltmann (1991). The reason why Kang does not adopt a simple set-theoretical part relation, is that the context often contributes to determining what a relevant part is. To illustrate this context dependence, Kang presents the following examples:

In a situation where you want a towel to dry your body, you might call a towel dry, even if a small part of it is wet. If you need a towel to cover an expensive electronic machine, however, even the smallest wet spot might be enough for you to insist that it is wet.

If a friend tells you that one of his parents is in hospital due to a serious heart problem, and inquires whether your parents are healthy. You know that your mother has a cold and that your father is suffering from a tooth ache. In this situation, you would probably say that your parents are healthy. For a professional athlete who is asked a day before a competition if he or she is healthy, a less serious sickness would be enough for him or her to claim to be sick.

---

3 In section 4.9 we will see that Schwarzschild (1996) also proposes that the context has an important role in determining what are relevant parts in relation to a predicate property.
As a brief comment to these examples, I will point out that I agree with Kang that what you choose to classify as wet or sick depends on the situation. However, I do not see that this context dependence is necessarily related to part structure.

Whether you call a towel wet or dry might depend just as crucially on the degree of wetness as on how many (or large) parts of it are wet. For example, a towel which is a little damp all over, might be classified as dry enough if you need it for the shower, but too wet to cover an electronic machine.

In the second example, when Kang speaks about serious heart problems and and less serious colds, she seems to have left the part-whole terminology. The crucial matter here is the seriousness of the sickness, not how many (or large) body parts it is concerned with.

Below is the list of total and partial predicates presented in Kang (1996, p. 228). The question marks in parenthesis are Kang’s own.

---

4 The list is a slightly enlarged version of the list in Kang (1994).
5 This list does not seem to be exhaustive. For instance, the following pairs seem to satisfy Kang’s criterion for total/partial predicate pairs: silent: noisy, keep secret: divulge, go ahead with: abstain, behave well: behave badly, sing in tune: sing out of tune.
<table>
<thead>
<tr>
<th><strong>Total predicates</strong></th>
<th><strong>Partial Predicates</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>healthy</td>
<td>sick</td>
</tr>
<tr>
<td>closed, stopped up, blocked</td>
<td>opened up, penetrated, leak</td>
</tr>
<tr>
<td>clean, kept clean</td>
<td>dirty, soiled</td>
</tr>
<tr>
<td>spotless</td>
<td>spotted</td>
</tr>
<tr>
<td>in good order</td>
<td>out of order</td>
</tr>
<tr>
<td>kept intact</td>
<td>damaged, broken, burned</td>
</tr>
<tr>
<td>dry</td>
<td>wet</td>
</tr>
<tr>
<td>rejected</td>
<td>accepted</td>
</tr>
<tr>
<td>fail</td>
<td>pass</td>
</tr>
<tr>
<td>perfect, flawless</td>
<td>faulty, flawed</td>
</tr>
<tr>
<td>complete</td>
<td>incomplete</td>
</tr>
<tr>
<td>finished</td>
<td>in progress</td>
</tr>
<tr>
<td>thorough</td>
<td>limited, careless, negligent</td>
</tr>
<tr>
<td>level, smooth, even</td>
<td>rough, rugged(?)</td>
</tr>
<tr>
<td>straight</td>
<td>curved(?)</td>
</tr>
<tr>
<td>empty</td>
<td>fill(ed)(?)</td>
</tr>
<tr>
<td>naked</td>
<td>dressed(?)</td>
</tr>
<tr>
<td>move away from</td>
<td>move towards</td>
</tr>
<tr>
<td>run out, used up, gone, want, lack, devoid of, deficient</td>
<td>exist, in existence, left, remain</td>
</tr>
<tr>
<td>out of stock</td>
<td>in stock</td>
</tr>
<tr>
<td>innocent</td>
<td>guilty</td>
</tr>
<tr>
<td>turn out, turn off</td>
<td>turn on</td>
</tr>
<tr>
<td>clear, obvious</td>
<td>obscure, vague</td>
</tr>
</tbody>
</table>

**Normal predicates**  Predicates that are not total or partial, labeled *normal predicates* by Kang, can also be categorized as weak or strong. We have already seen that *build a raft* in 2.4 was classified as weak, while *be eight years old* in 2.6 was classified as strong. *Own*, discussed above, is another a strong (though not total) predicate, while *beautiful* is neither weak nor strong.

### 2.4 Semantic and pragmatic factors involved in the weak reading

Why do certain sentences have a weak reading? As Kang considers predicates to be the determining part of speech in relation to weak readings, she searches for lexical semantic factors that "weak predicates" have in common.
2.4.1 Normal predicates

Kang claims that, for normal predicates, the s-level/i-level distinction is the main semantic feature which explains why some predicates favour the weak reading and others do not. As the content of the i-level/s-level distinction is important to the later evaluation of Kang’s semantic criteria for weak readings (cf. section 6.2), I will give a short presentation of it here.

Kang uses the terms ”stative” and ”episodic’ instead of “i-level” and “s-level” respectively. She makes clear, however, that she regards i-level and stative predicates on the one hand, and s-level and episodic predicates on the other hand, as equivalent (cf. Kang (1994, p. 27)). As most of the literature I have encountered seem to prefer the former terms, I will use i-level and s-level throughout this thesis.

According to Chierchia (1995) i-level predicates express properties which are permanent or tendentially stable like know French, have red hair, be extinct, while s-level predicates describe transient, episodic properties like is speaking French, is dirty, are smoking. The i-level/s-level distinction was originally proposed by Carlson (1980) who claims that i(individual)-level predicates denote properties of individuals and s(stage)-level predicates refer to properties of stages of individuals. An individual can both be an object, like a dog or a spoon, or a kind, like the kind dog or the kind spoon. A stage of an individual is an activity this individual performs at a particular time and place.\(^6\)

It is important to keep in mind that the category of i-level (stative) predicates is not the same as the category of states in the sense of Vendler (1967).\(^7\) Both i-level (stative) and s-level (episodic) predicates can be states. For example, scared, wet, angry denote states, but are s-level (episodic) predicates because they are not tendentially stable. Tall, intelligent, English, on the other hand, are tendentially permanent, and thus i-level (stative) statives. I will use the term stative to refer to predicates which denote states in the sense of Vendler (1967).

Kang’s claim is that s-level predicates trigger weak readings and i-level predicates do not. This explanation serves well to account for why sentences such as 2.12, but not 2.13, get a weak reading.

2.12 The children brought a cake.

2.13 The children are intelligent.

---

\(^6\) Kratzer (1988), Diesing (1992) and Chierchia (1995) have contested Carlson’s (1980) account of the difference between s-level and i-level predicates, and no longer regard them as denoting properties of stages and individuals. The disagreement between these positions is, however, irrelevant to the arguments presented in this section and in section 6.2.2. I have chosen to use the terms i-level and s-level instead of individual-level and stage-level in order to withdraw the focus from the relationships with stages and individuals.

\(^7\) Vendler (1967) distinguishes four predicate categories: states, activities, accomplishments and achievements.
Kang notes, however, that there are some sentences with s-level predicates that do not allow the weak reading. Kang (1994) mentions 2.14 and 2.15 as problematic examples.

2.14 The children walked to school.

2.15 The frozen pies were put into the refrigerator.

These problematic examples forces her to admit that the i-level/s-level distinction cannot give an exhaustive account of why some predicates give rise to weak readings and others do not.

To account for the problematic examples above, Kang (1994, p. 28) suggests that predicates "which express changes of state for the subject NP" tend to require the strong reading.

Kang (1994) also notes that sentences which are assigned a collective reading, usually trigger a weak interpretation. She gives 2.16 as an example of a sentence which favors a collective reading.

2.16 The children built a raft.

In her 1996 article, Kang's explanation criteria are somewhat changed. She still claims that collectivity enables weak readings, but no longer relies on the change of state property to explain why certain sentences with s-level predicates disallow a weak reading. Her new claim is that (abstract) movement verbs in the sense of Gruber (1965) prevent weak readings. To clarify what she means by "movement" she gives the following examples: 2.17-2.19 involve movement, while 2.20-2.22 do not.

2.17 x walks to y: x moves to y.

2.18 z puts y to x: y moves to x.

2.19 x eats y: y moves into x's inside.

2.20 x pets y.

2.21 x feeds y.

2.22 x sees y.

This movement criterion accounts for why 2.14 and 2.15 above cannot give rise to a weak reading.\textsuperscript{9}

\textsuperscript{8} In section 4.2 I give a brief introduction to the collectivity/distributivity distinction.

\textsuperscript{9} Kang (1996) also mentions domain narrowing in the sense of Barker (1993) as a factor which determines whether donkey sentences are assigned a weak reading or not. As we are not concerned with donkey sentences here, I will not comment on this suggestion.
2.4.2 Total and partial predicates

According to Kang, total and partial predicates are both s-level, and thus the i-level/s-level distinction cannot be of any help here. In Kang (1994), she says explicitly that she regards it as unsatisfactory that she cannot find a common factor which accounts for the two types of weak predicates, partial and normal s-level predicates. She leaves the question of whether there is one basic distinction applies to both types of predicates to further study.\(^{10}\)

To account for the difference in behaviour between total and partial predicates, Kang refers to the universal/existential distinction made by Rossedeutscher and Kamp (1992). They claim that certain predicates like clean, healthy, closed refer to "universal" concepts while others such as dirty, sick, open denote "existential" concepts. One way of perceiving this distinction, is to regard cleanness/healthiness/closedness as the absence of dirt/sickness/openness while sickness/dirtiness/openness is the presence of the same property. Another way of viewing the distinction is in terms of a requirement on part structure. As we have seen above, one can characterize something as dirty even though only part of it is dirty, but something qualifies as clean only if every part of it is clean.\(^{11}\)

Kang's claim is thus that total predicates trigger strong readings because they denote universal (or strong) concepts and partial predicates trigger weak readings because they denote existential (or weak) concepts.\(^{12}\)

2.4.3 The role of context

What role does Kang ascribe to context in determining whether a weak reading is possible?

Although Kang stresses the importance of using a context dependent part relation, she does not mention specific contextual factors which are involved in the weak reading. She says that weak predicates trigger a weak reading in "neutral contexts", but does not specify further what she means by this term.

As the quotes below indicate, the importance assigned to context seems to increase somewhat from Kang (1994) to Kang (1996).

[...] my analysis does not mostly rely on pragmatics, but leaves a bit of room for the role played by pragmatics. (Kang, 1994, p. 52)

\(^{10}\)In section 6.2.2 I will show that the i-level/s-level distinction is in fact relevant to total and partial predicates as well.

\(^{11}\)The so-called universal/existential distinction was observed, and thoroughly discussed, in Cruse (1980). We will return to it in chapter 3.

\(^{12}\)As I will point out in section 6.2, it is not clear what Kang achieves by referring to existential (weak) and universal (strong) concepts. She does not explain how weak and strong concepts differ from weak and strong predicates.
Concerning normal episodic predicates, [...] factors other than the predicate category itself, including contextual factors clearly seem to play a role in deriving the weak or the strong interpretation..(Kang, 1996, p. 232)

The increased reliance on context may be partly due to the critique posed by Krifka (1996).

Without doubt the total vs. partial interpretations of predicates like closed and open is an important phenomenon of semantic interpretation that has not yet received the attention it deserves. However it seems that it is not strictly a lexical property, as Yoon (1994) has proposed.\textsuperscript{13}

Krifka (1996) sketches the following situation to demonstrate that the total/partial distinction relies on contextual factors: The local bank has a safe which is accessible only through a hallway with three doors, all of which must be open to reach the safe. Krifka claims that, in the given context, 2.23 means that all the doors were open, whereas 2.24 means only that at least one of the doors was closed. Thus the context has switched the roles so that the partial predicate, open, gives rise to a strong interpretation and the total predicate, closed, gives rise to the weak interpretation.

2.23 I could reach the safe because the doors were open.

2.24 I could not reach the safe because the doors were closed.

2.4.4 Negation

2.25 The glasses are not dirty.

2.26 The glasses are not clean.

Kang claims that when partial predicates are negated, they become equivalent to their total counterparts. In other words, not dirty means the same as clean, and 2.25 thus requires a strong reading. Similarly, negated total predicates are equivalent to partial predicates. A consequence of this is that 2.26 allows a weak reading.

2.27 The children did not build the bridge.

2.28 The children are not intelligent.

\textsuperscript{13} Yoon (1994) is Kang (1994). I have chosen Kang since this is how she refers to herself.
There is no such parallel for normal predicates. As, 2.27 and 2.28 illustrates, strong and weak normal predicates both trigger the strong reading when they are negated.

When the four predicate categories total, partial, normal strong and normal weak are combined with upward monotone and downward monotone contexts (i.e. the possibility of negation), we get what Kang (1996, p. 235) calls “eight distinct predicate categories”, each of which she classifies as weak or strong.

<table>
<thead>
<tr>
<th>Contexts</th>
<th>Weak predicates</th>
<th>Strong predicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upward monotone</td>
<td>partial, (normal s-level)</td>
<td>total, normal i-level</td>
</tr>
<tr>
<td>Downward monotone</td>
<td>partial, normal</td>
<td>total</td>
</tr>
</tbody>
</table>

As we can see, the only predicate category Kang has reservations in characterizing as weak or strong, is normal s-level predicates in upward monotone contexts. Kang claims that both contextual factors and other semantic factors than the predicate category contribute to determine which readings these predicates give rise to.

2.5 Formal representation

Kang states clearly that she regards the distinction between the strong and the weak reading as a truth conditional one. As we will see in section 5.2, this is not the only possible way of viewing it. Lasersohn (1999) regards similar interpretation differences as differences of pragmatic slack, but not of truth conditions.

Kang (1994) chooses Discourse Representation Theory (DRT) as her formal framework for giving semantic representations of sentences with weak and strong predicates. She does not state her reasons for choosing this framework over other available ones. A possible reason, however, is that she is concerned with donkey sentences, and that DRT has shown to be an adequate framework for representing these.

Kang represents definite plural noun phrases as sum individuals in the sense of Link (1983). This results in the construction rule CR.NP[Quant=def/Num=Plur] below, which we will adapt for our own purposes in section 7.4.

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14 We will see, however, in sections 6.2 and 6.3 that when it comes to assigning the weak reading, contextual factors are crucial for partial predicates as well.

The distinction between weak and strong predicates is represented as a difference in their demand on the sum individual: total predicates require that every element in the sum individual satisfy the predicate, while partial predicates must hold for at least one member of the sum individual. Although Kang has acknowledged the importance of context in assigning weak readings to sentences with normal s-level predicates, she suggests to use DRS construction rules which rely solely on lexical information. In short, her proposal is that the quantifier *at least one* should be used in the representation of sentences with weak predicates, and the quantifier *all* should be used in sentences with strong predicates. We will not introduce Kang’s construction rules for total and partial predicates here, as we will not make use of these.

### 2.6 The function of the weak reading

Why do we sometimes choose to imply the weak reading instead of the strong? Kang is extremely brief on this point:

The phenomenon which we observe in sentences with *partial* predicates seems to be based on avoidance of overspecificity. In
other words, the price of being too specific in our speech is usually so high that we tend to settle for a general meaning or interpretation. (Kang, 1994, p. 38)

2.7 The survey studies

Kang (1994) conducts two survey studies to test her hypothesis that certain predicates give rise to weak readings when they appear in donkey sentences and sentences with definite plural noun phrases. Kang’s general conclusion is that the results of these studies support her hypothesis. Also, there is no significant difference between donkey sentences and sentences with definite plural noun phrases in their ability to produce weak readings.16

2.8 Summary

We have seen that Kang proposes that there are two distinct readings of donkey sentences and sentences with definite plural noun phrases: a strong reading which requires that every member of the sum individual satisfies the predicate, and a weak reading which only requires that the predicate holds of one member. It is predominantly the predicate which decides whether a sentence is assigned the weak or the strong reading. There is a special class of predicate pairs, total and partial predicates, where one member, the total predicate, triggers the strong reading, and the other, the partial predicate, gives rise to the weak reading. Predicates which do not have any such lexical counterpart, the so-called normal predicates, can also trigger the weak reading. Kang claims that the i-level/s-level distinction can predict which normal predicates trigger weak readings (s-level predicates) and which do not (i-level predicates). Unfortunately, the i-level/s-level distinction is not relevant to total and partial predicates.

Kang conducts two survey studies which largely confirm her hypothesis about the existence of weak and strong readings.

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16 See Geurts (2002), however, for some criticism of the experimental technique Kang (1994) uses. As this critique is not relevant for the present purposes, we will not pursue it here.
Chapter 3

Cruse’s gradable complementsaries

3.1 Introduction

In this chapter we will introduce Cruse’s (1980) class of gradable complementsaries, a class of adjective pairs which resembles Kang’s total and partial predicates.

Cruse claims that gradable complementsaries, pairs like clean:dirty, belong to a different class than antonyms, pairs like long:short. When arguing for this division, he presents six features which distinguish gradable complementsaries from antonyms. The underlying reason why the two classes behave differently in relation to these features is, according to Cruse, that gradable complementsaries describe a scale of undesirability, while antonyms describe a scale of desirability or neutrality. We will make use of this feature of gradable complementsaries when accounting for weak and strong readings of sentences with adjectives in chapter 6.

In this chapter we merely present the ideas of Cruse (1980) and compare them to Kang’s total and partial predicates. An evaluation of Cruse’s account of the semantic and pragmatic features which underlie the class of gradable complementsaries is given in section 6.3.

3.2 Gradable complementsaries

3.2.1 Lyons’ terminology for contrasting terms

Lyons (1977) employs the following terminology for contrasting terms: Contrast is taken as the most general term. It carries no implications as to the number of elements in the set of paradigmatically contrasting elements. Opposition is restricted to binary contrasts. Antonyms are gradable opposites. Complementsaries are ungradable opposites. Typical antonym
pairs are long:short, hot:cold, good:bad, and characteristic complementaries are pairs like: dead:alive, open:shut, male:female.

3.2.2 Are total and partial predicates complementaries?

Lyons (1977) claims that a defining characteristic of complementaries is that they are non-gradable, i.e. they are odd in the comparative and the superlative. Some total and partial predicates comply fairly well with this observation, cf. ?a bit complete, ?very closed, ?fairly empty, ?a little naked. However, many total and partial predicates are clearly gradable, cf. cleaner, the cleanest, fairly healthy, very dangerous, terribly sick. Thus the latter pairs are classified as antonyms according to Lyons (1977).

In the article Antonyms and gradable complementaries (1980), Cruse asserts that complementaries can in fact be gradable. He makes a division between complementary pairs which are no more than two-term incompatible sets and which are non-gradable, like alive:dead, and pairs which are associated with an underlying scaled property, and which are gradable, like clean:dirty. He also shows how the gradable complementaries differ from antonyms. As we shall see in section 3.3, the class of gradable complementaries is strikingly similar to Kang’s class of total and partial predicates.

In his book Lexical Semantics (1986) Cruse mentions the following characteristics of complementaries:

1. They divide some conceptual domain between them in such a way that what does not fall into one of the compartments must necessarily fall into the other. There is no no-man’s land, no neutral ground, no possibility of a third item lying in between them. (Cruse, 1986, p. 198)

2. The assertion of one of the terms in a complementary pair is an implicit denial of the other, e.g 3.1 implies 3.2.

3.1 He is alive.

3.2 He is not dead.

3. A sentence denying both terms, like 3.3, is anomalous.

3.3 He is neither dead or alive.

4. Complementaries are usually verbs or adjectives.

These four characteristics appear to match the adjectives in Kang’s class of total and partial predicates, i.e. pairs such as clean:dirty, healthy:sick, empty:filled.
It seems, however, that Cruse (1986) takes an intermediate position between Lyons (1977) and Cruse (1980). The class termed gradable complementsaries in Cruse (1980) is labeled \textit{privative antonyms} in Cruse (1986). The term “privative” is defined as an opposition between two terms, one of which has a distinctive feature that the other one lacks. Further Cruse (1986) remarks on the class of privative antonyms that

These opposites have a number of puzzling properties which make them difficult to classify and describe. (Cruse, 1986, p. 204)

The standpoint Cruse (1986) ends up taking on this puzzling class of privative antonyms is that there are, in fact, two senses of each term, one antonymic and one complementary. For example, \textit{clean} has the sense \textit{clean1}, which appears in contexts such as \textit{It's clean}, and which has a complementary relation with \textit{dirty}, and \textit{clean2}, which appears in sentences such as \textit{How clean is it?} and \textit{It's cleaner now?}, and which has an antonymic relation to \textit{dirty}.

As Cruse (1980) gives a much more thorough treatment of the class of adjectives in question than Cruse (1986)\textsuperscript{1}, and as the difference in opinion between the two works is not relevant to our purposes, the discussion will be confined to his earlier work.

\subsection{The distinction between antonyms and gradable complementsaries}

What makes Cruse (1980) postulate a distinction between gradable complementsaries, pairs like \textit{clean:dirty}, \textit{smooth:rough}, and antonyms, pairs like \textit{long:short}, \textit{heavy:light}? Why deviate from Lyon's classical work which categorize all the above pairs as antonyms?

Cruse shows that six different features yield the same grouping of gradable opposites: antonyms on the one hand, and gradable complementsaries on the other hand. On the basis of this observation, Cruse proposes that there is a fundamental distinction between traditional antonyms and gradable complementsaries which should not be ignored in a classification. Let us look at the six features which lead Cruse to introduce the distinction.

A list of the gradable complementsaries and antonyms mentioned in Cruse, will give a better foundation for the comparison.\textsuperscript{2} Gradable complementsaries: \textit{safe:dangerous, clean:dirty, accurate:inaccurate, smooth:rough, sober:drunk, pure:impure, honest:dishonest, true:false}. Antonyms: \textit{long:short, fast:slow, light:heavy, good:bad}. Below I will refer to items from the first list as gradable complementsaries and items from the second list as antonyms. I do not take Cruse's distinction between these two for granted, but rather use the terms as abbreviations for the rather long lists.

\textsuperscript{1} In fact, Cruse (1986) refers his readers to Cruse (1980) for a more detailed discussion.

\textsuperscript{2} Cruse gives no list of gradable complementsaries or antonyms. The present list is made from his examples.
1. **Not X implies Y** Let us compare gradable complementaries and antonyms with regard to the entailment schema 3.4 below.

3.4 *It's not X entails it is Y.*

3.5 *It's not long entails that it is short.*

3.6 *It's not safe entails that it is dangerous.*

The entailment in 3.5 clearly does not hold. It is possible to be neither long nor short, but average. What about the entailment in 3.6? According to Cruse it is valid. It may seem, however, that *dangerous* is a too strong word to describe everything that is *not safe*. Thus the entailment in 3.6 seems to imply more than we normally want to commit to.\(^3\)

If we modify 3.4 to 3.7, however, the entailment for the pair *safe*:*dangerous* is secured, while it is still invalid for the pair *long*:*short*.

3.7 *It's not X entails it is at least a bit Y.*

3.8 *It's not long entails that it is at least a bit short.*

3.9 *It's not safe entails that it is at least a bit dangerous.*

Trying the entailment schema in 3.7 with the other gradable complementaries seems to yield the same result as for *safe*:*dangerous*, while the antonym pairs perform equally to *long*:*short*.

2. **Scale of degrees** According to Cruse, every gradable adjective can be said to operate over a scale of degrees. For most adjectival opposites the scale is one-ended: it has a point representing zero and extends infinitely in the direction going away from this point. Two-ended scales, as for the pair *full*:empty exists, but are not frequent. Cruse introduces a distinction based on these scales: the term which denotes less of the scaled property is termed **Q-negative**; the other item in the pair, which denotes more of the scaled property, is called **Q-positive**.

As will be explained in point 4 below, Cruse claims that the scale for gradable complementary pairs is a scale of demerit, while the scale for antonyms is a scale of merit or neutrality. This means that the scale for the complementary pair *clean*:dirty is a scale of dirtiness, while the scale for the antonym pair *long*:short is a scale of length. On a scale of dirtiness, clean is the Q-negative term since it denotes less of the scaled property (dirtiness).

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\(^3\)Cruse (1986, p. 203) hints at the same:

It seems that the bald statement *It's dirty* is reserved for distinctly dirty things, and would not be appropriate for only very slightly dirty things.
and *dirty*, denoting more of the scaled property, is the Q-positive element. For the antonym pair *long*: *short*, which is described as a scale of length, *long* is Q-positive and *short* is Q-negative.

Thinking about opposites in terms of scales reveals a difference between antonyms andgradable complementaries: The point on the scale where one of the two terms ceases to apply and the other takes over is in the middle of the scale for antonyms, but at the end of the scale for complementaries. I will illustrate this with examples, but first we need to sketch out a few details of Cruse’s scales approach.

```
CLEAN ← DIRTY →
```

```
SCALE OF DIRTYNESS
```

```
Absolute scale
```

```
Figure 3.1: Scale describing the complementary pair *clean*: *dirty*.
```

We must distinguish two separate scales: an absolute scale with an end-point and a relative scale, which has a variable position with regard to the absolute scale and which does not need to have an end-point. The relative scale is needed to account for the relative nature of many predicates: what counts as *clean* in one respect does not necessarily count as clean in another. When a nurse tells you she will use a clean cotton pad, she has another degree of cleanliness in mind than a sweep who congratulates you on having a clean chimney.

Cruse argues that the relative scale for gradable complementaries has a definite end-point, while this is not the case for antonyms. He develops his argument by claiming that sentences like 3.10 and 3.11 below, which contain the Q-negative element of a complementary pair (e.g. *clean*, the term which denotes less of the scaled property *dirtiness*), can be regarded as referring to successive stages in the approach to an end-point. 3.12 is seen as the arrival at that point. Sentences which contain the Q-positive element, however, cannot be used in this way, because there is no underlying reference to an end-point in them. 3.13 and 3.14 are thus pragmatically odd.

3.10 *It’s half-clean.*

3.11 *It’s almost clean.*
3.12 *It's clean.*

3.13 *It's half-dirty.*

3.14 *It's almost dirty.*

3.15 *It's dirty.*

For antonym pairs there is no such distinction between the Q-positive and the Q-negative element. Both members of the antonym pair behave like the Q-negative element of gradable complementary pairs (compare 3.16 and 3.17 to 3.13 and 3.14). The underlying reason for this behaviour is that the relative antonym scale has no end points. A consequence of there being no end-points is that both terms occupy an extended area on the relative scale. In addition, there is an area which is not described by either of the terms, since something may be described as neither X nor Y when X:Y is an antonym pair (cf. neither *long* nor *short*, but average).

![Diagram](image)

**Figure 3.2:** Scale describing the antonym pair *long:short.*

3.16 *It's half-long (half-short)*

3.17 *It's almost long (short).*

3.18 *It's long (short).*

3. **Comparative or non-comparative interpretation** According to Cruse, antonyms, even when uninflected for degree, are interpreted comparatively. If you call X *long* or *short*, it is normally understood to be 'longer than something' or 'shorter than something', and this something is usually an average value for X. Gradable complementaries have no such underlying comparison as part of their meaning. If you call X *clean* or *dirty*, you don’t implicitly say that X is cleaner or dirtier than average. *Clean* doesn’t mean

27
'cleaner than average', but rather 'clean enough'. And dirty does not mean 'dirtier than average', but 'not clean enough'. It is thus possible for the majority of referents in the world to satisfy one of the terms in a pair of complementaries.

4. Markedness and Q-polarity  Cruse claims that the unmarked member of an antonym pair is the Q-positive element, while the unmarked member of a pair of complementaries is the Q-negative element. The unmarked member of a predicate pair is the term which is used in contexts where the contrast between the opposing elements is neutralized. For example, heavy is the unmarked member in the antonym pair heavy:light. Asking how heavy is it? carries no partiality (no presumption or expectation on the part of the speaker), while a question like how light is it? carries a presupposition that the speaker would regard light, as opposed to heavy, as an appropriate description of the item. Heavy is the Q-positive term because it represents more, rather than less of what the scale measures, namely weight.

According to Cruse, it is obvious that How clean is it? rather than How dirty is it? represents the impartial alternative, and hence that clean is the unmarked term in the pair clean:dirty. In many cases, the unmarked nature of a member of a complementary pair is confirmed by the fact that it is morphologically less complex than its marked counterpart: clean:unclean, safe:unsafe, true:untrue, pure:impure, accurate:inaccurate, etc.

To show that the end-term of a complementary pair (e.g. clean) is the Q-negative term, the term which denotes less of the scaled property, Cruse demonstrates that it denotes the complete absence of something. Clean denotes the complete absence of dirt, and accurate the complete absence of inaccuracy. Only by postulating this, can we explain why 3.19 and 3.21 are fine, while 3.20 and 3.22 sound odd.

3.19 When something is clean, there is a complete absence of dirt.

3.20 When something is dirty, there is a complete absence of cleanliness.

3.21 When something is accurate, there is a complete absence of inaccuracy.

3.22 When something is inaccurate, there is a complete absence of accuracy.

Cruse actually claims that 3.20 and 3.22 are not merely odd, but in fact untrue. If something is called slightly dirty or slightly inaccurate, this does

4 As will be mentioned later, Cruse is of the opinion that when using gradable complementaries, the speaker is interested in whether something is satisfactory (e.g. clean) or unsatisfactory (e.g. dirty). It is this binary choice which makes the pair a complementary, rather than an antonym. In the light of this explanation, it seems odd to ask How clean is it?, i.e. to inquire how satisfactory something is. The natural choice would rather be Is it clean?
not imply that it has a complete absence of cleanliness or accuracy. An interesting pair in this connection is true: false. True is the Q-negative value, representing a complete absence of falsehood. The Q-positive value, false, does not necessarily represent a complete absence of truth.

That clean, accurate etc. are the Q-negative terms, which denote absence of the property in question, explains why the scale for the the pair clean: dirty is a scale of dirtiness, not of cleanliness, and the scale for the pair accurate: inaccurate is a scale of inaccuracy, not accuracy.

5. Desirability and Q-polarity For antonym pairs the Q-positive term is desirable or neutral, while for gradable complementaries the Q-negative term is desirable. In other words, antonyms denote degrees of a neutral or desirable property, while gradable complementaries denote degrees of an undesirable property. For example, long and fast denote presence of the neutral or positive properties length and velocity. Clean and safe denote absence of the undesirable properties dirt and danger respectively.

Cruse does mention, however, that there are some gradable complementaries which are primarily descriptive and do not necessarily include an evaluative component. An example is smooth: rough.

6. Behavior when modified by fairly Fairly has two uses: one expressing reservation (It’s fairly safe) and one expressing pleasant surprise (He is fairly clever, actually). In the former case, the nature of the reservation is affected by whether the modified adjective or adverb is an antonym or a gradable complementary. 3.23 expresses that it is not clean, in fact it is slightly dirty. 3.24, however, does not call into question whether it is long or not, but rather whether it is very long.

3.23 It’s fairly clean.

3.24 It’s fairly long.

Desirability as the underlying explanation What can be the underlying explanation for the fact that so many features, most of which seem independent of each other, yield the same grouping of opposites? Cruse gives the following answer.

I believe that the observed clustering of features is psychologically motivated, and I suggest that the most fundamental feature, the one which motivates and controls all the others, is our affective reaction to the underlying scaled property, that is, whether what is being measured is rated as undesirable or not. (Cruse, 1980, p. 22)
Why do undesirable properties behave so differently from neutral and desirable properties? Cruse (1980) asserts that a speaker has different intentions when referring to an undesirable than when referring to a neutral or desirable property.

When a speaker refers to a neutral property, he or she typically intends to specify whether its value is normal or abnormal. Abnormal values are the most salient, and are signaled by pairs like long:short, light:heavy, fast:slow, etc. These pairs of opposites are defined with reference to an average, or most likely value. Thus there are three fundamental values to refer to: more than usual, usual and less than usual. Since one of the defining characteristics of contradictories is that they involve a choice between only two values, it follows that opposites on neutral scales are not contradictories.

In the case of a Q-negative undesirable property, the most salient question for a language user is whether it is present or absent. As the desired state is a zero value of the property (on a relative scale), any positive value represents an unsatisfactory state. Thus the use of gradable complementaries is governed by a norm, rather than an average, and there are just two alternatives: satisfactory or unsatisfactory. This explains why undesirable properties give rise to contradictory pairs.

What about desirable properties? Do they, like undesirable properties, give rise to a norm? According to Cruse, Q-positive desirable properties do not create such a norm, because even unsatisfactory items are credited with some positive value on the scale (here “positive” is used in a purely arithmetical sense). The satisfactory point on the scale is not the end-point, as for scales of undesirability, but is situated mid-way along the scale. In other words, positively evaluated properties resemble neutral properties in being defined in relation to a value on the middle of the scale, rather than at the end, as for undesirable properties.

3.3 Kang’s total and partial predicates and Cruse’s gradable complementaries

How does Kang’s class of total and partial predicates compare with Cruse’s class of gradable complementaries?

A difference between the two classifications is that Kang’s class consists of both adjective pairs and verb pairs, while Cruse’s class contains only adjectives. The verbs in Kang’s classification are not complementaries. As an example take move towards:move away from. 3.25 does not imply 3.26.

3.25 She did not move away from it.

Cruse does not explicitly limit his class to adjectives, but the criteria he uses (cf. section 3.2.3) exclude verbal predicates.
3.26 She moved at least a bit towards it.

The class of total and partial predicates thus appears to be a larger class than the class of gradable complementaries. For this reason we restrict the comparison to adjectives.

First of all, there is overlap between the classes of total and partial adjectives and gradable complementaries. Predicate pairs which are mentioned by both Kang and Cruse are (Cruse's deviations in parenthesis): clean:dirty, smooth:rough, straight:curved (bent). Many other predicate pairs are closely semantically linked: healthy:sick (well:unwell), perfect:faulty (satisfactory:unsatisfactory), complete:incomplete, spotted:spotless (accurate:inaccurate, pure:impure).

Comparing Kang's list of total and partial adjectives to the criteria given in 3.2.3, Kang's adjective pairs generally behave like gradable complementaries. A few of Kang's pairs are not necessarily evaluative (cf. naked:dressed, empty:filled), but as already mentioned, Cruse (1980) does admit that some gradable complementaries are merely descriptive. More problematically, three of the pairs have a negatively evaluative Q-negative element. These three predicates are the first members of the following pairs: rejected: accepted, fail:pass and deficient: in existence. In my opinion neither of these three are good examples of total/partial predicate pairs: It is not necessary to fail all parts of an exam to be given a total failing grade, neither is it sufficient to pass one part of a test to pass the test as a whole. Reject and accept both seem to be total predicates: when rejecting or accepting something, one rejects or accepts all parts of it. As for deficient, I see no reason why something deficient should need to be deficient in all its parts.

Some of Kang's total and partial adjectives are not so clearly gradable (cf. naked, empty, closed). Cruse himself, however, uses the pair true: false as an example of gradable complementaries. He argues that the pair can be considered gradable by claiming that the following two sentences are felicitous.

3.27 John's account of the incident was truer than Bill's.

3.28 Bill's account of the incident was falsier than John's.

If such statements as 3.27 and 3.28 are accepted, then it seems reasonable to permit 3.29, 3.30 and 3.31 as well.

3.29 John's body is more naked than Bill's.

3.30 John's glass is emptier than Bill's.

3.31 The door to John's office is more closed than Bill's.
From the comparison above, we can conclude that the two phenomena Kang (1994, 1996) and Cruse (1980) have singled out independently of each other, total and partial adjective pairs and gradable complementaries respectively, are probably the same class. Thus it is possible that the characteristics of gradable complementaries mentioned by Cruse may contribute to a better account of weak and strong readings of sentences with total and partial adjectives. We will return to this issue in chapter 6.

3.4 Summary

Cruse (1980) introduces a class of gradable complementaries which turns out to be strikingly similar to adjectival total and partial predicates.

He also shows that gradable complementaries, like clean:dirty, differ from antonyms, like long:short, in a number of ways. The contrast between the two classes is clearly exposed when scales are used to represent the pairs of opposites. The pair member which denotes more of the scaled property is termed Q-positive and the member which denotes less of the scaled property Q-negative.

For gradable complementaries the scale measures the degree of the Q-positive term (dirty). The Q-negative term (clean) corresponds to the end-point of the scale where the degree of the Q-positive property is zero. The Q-positive term corresponds to the whole rest of the scale. For antonyms the scale has no such end-point, and the transition from the Q-positive property (long) to the Q-negative property (short) is in the middle of the scale.

According to Cruse, the underlying feature which explains the different behaviour of gradable complementaries and antonyms, is desirability. The Q-positive member of a pair of gradable complementaries denotes an undesirable property, while the Q-positive member of an antonym pair describes a neutral or desirable property. When we speak of a neutral or desirable property, we are interested in whether its value is more than usual, usual or less than usual. Since there is a three-way choice, the antonym pairs are not complementary. When referring to an undesirable property, on the other hand, what is salient is whether the property is present or not. Thus we have a complementary choice: presence (unsatisfactory) or absence (satisfactory) of the undesirable property.
Chapter 4

Earlier work on related phenomena

4.1 Introduction

This chapter presents a survey of earlier contributions on, or particularly relevant to, the phenomenon that we termed representativity in chapter 1. The survey is by no means exhaustive. Some works, like Vallée (1996), Lasersohn (1999) and Schein (2001), which have considerable sections on representativity, have been omitted because they mostly reproduce the ideas of earlier works mentioned in this chapter. As the works of Kang (1994, 1996) and Cruse (1980) have been discussed quite extensively in chapter 2, they will not be mentioned here.

Section 4.2 provides a brief introduction to distributivity and collectivity. This will serve as background information for the rest of the chapter where these notions will be employed frequently.

4.2 Collectivity and distributivity

The collective/distributive distinction

According to Link (1991) a verb or predicate is distributive if it applies to individuals, but not to groups of individuals. Examples of distributive predicates are sleep, bleed and stink. In 4.1, for example, the property slept applies to the individual girls, not to the collection of girls seen as a whole. For this reason 4.1 may be paraphrased as 4.2.¹

4.1 The girls slept.

4.2 Every girl slept.

¹As we will see in sections 4.5 and 5.2, certain linguists, such as Dowty (1987) and Brisson (1998), claim that 4.1 and 4.2 are not equivalent.
There are many different definitions of what a collective verb or predicate is (cf. for instance Scha (1981), Link (1983) and Landman (1996)), and several subtypes of collectivity have been discussed (cf. Lasersohn (1988), Link (1991), Schein (2001)). Verkuyl’s (1999) definition represents the perhaps most common view on collective predication. He claims that a sentence can only have a collective reading if the predicate is false of every individual in the noun phrase denotation. To illustrate his definition of collective predication, Verkuyl (1999) presents the following example.

4.3 These twelve passengers on the Orient Express killed that villain.

According to Verkuyl, 4.3

can only be used truthfully if none of the individuals can be held responsible for the death of the man. Otherwise one would have to say that one of the twelve passengers did it and that the others assisted him or her. The speaker of [4.3] wants to hold the twelve passengers responsible as a collectivity. This means that no individual or subset satisfies the predicate. (Verkuyl, 1999, p. 208)

Much of the literature on collectivity seems to contain an underlying assumption of Verkuyl’s definition (cf. for instance Bech and Sauerland (2000); Schein (2001)). Sometimes this assumption is formulated as a demand that every individual in the plural group in question participate actively in the property described by the predicate. Such a universal participation requirement rules out the possibility that the predicate may be satisfied by an individual or subgroup of the noun phrase denotation.²

Examples of predicates which only give rise to collective readings are gather, split up, collide. In 4.4, for example, the property denoted by the predicate gather can be true of the group of girls as a whole, but not of any individual girls.

4.4 The girls gather.

Predicates such as build a raft, lift a piano, eat a pie can give rise to both distributive and collective readings. 4.5, for example, is ambiguous between the distributive and the collective reading. On its distributive reading 4.5 means that the girls ate a pie each, while on its collective reading it means that the girls ate a pie together.

4.5 The girls ate a pie.

²Note that with this definition of collectivity, the representative interpretation is weaker than the collective interpretation, and is thus implied by the collective interpretation.
We have seen that 4.1 can be paraphrased by the singular universal sentence 4.2, 4.4, on the other hand, cannot be paraphrased by 4.6.

4.6 *Every girl gathers.*

Does the fact that 4.1, but not 4.4 can be paraphrased by a singular construction mean that the noun phrase *the girls* is ambiguous? Link (1998) argues that this difference between 4.1 and 4.4 should rather be traced back to the distributive/collective distinction of the predicate. The argument for placing the ambiguity in the predicate instead of the noun phrase rests on examples such as 4.7 where a single noun phrase combines with one collective predicate (split up) and one distributive predicate (start a solo career).

4.7 *The Beatles split up and started a solo career.*

**The collective/distributive distinction combined with scope.**

The two distinctions *collective/distributive* (reading) and *wide/narrow* (scope) are used to single out a number of different readings of sentences involving plural noun phrases. To illustrate this, consider the following sentences.

4.8 *Three girls lifted the sofa.*

4.9 *Three girls lifted a sofa.*

4.8 is two-ways ambiguous, it either refers to one single lifting act (its collective reading) or to three separate lifting acts (its distributive reading). How about 4.9? In this case scope enters the picture. This may seem strange since there is no scope effect when two singular indefinite phrases are combined. It is a fact, however, that indefinite plural noun phrases do create scope differences. When wide and narrow scope is superimposed on the distributive/collective readings we get a total of four readings for 4.9, two of which are equivalent:

1. Girls: wide scope, collective. Sofa: narrow scope. There is a group x of three girls and a sofa y such that x lifted y. There is one lifting act and one sofa lifted.

2. Girls: wide scope, distributive. Sofa: narrow scope. There is a group x of three girls who each lifted a sofa. There are three acts of lifting and up to three sofas lifted.

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3 Consider for instance 4.10 which has only one reading.

4.10 *A girl lifted a sofa.*
3. Girls: narrow scope, collective. Sofa: wide scope. There is a sofa x and a group of three girls y such that y lifted x. This reading is equivalent to 1.

4. Girls: narrow scope, distributive. Sofa: wide scope. There is a sofa x and a group y of three girls such that each girl in y lifted x. There are three lifting acts and one sofa.

It gets even more interesting when we have two-place predicates with plural noun phrases at both argument places. In 4.11 there are four readings of both noun phrases, producing a total of eight readings, two of which coincide (there is no scope in the doubly collective reading).

4.11 *Three men lifted four tables.*

Lønning (1997) and Verkuyl (1999), however, propose that there is an asymmetry between the external and the internal arguments of a transitive verb\(^4\): the external argument leads to ambiguity and the internal argument to indeterminacy. A sentence like 4.11 is thus ambiguous between a reading where three men each lifted four tables (distributive reading of the external argument) and a reading where three men as a group lifted four tables (collective reading of the external argument). The two readings are logically incompatible. *Disambiguation markers*, in this case *each, together*, can serve to resolve the distributive/collective ambiguity.

Whether the tables get lifted one by one (the distributive reading of the internal argument) or as a group (the collective reading of the internal argument) is a matter of indeterminacy. All the possible readings are logically compatible, but *amplification markers*, like *one-by-one, as a group*, can add detail to the logical representation. The detailed representation implies the original, less specific, interpretation.

Link (1991) points out that in certain rare contexts, the ambiguity/indeterminacy theory fails to distinguish between saliently different readings. As an example he mentions 4.14. In this case it does matter whether John simultaneously kept six plates in the air or simply juggled with, for instance, three at a time.\(^5\)

\(^4\) When the verb is in the active voice, the external argument of a transitive verb is the subject and the internal argument is the direct object.

\(^5\) I suggest that it is perhaps not so rare that the differences between so-called indeterminant readings are salient. For example, it is quite common that the temporal relationship between the various actions expressed by a plural sentence are of interest. In 4.12 and 4.13 below, it might be highly relevant whether the women were seen (dated) at the same time.

4.12 *The women were seen at the crime scene.*

4.13 *He dated these women.*
4.3 Frege (1892)

In *On Concept and Object* (1892) Frege states that the singular definite article always indicates an object, whereas the indefinite article accompanies a concept word.

Frege claims that this rule is unproblematic in the case of the indefinite, but notes that

The matter is not so simple for the definite article, especially in the plural, but then my criterion does not relate to this case.  
(Frege, 1892, p. 94)

In a preliminary draft of *On Concept and Object* there is a discussion of plural definite descriptions which is left out from the published version. In the draft Frege distinguishes two kinds of plural definite descriptions, concept word descriptions and object descriptions. We have a concept word if the definite article can be replaced by 'all' and the statement holds of each individual member of the class. Frege uses 4.15 to exemplify the concept word description.

4.15 *Die Pferde sind pflanzenfressende Tiere.*

In *Posthumous Writings* Hermes et al. (1979) has the following comment to this example:

In the German sentence the word 'die' is the plural form of the definite article. The natural English translation would be 'Horses are herbivorous animals'.

To illustrate the other type of plural description, object descriptions, Frege gives the example 4.16.

4.16 *The Romans conquered Gaul.*

Frege argues that the plural noun phrase in 4.16

is to be regarded as a proper name, for here we are not saying of each Roman that he has conquered Gaul; we are speaking of the Roman people, which is to be regarded logically as an object.  
(Frege, 1892, p. 95)
It is not clear why he omitted this discussion from the published version of *On Concept and Object*. In any case, the reason does not seem to be that he thought his remarks erroneous. Frege repeats his account of the different types of plural noun phrases in a letter to Russell ten years later, and on the object class he remarks

'Bunsen and Kirchoff laid the foundations of spectral analysis.' Here we must regard *Bunsen and Kirchoff* as a whole. 'The Romans conquered Gaul' must be conceived in the same way. The Romans are here the Roman people, held together by customs, institutions and laws. An army is in this sense a whole, or system. We regard every physical body as a whole, or system, consisting of parts. (Frege, 1902, p. 140)

Another indication that Frege stood by what he said about plural descriptions in the draft of *On Concept and Object*, is that the published version includes a discussion of a “singular version” of the sentence-type illustrated in 4.16

4.17 *The Turk besieged Vienna.*

which he considers a case “where a singular takes the place of a plural” and a case which does not subsume under his “definite article object indefinite article concept”- rule. He does not consider 4.17 a problem for his rule, however, since 'the Turk' is the proper name of a people. Oliver (1994) remarks that Frege must regard “The Turk besieged Vienna” and “The Turks besieged Vienna” as synonymous.

To conclude, although Frege never maintained it explicitly, it appears that he thought plural noun phrases sometimes occur as proper names, which should be regarded logically as singular objects. Interestingly, 4.16, which Frege employs to exemplify this use of plural noun phrases, has what we will call a representative interpretation.

As we will see in section 4.8, Landman (1989, 1996) claims that representative predication is singular predication, i.e. that the Romans in 4.16 should be represented as a singular object without internal structure.

4.4 **Link (1983, 1984)**

Introduction

The paper *The Logical Analysis of Plurals and Mass Terms* by Link (1983) has been very influential in the collectivity debate. In addition, this paper, together with Link (1984), formed the point of departure for Landman's (1989, 1996) group theory, which is one of the most thoroughly developed formal frameworks aimed at treating representativity (cf. section 4.8). In
this subsection we will only review the parts of Link (1983) and Link (1984) which are the most relevant for modeling representativity. For this reason we will leave out some nuances that are not relevant to our purposes.

Link (1983) proposes that a lattice structure should be used to model plural and mass terms. There are two main reasons why he advances the lattice-theoretic approach.

One is that it allows us to model certain similarities between plural terms and mass terms: Firstly, both types of terms have the semantic property of 

*referring cumulatively*, which means that any sum of parts which is referred to as x is x. The cumulative reference property for mass terms and plural terms respectively is exemplified by 4.18 and 4.19 below.

4.18 *If a is butter and b is butter, then the sum of a and b is butter.*

4.19 *If the vegetables in this garden are carrots and the vegetables in that garden are carrots, then the vegetables in both gardens are carrots.*

Secondly, collective predicates such as *gather*, can be used both in collective predication with plural terms and predication involving mass nouns:

4.20 *The children gather around their teacher.*

4.21 *The water gathers in big pools.*

Link's other reason for choosing the lattice-structure approach is a weakness in traditional set-theoretic treatments of plurals such as Bennett (1974), Hauser (1974), Stechow (1980), Hoepelman and Rohrer (1980) and Scha (1981). These frameworks distinguish between singular terms, which are represented as objects in a model, and plural terms which denote sets of objects. Since most predicates can take both singular and plural arguments, the grammar needs to contain two entries for each such predicate, one that takes an object as an argument and one that takes a set. According to Link this duplication of entries does not reflect any systematic type ambiguity in predicates, and should therefore be omitted. In Link's (1983) lattice structure, singular terms refer to individuals and plural terms denote sum individuals. The important point is that both are of the same logical type.

To appreciate the impact of this representation we need to look at the most basic operators in Link's (1983) framework.

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It should be noted that some linguists, such as Scha (1981) and Schwarzschild (1996), have attempted to redeem this problem within a set-theoretic framework. They assume a set theory where individuals are identified with their singleton sets. This means that both singular and plural terms denote sets in his model. But see Link (1991, p. 62-66) for a criticism of this approach.
The framework of Link (1983)

The perhaps most important proposition of Link (1983) is the $*$ operator which works on 1-place predicates $P$ and generates all the individual sums of members of the extensions of $P$. $*P$ refers cumulatively just like a mass predicate since it is closed under sum formation: any sum of parts that are $*P$ is again $*P$.

In Link’s framework the domain of discourse is a complete join semilattice. It consists of a set of individuals $E$ which is closed under a summing operation $\oplus$. Let $A$ be the set of atoms of $E$, where an atom refers to “a singular object” like a card or a deck of cards. If $a$ and $b$ are two atoms in $A$, $a \oplus b$ is the individual sum of $a$ and $b$. The crucial point is that $a$, $b$, and $a \oplus b$ is the same type of object. Sums are partially ordered through an ordering relation on $E$ which we will call $\leq$. 4.1 holds of the ordering relation.

4.1
If $a \leq b$ then $a \oplus b = b$.

In words, the sum of the individual $a$ and the individual $a + b$ is again $a + b$. This means that $\leq$ has much in common with the set operator $\subseteq$.

Even though plural and singular entities refer to the same type of entity in the framework of Link (1983), it is possible to distinguish between them. 4.2 below, where At stands for atomic, enables us to differentiate between individuals that are sums and individuals that are singular in the intuitive sense (i.e. a child and a horse are singular, but not a group of children or a group of horses).

4.2
At a $\leftrightarrow \forall x (x \leq a \rightarrow x = a)$

The supremum operator $\sigma$ picks out the maximal individual in the denotation of a predicate, and is used to represent the meaning of the definite description. $\sigma xP x$ is defined as $\exists x (*P x \land \forall y (*P y \rightarrow y \leq x))$.

To demonstrate the use of the $*$ operator and the supremum operator in Link’s (1983) framework, consider a fragment of a model where $E = \{a, b, c, a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}$ and $[\text{children}] = \{a, b\}$. Then the denotation of children would be $[\text{*children}] = \{a, b, a \oplus b\}$. The supremum of the predicate children would be $a \oplus b$, and would thus represent the meaning of the children.

Link (1983) distinguishes between collective predicates, which can only have sums in their extension, mixed predicates, which admit both atoms and sums, and distributive predicates which only take atoms in their extension. Collective and mixed predicates are also referred to with the common term non-distributive predicates. As examples of non-distributive predicates Link (1983) mentions gather and carry the piano, and as an example of a distributive predicate he mentions die. Only distributive predicates are translated with the $*$ operator when applied to plural arguments. Thus The children
died would be translated as $\text{*die'}(\sigma x \cdot \text{child'}(x))$, but The children gather would be translated as $\text{gather'}(\sigma x \cdot \text{child'}(x))$.

How, then, do we distinguish between the collective and the distributive interpretation of predicates with mixed extensions such as carried the piano? To deal with these predicates Link (1983) introduces a distributivity operator that we will call $D$. Thus 4.22 would be translated as 4.23 on its collective reading and 4.24 on the distributive reading.

4.22 Paul and Lucy carried the piano.
4.23 carried - the - piano'($p \oplus l$)
4.24 $D$carried - the - piano'($p \oplus l$)

The framework of Link (1984)

We have seen that in the framework of Link (1983) there are only two types of individuals: atomic individuals, such as $a$ or $b$, and plural individuals, such as $a \oplus b$. Link (1984) expands the lattice theoretic framework and introduces groups, such as $\langle a \oplus b \rangle$. A group is essentially like a sum, except that it denotes an atom in the domain of individuals.

Sentences with conjoined term phrases, like 4.25, was the motivation for introducing groups.

4.25 George and Martha and Nick and Honey hate each other.

4.25 can mean that George, Martha, Nick and Honey all hate each of the others. It may also mean, however, that George and Martha on the one hand, and Nick and Honey on the other hand, are couples, and that it is within each couple there is hate. In the latter case, the hating and humiliation needs to be distributed down to the level of the couples, but not further. With the framework of Link (1983) this reading is not available, since the only two translations at hand are 4.26 and 4.27. 4.26 represents the reading where all of the four individuals stand in the hate each other relation to each other, while 4.27 does not make sense at all as it means that George hate each other, Martha hate each other and so on.

4.26 hate - each - other'($g \oplus m \oplus n \oplus h$)
4.27 $D$hate - each - other'($g \oplus m \oplus n \oplus h$)

To solve this problem Link (1984) introduces the representation 4.28 where $\langle g \oplus m \rangle$ represents the group made up by $g$ and $m$.

4.28 $D$hate - each - other'($\langle g \oplus m \rangle \oplus \langle n \oplus h \rangle$)
Thus, a plural term can now refer to either a sum or a group. A consequence of this is that a sentence with a collective predicate like 4.29 can have two different readings: 4.30 and 4.31:

4.29 *The activists met.*

4.30 \( \text{meet}'(\sigma x \ast \text{activist}'(x)) \)

4.31 \( \text{meet}'(\langle \sigma x \ast \text{activist}'(x) \rangle) \)

It seems, then, that we have an ambiguity between collective readings that concern sums of individuals and collective readings that concern groups, which are atomic individuals with no internal structure. This ambiguity is an unwanted consequence of Link’s solution to the problems presented by sentences with conjoined term phrases like 4.25. According to Landman (1989) the distinction between 4.30 and 4.31 does not refer to any real ambiguity, and this criticism forms part of the basis for Landman’s (1989) revision of Link’s (1983) framework.

**Treatment of representativity**

That Link (1983) is directly concerned with the phenomenon we call representativity, can be seen in his discussion of the meaning difference between sentences with the quantifier *all* and the definite determiner and sentences with just a definite determiner.

It seems to me that in *all the children built the raft* it is claimed that every child took part in the action whereas in *the children built the raft* it is only said that the children somehow managed to build the raft collectively without presupposing an active role in the action for every child. (Link, 1983, p. 310)

In order to distinguish between the plural terms, *the children* and *all the children*, Link (1983) introduces an operator \( T \).\(^8\) \( TP \) is read *partakes in* \( P \), and the following two meaning postulates partly define the operator.

4.3
\[ \forall x(TPx \to \exists y(x \leq y \land Py)) \]

4.4
\[ \text{Distr} P \to \forall x(TPx \leftrightarrow Px) \]

\(^8\)Schein (2001) presents an approach which is essentially similar to the T-operator, except that it also incorporates thematic roles. It is, however, just as reliant on pragmatics as Link’s (1983) operator.
4.3 means that every individual x that takes part in some property P is a member of some group that has property P. 4.4 says that if P is a distributive predicate, then x partakes in P if and only if x performs the whole action that brings about P, not just some part of it.

When employing this new operator 4.32 and 4.33 translate as 4.34 and 4.35 respectively (where Px: x is a child, Qx: x built the raft).

4.32 The children built the raft.

4.33 All the children built the raft.

4.34 \( \exists y (y = \sigma^x P x \land Q y) \)

4.35 \( \forall y (y = \sigma^x P x \rightarrow \bar{Q} y \text{ where } \bar{Q} := \lambda x (Q x \land \forall z (z \leq x \rightarrow T Q z)) \)

So far, the T-operator seems promising with regard to characterizing representativity, but unfortunately, Link (1983) cannot give more than a partial formal definition of it. This is pointed out by Link himself:

I want to stress, however, that the operator T can only be partially characterized in view of the essentially pragmatic nature of its intended interpretation. (Link, 1983, p. 310)

4.5 Dowty (1987)

The contribution of all to collective and distributive predicates

As we saw above, Link (1983) is very vague when pointing out the problems with his T-operator. Dowty (1987) is more specific in his criticism, and defines two problems with Link’s partake operator: Firstly, it tells us that being part of a group with some property P is a necessary condition for taking part in P, but it does not provide a sufficient condition. Secondly, as 4.4 makes clear, all has no function with distributive predicates. This means that 4.36 and 4.37 are synonymous.

4.36 The soldiers sleep.

4.37 All the soldiers sleep.

The second point of criticism shows that there is a difference in opinion between Link and Dowty: Link thinks the quantifier all only makes a truth-conditional difference with collective predicates. Dowty, on the other hand, regards all as having a truth conditional impact with distributive as well as collective predicates. This means that while Link regards 4.36 as equivalent to 4.37, Dowty regards it as being equivalent to something like 4.38.
4.38 *Nearly all the soldiers sleep.*

How can we explain that Link and Dowty have such different opinions in this matter? It seems that the answer may lie in their different motivations for being concerned with the partake-operator. What Link had in mind when defining the partake-operator was giving truth conditions for collective action. Dowty (1987), on the other hand, seeks to give an account of the contribution of the quantifier *all*. In other words, Dowty (1987) has a broader intention with a partake-operator than Link (1983). He wants to account for the contribution of *all* with all predicates, both distributive and collective. From his perspective it may therefore seem unlikely that *all* should have a truth conditional impact on only one type of predicates.

We shall see the importance of this difference in opinion in chapter 5, when we discuss the relation between representativity and Christine Brisson’s (1998) term nonmaximality. Dowty’s work forms the basis of Brisson’s theory, an approach which views representativity as a part of the greater phenomenon nonmaximality. The nonmaximality approach makes no essential distinction between collective and distributive predicates. In section 5.2 I will take Link’s side and suggest that there are essential differences between sentences like 4.32 and sentences such as 4.36. These differences require a different treatment of the broader phenomenon nonmaximality and the narrower phenomenon representativity.

**Subentailments and the maximizing effect of *all***

The perhaps most significant contribution of Dowty (1987) is the introduction of two important notions: *subentailments* and *the maximizing effect* which have come to be much discussed in the collectivity literature. To see what these terms mean, we need to take a closer look at Dowty’s theory.

4.36 above entails that *sleep* is true of every individual soldier. Dowty (1987) proposes that it is not only distributive predicates like *sleep* which have entailments of the individual members of a plurality. For example, the collective predicate *gather* in a sentence like 4.39 requires something of the individual students: namely that each of them comes into the hall and remains there long enough that every student is in the hall at the same time.

4.39 *The students gathered in the hall.*

Similarly the predicate *disperse* requires that the individuals in question move away from each other, and the predicate *be alike* requires that the individuals have a property in common with the other group members. Dowty (1987) call these entailments on individuals of collective predicates (distributive) *subentailments*.

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9 The same approach is found in Lasersohn (1999), but I refer to Brisson (1998) here because she provides the most thorough account of it.
Further Dowty claims that the predicates usually do not demand that their subentailments distribute down to every member of a plural noun phrase denotation. For example, the predicate vote in 4.40 only requires that the subentailment apply to the majority of the individual students. Other collective verbs, such as gather in 4.39, require that their subentailments hold of nearly all the individuals in the noun phrase denotation.

4.40 The students voted to accept the proposal.

4.41 The students gathered in the hall.

As we have seen above, when discussing 4.36, Dowty claims that universal distribution is not required of distributive predicates, either.

According to Dowty, the theory of subentailments can explain the meaning difference between sentences beginning with the and sentences beginning with all the. He hypothesizes that the influence of all on a collective predicate is to distribute the predicate’s subentailments to every member of the plurality. This influence is labeled the maximizing effect of all. When there is no all, it is the individual predicate which determines the size of the share of members which must have the subentailment. In 4.42, for example, the predicate’s own requirement that a majority of the students must satisfy the subentailment is overridden by the maximizing effect of all which requires that the subentailment must hold of every individual student.

4.42 All the students voted to accept the proposal.

Dowty (1987) points out that unlike Link’s (1983) \( T \) operator, the subentailments framework provides not just a necessary condition for the contribution of all to the meaning of a predicate, but also a sufficient condition. Also, the subentailment hypothesis can account for why sentences like 4.43 are anomalous.

4.43 All the kangaroo in Australia are numerous.

Dowty (1987) suggests that collective predicates that are ’purely cardinal’ like be numerous, a large group, few in number etc. are completely devoid of subentailments. Consequently, all has no subentailments to operate on in sentences with these predicates, and thus there is no place for it in the sentence.

Dowty (1987) provides no formalization of his subentailment hypothesis. He does, however, offer a fairly detailed discussion of the subentailments of many specific predicates.
Representative sentences

Interestingly, Dowty mentions 4.44 as a particularly clear case where the predicate’s subentailments need only apply to a small portion of the members in the plurality.

4.44 The Romans built this bridge.

One group of predicates is surprisingly difficult to deal with, he admits, and that is “Link’s sentences and similar ones involving cooperative endeavors by groups” (Dowty, 1987, p. 104). As examples of such group endeavors he mentions 4.45 and 4.46.

4.45 The children built the cabin.

4.46 The students carried the piano upstairs.

The problem, says Dowty, is that when a group builds a house or carries a piano each person does a different kind of action. Then how can we specify subentailments for these verbs? A solution where the subentailment is classified very generally, like “performing some action relevant to house building” will not do, as it is not enough that everybody does roof building if nobody does wall building. Also, each individual’s contribution must be non-trivial and non-redundant. Dowty admits that he cannot provide a fully developed theory of group actions, and thus only makes some weak assumptions about what a group action is:

an action by a group takes place whenever every member of the group does something (i.e. it’s not necessary to talk about coordination, or a common purpose of a group action, etc. for my purposes). (Dowty, 1987, p. 105)

What is the distributive subentailment of predicates denoting group actions, then? According to Dowty, the subentailment is just the property of being a member of the subgroup which brings about the result of the group action.

This treatment of group action seems to have two fundamental weaknesses.

Firstly, as Lasersohn (1999) points out, it may have unwanted consequences to allow such weak requirements as the one quoted above to qualify as a subentailment. Consider the purely cardinal predicates be numerous, a large group, few in number which Dowty (1987) claims are anomalous with the quantifier all because they have no subentailments. If being a member of a group that collectively does something qualifies as a subentailment, why cannot being a member of a group with a sufficiently large or small cardinality qualify as a subentailment?
Secondly, note that Dowty’s specification of the group action subentailment says that every member of the group must participate in bringing about the property described in the predicate. One of Link’s points was precisely that group actions do not have this requirement. Also, when Dowty (1987) characterizes 4.44 as a sentence where only some individuals need to participate, and 4.45 as a group action where every member needs to participate, he seems to overlook the common factors these two sentences have. He provides no explanation for why the first sentence does not denote a group action or why the second sentence requires participation from every child.

From the subentailment framework described above, it is clear that representativity is not described as a separate phenomenon, but seen as a point on a scale of subentailment requirements: for gather in 4.41 the subentailment applies to nearly all of the children, for vote in 4.40 the subentailment must hold of some majority of the students, and build in 4.44 the subentailment need only apply to some of the Romans. In other words, what we call representativity is a case where a predicate distributes subentailments to some members of the plural noun phrase denotation. The tendency to treat representative sentences as a point at one end of a scale where sentences allowing just a few exceptions are at the other end, is adopted by Brisson (1998) and Lasersohn (1999). The scale in question, according to these linguists, is a scale of imprecision. Some predicates like carry, build allow a low level precision (it is enough that only some members of a plurality participate) while other predicates like sleep require a higher level of precision (requiring almost all members of a group to participate). The difference between the predicates is not an essential one, but simply one of degree. A consequence of this conviction is a belief that one common framework is able to account for the whole phenomenon of allowing (more or less) non-participation, or nonmaximality as Brisson (1998) labels it.

4.6 Lasersohn (1988)

According to Lasersohn (1988) the collective reading is vague between three different interpretations. 4.47 below will serve to illustrate these interpretations.

4.47 The investors made 10 000 $.

The pure collective interpretation corresponds to situations where the group enters into some joint enterprise which yields 10 000 $. On the additive interpretation, the sum of the individual investors’ earnings add up to at least 10 000 $. The “team credit” interpretation matches situations where some of the investors earn 10 000 $, but where the group as a whole gets is credited for their action because the investors are seen as a team.
Clearly, the team credit interpretation of 4.47 corresponds to what we call the representative interpretation. It is therefore the "team credit" interpretation we will be concerned with in this section. According to Lasersohn (1988, p. 175) we get the "team credit" interpretation when some members of a group perform an action and the group as a whole gets credit for this action "because it is seen to function as some sort of team".

Lasersohn (1988) develops an event semantic framework to account for the different interpretations of sentences such as 4.47 above. In this framework the distributive reading and the three different interpretations of the collective reading all correspond to different event structures. On the distributive reading of 4.47 the event of the group earning 10 000 $ has a subevent for each member where that member earns 10 000 $. In the case of pure collectivity, the event of the group earning 10 000 $ does not have any subevents in which any member of the group earns money. In the additive case, however, the event of the group earning 10 000 $ does have subevents in which each of the members earns money. On the team credit interpretation, the event of the group earning 10 000 $ has a subevent in which some member or subgroup earns 10 000 $.

As can be guessed from this informal outline of the event structures, and as Lasersohn (1988) makes clear when he spells out his formal framework, the "team credit" case is just a subcase of the additive case. Since the team credit case is a "special" additive case, a case where some members do not contribute to the property denoted by the the predicate, it is treated separately in some of his informal discussion. In his formal framework, however, only two types of collectivity are left, the pure collective case and the additive case. The "team credit" interpretation is regarded as the weakest instantiation of the additive case.

It seems, however, that considering cases where the individual's contributions sum up to the predicate property (additive case) and cases where one individual (or a subgroup) performs an action on "behalf of" the others (the "team credit" case), as being the same phenomenon, fails to capture certain idiosyncratic properties of the "team credit" interpretation. More specifically, it is not the case that all predicates which give rise to the additive interpretation also allow the "team credit" interpretation. Consider the predicates cost, weigh, equal, total, add up to, amount to. These predicates clearly give rise to additive interpretations, but "team credit" interpretations seem hard to come by.

4.48 These oranges weigh a kilo.

4.49 The bills add up to 500 $.

It appears, for example, that there are no more than two interpretations of 4.48: the distributive, where each orange weighs a kilo, and the additive
collective, where each individual orange contributes a portion of weight and that these weights sum up to one kilo. A "team credit" interpretation, where one orange (or a subgroup of oranges) weighs one kilo and the whole group is "credited" for this, is nonsense. The same is the case for 4.49. Thus it is clear that the "team credit" interpretation is not just a subcase of the additive collective interpretation.

Another question is whether representativity, the phenomenon we sketched in chapter 1, can be equated with "team credit". We will argue that the sentences which can be subsumed under Lasersohn's "team credit" interpretation only make out a subset of sentences which may have representative interpretations. As we saw above, Lasersohn confines the "team credit" interpretation to cases where some individual performs an action which is credited to a group because this group is seen to function as a team. As examples of sentences which may have the representative, but not the "team credit" interpretation, consider 4.50 and 4.51 below.

4.50 *The demonstrators set fire to the shop.*

4.51 *The monster hid behind the garbage cans.*

As we discussed in chapter 1 it is possible to use 4.50 without claiming that the demonstrators engaged in a joint enterprise to set fire to the shop. The speaker may even know that some of the individuals in the denotation of *the demonstrators* disapprove of the action. Thus the demonstrators cannot be said to function as a "team" in any sense of the word.

In 4.51 the inanimate garbage cans are passive participants in an action and there is thus no implication that they perform an action or form a team. Still, 4.51 may be used to characterize a situation where the monster only hid behind some of the garbage cans.

Thus it is clear that the representative interpretation can be used in cases where we would not say that its members perform an action or form a team. On the basis of this we can conclude that representativity describes a broader phenomenon than "team credit" interpretations in the sense of Lasersohn (1988).

### 4.7 Kamp and Reyle (1993)

**The shared responsibility reading**

Kamp and Reyle (1993) mention a type of reading they call *the shared responsibility reading*. They illustrate this reading with the following example.

4.52 *The guys in 5b have been cheating on their exam again.*
They claim that 4.52

...can be accepted as correct even though only a small number of the guys cheated; the sentence is acceptable in such a situation to the extent that it makes sense to hold the class as a whole responsible for the acts of some, perhaps only one, of its members.

(Kamp and Reyle, 1993, p. 412)

Kamp and Reyle (1993) point out that the shared responsibility reading differs from the generic reading. They give 4.53 as an example of a sentence having a generic, but not a shared responsibility reading.

4.53 *The children in this city thrive.*

4.52 also has a generic reading, corresponding to a situation where most students in 5b cheated,

...excepting only those who qualify as exceptions for some reason.

(Kamp and Reyle, 1993, p. 412)

From this it appears that Kamp and Reyle (1993) makes essentially the same distinction that Dowty (1987) criticized Link (1983) for making: the distinction between holding a group responsible for the acts of one (or some) and the case where one allows a few exceptions when predicating about a group. Thus, Kamp and Reyle (1993) would say that 4.32 repeated here as 4.54 has a shared responsibility reading, where one or a few children build a raft "on behalf of" the others, while 4.36, repeated here as 4.55, has a generic reading, allowing only a few exceptional soldiers to be awake.

4.55 *The children built a raft.*

4.54 *The soldiers sleep.*

Unfortunately, Kamp and Reyle do not incorporate the shared responsibility reading into their formal framework, Discourse Representation Theory (DRT). In fact, they provide only a very underspecified treatment of sentences with definite plural noun phrases and collective predicates. As we will make use of the DRT framework in chapter 7, we provide a survey of Kamp and Reyle’s treatment of definite plural noun phrases below.\(^\text{10}\)

**Plurals and definites in DRT**

**Plurals** To distinguish between singular and plural entities, Kamp and Reyle (1993) introduce two types of DRS-conditions: at(v) which is an

\(^{10}\) As stated in chapter 1, we assume a basic knowledge of DRT as it is presented in Kamp and Reyle (1993).
abbreviation for \( v \) is an atom (i.e. an individual) and \textbf{non-at}(v) which is read: “\( v \) is a collection of two or more individuals”. The model-theoretic foundation for the distinction between atoms and non-atoms is as follows: Each count noun \( \alpha \) has an extension consisting of atoms and non-atoms. Atoms are elements in the extension of the singular form of \( \alpha \). They cannot be subdivided into parts that also belong to the extension of \( \alpha \). Non-atoms belong to the extension of a plural form \( \alpha \) and can be decomposed into atoms which all belong to the extension of \( \alpha \). In practice at(\( x \)) and non-at(\( x \)) are omitted. Instead singular discourse referents are represented with non-capital letters, while plural discourse referents are represented with capital letters.

Kamp and Reyle (1993, p. 336) distinguish between three groups of noun phrases:

1. Noun phrases which introduce their discourse referents into the main DRS.

2. Noun phrases which introduce their discourse referents at the level which they are processed.

3. Noun phrases which introduce their discourse referents at a level subordinate to that at which they are processed.

Plural proper names and definite descriptions (such as \textit{The Talking Heads}, \textit{the children}) belong to the first group, while plural indefinites (such as \textit{some children}, \textit{three rabbits}) are in group two. In the third group we find noun phrases beginning with quantifiers such as \textit{every}, \textit{most}. This is the only thing they do to distinguish between definite and indefinite noun phrases.

\textbf{Definite noun phrases} Kamp and Reyle (1993) give a very rudimentary treatment of definite noun phrases. Their construction rule for singular definite noun phrases is as follows:
Kamp and Reyle (1993) acknowledge that the rule is

nothing more than a stopgap which leaves all the hard questions
to be dealt with later. (Kamp and Reyle, 1993, p. 254)

All this construction rule does is introduce the condition \( \alpha(x) \), where \( \alpha \)
is the processed definite description and \( x \) is the discourse referent which denotesthis definite description. Thus the rule does not give us any guidelines
for reduction of \( \alpha(x) \). Of course, in many cases we need access to the whole
sentence in which the definite description occurs in order to determine how
\( \alpha(x) \) should be reduced.

As can be seen from the construction rule below, Kamp and Reyle (1993)
presents the same "stopgap" treatment of definite plural noun phrases.\(^{11}\)

\(^{11}\)Note that although CR.NP [Quant=def/ Num=plur] specifies that definite plural noun
phrases should be represented as \( \beta(X) \). Kamp and Reyle use the notation \( \text{the } \beta(X) \) in
their examples. I have chosen to follow the construction rule on this point. But no matter
which of these versions we choose, it will be necessary to modify CR.NP [Quant=def/
Num=plur] to fit our account of representativity in section 7.4.
### CR.NP \([\text{Quant}=\text{def}/ \text{Num}=\text{plur}]\)

Triggering configurations \(\gamma \subseteq \overline{\gamma} \in \text{Con}_K\):

(i) \[
\begin{array}{c}
\text{S} \\
\text{NP} \quad \text{VP} \\
\text{DET} \quad \text{N} \\
\delta \quad \beta
\end{array}
\]

(ii) \[
\begin{array}{c}
\text{VP} \\
\text{V} \quad \text{NP} \\
\text{DET} \quad \text{N} \\
\delta \quad \beta
\end{array}
\]

Introduce into the universe of the main DRS \(K'\):
- a plural discourse referent \(X\)
- Add to \(\text{Con}_{K'}\)
  \[\beta(X)\]
- Substitute in \(\overline{\gamma}\):
- \(u\) for \(\text{NP}(\delta\beta)\)

Compare this rule to the construction rule for plural indefinite noun phrases below:

### CR.NP \([\text{Quant}=\text{ind}/ \text{Num}=\text{plur}]\)

Triggering configurations \(\gamma \subseteq \overline{\gamma} \in \text{Con}_K\):

(i) \[
\begin{array}{c}
\text{S} \\
\text{NP} \quad \text{VP} \\
\text{DET} \quad \text{N} \\
\delta \quad \beta
\end{array}
\]

(ii) \[
\begin{array}{c}
\text{VP} \\
\text{V} \quad \text{NP} \\
\text{DET} \quad \text{N} \\
\delta \quad \beta
\end{array}
\]

Introduce into the universe of the DRS \(K\):
- a plural discourse referent \(X\)
- Add to \(\text{Con}_K\)
  \[\beta(X)\]
- Substitute in \(\overline{\gamma}\):
- \(u\) for \(\text{NP}(\delta\beta)\)

As we can see, the only difference in the treatment of definite and indefinite noun phrases is that definite discourse referents are introduced into the main DRS while indefinite discourse referents are introduced at the level at which they are processed. In other words, definite plural noun phrases are essentially treated the same way as indefinites. For example, this means that 4.56 and 4.57 will receive the same truth value.
4.56 Some children built a raft.

4.57 The children built a raft.

4.8 Landman (1989, 1996)

Recall from section 4.4 that Link's (1984) framework contains a distinction between collective readings concerning a sum and collective readings concerning a group. Landman (1989) argues that all collective predication can be reduced to group predication. Consequently he revises Link's theory and transforms it into a framework with only collectivity type. In a subsequent article, Landman (1996), he argues in more detail why group predication, which is singular predication, should be used to represent collective readings. In this regard he mentions several examples of what we would call the representative interpretation. In this section we will take a look at the parts of Landman (1989) and Landman (1996) which are most relevant to representativity.

Landman (1989)


4.58 The teachers carry a statue.

4.59 \(D\text{carry} \rightarrow \text{the} - \text{statue}'(\sigma x \ast \text{teacher}'(x))\)

4.60 \(\text{carry} \rightarrow \text{the} - \text{statue}'(\sigma x \ast \text{teacher}'(x))\)

4.61 \(\text{carry} \rightarrow \text{the} - \text{statue}'(\sigma x \ast \text{teacher}'(x))\)

4.58 represents the distributive meaning, i.e. that each teacher carry a separate statue. 4.60 and 4.61 represent the collective reading concerning a sum and the collective reading concerning a group respectively. What exactly is the difference between these two? According to Landman (1989) the difference is that if a sum has a property \(P\) then all its parts are involved in \(P\) but for groups there is no such requirement. In other words, 4.60 corresponds to a scenario where the teachers carry a statue together, and where each individual teacher participates, while 4.61 may correspond to a situation where one (or a subgroup) of the teachers actually carry the statue, but the property is credited to the whole group of teachers.

\[12\] We will continue using Link’s (1983) terminology as introduced in section 4.4. Landman (1989, 1996) employs a terminology which differs from Link’s in some respects, but the differences between the two do not concern us here.
Landman (1989) claims that the question of involvement, who in a group is actually involved in a property, does not correspond to a semantic ambiguity, and that it is therefore outside the scope of his framework to distinguish between interpretations like 4.60 and 4.61. Moreover, he shows that the distinction between the two collectivity types leads to problems with the treatment of distributivity and cumulative reference in certain cases.\footnote{It is straightforward that we have cumulative reference with distributive predicates like \textit{sleep} (cf. 4.62) and with mixed predicates like \textit{lift} on their distributive reading (cf. 4.63).}

4.62 \textit{Anne sleeps and David sleeps iff Anne and David sleep.}

4.63 \textit{Joe lifts a piano and Paul lifts a piano iff Joe and Paul lift a piano. (on the distributive reading).}

However, we also have cumulative reference with readings like 4.64 which are distributive, not down to individuals, but down to collections. 4.64 has a distributive reading which is clear from the part in the parenthesis. On this reading, we have the same correspondence between cumulative reference and distributivity as in the sentences above, i.e. the equivalence in 4.65.

4.64 \textit{The boys meet and the girls meet (but not in the same room).}

4.65 \textit{The boys meet and the girls meet (but not in the same room).}

It appears that Link (1983) has not considered such cases of cumulative reference as we see in 4.65, because it is clear that his framework cannot support them. In his framework 4.64 is represented as 4.66. Since it is a normal collective reading not involving any conjoined term phrases, it is sums, not groups, of boys and girls who meet.

4.66 $\text{meet}'(\sigma x * \text{boy}'(x)) \land \text{meet}'(\sigma x * \text{girl}'(x))$

The second part of the equivalence, however, is represented as 4.67 which is equivalent to 4.68. Here, groups are needed to prevent the predicate from distributing all the way down to the individuals.

4.67 $\omicron \text{meet}'((\sigma x * \text{boy}'(x))) \ominus ((\sigma x * \text{girl}'(x)))$

4.68 $\text{meet}'((\sigma x * \text{boy}'(x))) \land ((\sigma x * \text{girl}'(x)))$

Clearly, 4.66, involving sums, and 4.68, involving groups, are not equivalent and in fact, logically independent. The only way to obtain the desired equivalence is through a meaning postulate like 4.69.

4.69 $\text{meet}'(\sigma x * \text{boy}'(x)) \leftrightarrow \text{meet}'((\sigma x * \text{boy}'(x)))$

The effect of such a meaning postulate would, of course, go against Link’s (1983) arguments in favour of introducing this distinction. When we eliminate the collective sum reading and make all collective predication group predication, 4.64 is represented as 4.68 and we have the desired equivalence.

56
reading and make all collective predication group predication.

Since a group is an atomic individual without any part structure, we are now left with only two types of predication: singular predication which applies a predicate to an atomic (singular or group) individual and plural predication which applies a predicate distributively to a plural sum of atom individuals. Thus all collective predication is singular predication.

Note, however, that with this framework Landman cannot account for verb phrase conjunction where one conjunct is assigned a distributive interpretation and the other is assigned a collective interpretation. In order to redeem this shortage in his formalism Landman postulates a complicated type shifting system which we will not go into here.

**Landman (1996)**

In his 1996 article, Landman argues quite extensively that language users intuitively regard collective readings as instances of singular predication. The examples he gives to illustrate this, reproduced below, all involve what we call representativity.

4.70 *The boys touch the ceiling.*

Landman (1996, p. 429) classifies this example as an instance of **collective body formation** and describes its truth conditions as follows.

...to be true on a collective reading there is no need for more than one boy to do the actual touching; [4.70] is true if the boys form a pyramid and the topboy touches the ceiling.


4.71 *Maria touches the ceiling.*

4.71 would be true even though only a part of María, for instance her hand, touches the ceiling. In fact, a scenario where only a part of María touches the ceiling is the most plausible context in which the sentence is true. The only difference between these two examples is the nature of the argument that fills the agent role: individual or collection.

Instances of **collective action** have many of the same properties as instances of collective body formation. As an example, Landman (1996) discusses 4.72. He asserts that the predicate does not have to distribute down to all the individuals in the noun phrase denotation, in fact it does not have to distribute at all.

4.72 *The boys carried the piano upstairs.*

As with 4.70, Landman compares 4.72 with an instance of singular predication, 4.73.
4.73 *Jules carried the piano upstairs.*

According to Landman, 4.72 implicates that some of the boys are at least partly under the piano some of the time and that some of them move up the stairs. Similarly, in 4.73 at least some part of Jules must be under the piano some of the time. The fact that individuals, unlike collections, can only be spatially continuous gives a natural explanation for why all of Jules needs to move up the stairs, even though not all of the boys need to do this in 4.72.

**Collective responsibility** is a third case where a collective reading parallels a singular reading. Here the individuals need not be directly involved in the action but share a responsibility for it. Just as only one of the gangsters in 4.74 may have taken direct action to kill the rivals, Al Capone in 4.75 might have ordered someone to pull the trigger for him.\(^{14}\)

4.74 *The gangsters killed their rivals.*

4.75 *Capone killed his rivals.*

It is clear from the discussion above that Landman views his formal framework as particularly well suited to handle what we call representativity. Note, however, that his treatment of collectivity, which includes representativity, is very underspecified. As we saw above, Landman explicitly refrains from specifying involvement, i.e. who in a group is involved in a property. In practice this means that he does not give any specific truth conditions for collective interpretations. For a sentence like 4.74, all that is specified in the truth conditions is that the singular individual referred to as the gangsters has the property denoted by the predicate. Since the gangsters is represented as a singular object without internal structure, we do not have access to its individual members and thus cannot specify any requirements on these. Consequently, we will not be able to assign a different representation to the gangsters in 4.74 and 4.76 on its collective reading. Still, we have seen that 4.74 may have a representative interpretation, corresponding to a situation where only some of the gangsters killed their rivals, while such an interpretation is ruled out for 4.76.

4.76 *The gangsters weigh 500 kilos.*

Note also that all the examples Landman mentions to illustrate collective body formation, collective action and collective responsibility are instances of the team credit interpretation in the sense of Lasersohn (1988). In other words, it seems that Landman require that the plurality in question "function as a team" for non-involvement to be possible. In Landman (2000) he is explicit about this standpoint. When discussing the example 4.77 below he

\(^{14}\)Sentences like 4.75 are discussed in section 8.2.3.
emphasizes that whether non-involvement is possible depends on whether the soldiers are considered to be a team with regard to the invasion, not how many soldiers participated.

4.77 The soldiers invaded Grenada.

We saw in section 4.6 that representativity cannot be equated with team credit. In many cases it is not that the individuals are regarded as a team that matters, but that the action is performed by someone within the plural noun phrase denotation. Thus it seems that non-involvement is possible in more situations than the ones described by Landman.

4.9 Schwarzschild (1996)

We will introduce Schwarzschild's cover framework because one of the most thorough attempts to account for non-universal involvement, the work of Brisson (1998), has been conducted within this framework. Also, its specification of a context dependent domain selection variable has been widely recognized (cf. for example Landman (2000)).

The cover framework

Schwarzschild (1996), like Link (1984) and Landman (1989, 1996) before him, notes the phenomenon of "intermediate distributivity": the distribution down to subpluralities, but not individuals, of a plural noun phrase denotation. What distinguishes Schwarzschild's approach from the earlier ones is the claim that the relevant subpluralities are determined by context.\(^{15}\)

An example Schwarzschild (1996) uses to illustrate how relevant subpluralities can be contextually determined, is a situation where two merchants are attempting to price some vegetables. The vegetables are piled up in baskets, and to determine the price, the merchants have to weigh them. Unfortunately the merchants do not have an appropriate scale for this task. Their grey retail scale is only suitable for a few vegetables at a time, and their black wholesale scale is meant to weigh truck loads. Considering the situation, one of the merchants says 4.78 to the other.

4.78 The vegetables are too heavy for the grey scale and too light for the black scale.

For simplicity Schwarzschild decomposes 4.78 into 4.79 and 4.80.

\(^{15}\)The idea that assignment of subpluralities is context-dependent was proposed by Gillon (1984), and Schwarzschild (1996) makes several references to Gillon's examples in his account.

59
4.79 *The vegetables are too heavy for the grey scale.*

4.80 *The vegetables are too light for the black scale.*

4.79 is obviously false on its totally distributive reading, where the predicate *be too heavy for the grey scale* applies to each individual vegetable. 4.79 is true on the total collective reading where the predicate does not distribute at all, but the context makes clear that this is not the interpretation the merchant intends to convey. 4.80 is true on its distributive reading, but this is obviously not what the merchant means, and false on its collective reading. The context, more precisely the background information that the vegetables are in baskets, suggest that the relevant subpluralities are baskets of vegetables. The reading is true of every subplurality if these are specified to be baskets.

This, and similar examples, motivated the introduction of a context-dependent domain selection variable or a *cover*. Schwarzschild (1996) defines cover as follows:

C is a cover of A if it fulfills the following requirements:
1. C is a set of subsets of A.
2. Every member of A belongs to some set in C.
3. $\emptyset$ is not in C.

Schwarzschild assumes a set theory where individuals are identified with their singleton sets. Consequently, individuals are included in the possible subsets of A in requirement 1 above. The subsets that make up a cover are referred to as its *cells*.

Schwarzschild (1996) assumes a model $M = \langle \{1, 0\}, D, D^*, V \rangle$ where $\{1, 0\}$ denote the truth values true and false, D is a set of singular individuals (like Paul and Sue), $D^*$ the set which contains all the non-empty subsets of D, and V is a function assigning a denotation to each non-logical constant. In his book, Schwarzschild (1996) uses direct interpretation and indirect interpretation (English is translated into a language which in turn has an interpretation) interchangeably, but in my brief presentation I will only use indirect interpretation.

Schwarzschild (1996) adopts a distribution operator for one-place predicates which he calls *Part* (for partition). Unlike the D operator of Link (1983) and Landman (1989, 1996), the Part operator takes two arguments: the Cover and the verb phrase translation. To understand the definition of the Part operator, we need the following background information: Expressions of type $e$ denote elements of $D^*$ and expressions of type $\langle e, t \rangle$ denote subsets of $D^*$. The cover variable is of type $\langle e, t \rangle$.

Schwarzschild (1996) defines the Part operator as follows:

Let $\alpha$ and $\beta$ be variables whose values are of type $\langle e, t \rangle$ and let u, v be variables whose values are entities in $D^*$. For all
\[u, \alpha, \beta : u \in \llbracket \text{Part}(\beta)(\alpha) \rrbracket \iff \forall v (v \in \llbracket \beta \rrbracket \land v \subseteq u) \rightarrow v \in \llbracket \alpha \rrbracket \rrbracket^{16}\]

(Schwarzchild, 1996, p. 72)

The translation rule for plural verb phrases is as follows:
If \( \alpha \) is a singular VP with translation \( \alpha' \), then the corresponding plural VP is translated as \( \text{Part}(\text{Cov})(\alpha') \).

Consider now example 4.81 and its translation 4.82.

4.81 The dancers were excellent.

4.82 \( \text{Part}(\text{Cov}) \ (\text{were-excellent'}) \) \( \ (\text{the-dancers'}) \)

In order to assign a truth value to 4.81, we must have specific cover available, and for that we need to delineate a universe of discourse. Let \( U \) be the universe of discourse, and A-C possible covers.
\[
U = \{a, b, c, d, e, f\}
\]
\[
A = \{a, b, c, d, e, f\}
\]
\[
B = \{\{a, b, c\}, \{d, e, f\}\}
\]
\[
C = \{\{a, b, c, d, e, f\}\}
\]

If the context assigns the value \( A \) to \( \text{Cov} \), we have a distributive interpretation, since each individual has her own cell in the cover, and the Part operator works on the cells of the cover. In order for 4.81 to be true, every dancer has to be excellent. In case the value is \( B \), we have an instance of “intermediate distributivity”. \( B \) would be a possible cover in the context of a dance festival where the sets \( \{a, b, c\} \) and \( \{c, d, e\} \) make up the two dance groups at the festival. It may be true that each dance group was excellent, but not every individual in the dance groups was excellent. If the context assigns cover \( C \), we have a collective reading.

Schwarzchild (1996) briefly discusses the "team credit" interpretation introduced by Lasersohn (1988). He maintains that one should not attempt to assign specific truth conditions to this interpretation:

\[\text{team credit extensions have a non-logical aspect to them. They cannot be analyzed simply by providing a translation for the verb phrase that has an existential quantifier in it...} \ (\text{Schwarzchild, 1996, p. 90})\]

In fact, Schwarzchild ends up adopting the treatment provided in Landman (1996) for "team credit" interpretations. In other words, he views this interpretation as an instance of singular collective predication where it is not possible to specify exact truth conditions.

16 \( \llbracket \rrbracket \) is an abbreviation for \( \llbracket A^{\mathcal{M},\varphi} \).
4.10 Conclusion

It seems that Frege (1892) was the first to assert that plural noun phrases sometimes occur as proper names, which should be regarded logically as singular objects. As we have seen, the idea of regarding plural noun phrases as singular objects becomes an important explanation factor in the theories of Link (1984) and Landman (1989, 1996).

Link (1983) is of the opinion that the representative interpretation of such sentences as 4.83 should be specified in the truth conditions of the semantics. Link maintains, however, that sentences with distributive predicates, such as 4.84, have only one interpretation, the one which is represented with the universal quantifier.

4.83 The children built a raft.

4.84 The soldiers sleep.

Dowty (1987) on the other hand, regards both the sentences above as having truth conditions weaker than what the universal quantifier requires. In 4.83 the distributive subentailments, i.e. the requirements the predicate makes on individuals, need only distribute down to some of the children, while in 4.84 the subentailments of the predicate must distribute down to nearly all of the soldiers.

Lasersohn (1988) claims that the collective reading of 4.83 is vague between three collective interpretations: the pure collective interpretation, where the predicate does not distribute at all, the additive interpretation, where the efforts of every individual taken together add up to the property denoted by the predicate, and the "team credit" interpretation, where one or a few individuals achieve the property denoted by the predicate, but where it is attributed to the whole group since they function as a team. In Lasersohn's formal framework, the "team credit" interpretation is treated as a subcase of the additive interpretation, although we have seen that there are some predicates which give rise to the additive interpretation but not the "team credit" interpretation. Also, we saw that representativity is a broader phenomenon than the "team credit" interpretation.

Kamp and Reyle (1993) proposes that sentences such as 4.83 have a shared responsibility reading which is different from the generic reading. For 4.84, on the other hand, only the generic interpretation is available. Unfortunately, they do not incorporate the shared responsibility interpretation into their formal framework, Discourse Representation Theory.

Landman (1989, 1996) and Schwarzschild (1996) both claim that they cannot provide any specific truth conditions for the representative interpretation. They choose to regard it as an instance of singular, collective predication.
Schwarzschild (1996) introduces the cover framework to account for the fact that relevant distribution units, the groupings of individuals the predicate distributes down to, can be contextually determined.
Chapter 5

Related notions

In this chapter we will consider how representativity should be placed in the semantic landscape of related notions. The objective is that a comparison between representativity and the notions nonmaximality, collectivity, cumulativity and genericity will yield a better understanding of the nature of representativity.

5.1 Collectivity

In section 4.2 we saw that according to Verkuyl (1999), a prerequisite for the collective reading is that the predicate is false of every individual and subset in the plural noun phrase denotation. This implies that the collective reading can only be true if every member of the noun phrase denotation contributes to the property denoted by the predicate. When we speak of collective readings in this section, we mean collective readings in the sense of Verkuyl (1999).

With one exception, all predicates which can trigger a collective reading in the sense of Verkuyl (1999), can also give rise to the type 1 representative interpretation.\footnote{Recall that the type 1 representative interpretation involves sentences which convey that the focus is on the result or success of some action rather than the individuals that perform it. Type 2 representativity encompasses sentences which convey that members of the noun phrase denotation are seen as a mass of indistinguishable individuals. Finally, type 3 representativity deals with sentences describing an undesirable property which may be changed/change to a desirable one. For a detailed description of the semantic and contextual factors involved in the three types of representativity, confer chapter 6.}

To illustrate this, consider the examples 5.1 and 5.2 below.

5.1 The boys carried the piano.

5.2 The teachers raised a statue.
One interpretation of 5.1 is that all the boys carried a part of the weight of the piano and that their joint efforts resulted in the carrying of the whole piano. This is clearly a collective interpretation, but not a representative interpretation. The representative interpretation of 5.1 is that the carrying of the piano is attributed to the boys as a group, but that only some of the boys actually participated in the carrying. Similarly, 5.2 has a collective interpretation, where all the teachers joined their efforts to raise a statue, and a representative interpretation, where some teacher(s) raised the statue in such a way that the raising was attributed to the teachers as a group.

**Collectivity without representatvity**

There is, however, one group of predicates that give rise to collective interpretations but not representative interpretations. These are predicates which denote an adding of the individuals (or a property of the individuals) in the plural noun phrase denotation. Examples of such predicates are *cost, total, equal, weigh, sum up to*. For instance, 5.3 and 5.4 have a collective interpretation, but not a representative interpretation.

5.3 *The potatoes weigh a kilo.*

5.4 *The pupils are more numerous than the teachers.*

The collective interpretation of 5.3 implies that when the weights of all the individual potatoes are added together, the sum is one kilo. Clearly, there cannot be one potato that weighs one kilo on behalf of the others or projects its weight onto the whole group of potatoes. Likewise, 5.4 has a collective interpretation saying that the pupils, when added together, are more numerous than the teachers. An interpretation where there is some pupil who is more numerous than the teachers on behalf of all the students is impossible.

Thus we have seen that there is one class of exceptions to the observation that all predicates which have a collective interpretation also have a representative interpretation.

Do we also find predicates which give rise to representative interpretations, but not collective interpretations?

**Representativity without collectivity**

Certain perception predicates give rise to representativity but not collectivity. To see this, consider 5.5 below.

5.5 *The scouts saw the deer.*

5.5 may depict a situation where one scout saw the deer, and someone later attributed this event to the whole group. A collective interpretation
seems difficult to come by, since it is hardly possible for several active participants to each contribute to the seeing event without the predicate *saw the deer* being true of any of them.

**Collectivity without collective endeavor?**

So far we have only discussed sentences with what we termed the type 1 representative interpretations in chapter 1. The parallel between representativity and collectivity is clearest with this type of representativity. Even Kang notes the correlation between the weak reading and collectivity in typical type 1 representative sentences such as 5.6.

5.6 *The children built the raft.*

Kang (1996) makes clear, however, that collectivity is only a relevant determination factor for normal predicates, i.e. predicates which are not total or partial. In fact, she seems to limit the impact of collective readings even more as she only discusses sentences of collective endeavor like 5.6.

Here I will suggest that it is intuitively plausible to regard all three types of representative interpretations as instances of collectivity. Let us examine all three representativity types with regard to collectivity.

5.7 *The cups are dirty.*

Kang (1994, 1996) claims that the sentence 5.7 can be true in a situation where only some cups are dirty. In a minimal situation, this means that the property of one cup determines the way we predicate about a plurality of cups. For one cup to have this impact on the plurality, the cups must be seen as connected to each other, i.e. they must be seen as a group or a collection with respect to dirtiness. That we regard the cups as a collection is confirmed in situations where we want to verify the sentence. If we start by inspecting one of the cups and find that it is dirty, we need not look at any of the others to determine the truth value of the sentence. One cup can speak for all the cups because they form a group, and all we are interested in is whether there is dirtiness present within the group.

The same reasoning seems to be valid for the two other types of representative readings, exemplified by 5.8 and 5.9 below.

5.8 *The children built the raft.*

5.9 *The colonel spotted the enemy soldiers.*

If 5.8 can be true even if only one child does the actual building, then the action of one determines the way we predicate about a plurality of children. This implies that the children must be seen as a group with respect to the building of the raft. One child can build a raft on behalf of them all because
we see the children as a group and are not interested in the contribution of the individuals. Along the same line, if we consider 5.9 to be true in a situation where the colonel spotted only some of the enemy soldiers, this is because we regard the enemy soldiers as a group with respect to the property of being spotted.

On theories which exclude representativity from collectivity

We have seen that it is common to define collective predication as predication where no individual or subgroup of the plural noun phrase denotation satisfy the predicate. How does this theory account for sentences such as 5.10 where the representative interpretation seems to be the only available interpretation?

5.10 *The Romans built this bridge.*

If 5.10 should not be regarded as an instance of collectivity, how should it be represented?

And do the promoters of this collectivity definition not acknowledge that sentences like 5.11 can have an interpretation where one child or a subgroup of the children brought a cake on behalf of the others? If they do recognize this interpretation, how do they account for it when it cannot be regarded as an instance of collective action?

5.11 *The children brought a cake.*

5.2 Nonmaximality

In her PhD. thesis Christine Brisson introduces the term *nonmaximality* which is adapted from Dowty’s (1987) expression ‘the maximizing effect of all’ (cf. section 4.5). This maximizing effect can be seen by comparing sentences like 5.12 and 5.13 above.

5.12 *The students gathered in the hallway.*

5.13 *The students all gathered in the hallway.*

If the group of students is fairly large, 5.12 is acceptable even if only a few students did not come to the gathering. 5.13, on the other hand,

emphasizes that the group of which the predicate holds is really the largest contextually salient group that can be referred to by *the students* (Dowty, 1987, p. 99)
This difference between 5.12 and 5.13 is thus due to a maximizing effect of all upon the group that the definite plural noun phrase refers to. The implication that all the students gathered is regarded as an implicature which is cancellable in 5.12 but not in 5.13. In other words she regards the weakening effect of nonmaximality as a pragmatic phenomenon.

Brisson (1998) does not give any explicit definition of nonmaximality, but she does specify that sentences with definite plurals apply **maximally** when some property is applied to every individual making up the noun phrase denotation. This definition and her further discussion suggest that “nonmaximality” is used to describe sentences with definite plurals which do not apply maximally, i.e. sentences where some property does not apply to every member of the plural noun phrase.

As examples of nonmaximality she discusses, among others, 5.14 and 5.15.

5.14 *The boys are building the raft.*

5.15 *The townspeople are asleep.*

She claims that 5.14 can be true even if not all the boys participated actively, and that 5.15 can be true in situations where a few, exceptional, townspeople are awake. In other words nonmaximality is not sensitive to whether the predicate is collective or distributive in the sense of Landman (1996).

### 5.2.1 Brisson’s critique of Kang (1996)

Brisson (1998) discusses several earlier works which have dealt with phenomena similar to nonmaximality, but to us her discussion of Kang (1996) is the most relevant. Brisson (1998) acknowledges that partial predicates like *dirty, sick* and other weak predicates like *built a raft* give rise to non-maximal readings, but she finds that the total and strong predicates also allow nonmaximal readings. For example she notes that 5.16 and 5.17, which Kang (1996) uses as examples of total predicates, do not necessarily require that all individuals in the noun phrase denotation have the properties *be from Texas* and *like jazz* respectively.

5.16 *The children are from Texas.*

5.17 *The children like jazz.*

On the basis of these examples Brisson concludes that the distinction between the weak and the strong reading is not fine-grained enough to capture nonmaximality.
5.2.2 Brisson’s formal treatment of nonmaximality

Brisson (1998) gives a formal treatment of nonmaximality within Schwarzschild’s cover approach (cf. section 4.9). She claims that nonmaximality is the assignment of an ill-fitting cover. To grasp this notion, let us look at an example.

5.18 The athletes are tall.

\[ \text{the - athletes} = \{a, b, c, d\} \]

\[ A = \{a, b, c, \{d, e, f\}\} \]

The semantics specifies that we have four athletes, let us call them Ann, Benny, Carl and Dina. In the cover \( A \), there is one cell for each of Ann, Benny and Carl, while Dina is grouped in a cell with two non-athletes. In this context \( A \) is an ill-fitting cover with respect to the athletes, because there is no set of cells whose union is equivalent to the set of athletes. When an ill-fitting cover such as \( A \) is assigned, the semantics becomes indifferent to whether Dina is tall or not. This is because the set \( \{d, e, f\} \) is not a subset of the set of athletes, and therefore it does not satisfy the antecedent in the definition of the Part operator (which is restricted to sets having only athletes as members. Thus the semantics may verify 5.18 even if Dina is not tall. Brisson (1998) proposes that the effect of all is to disallow an ill-fitting cover.

Brisson’s also extends Schwarzschild’s in another direction, namely by incorporating certain lexical information:

we must assume that lexical semantics plays some role in constraining the felicity of certain types of covers. (Brisson, 1998, p. 75)

She proposes to distinguish between distributive predicates like be hungry which must assign a cover with singleton cells (i.e. one cell for each individual), mixed predicates such as eat a sandwich which allows both singleton and non-singleton cells, and collective predicates like gather which only assign covers with non-singleton cells.

5.2.3 Nonmaximality and representativity

Is the representative interpretation just a nonmaximal interpretation? Is the only difference between 5.19 and 5.20 a difference in degree of nonmaximality; that 5.19 minimally requires one Roman as a participant and 5.20 minimally requires almost all townspeople as participants?

5.19 The Romans built this house.

\(^2\) In section 7.1 we will see that this framework cannot account for representativity.
5.20 *The townspeople are asleep.*

Let us look at some potential differences between representative interpretations and other nonmaximal interpretations.

**Truth** Brisson (1998) uses the word "true" both in cases like 5.19 where some or a few act on behalf of many and in cases like 5.20 where a few exceptions are normally allowed. She does not, however, take up the question of whether such interpretations are actually true or just acceptable in certain pragmatic situations. Since she does not concern herself with this question, it is uncertain whether she has taken a stand on this matter or not. Lasersohn (1999), on the other hand, discusses this question extensively. His article has the same main aim as the thesis of Brisson (1998), namely to account for the effect of adding *all* to a definite plural noun phrase.

Like Brisson, Lasersohn observes that 5.20 can be uttered in situations where some exceptional townspeople are not asleep. He claims, however, that this cannot be laid down in the truth conditions. If the quantification in 5.20 is not universal, but near-universal instead, 5.20 could be paraphrased as 5.21. But this paraphrase leads to a problem: 5.22 is contradictory but 5.23 is not.

5.21 *Nearly all the townspeople are asleep.*

5.22 *The townspeople are asleep, but some of the townspeople are still awake.*

5.23 *Nearly all the townspeople are asleep, but some of townspeople are still awake.*

On the basis of this and other examples, Lasersohn (1999) concludes that sentences such as 5.24 and 5.25 below are truth-conditionally equivalent. The difference between them lies in how much **pragmatic slack** they allow. Pragmatic slack is defined loosely as "deviance from the truth" (Lasersohn, 1999, p. 523). Expressions such as *all, exactly, perfectly* are termed **slack regulators**.

5.24 *The townspeople are asleep.*

5.25 *All the townspeople are asleep.*

Apart from the diverging opinions of what truth conditions should account for, Lasersohn (1999) develops a framework which is similar to that of Brisson (1998). His notion of pragmatic slack accounts for basically the same phenomenon as nonmaximality. Just like Brisson, he claims that the function of *all* is to prevent nonmaximality.
Thus we can conclude that Brisson (1998) and Lasersohn (1999) basically account for the same phenomenon, and that Lasersohn (1999) argues convincingly that this phenomenon is not a truth conditional one.

From the discussions in chapter 2, 4 and above, it seems that we can distinguish three camps with different opinions on the truth conditional status of nonmaximality and representativity. First, Link (1983) claims that sentences with collective predicates, such as 5.19, have truth conditions which may be represented with the existential quantifier, while sentences with distributive predicates always have truth conditions corresponding to the universal quantifier. Essentially this is in line with Kang (1994, 1996) who argues that representativity, but not nonmaximality in general, should have an impact on the truth conditions of a semantics. Dowty (1987) (and possibly Brisson (1998)) maintains that both collective and distributive predicates give rise to interpretations which should be represented with less than universal truth conditions. This means that the whole phenomenon of nonmaximality should be treated in terms of the truth conditions. Lasersohn (1999), on the other hand, asserts that all weaker than universal interpretations, no matter whether the predicate is collective or distributive, are instances of pragmatic slack and should not be accounted for in the truth conditions of a semantics.

Lasersohn's paraphrase schema, sketched in 5.22 and 5.23, shows that certain instances of nonmaximality lead to contradictions when they are represented with less than universal truth conditions. Lasersohn does not, however, test this paraphrase schema on any sentences with representative interpretations. A possible reason for this is that sentences with collective predicates are not in focus in Lasersohn's article, and are only mentioned as examples a few times.

Therefore it is up to us to determine whether his schema yields contradictions with representative sentences as well. In the examples below, I have fleshed out the schema in an attempt to present natural sounding sentences which may be easier to judge.

5.26 The Americans invented the atomic bomb in July 1945, but most Americans did not know of the invention until August, when a bomb was dropped over Hiroshima.

5.27 The little boy dared to pet the goats, but he stayed away from the ones with horns.

5.28 You were right that the plates are dirty, but the ones on the long table are clean.

Are 5.27, 5.26 and 5.28 contradictory? I have no more than my own intuitions to rely on in answering this question, but I will suggest that they are not.
5.26 seems to be an acceptable description of a familiar situation. 5.27 can serve as a description of a situation where a little boy has been afraid of the goats for long, but finally one day he dares to approach them. He pets some of them, but still finds the ones with horns too intimidating.

5.28 is acceptable within the following scenario: A head waiter and his crew are preparing for a large reception in a restaurant. The head waiter suspects that the plates, which are already placed on the tables, may not have been washed properly. He asks an assistant to check whether he is right in his suspicion. The assistant responds that he thinks the plates are clean, but goes off to inspect the plates anyway. When he returns, he utters 5.28 to the head waiter.

Whether 5.26, 5.27 and 5.28 are generally judged to be contradictory or not in the situations sketched above, must be determined in an experiment before one can make any assumptions. For the present we will only note that 5.26, 5.27 and 5.28 do not seem contradictory, and that this is an indication that representativity and nonmaximality are two different phenomena.

Assuming that the sentences above are not contradictory: How can we explain that 5.26 is true when we know that only a miniscule share of Americans participated in the invention of the atomic bomb? How can 5.27 and 5.28 be true even though there may be a substantial amount of the goats that the little boy did not pet and many plates which are clean?

My suggestion is that representative predication differs from other predication in one respect: Normally, predication specifies who participates in an event, i.e. who fills the thematic roles such as AGENT, PATIENT etc. Representative predication, however, does not specify who participates, but the limits of who participates. In other words, it gives us the possible options for who can fill a specific thematic role. For example, when a speaker utters 5.26 and intends to convey the representative interpretation, he or she does not mean to specify who invented the atomic bomb, but rather to attribute the invention of the bomb to a certain group, the Americans. All that is conveyed is that the AGENT of the invention is somewhere within the denotation of the Americans, either one of them, a subgroup of them, or all of them. Similarly, when uttering 5.27, the speaker wants to convey that the ones which the little boy dared to pet are within the extension of the goats. In 5.28, the speaker seeks to attribute dirtiness to the group of plates. Again, the objects that are recognized as dirty must be within the extension of the plates.

Why do we choose to predicate the limits of a thematic role holder rather than the role holder itself?

There are at least two plausible reasons for this. One is that the speaker does not know exactly who the AGENT or PATIENT is, perhaps because the actual participants are far away in time (The Romans built this bridge) or space (The Australians discovered a new species of mammal). But we may wish to predicate representatively in situations where we are familiar
with the members of the noun phrase denotation. Consider the parents of
four children returning home from work and discovering a smashed vase on
the floor. When the father utters 5.29, he does not commit to any more than
that the limits of extension of the AGENT is the noun phrase denotation
of the children. It may be all the children together or any subgroup of the
children who did it; the children did this is true in any case.

5.29 I am sure that the children did this.

The other reason for wanting to predicate representatively, is that we
do not want to bother with details. Consider a situation where a mother
finds two of her four children sick, calls her employer, and utters 5.30 as
an explanation for why she cannot come to work. She has probably judged
that it is irrelevant how many of her children are sick, so she saves herself
the effort of giving a detailed explanation, and her employer the effort of
listening to a detailed explanation. If the employer starts asking detailed
question about the sickness of her children, the mother will probably change
her mode of predication and speak of the individual children.

5.30 My children are sick.

To conclude, it appears that predicating representatively is to abstain
from implying the most specific truth conditions, and instead round up the
possible options.

How does this view of representativity compare with nonmaximality? If
we follow Lasersohn (1999) and define nonmaximal predication as rating a
sentence as being close enough to the truth for practical purposes, we can
illustrate the difference between the two modes of predication as follows:
Imagine a situation where someone asks you what time it is, and you know
that it is a little after three, but not exactly how much. Representative predi-
cation would correspond to the answer 5.31, while nonmaximal predication
would correspond to 5.32.

5.31 It's between three and three fifteen.

5.32 It's three.

Now, as noted above, the ill-fitting cover approach depends crucially on
having the context assign a cover where the relevant individuals are specified.
But the representative interpretation is used exactly in situations where we
do not know the specific cover (i.e. who the relevant individuals are) or do
not want to convey any specific cover to the receiver, e.g. because we do
not want to bother with details. In these cases Brisson's framework cannot
assign any truth conditions.\textsuperscript{3}

How could Brisson (1998) rely on having a specific cover assigned by the context? In answering this question, we have to keep in mind that Brisson (1998) has a different point of departure and a larger phenomenon to account for than we do. She is concerned with the pragmatic effect of \textit{all}, and consequently her main focus is on accounting for the pragmatic difference between a sentence beginning with \textit{all} and its counterpart without \textit{all}. This explains why she focuses on allowing for exceptions, not attributing a property to a group. When allowing for exceptions, we often know what the exceptions are, thus the specific cover assignment may be a reasonable assumption.

\textbf{Quantifier scope} The representative interpretation of (active) sentences with transitive predicates is only consistent with an assignment of wide scope to the second argument noun phrase. The nonmaximal interpretation is consistent with either scope assignment.

5.34 \textit{The students ate a sandwich.}

In 5.34 \textit{a sandwich} either has wide scope, there is only one sandwich, or it has narrow scope, there is one sandwich per student. The representative interpretation is only possible on the wide scope interpretation, when some students finished a single sandwich "on behalf" of all of them. A nonmaximal interpretation, on the other hand, can be assigned no matter what scope \textit{a sandwich} has. For example, in a situation with twenty students, where eighteen ate his or her own sandwich, but where two students did not eat because they were feeling sick, 5.34 can be predicated nonmaximally.

\textbf{Range of applicability} The representative interpretation is only available in a restricted set of situations. Also, certain predicate types, for instance totally distributive predicates such as \textit{sleep}, rule out a representative

\textsuperscript{3}Brisson admits that sometimes the speaker or the hearer in a conversation must guess at the exact cover values the other has in mind. To illustrate this, Brisson sketches a situation where four boxes of sweaters arrive in a clothing store one morning. One of the boxes is set off to the side in a space usually reserved for items that the store manager deals with. When the manager utters 5.33 to a clerk, the clerk might wonder whether his request applies to \textit{all} the sweaters or whether the ones in the box set aside should be excluded.

5.33 \textit{The sweaters that came in this morning go in aisle three.}

The point is, however, that even though Brisson admits that a conversation partner might not know the exact cover the other has in mind, she presupposes that the speaker and the hearer themselves always have specific covers in mind, and that they intend to convey these exact covers. As we have seen, neither of these presuppositions are necessary with the representative interpretation.
reading. For a discussion of when the representative reading is available and when it is not, see section 6.4.

Nonmaximality, on the other hand, seems to be an option that is generally available. No predicate is ruled out. Therefore the generalizations noted by Kang (1994, 1996), which distinguish between total and partial predicates, cannot be accounted for by nonmaximality. As we have seen, both 5.35 and 5.36 can have a nonmaximal interpretation.

5.35 The glasses are dirty.

5.36 The glasses are clean.

Singular collective action  Brisson (1998) claims to show that the groups framework of Landman (1989, 1996) cannot account for nonmaximality. A close examination of her arguments against Landman reveals that the critique is not relevant for instances of representativity, only for other types of nonmaximality. To my knowledge, there is no other evidence which indicates that Landman’s approach cannot account for representativity.\(^4\) It thus seems that representativity can be treated as singular, collective predication while other cases of nonmaximality cannot. In other words, there is a difference between nonmaximality and representativity which has formal consequences.

Brisson (1998) finds three problems with the approach of Landman (1996), i.e. treating collective predication as singular predication and treating nonmaximality as collective predication.

The first problem is that since collective predication is a type of singular predication, nonmaximality effects should have the same distribution as “part of” effects in singular predication. For example Landman (1996) shows that that the predicate touch the ceiling in 4.70 repeated here as 5.37 distributes down to at least one member of the collection. In a parallel manner 4.71, repeated here as 5.38, distributes down to a part of Maria, for instance her hand.

5.37 The boys touch the ceiling.

5.38 Maria touches the ceiling.

Brisson (1998) claims that there are examples where this parallel cannot be found. To illustrate this, she gives the following example pair.

5.39 The soldiers of the 4th platoon were captured by the enemy.

5.40 Bill was captured by the enemy.

\(^4\)We noted in chapter 4 that Landman’s approach does not give any specific truth conditions for collective interpretations. But this is another matter.
According to Brisson (1998, p. 65) 5.39 exhibits nonmaximality since it can be true “if one or two of the soldiers managed to get away”. 5.40 lacks this effect. This critique is not relevant to representativity, however. As we will see in section 6.4.3, the second argument of the predicate capture does not permit a representative interpretation. To anticipate events, only predicates with non-affected second arguments permit the representative interpretation of this argument.\(^5\)

The first argument of capture, on the other hand, does permit the representative reading, and here the parallel between singular and plural arguments is present.

5.41 *The soldiers of the 4th platoon captured the enemy.*

5.42 *Bill captured the enemy.*

5.41 can be true even if just some members of the platoon captured the enemy. In the same way 5.42 can be true even if just a part of Bill, probably his hands, seized the enemy by his neck.

We will consider a few other examples that Brisson (1998) claims show similar differences between singular and collective predication.

5.43 *Jane knows the answers to these questions.*

5.44 *Jane knows the answer.*

Brisson (1998) argues that in a context where we have a dozen questions, 5.43 can be true even if Jane doesn’t know the answers to one or two of them. 5.44, on the other hand, will be false in a situation where we have one big question with many subparts and Jane does not know the answer to one of these subparts. I am not sure if I agree on this intuition, but in any case, the predicate know is stative, and consequently, according to the prerequisites in section 6.4.1, it cannot give rise to a representative interpretation.

5.45 *Polly graded the exam.*

5.46 *Polly graded the exams.*

In both 5.45 and 5.46 above there are salient parts (parts of an exam, individual exams), but according to Brisson (1998) 5.45 does not provide the possibility of applying the predicate to just some of these parts. Again, however, we are dealing with a predicate which affects its second argument and which thus prohibits a representative interpretation of this argument. Consequently the example pair above is not relevant to representativity.

*Grade* does allow a representative interpretation of its first agent argument, however. We would thus expect that the parallel between plural and

\(^5\) Confer section 6.4.3 for a modification and further specification of this requirement.
singular noun phrases is present for the subject arguments. 5.47 and 5.48
show that this is the case.

5.47 The teachers graded the exam.

5.48 The teacher graded the exam.

5.47 can be true even if only some teachers took care of the grading, and
in 5.48 it is usually only parts of the teacher, like one hand and the head,
which do the grading, the big toe and the knees have little to do with it; a
teacher lacking these parts may well do the grading.

In conclusion, the three example pairs above show that certain instances
of nonmaximality cannot be treated as collective singular predication. What
is relevant to us, however, is that the examples do not refute Landman's
claim that all instances of representativity can be treated as collective sin-
gular predication.

Let us proceed to the second problem Brisson (1998) finds in the ap-
proach of Landman (1996), namely that it does not manage to capture
nonmaximality in sentences that are represented with a universal quantifier
taking scope over an existential quantifier.

5.49 The boys ate a sandwich.

One reading of 5.49 would be the collective, that the boys share a single
sandwich, another would be the distributive, that the the boys have one
sandwich each. Brisson (1998) claims that it is possible to interpret the
sentence distributively and at the same time allow the sentence to be true
even if, out of a large group of boys, one or two of them didn’t eat a sandwich
(for example because they were feeling sick). The approach of Landman
(1996) is unable to account for a situation where there may be more than one
sandwich, but not necessarily one for every single boy. But as we have seen
above, and as will be discussed in section 6.4.2, the narrow scope situation
is not compatible with a representative interpretation. Thus, it seems this
objection is not relevant for cases of representativity.

The third problem with the account of Landman (1996), according to
Brisson (1998), is that it cannot distinguish between a maximal collective
reading and a nonmaximal collective reading. In other words, the approach
cannot account for the difference between 5.50 which allows a nonmaximal
reading and 5.51 which according to Brisson (1998)) requires a maximal
reading.

5.50 The children lifted the boat.

5.51 All the children lifted the boat.

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The problem of accounting for the difference between sentences with and without the predicate *all* is common to readings that allow representativity, like 5.50 and 5.51, and sentences which disallow representativity, like 5.52 and 5.53 below. Thus this problem is at a more general level than representativity and must be accounted for, not within a theory of specific of representativity, but in a more general theory, incorporating cases like 5.52 and 5.53.

5.52 *The soldiers sleep.*

5.53 *All the soldiers sleep.*

The three objections against treating collective predication as a type of singular predication and dealing with nonmaximality in terms of collectivity are relevant only to the nonmaximality phenomena that are not instances of representativity. Thus these objections present no threat to an account of representativity in terms of singular, collective predication.

**Conclusion** We have seen that Brisson (1998) claims that representativity is a subcase of nonmaximality, and consequently can be accounted for in a general framework of nonmaximality. A comparison of representativity and nonmaximality has shown, however, that they seem to be essentially different phenomena. Also, it appears that the cover framework, introduced by Schwarzschild and extended by Brisson to handle nonmaximality, is not well suited for treating representativity.

### 5.3 Cumulativity

The cumulative reading is normally accredited to Scha (1981). He observed that sentences such as 5.54 have a reading in addition to the collective and distributive ones: a cumulative reading where only the total number of individuals on both sides of the relation matter. In other words, the only restrictions put on the relation *laid*, are that its domain has cardinality ten and that its range has cardinality thirty.

5.54 *Ten chickens laid thirty eggs.*

Since Scha (1981), there has been much discussion of cumulative readings, both what they encompass and whether they represent a separate reading at all. In this section we will employ the definition of cumulativity found in Bech and Sauerland (2000) since it seems to represent a predominant position in the current debate.

Bech and Sauerland (2000) use the term cumulative interpretation for "all cases where a sentence containing two plurals has truth conditions
weaker than a doubly distributive paraphrase”. Following, Krifka (1986) and Sternfeld (1998), they capture cumulativity by a syntactic operator, the **-operator, which applies to any binary predicate R formed in the syntax:

Definition 5.1 \([**R](X)(Y) = 1\)
iff \(\forall x \in X \exists y \in Y R(x)(y)\) and \(\forall y \in Y \exists x \in X R(x)(y)\)

But does this formal definition capture the informal definition given above? More specifically, does 5.1 describe all cases with two plurals and truth conditions weaker than a doubly distributive paraphrase? The answer seems to be no. Representative readings (with two plurals) are weaker than the doubly distributive paraphrase, but the definition in 5.1 does not include them. For example 5.1 excludes 5.55 on its representative reading, i.e. the reading were some Romans built the bridges. This is because 5.1 requires that every Roman and every bridge appear as a member in one of the pairs of the 'build'-relation.

5.55 The Romans built the bridges.

One might think that this discrepancy between the formal and informal definition of cumulativity is due to the fact that Bech and Sauerland (2000) are unfamiliar with the weak readings introduced by Kang (1994, 1996). This is not the case, however. In a footnote Bech and Sauerland (2000, p. 350) comments on the relationship between the weak readings of Kang (1996) and the cumulative reading. They have thus failed to notice that the weak reading discussed in Kang (1996) requires a reformulation of their informal definition of cumulativity. The footnote shows, however, that they regard Kang’s weak reading and the cumulative reading as two different phenomena: 

A phenomenon that at first might seem related to cumulative interpretations is the difference between total and partial predicates discussed by Krifka(1996) and Yoon(1996) [Kang(1996)]. But (i) and (ii) show that cumulative interpretations are an independent phenomenon: (i) shows that only the predicate “dirty” in (ib) allows a partial reading since only (ib) can be true if some of the cups are actually dirty, while most are clean. But, both (iia) and (iib) allow a cumulative reading.

1 a. The cups are clean.

Note that (iib) has a representational reading as well as a cumulative, namely the reading where some boys performed the dirtying of some of the cups on behalf of the others.
b. The cups are dirty.
   ii. a. The boys cleaned the cups.
   b. The boys dirtied the cups.

So far we have established that representativity and cumulativity are distinct phenomena, and that a definition of cumulativity needs to be formulated in such a way that it excludes representative readings. What we have not addressed is how cumulativity differs from representativity. Since Bech and Sauerland (2000) are silent on this matter, we need to look for criteria on our own.

One evident difference is argument requirements. The cumulative reading is subject to the double plural requirement (Scha, 1981), i.e. it applies only to sentences with two plural noun phrases. The representative interpretation, on the other hand, applies to sentences with one or two arguments alike, as long as there is one definite plural argument. We can account for this difference by the following description of the purpose of each interpretation: Cumulativity is concerned with how the predicate relates the individual members in the two plural noun phrase denotations to each other. Representativity is concerned with the number of individuals in one plural noun phrase denotation that are actually involved in the property described by the predicate. Thus cumulativity describes a relationship between the members of two noun phrase denotations while representativity describes a relationship between the group of members of one noun phrase denotation and a predicate. This means that in the cumulative reading, the predicate must distribute down to every member of the plural noun phrase denotation, while this distribution requirement does not apply to the representative interpretation. The example 5.56 below illustrates this distribution difference between the cumulative and the representative reading.

5.56 The soldiers hit the targets.

For 5.56 to be true on a cumulative reading, every soldier must hit at least one target, and every target must be hit by at least one soldier. Thus figure 5.1 where each connection represents the predicate hit, illustrates a minimal situation that makes 5.56 true on a cumulative reading. The situation is described as minimal because the removal of one connection will be enough to make it false. What is vital for the truth of this reading is the connections between each of the individual members of the first noun phrase (the soldiers) and each of the individual members of the second noun phrase (the targets).\footnote{As Agüero-Bautista (2001) points out, the cumulative reading does not necessarily involve complete knowledge of the graph of a function relating the elements in the domain of the first noun phrase denotation to the elements in the domain of the second noun phrase denotation. In other words, the cumulative reading does not require knowledge of which soldier who hit which target.}
For 5.56 to be true on a representative interpretation, every target must be hit.\(^8\) Figure 5.2 sketches the situation where one of the soldiers hits all the targets, i.e., the minimal situation that makes 5.56 true on a representative interpretation. What is vital for the truth of this interpretation is that there is a connection from the group denoted by the first noun phrase, \textit{the soldiers} to every individual member of the second noun phrase, \textit{the targets}. Where the connections are anchored internally in the first noun phrase denotation, i.e., which of the individual soldiers who hit a target, is not of importance to the representative reading. Therefore, a better illustration of the representative reading of 5.56 is figure 5.3 which shows that what matters is that the plurality, seen as a whole, performed the action.

Figure 5.2: A minimal situation that makes the representative interpretation of 5.56 true.

Another difference between cumulativity and representativity is the semantic-pragmatic status. The cumulative reading is generally available for sentences with two plural arguments. Thus the possibility of having a cumu-

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\(^8\) Note that 5.56 can only have a representative reading of its first argument, \textit{the soldiers}. This is seen by studying the prerequisites for the representative interpretation in section 6.4. The second argument, \textit{the targets}, is affected by the action in the predicate, and consequently a representative interpretation of this noun phrase is excluded.
Figure 5.3: The representative interpretation of 5.56.

The representative reading is syntactically determined. Since contextual factors do not contribute to determine whether a cumulative reading is possible (even if they may indicate whether it is plausible), we will call the cumulative reading a semantic reading. The representative interpretation is available for sentences with at least one plural argument, but in addition it may require a certain pragmatic context (cf. section 6.4). Therefore we will call the representative interpretation a pragmatic interpretation.

5.4 Genericity

According to Krifka et al. (1995) 'genericity' as it is used in linguistics and philosophy of language refers to two distinct phenomena. The first of these phenomena is "propositions that do not express specific episodes or isolated facts, but instead report a kind of general property, that is, report a regularity which summarizes groups of particular episodes or facts" (Krifka et al., 1995, p. 2). An example of such a proposition is found in 5.57.

5.57 _John always smokes a cigar after dinner._

The second genericity phenomenon is reference to kinds, exemplified in 5.58 where the _potato_ does not designate some particular potato or group of potatoes, but rather the kind potato itself.

5.58 _The potato was first cultivated in South America._

The representative object interpretation Within the second type of genericity, reference to kinds, we find an interpretation type that has a property in common with representative interpretations.

Consider the following sentences.

5.59 _The fox broke into the chicken house again._
5.60 *In Alaska, we filmed the grizzly.*

According to Krifka et al. (1995) 5.59 and 5.60 have a **representative object interpretation.** On this interpretation the individual described, i.e. *the fox* or *the grizzly,* is only relevant as a representative of the whole kind, and therefore properties which hold of the individual are projected from the individual to the kind.

What the representative object interpretation has in common with representativity is projection of a property from an individual to a larger group that this individual is contained in. In sentences with a representative object interpretation, it is the individual, the source of the projection, that is explicitly mentioned, while in sentences with a representative interpretation it is the group, the goal of the projection, that is explicitly mentioned.\(^9\)

As described in Krifka et al. (1995), the representative object interpretation is restricted to sentences with reference to kinds. Since a kind, like fox, is not defined solely by its existing specimens, *"the fox"* in 5.59 cannot have a specific reference. Plural noun phrases which have a representative interpretation, on the other hand, do have a specific reference. For example, *the thieves,* on the representative reading of 5.62, refer to some specific set of thieves and not to the kind thief.

5.62 *The thieves broke into the chicken house again.*

In conclusion, the representative interpretation and the representative object interpretation both describe projection from an individual or sub-group to a larger group. They are, however, distinguished by two variables: referring/non-referring and singular/plural.

More generally, we saw in section 4.7, that Kamp and Reyle (1993) called for a different treatment of generic readings and *"shared responsibility readings"* (which have much in common with the representative interpretation).\(^10\) They do not specify a representation of shared responsibility readings, but propose that generic readings should be treated with a generalized quantifier Gen. In 5.63, for example, the Gen quantifier does not require that the conditional condition between being a child in the city and thriving holds universally, but only that it holds for *"typical"* cases.

5.63 *The children in this city thrive.*

\(^9\)In this respect the representative object interpretation behaves like sentences such as 8.4, repeated here as 5.61.

5.61 *Napoleon lost the war against the Russians.*

\(^10\)I have not been able to find a discussion of the relation between genericity and *"representativity"*-like phenomena anywhere else than in Kamp and Reyle (1993).
This specification of a "typicality"-quantifier helps contrasting the generic and representative interpretations. Representativity has nothing to do with what is typical or normal. It allows a property to be attributed to both typical and atypical members of a noun phrase denotation.

5.5 Conclusion

In section 5.1 we saw that, with one exception, all predicates which give rise to the collective interpretation (in the sense of Verkuyl (1999)) also give rise to the type 1 representative interpretation. Also, there are certain perception verbs which do not give rise to a collective interpretation but still trigger the type 1 representative interpretation. We argued briefly that the pluralities involved in the type 2 and type 3 representative interpretation can also be regarded as collections.

In section 5.2 we argued that Christine Brisson's notion nonmaximality is essentially different from representativity. Further, we claimed that certain properties of representative predication renders Brisson's cover framework unfit to account for representativity: Representative predication does not specify who participates in an event, but the limits of who participates. In other words representative predication gives us the possible options for who can fill a specific thematic role. This means that we do not assign specific covers when we predicate representatively, and consequently a theory which relies on having the context assign exact covers cannot treat representativity.

We pointed out the differences between cumulativity and representativity in section 5.3. Cumulativity describes a relationship between the members of two noun phrase denotations, while representativity describes a relationship between the group of members of one noun phrase denotation and a predicate. A consequence of this is that on the cumulative reading, the predicate must distribute down to every member of the plural noun phrase denotation, while this distribution requirement does not apply to the representative interpretation. Also, cumulativity and representativity differ with regard to semantic-pragmatic status since the cumulative interpretation is generally available for sentences with two plural noun phrases, whereas the representative interpretation is only possible under certain contextual conditions.

In section 5.4 we compare representativity with the generic representative object interpretation and genericity in general. We observe that the representative object interpretation is singular, non-referring predication, while the representative interpretation is plural, referring predication. More generally, we conclude that generic predication describes "typical" or "normal" cases, while this is not necessarily the case for representative predication.
Chapter 6

Prerequisites for Representativity

6.1 Introduction

This chapter is an account of the prerequisites for three types of representative interpretations.

In section 6.2 we evaluate the criteria Kang uses to explain the weak reading. We conclude that although she has made several important observations, her criteria fail to account for a number of cases. Cruse’s theory of gradable complementaries is discussed in 6.3. We note the context dependence of some phenomena Cruse classifies as lexical. Further, Cruse’s criteria are supplemented with observations made by Talmy (2000). In section 6.4 we attempt to modify and extend the explanations given by Kang and Cruse in an account of the three types of representativity.

6.2 Evaluation of Kang’s criteria for representativity

6.2.1 General evaluation

No semantic criterion which covers all weak and strong predicates

Kang (1994, 1996) attempts to give a classification of predicates which require a strong reading and predicates which allow a weak reading. For so-called normal predicates (i.e. predicates which are not total or partial) the main classification variable is the i-level/s-level distinction: i-level predicates can only have the strong reading while s-level predicates allow the weak reading.

For one group of predicates, namely the total and partial predicates, the distinction between s-level and i-level predicates is of no use, Kang (1994)
claims. This is because both total and partial predicates are s-level. Kang (1994) regards it as a problem for her analysis that she cannot give a unified explanation of the distinction between weak and strong readings. She leaves the task of finding one variable which can account for both total/partial predicates and the other cases of strong and weak readings to further research.

**No proper account of the total/partial distinction**

To explain why total predicates require the strong reading while partial predicates permit the weak reading, Kang employs Rossedeutscher and Kamp’s distinction between universal concepts and existential concepts. But neither Kang nor Rossedeutscher and Kamp (1992) give any definition of what a universal or existential concept is, and thus it does not have much explanatory power: It is unclear how universal and existential *concepts* differ from total and partial *predicates*.

In section 6.2.2 we suggest that total and partial predicates do in fact differ in their i-level/s-level status. Partial predicates are typical examples of s-level predicates, while total predicates have much in common with i-level predicates. Thus it seems that Kang has failed to see that the i-level/s-level distinction may be of use also with regard to total and partial predicates.

According to Kang, only predicates with a corresponding lexicalized predicate can be classified as total and partial. What she means by ‘corresponding lexicalized predicate’, however, is not entirely clear. Adjectives like *clean, dry, healthy* clearly have the lexicalized counterparts *dirty, wet, sick*. But some of the adjectives in Kang’s list of total and partial adjectives (cf. section 2.3) do not have obvious lexical counterparts. Take for example *kept intact:damaged, broken, burned, closed:leak or thorough:limited*. One problem is that a total predicate may have several partial counterparts. Another is that the words in the pairs are not evident counterparts and not listed as such in the major antonymy dictionaries, such as WordNet. Thus the relation between the terms in these pairs seem to be more of a semantic nature than a lexical one.

**No sufficient account of s-level predicates which cannot have the weak reading**

A second problem Kang (1994, 1996) discusses, is that the i-level/s-level distinction does not even account for all normal predicates (i.e. predicates which are not total or partial). More specifically, there are certain s-level predicates which cannot have the weak reading. Kang (1996) illustrates this problem with two examples:

6.1 *The children walked to school.*
6.2 *The frozen pies were put into the refrigerator.*

In these cases the plural noun phrases do not have a weak reading. To account for 6.1 and 6.2, Kang (1996) proposes a third explanation variable which is meant to distinguish between the s-level predicates that allow a weak reading and the ones that do not: Predicates which denote movement in the sense of Gruber (1965) cannot have a weak reading, while non-movement predicates do give rise to the weak reading. Kang (1996) gives the following examples to illustrate the difference between movement (6.3-6.5) and non-movement (6.6-6.8).

6.3 *x walks to y: x moves to y.*
6.4 *z puts y to x: y moves to x.*
6.5 *x eats y: y moves into x's inside.*
6.6 *x pets y.*
6.7 *x feeds y.*
6.8 *x sees y.*

Thus the new movement criterion accounts for why 6.1 and 6.2, which contain movement verbs, cannot give rise to the weak reading.

A problem with the movement criterion is that Gruber (1965) does not define the class of movement predicates (or motion/transaction verbs as he calls them) in terms of semantic criteria; he merely gives some examples. This imprecision makes it a difficult criterion to use. More importantly, a large number of s-level predicates which clearly fall outside the class of movement predicates also disallow a weak reading. A few examples are *cry, smile, laugh, frown, stutter, gaze at the sea.*

In her earlier work, Kang (1994), she does not say much about s-level predicates which prohibit the weak reading, but mentions in a footnote that verbs denoting a change of state seem to prohibit the weak reading. Kang does not specify what she means by "change of state". In any case, this criterion cannot explain the problematic cases mentioned above any better than the movement criterion. For example, I have not been able to find a semantic theory which regards walking (cf. 6.3), but not being fed (cf. 6.7), as a change of state.\(^1\) What is more, it is not even clear that the change of state criterion explains the cases the movement criterion can account for, such as 6.1 and 6.2.

\(^1\)For definitions of change of state, see for example Levin and Hovav (1995).
No distinction between the predicate’s argument positions

Another weakness of Kang’s explanation criteria is that she does not recognize that triggering weak and strong interpretations is not a feature of *predicates*, but of predicates in relation to argument positions. Kang classifies each predicate as either triggering a weak or a strong reading, but it seems that some predicates can be both weak and strong, i.e. allow a weak reading of the noun phrase in one argument position but not in another. For example, verbs like *paint* and *kill* can trigger a weak reading of the phrase that typically occupies the subject position, but these verbs require a strong reading of the noun phrase that normally functions as object. For instance, all the houses must be painted and all the bank employees must be killed for 6.9 and 6.10 to be true.

6.9 *The children painted the houses.*

6.10 *The gangsters killed the bank employees.*

No i-level predicates trigger weak readings

I have not been able to find any i-level predicate that can trigger a weak reading. This suggests that Kang’s distinction between i-level and s-level predicates is relevant in separating predicates that give rise to weak readings from predicates that do not.

Conclusion

Kang has made an important observation in regarding the i-level/s-level distinction as significant in determining whether a predicate can give rise to weak readings or not. Still, the criteria presented in Kang (1994, 1996) are insufficient to differentiate between predicates giving rise to weak readings and predicates requiring strong readings of their noun phrase arguments. Another weakness is that Kang does not distinguish between argument positions of predicates in her discussion, i.e. she does not consider whether the noun phrases typically occupying the subject position (in active sentences) behave differently from those which are normally in object position. Such a distinction seems necessary as some verbs can trigger a strong reading of their subject position argument but not their object position argument, and vice versa.

Generally, a more precise account of the relation between predicate types and weak and strong readings is called for.
6.2.2 The i-level/s-level distinction and total/partial predicates

In chapter 2 we briefly discussed the difference between s-level and i-level predicates. Here we will elaborate on the subject to show that total predicates have many characteristics in common with i-level predicates while partial predicates are prototypical s-level predicates.

Chierchia (1995) gives a list of six characteristic properties which have been used to distinguish i-level predicates from s-level predicates in the literature. Five of these characteristics are presented as specifications of syntactic environments in which one type of predicate can occur, or get some specific reading, and where the other type of predicate cannot occur, or get this specific reading.

In the following we will compare total and partial predicates with regard to each of the six characteristics. The comparison shows that while partial predicates match all the characteristics, it is generally necessary to postulate unusual contexts to make the i-level predicates fit in.²

We will suggest that a listing of syntactic environments, like the one given in Chierchia (1995) and various other works (cf. Milsark (1979), Carlson (1980) and Kratzer (1988)) is not sufficient to give a good characterization of the distinction between s-level and i-level predicates. The background for this claim is that the i-level/s-level status of total predicates seems to be situation dependent. Consequently we need an account of the i-level/s-level distinction which relies more on pragmatics.

1. The existential construction with there

Milsark (1979) was the first to note that the existential construction with there is possible with some adjectival predicates, such as available in 6.11 and not with others, such as intelligent in 6.12. Carlson (1980), who bases his account on Milsark’s work, notes that the former adjectives come under his class of s-level predicates while the latter adjectives are i-level predicates.

6.11 There were several policemen available.

6.12 There were several policemen intelligent.

Milsark gives the following examples of adjectives which are tolerated with the existential construction: sick, hungry, tired, alert, clothed, naked, drunk, stoned, closed, open. Carlson (1980) presents almost the same example list, but leaves out clothed, open, stoned and adds awake. This amended list of predicates consists mostly of predicates denoting undesirable or negative properties (sick, hungry, tired, drunk, naked) and also contains two.

²In his article, Chierchia suggests that a revision of the criteria for i-level predicates is needed. His revisions concern technical details which are not relevant to our purposes.
verbs denoting presence of attention (alert, awake). Kang (1994, 1996) mentions dirty as an example of a partial predicate, and Cruse (1980) lists drunk as belonging to the class of gradable complementaries. Tired and hungry also have the qualities of partial predicates and gradable complementaries. Naked, on the other hand, is classified as a total predicate by Kang (1994, 1996).

As examples of predicates which are not allowed in the existential theta-construction, Milsark (1979) mentions: all noun phrase predicates, shapes, colors and beautiful, intelligent, boring, crazy.

Milsark (1979), Carlson (1980) and Chierchia (1995) thus agree that 6.13 is acceptable and that 6.14 is not, but what do they think of 6.15?

6.13 There were two people sick/drunken.

6.14 *There were two apples red.

6.15 ?There were two people healthy/sober.

6.15 seems fairly odd. To be uttered felicitously, it would require a special context where it would be part of the common ground that almost everyone were sick(drunken).

In their discussion of existential constructions with there, Barwise and Cooper (1981) mention uninformativity as the reason why certain noun phrases such as all boys, no girls etc., do not fit with the existential construction. They define strong determiners as those giving rise to noun-phrases which sound strange after there is or there are. Positive strong determiners, like both, all, most result in tautologies (There are all boys), and negative strong determiners, like neither, trigger a contradictions (There is neither girl). Further Barwise and Cooper remark that

While tautologies and contradictions are not ungrammatical, they are not very informative and are normally restricted to use in special situations... (Barwise and Cooper, 1981, p. 183)

A parallel argument could be used to explain why there-constructions sound better with partial than with total predicates. Under normal circumstances, where health is the norm, a sentence like 6.15, stating that there are two healthy people, does not carry much information. Thus, it can only be uttered felicitously in unusual situations.

2. Stable stativity

I-level predicates are aspectually stative and refer to “tendentially stable” properties, while s-level predicates have the opposite properties. This means that the majority of stative predicates, but not all, are i-level.
The only statives that are s-level are adjectives which express “transient” or “episodic” qualities (like being drunk or being sick) and pure locatives (like being on the roof). (Chierchia, 1995, p. 177)

A test for stability is combining the predicate with a temporal adverb.

6.16 *John was drunk yesterday/last month/a year ago.

6.17 John was tall yesterday/last month/a year ago.

Is there any difference between total predicates like healthy, clean and partial predicates like sick, drunk with regard to stability? First, note that Creuse (1980, p. 19), in characterizing gradable complementaries like healthy:sick, sober:drunk and clean:dirty, remarks that the Q-negative term (in this case healthy, sober, dirty) represents a “conventionally established qualifying norm”. He also shows that the Q-negative term is the “unmarked” term, which implies that Is it clean? is an uncommitted question while Is it dirty? is a marked question “and would be used only if the speaker had a good reason to suppose the answer would be “yes”” (p.21). These comments are evidence that Creuse (1980) regards the Q-negative term as representing the “default” state and the Q-positive as denoting deviance from a norm. This seems to indicate that the Q-positive norm is the “tendentially stable” one. Generally, people tend to be fairly clean, healthy and sober, and it is not the presence of these states, but deviation from them, that merits comment. This explains why 6.18 is acceptable and 6.19 is odd where no special context is available.

6.18 She was a normal, healthy child.

6.19 She was a normal, sick child.

Let us compare total and partial predicates in combination with temporal adverbs.

6.20 John was sick/dirty yesterday/last month/a year ago.

6.21 John was healthy/clean yesterday/last month/a year ago.

6.20 does not need any particular context to be acceptable, while 6.21 seems to require a common ground where John has been sick/dirty for a while.
3. Locatives

Locative modification of an i-level predicate is generally impossible, as Chierchia (1995, p. 178) illustrates with the following examples:

6.22 *John is a linguist in his car.
6.23 *John is intelligent in France.
6.24 *John knows Latin in his office.
6.25 John is always sick in France.
6.26 John works in his office.

6.25 and 6.26 are acceptable, but what about 6.27 and 6.28?

6.27 ?John is always healthy in France.
6.28 ?John is always clean in his office.

Again, although 6.27 and 6.28 are better than 6.22-6.24, they seem to require some special context where it is commonly known that John is often sick/dirty. If this special context is not available, 6.27 and 6.28 are not informative, and thus seem odd.

4. Perception sentences

Chierchia (1995) notes that while s-level predicates are acceptable within the "small-clause" complements of perception verbs, i-level predicates are not.

6.30 I saw Annie run.
6.31 I saw Nils drunk.
6.32 I heard Peter play Mozart.
6.33 *I saw Sarah intelligent.
6.34 *I heard Nina envy Maria.

3 Note that 6.29 works fine.

6.29 John is always dirty in the kindergarten.
Applying this test to total and partial predicates shows that the partial predicates can function quite naturally as the complements of perception verbs, but the total predicates require a somewhat unusual context.

6.35 I saw Jacob dirty.

6.36 ?I saw Jacob clean.

6.37 I saw Yoko sick.


5. Bare plurals

Chierchia (1995) notes that i-level predicates, as in 6.39 and 6.40, select the universal or generic reading of bare plurals. S-level predicates, like the ones in 6.41 and 6.42, on the other hand, can trigger both the existential reading and the generic reading.

6.39 Platypuses are mammals.

6.40 Italians love pizza.

6.41 Tables are available.

6.42 Suitors are singing in her backyard.

Consider now some examples with partial and total predicates:

6.43 Boys are sick in our neighbourhood.

6.44 Boys are healthy in the suburbs.

6.45 Stores are open in the city center.

6.46 Stores are closed in the city center.

6.47 Stomachs are empty here in Oslo.

6.48 Stomachs are filled in the wealthy areas of the city.

We can easily attribute the existential reading, “there are boys in our neighbourhood who are sick”, to 6.43, but 6.44 clearly cannot mean that “there are boys in the suburbs who are healthy”. Thus 6.43 can have both the existential and the generic reading, while 6.44 requires the generic reading. If you are out of bread on a public holiday, someone may tell you that 6.45, meaning “there are some stores in the city center that are open”. If
instead you are told that 6.46, you can be sure that they do not mean "there are some stores in the city center that are closed". The same pattern is seen in the other examples.

This difference in reading for bare plurals is not seen as clearly in all the total/partial predicate pairs, but there does seem to be a difference in acceptability in all cases.

6. Adverbs of quantification

Kratzer (1988) has noticed a difference between i-level and s-level predicates in their interaction with adverbs of quantification. Chierchia (1995) gives the following examples to illustrate this contrast.

6.49 *When John knows Latin, he always knows it well.

6.50 *When John is intelligent, he is always pleasant.

6.51 When John speaks Latin, he always speaks it well.

6.52 When John is drunk, he is always obnoxious.

The sentences containing s-level predicates sound natural, while the parallel sentences with i-level predicates sound odd out of context.

This difference does not seem to be present in sentences with total and partial predicates.

6.53 When Arnold is sick, he always complains a lot.

6.54 When Arnold is healthy, he is always cheerful.

6.55 When Lisa is dirty, she is always embarrassed.

6.56 When Lisa is clean, she is always careful not to step in the puddles.

Thus, interaction with adverbs of quantification is a property which seems unrelated to the distinction between total or partial properties.

Inherent Genericity

Chierchia (1995) attempts to show that all the six properties mentioned above can be deduced from the fact that i-level predicates are inherent generics. By this he means that i-level predicates have no natural non-generic uses. He further claims that the main characteristic of i-level predicates is that they ascribe tendentially permanent properties to their arguments, a

\[\text{6.46 can in fact have an existential reading, which corresponds to "they are closing down stores in the city center". But here \emph{closed} clearly functions as an s-level predicate.}\]
prominent property of all generics. Note in this regard that being reasonably healthy, sober, clean are tendentially permanent qualities of humans, while being sick, drunk or dirty tend to be short lived properties.

Conclusion

In the literature on the i-level/s-level distinction, total and partial predicates are both considered to be s-level predicates (cf. Milsark (1979), Carlson (1980), Kratzer (1988)), although it is almost always the partial predicates which are mentioned explicitly as examples. According to Chierchia (1995), the characteristic properties distinguishing i-level from s-level predicates are usually described by reference to syntactic environments in which one predicate type is acceptable and the other is not. When comparing total and partial predicates in these syntactic environments, the partial predicates fit in well, while the total predicates require unusual circumstances to be admissible. To be more specific, special contextual assumptions for total predicates are needed with four of the characteristics mentioned by Chierchia (1995). When it comes to bare plurals, the total predicates do not conform to the pattern sketched by Chierchia (1995) at all. Only with regard to one characteristic environment, adverbs of quantification, do the i-level and s-level perform equally. Thus we can conclude that partial predicates are more easily interpreted as s-level predicates than total predicates are.

Also, it seems that the i-level/s-level distinction is more context dependent and less lexical than the criteria in Chierchia (1995) predict. The s-level interpretation is possible for both total and partial predicates, but for total predicates this interpretation requires unusual circumstances. Perhaps we could say that total predicates are interpreted as i-level by default, while partial predicates are s-level by default. We leave it to further research to give an account of the i-level/s-level distinction which incorporates pragmatics to a greater degree.

For our purposes, however, the most important observation is that Kang was too fast in judging the i-level/s-level distinction irrelevant as an explanation factor for total and partial predicates. The discussion above has shown that total and partial predicates do in fact behave differently with regard to the s-level/i-level distinction.

6.3 Evaluation of Cruse’s account of gradable complementaries

In this section we will suggest that scalar properties of gradable complementaries are not strictly lexical as Cruse (1980) claims, but context dependent. First we will draw attention to the context dependence of desirability, the property singled out by Cruse as the most important in determining whether
a term denotes an end-point on a scale or not. Second, we will present a suggestion made in Talmi (2000), namely that other lexical items may influence the scalar properties of predicates.

6.3.1 Desirability is context dependent

We saw in section 3.2.3 that Cruse (1980) regards desirability as the underlying factor which distinguishes gradable complementaries from antonyms. Pairs of gradable complementaries denote scales of demerit, while antonym pairs represent scales of merit or neutrality. For instance, clean:dirty, a complementary pair, describes a scale of the undesirable property "dirtiness", and long:short, an antonym pair, describes a scale of the neutral property "length". The word clean thus denotes absence of dirt, while long denotes presence of length.

On the scales for gradable complementaries, the Q-negative term\(^5\), e.g. clean, represents an end-point, while the scale continues infinitely in the other direction, towards dirty. Thus sentences such as 6.57 and 6.58 describe successive stages in the approach to the end point, 6.59.

6.57 It's half-clean.

6.58 It's almost clean.

6.59 It's clean.

Cruse (1980) describes desirability as a lexical property of a predicate. This makes the right prediction in most cases, but since desirability is dependent on the assessment of the speaker in specific situations, it is, in the last resort, a context dependent property. In other words, the end-point of a scale depends on the preferences of agents in specific situations. Normally, we want things to be clean, dry, straight and smooth. But if we for some reason want to make something dirty, wet, bent or rough, this term will become the end-point.

As an illustration of this point, imagine the following scenario: An artist has just finished a day's work on a clay sculpture in his studio. He knows that in order to retain the plasticity of the clay until the day after, the sculpture must be kept moist. The artist calls his assistant and asks him to wet a larger number of towels to cover the sculpture with. In this situation the goal, and thus the end-point, of the action the assistant performs is to get the towels wet. It would therefore be quite appropriate for the assistant, seeing the artist getting impatient, to utter 6.60 as a confirmation that he is nearly finished.

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\(^5\)Recall from section 3.2.3 that the Q-negative term is the element in a pair which denotes less of the scaled property.
6.60 The towels are almost wet.

With some gradable complementaries such as clean:dirty, healthy:sick, safe:dangerous, it is difficult to think of situations where the latter term would mark the end-point of the scale. With others, such as closed:open, dry:wet, straight:bent, however, the undesirable predisposition of the latter term is not as strong. 6

6.3.2 Talmy (2000): Scalar properties are influenced by other lexical items

We have just noted that one problem with Cruse’s account is that desirability is context dependent. Another problem, which will appear when comparing Cruse’s account with the one of Talmy (2000), is that desirability is not the only factor which determines whether a predicate is seen as an end-point on a scale. Under the influence of other lexical items, even a predicate denoting an undesirable property may change its scalar status and come to denote an end-point.

Talmy (2000) notes that the members of certain adjective pairs, like well:sick, behave contrarily when associated with grammatical forms which specify degree, such as slightly, almost. Also, the members give rise to different readings of certain temporal forms such as in five days. In this respect, the adjective pairs parallel the behaviour of certain pairs of spatial expressions, like at the border/past the border. The example sentences 6.61-6.64 in this section are due to Talmy (2000, pp.64-66).

6.61 He is slightly sick/past the border.

6.62 ?He is slightly well/at the border.

6.63 He is almost well/at the border.

6.64 ?He is almost sick/past the border.

6.65 He got well/to the border in five days (i.e. in the course of five days).

6.66 He got sick/past the border in five days (i.e. after five days had elapsed).

To account for this behaviour of certain opposing adjectives, Talmy (2000) claims that it is necessary to presuppose a directed axis of which each adjective labels a different portion. In the case of well:sick, we have an axis of health. Well refers to the end-point while sick denotes the remainder of the line. The position and extension of adjectives in relation to the axis, is termed their lexical axially.

6 As pointed out in section 3.2.3, Cruse (1980) mentions in passing that some gradable complementary pairs are more descriptive than evaluative.
Grammatical forms, such as *slightly:almost* and *in five days* also have axial properties. Sometimes, the axially of lexical items function in concordance with the axially of grammatical forms as in 6.61 and 6.63. This concordance is schematized in figure 6.1 below.

![Diagram of lexical axially](image)

*Figure 6.1: Lexical axially.*

Other times the lexical axially of a word and a grammatical form conflicts. Such conflict may result in an unacceptable sentence, as in 6.62 and 6.64, but it may also lead to a resolution, where the lexical item shifts its axially. Talmy illustrates a lexical shifting process with the example 6.67 below.

6.67 *After exposure to the virus, he felt worse and worse and he was almost sick at one point.*

In 6.67 the axially of *almost* conflicts with the axially of *sick*. *Sick* usually denotes the extended part of an axis that leads away from the point *healthy*, but the conflict with the grammatical form triggers two operations. *Sick* **punctifies**, i.e. comes to denote a point, and **terminalizes**, i.e. changes the direction of the axis so that it leads towards *sick*. This change of direction means that instead of an axis of health, we now have an axis of "feeling poorly".

Talmy (2000) thus shows that although it is a lexical property of gradable complementaries that they have a specific relation to a scale, this property

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7Talmy (2000) does not specify what he means by "grammatical form".

99
is defeasible, and can be overridden when the word is incorporated into a sentence with conflicting scalar properties.

6.3.3 Implications for representativity

Kang demonstrates that partial predicates give rise to weak interpretations. In section 3.3 we saw that Kang's total and partial adjectives is probably the same class as Cruse's gradable complementaries. Also, we noted that an adjective is total (in the sense of Kang (1994, 1996)) when it represents an end-point on a scale (in the sense of Cruse (1980)).

In this section we have seen that whether a predicate represents the end-point on a scale or not is context dependent in at least two ways: First, end-points are usually desirable properties. But what is desirable depends on the situation. Second, even when a predicate denotes an undesirable property, it can come to represent an end-point when modified by certain adverbs such as *almost, nearly or half*. We will call adverbs which reverse the axiability of partial predicates total adverbs.

To conclude, adjectives belonging to the class of total and partial predicates seem to have a default status as end-point or non-end-point elements. This status has proved to be defeasible since it depends on desirability which is a context dependent factor, and since it may be influenced by the properties of other lexical items.

When giving an account of weak readings of definite noun phrases, or representativity as we call it, we will need to keep this context dependence in mind.

6.4 Prerequisites for the representative interpretation

In section 6.2 we showed that the criteria presented in Kang (1994, 1996) to account for the weak interpretation of definite plural noun phrases are insufficient. In the subsequent section, 6.3, we learned that we cannot rely solely on lexical information in an account of weak interpretations.

In this section we attempt to give a better account of weak interpretations of definite plural noun phrases, or representativity as we have termed it. To give a detailed description of representativity, it seems necessary to divide the phenomenon into subtypes. In this section we will describe three types of representativity which involve different semantic and contextual factors. The description is made in terms of prerequisites which must be fulfilled for the representative interpretation to be possible. Note that the prerequisites are intended to be minimal conditions, i.e. conditions primarily aimed at excluding sentences which cannot have a representative interpretation. This means that we will include all cases which potentially
may trigger a representative interpretation, also the ones that are seldom used with this interpretation in mind.

It is important to keep in mind that the conditions listed here do not go down to the level of sub-entailments in the sense of Dowty (1987). This means that we will not particularize the entailments on individuals which different predicates or predicate classes have. For example, our description will not specify that *build a house* requires that someone in the agent noun phrase denotation build the roof, the walls, the foundation etc. All our conditions do is enumerate lexical and contextual factors which make possible an existential distribution of the property specified in the predicate.

### 6.4.1 Conditions common to all subtypes of representativity

In the present account we will require the noun phrase receiving the representative interpretation to be definite and plural. We will consider other syntactic constructions which may give rise to the representative interpretation in section 8.2.

In our evaluation of the semantic criteria presented in Kang’s works, we confirmed Kang’s observation that a predicate must be s-level in order to trigger the representative interpretation. Typically, this s-level prerequisite serves to exclude sentences with verbs such as *love, idolize, fear, be a lawyer, be eight years old* etc. In section 6.2.2 we noted, however, that the i-level/s-level distinction is not purely lexical since it is affected by contextual factors. Consequently, we need access to the linguistic context when determining whether a predicate is s-level or not. Moreover, it is important to keep in mind that the s-level requirement does not exclude all stative predicates. S-level statives like *dirty, dangerous, sick* give rise to type 3 representative interpretations.

When we speak about the arguments of a predicate with regard to a representative interpretation, it is the *semantic* arguments we refer to. It might be tempting to call type 1 representativity a representative interpretation of the subject denotation and type 2 representativity a representative interpretation of the object denotation. Considering passive sentences such as 6.68 and 6.69, shows that this is not the case.

In 6.68, we clearly have a type 1 representative reading of the object denotation, while in 6.69 we have a type 2 representative reading of the subject denotation.

6.68 *The bridge was built by the Romans.*

6.69 *The soldiers were spotted by the colonel.*

We must thus acknowledge that we are dealing with semantic, not syntactic arguments when making generalizations about the three types of representative interpretations.
6.4.2 Representativity type 1

6.70 The Romans built this bridge.

6.71 The children finished the pizza.

6.72 The extremists killed the child.

In examples like 6.70, 6.71, and 6.72, the representative interpretation is due to the fact that the focus is on the result of the action denoted by the predicate, not on the process it describes.\(^8\) What we care about is that the bridge is built, the pizza eaten and the child dead. Thus there is, strictly speaking, no need for more active participants than the ones required to bring about the result.

Perhaps we do not know exactly which Roman, child or extremist who carried out the result. Perhaps we do not want to bother with details about the exact active participants. What we do know and do want to convey is that the result was brought about by someone who is a Roman, child or extremist.

Now compare the above sentences with 6.73 and 6.74.

6.73 The children are eating pizza.

6.74 The girls are jogging.

Here the focus is on the activity itself, not its consequences. And the activity is so closely linked to the individuals that perform it that it cannot be detached from them. Thus there is nothing tangible, no result or achievement, that we can attribute to a plurality.

Focus on a result seems to be the general feature which instances of type 1 representativity have in common. This observation is too broad to serve as an explanation factor for type 1 representativity, however. We need to look for the underlying semantic features which enable this focus on a result. A specification of such semantic features can serve as a point of departure for a more formal account of type 1 representativity.

Semantic factors involved in type 1 representativity

In this section we will try to determine the minimal prerequisites for type 1 representativity. A few examples of constructions we want to avoid or include will give us a better foundation for the discussion to come.

6.75-6.78 all disallow a representative reading.

6.75 The girls like the boys.

\(^8\)In this section I will use representativity and type 1 representativity to mean the same.
6.76 The graduates drank champagne.

6.77 The Indian delegates greeted each other.

6.78 The sect members killed themselves.

6.75 and 6.76 lack an external result or achievement that can be attributed to a group. The verbs greet and kill in the two subsequent sentences normally give rise to a representative interpretation (cf. The Indian delegates greeted the president or The extremists killed the child), but the terms themselves and each other seem to prohibit this interpretation.

6.79-6.83, on the other hand, all permit a representative reading.

6.79 The graduates drank the champagne.

6.80 The soldiers spotted the mine.

6.81 The children built a raft.

6.82 The aunts gave Annabel a gift.

6.83 The ministers rewarded themselves.

In particular, note that in 6.83, the word themselves does not seem to have the same effect as in 6.78. It is possible that some of the ministers rewarded the whole class of ministers, e.g. by voting in favour of a bill which gave all the ministers some benefit.

It may seem that situation types in the sense of Vendler (1967) provide some explanation for why certain constructions permit a representative interpretation and others do not. Vendler (1967) identified four situation types: states, activities, accomplishments and achievements, and claimed that it is the verb or verb phrase which determine the situation type of a sentence. Verbs such as want, love, believe describe states, while run, swim, drive are activity verbs. Accomplishments are exemplified by verb phrases such as paint a picture, deliver a sermon, walk to school and achievements by find, start, win the race, spot someone.

In characterizing type 1 representativity, it may appear that we can exclude states, such as 6.75 and activities like for instance 6.76. Contrarily, accomplishments like 6.79 and 6.81, and achievements like 6.80 and 6.82 give rise to the type 1 representative interpretation.

According to Smith (1991), the feature which distinguishes states and activities on the one hand from accomplishments and achievements on the other is telicity. Smith defines a telic situation as one that is directed towards a goal and has a natural point of completion. She mentions 6.84 and 6.85 as examples of atelic and telic situations respectively.
6.84 He played sonatas.

6.85 He played a sonata.

Krifka (1992) points out that it is not situations that should be characterized as telic, but rather the way we speak about them. For example, 6.86 and 6.87, where the former is telic and the latter is not, may be used to characterize the same situation.

6.86 Lars ate three apples.

6.87 Lars ate apples.

Consequently I will speak of telic sentences and telic verb phrases, not telic situations.

Is telicity the factor which explains why certain verb phrases permit a representative reading? A look at the examples below demonstrate that the answer is no.

6.88 The children walked to school.

6.89 The balloons popped.

6.90 The students tried the telescope.

6.91 The scouts saw the deer.

6.88 and 6.89 are telic sentences, but they do not permit a representative interpretation: It is not possible that some children or balloons walk to school or pop on "behalf of" the others. Walking and popping are properties which are closely linked to each individual and thus cannot be attributed to a group. 6.90 and 6.91 on the other hand, are atelic sentences, but still allow a representative interpretation. Even though only some of the students tried the telescope or some of the scouts saw the deer, this action can be ascribed to the whole group.

Telicity may explain many typical examples of sentences which allow or disallow representative readings, but it is easy to find examples which are not accounted for by this feature. Consequently, situation types which are distinguished by telicity do not coincide with allowance or disallowance of the representative interpretation.

What we need to look for is a semantic feature which includes certain activity sentences, such as 6.90 and 6.91, but excludes other activities, such as 6.76. The feature must also include accomplishments like 6.79 and achievements like 6.80, but exclude the accomplishment sentence in 6.88 and the achievement sentence in 6.89.
A semantic notion which yields the right division is **M-transitivity** in the sense of Van Valin and LaPolla (1997). In order to recognize the explanatory power of M-transitivity, we must get familiar with the notion of **macroroles**.

**Semantic macroroles**

Semantic macroroles are generalized thematic roles. There are two such roles, **actor** and **undergoer**, which both subsume under them a number of thematic roles. When a verb takes two macroroles it is **M-transitive**, and when it takes only one macrorole it is **M-intransitive**. M-transitivity is contrasted with S-transitivity, a notion which concerns the number of syntactic arguments.

The actor is the subject argument in active sentences in English (Van Valin and LaPolla, 1997, p. 141). Thus, the argument *Lisa* is actor in all the three sentences below, although it has the thematic role AGENT in 6.92, EXPERIENCER in 6.93 and POSSESSOR in 6.94. The actor need not be animate. In 6.95, for example, *the plague* is actor.

6.92 *Lisa painted the kitchen.*

6.93 *Lisa loves Frank.*

6.94 *Lisa owns a flat.*

6.95 *The plague eradicated the village population.*

The undergoer is the direct object in an active English sentence. As an illustration of the variety thematic roles which can be held by the undergoer, consider the examples below. The undergoer, *prisoner*, is THEME in 6.96, PATIENT in 6.97, RECIPIENT in 6.98.

6.96 *The policeman moved the prisoner to another jail.*

6.97 *The cell mates killed the prisoner.*

6.98 *The woman gave the prisoner a present.*

The macrorole assignment for arguments of M-intransitive verbs, i.e., verbs which assign only one macrorole, is determined as follows: In activity sentences the macrorole is actor, while in all other sentences (state, achievement, accomplishment) the macrorole is undergoer.\(^9\)\(^10\)\(^11\)

\(^9\)There are many different classifications of thematic roles in the linguistics literature. Here we use the thematic roles framework employed by Van Valin and LaPolla (1997).

\(^10\)Van Valin and LaPolla (1997) uses basically the same situation types as Vendler (1967).

\(^11\)Dummy arguments such as *it* in *it rains* it not assigned any macrorole.
A verb never distributes more than two macroroles. When determining which arguments should receive which roles, a thematic role hierarchy for each macrorole is consulted. In the actor hierarchy, the thematic role AGENT is at the top, with PERCEIVER, INSTRUMENT, and RECIPIENT beneath it. For undergoer, PATIENT is ranked the highest, followed by RECIPIENT, THEME, LOCATION. In 6.99, for instance, John is AGENT and thus receives the macrorole actor. There are two possible undergoer arguments, the PATIENT the car and the LOCATION the petrol station. Since PATIENT has a higher ranking in the undergoer hierarchy than LOCATION, the car is assigned this macrorole.

6.99 John washed the car at the petrol station.

What is most relevant to our purposes, however, is that not every sentence with two arguments is M-transitive (i.e. has two macroroles). More specifically, there are certain requirements on the argument which is to receive the macrorole undergoer:

undergoer arguments refer to the participants which are viewed as primarily affected in the state of affairs, accordingly, undergoers must be referential. (Van Valin and LaPolla, 1997, p. 149)

As far as M-transitivity is concerned, Van Valin and LaPolla (1997) are particularly concerned with the situation type activity. They claim that the second argument of an activity predicate is usually a non-referential, or inherent, argument which is defined as

an argument which expresses an intrinsic facet of the meaning of the verb and does not refer specifically to any participants in an event denoted by the verb; it serves to characterize the nature of the action rather than to refer to any of the participants. (Van Valin and LaPolla, 1997, p. 123)

Since the second argument in activity verbs is not interpreted as having a specific discourse referent, it cannot take a macrorole. To illustrate the difference between referential and non-referential arguments, Van Valin and LaPolla (1997) contrast the two following examples: 6.100 is an activity sentence where the second argument of ate is non-referential, and 6.101 is an accomplishment where both arguments of ate are referential. Consequently, spaghetti has no macrorole, while the spaghetti is undergoer. This example shows that M-transitivity is not a lexical property of a verb, but a property of of a specific instance of a verb as it is used in a sentence.

6.100 Anna ate spaghetti.

6.101 Anna ate the spaghetti.
When the second argument of an activity verb is referential, however, it receives the undergoer role. According to Van Valin and LaPolla (1997), referential second arguments are common with activity verbs of directed perception and use. For instance, in 6.102 the car is undergoer.

6.102 John used the car.

What determines whether an argument is referential or not? Van Valin and LaPolla (1997) are not completely clear on this point, but they do point out that bare plurals and mass nouns are non-referential.\textsuperscript{12}

Oblique arguments, i.e. arguments that are adpositionally marked, are also mentioned as arguments which are not normally assigned a macrorole. According to Van Valin and LaPolla (1997), a typical case of verbs with oblique second arguments in English, is verbs of location and change of location. 6.103 is given as an example of a sentence with an oblique second argument (Van Valin and LaPolla, 1997, p.153). Note that 6.103 is not an activity sentence, but rather an achievement.

6.103 The girl ran into the room.

To summarize, a verb with two syntactic arguments is M-transitive only if the second argument has a non-oblique, specific referent.

**M-transitivity and representativity**

Now we have the necessary background to consider the relation between M-transitivity and representativity. Let us suppose that only sentences with M-transitive verbs can give rise to a type 1 representative reading.

The M-transitivity hypothesis explains why 6.76, repeated here as 6.104, cannot have a representative interpretation, while this interpretation is available for 6.79, repeated here as 6.105.

6.104 The graduates drank champagne.

6.105 The graduates drank the champagne.

So far, however, we have not explained any more than the telicity criterion can do. Let us look at the cases the telicity criterion cannot handle, namely 6.88-6.91, repeated here as 6.106-6.109.

6.106 The children walked to school.

\textsuperscript{12}It seems that being referential in the sense of Van Valin and LaPolla (1997) amounts to the same as not having "cumulative reference" in Quine (1960). Spaghetti and apples refer cumulatively since whenever there are two entities that these predicates apply to, the predicate applies to their collection as well. This is not necessarily the case with the spaghetti or an apple.
6.107 The balloons popped.

6.108 The students tried the telescope.

6.109 The scouts saw the deer.

Our new explanation factor, M-transitivity, predicts that the representative interpretation is prohibited in the telic sentences 6.106 and 6.107, but allowed in the atelic sentences 6.108 and 6.109: Walked to school in 6.106 has an oblique second argument and is thus M-intransitive. Having only one syntactic argument, the verb in 6.107 is also M-intransitive. Taking referential to mean "not a bare plural or mass noun", the telescope in 6.108 is referential, and consequently try is M-transitive in this sentence. Also, 6.108 probably falls into the category of activity verbs of use, which are claimed by Van Valin and LaPolla to generally assign two macroroles. Similarly, saw is also M-transitive in 6.109, and moreover it is a perception verb, a group of verbs which is normally supposed to assign two macroroles according to Van Valin and LaPolla.

Note that the M-transitivity criterion deals equally well with syntactically ditransitive verbs as with transitive verbs. In 6.82, repeated here as 6.110, the aunts is actor and Annabel is undergoer, and a weak reading of the actor argument is thus allowed.

6.110 The aunts gave Annabel a gift.

It seems that regarding type 1 representativity as a weak interpretation of the actor argument of an M-transitive verb, generally predicts which sentences that allow the representative interpretation.

Why is M-transitivity so successful in picking out sentences which can have a representative interpretation? It seems that the success is due to its ability to account for our underlying criteria, namely the focus on a result. Whenever a verb has a referential second argument (i.e. is M-transitive), it gives us something specific, and external to the actor, which we can focus on or attribute to a group. This something is usually a physical object, for instance a sculpture as in 6.111, but sometimes it is a less tangible result, like an agreement in 6.112.

6.111 The artists made an ice sculpture.

6.112 The farmers agreed to the conditions.

In an account of type 1 representativity, we must, however, add a few restrictions in addition to the M-transitivity requirement. These are concerned with reciprocity, reflexivity and the scope of the undergoer argument.

6.113 The Indian delegates greeted each other.
We claimed above that 6.77, repeated here as 6.113, cannot have a representative interpretation. The reason seems to be that reciprocity implies a relationship between the individual members of the actor phrase denotation. The predicate must necessarily distribute down to pairs of individual delegates. As we saw in section 5.3, when comparing cumulativity and representativity, sentences with representative interpretations are not sensitive to relationships within the plural noun phrase denotation. For example, we saw that the representative interpretation of 6.114 below is not concerned with which individuals hit which targets, or which individuals hit targets at all. It only specifies that the hittings can be attributed to the soldiers as a group. The representative interpretation is possible precisely because the plurality is regarded as a whole and there is no focus on its individual members. Since reciprocal sentences are necessarily concerned with the internal relationships in the plural noun phrase denotation, we must add a non-reciprocal prerequisite for the type 1 representative reading.

6.114 *The soldiers hit the targets.*

6.115 *The sect members killed themselves.*

6.116 *The ministers rewarded themselves.*

Reflexive sentences is an interesting case. 6.78, repeated here as 6.115, seems to rule out a representative reading, while 6.83, repeated here as 6.116, could describe a situation where some minister(s) rewarded himself (themselves) and the other ministers, for instance by voting for a law that gives all ministers a tax reduction. This difference in behaviour is due to the fact that the plural noun phrases, *the sect members* and *the ministers*, are both actor and undergoer in 6.115 and 6.116. Consequently, it is not enough that the verb allows a weak interpretation of its actor argument. It must also permit this interpretation of its undergoer argument, and it seems that *reward*, but not *kill* admits this. In section 6.4.3 we will discuss conditions for the weak reading of undergoer arguments.

6.117 *The scientists in the genome lab found a solution.*

6.117 has a representative interpretation, describing a situation where there is a solution which some scientist(s) in the genome lab found, and this solution is attributed to the whole group of scientists in the lab. On this interpretation *solution* has wide scope. On the interpretation where *a solution* has narrow scope, i.e. where there is one solution for each scientist in the lab, the representative interpretation is impossible. This seems to hold generally for all sentences with a scope effect. Consequently, we must introduce a requirement that the undergoer argument has wide scope.
Negation

When a sentence which licenses a type 1 representative interpretation is negated, the representative interpretation no longer applies. 6.118, for example, requires the strong interpretation, i.e. that none of the children built the raft.

6.118 The children did not build the raft.

Prerequisites

Let us summarize the minimal prerequisites for type 1 representativity. The agent argument in a sentence can receive the type 1 representative interpretation if:

- The main verb is M-transitive, i.e. it takes an agent argument and an undergoer argument.
- The main verb is not negated.
- It follows from the discourse context that the main verb is s-level.\(^1\)
- The sentence is not reciprocal, i.e. the undergoer argument is not the term each other.
- If the sentence is reflexive, a weak interpretation of the undergoer argument must be allowed (cf. section 6.4.3).
- The undergoer argument has wide scope.

What the criteria do not account for

M-intransitive verbs can sometimes trigger the representative interpretation when they direct the focus on a result instead of the agent argument. 6.119 and 6.120 are typical examples of such sentences. In some situations, 6.121 can also have a representative interpretation. The situations that allow the representative interpretation of 6.121 are those where the focus is on the fact that there was noise during the lesson (a result) rather than on the activity of talking.

6.119 The farmers demonstrated.

6.120 The lawyers objected.

6.121 The students talked during the lesson.

\(^1\) We saw in section 6.2.2 that s-level/\(\bar{s}\)-level status is context dependent.
Why can the sentences above, but not 6.122 have a representative reading?

6.122 *The students ate.*

All the above sentences describe activities. Still, *demonstrate* and *object* focus more strongly on a result than *eat*. An indication of this is that 6.123, 6.124 and 6.125 can describe what happened in 6.119, 6.120 and 6.121 respectively, while 6.126 seems odd as a description of 6.122.

6.123 *There was a demonstration.*

6.124 *There was an objection.*

6.125 *There was noise during the lesson.*

6.126 *There was an eating/a dinner.*

Certain resultative adjectives such as *be victorious, be the first on the moon* can also trigger the representative reading. 6.127, for example, is true in a situation where some American was first on the moon.

6.127 *The Americans were the first on the moon.*

To summarize, the representative reading is facilitated by a noun and predicate combination which imply a tangible result of the predicate eventuality. This result will often be realized in an undergoer argument, but in some cases it is omitted. The latter cases are not accounted for by the prerequisites for type 1 representativity spelled out above.

6.4.3 Representativity type 2

6.128 *The girl petted the rabbits.*

6.129 *The journalist asked the football players a question.*

6.130 *The colonel spotted the enemy soldiers.*

6.131 *Anna handed the baby to the aunts.*

6.132 *The monster hid behind the garage cans.*

14According to Van Valin and La Polla's criteria *object* is also an activity verb.
We have seen that type 1 representativity is possible in situations where we have a result which is external to the actor and which therefore can be attributed to a larger group. Type 2 representativity is exemplified by the sentences above. What semantic factors do these sentences have in common?

Type 2 representativity is a weak interpretation of either the undergoer argument in M-transitive sentences (cf. 6.128, 6.129 and 6.130) or a non-macrorole argument in a prepositional phrase (cf. 6.131 and 6.132).

Since the undergoer and non-macrorole holders are passive participants, there is no external result that they have brought forth. Thus representativity is not due to something external which can be attributed to the undergoer or non-role denotation.

It seems that the representative interpretation of the plural noun phrases in the sentences above is possible because the pluralities in question are viewed as a mass where individual idiosyncratic properties are erased. In other words, the individuals are salient only as representatives of the plurality denoted by the noun phrase, not as individuals in their own right. Consequently, they are interchangeable. For example, what matters on the representative interpretation of 6.128 is that the girl is in contact with the rabbits, not which ones or how many. Surely she petted some specific rabbit(s), but it could just as well have been another. 6.129 describes an event with a journalist on the one side and a group of football players on the other. The internal structure of the latter group, or which ones were present to hear or answer the question, is not regarded as relevant. In 6.131, there must be a specific aunt who was handed the baby, but on the representative interpretation all that matters is that the baby was moved from Anna to the group of aunts. The exact placement of the baby within this group is not in focus.

Semantic features involved in type 2 representativity

We have seen that there are two different semantic arguments which can receive the type 2 representative interpretation: undergoer arguments and non-macrorole arguments. Since the prerequisites for the type 2 are different for undergoer and non-macrorole arguments, the two cases will be treated separately.

The representative interpretation of undergoer arguments.

Let us consider a few M-transitive sentences where a type 2 representative reading is disallowed.

6.133 Magnus lost the marbles in the sand.

6.134 The workers moved the hay balls.

6.135 The government evicted the tenants.
6.136 The janitor washed the floors.

In 6.133, 6.134, 6.135 and 6.136, we may allow that a few exceptional marbles, workers, tenants or floors are not lost, moved, evicted or washed, but a representative interpretation is ruled out. Why do these undergoer arguments behave differently from the ones in 6.128-6.132 above?

It seems that only some verbs which allow their undergoer to be viewed as a mass of indistinguishable individuals. For example, if the verb implies that there is movement, as in 6.133 or 6.134, the plurality must be moved as a group. If it is separated, it can no longer be viewed as a mass. Thus it is required that all the marbles are lost or all the hay balls are moved. More generally, it seems that verbs which affect their undergoer arguments, make it difficult to view the plurality as a mass. In 6.135 and 6.136, the undergoers are clearly affected by the actors’ performance. We can therefore introduce a non-affected undergoer prerequisite for the type 2 representative interpretation.

There is, however, one exception to the non-affect criterion: cases where the actor gives something to the undergoer also exhibit type 2 representativity. In 6.137, 6.138 and 6.139 the type 2 representative reading is available.

6.137 The teacher gave the pupils the key to the classroom.

6.138 The old lady fed the doves.

6.139 Simon helped the children to get across the river.

Thus it appears that the type 2 representative reading is possible with two groups of verbs: Those which are non-affecting on the undergoer like see, detect, notice, smell, ask, touch, pet, and those which describe an action of giving something to the undergoer, like feed, lend, reward, pay, give, advise, help. With the latter verbs, the undergoer argument has the thematic role RECIPIENT.

Note that the type 1 representative interpretation of the actor argument is possible with all the verbs that trigger the type 2 representative interpretation.

---

15 It may seem odd to use the term "undergoer" for an entity which is unaffected by the predicate denotation. Van Valin and LaPolla (1997) do, however, use the macrorole undergoer for these cases as well.

16 Levin (1993) names the following four meaning components as important in distinguishing different classes of transitive verbs: cause, change, contact, motion. According to Levin (1993) cut is a verb of cause, change, contact and motion, break is a verb of cause and change, hit is a verb of contact and motion, while touch is a verb of contact. It seems that the semantic component which rules out a representative reading is change. In our case change of state, change of location, change of ownership are all relevant changes.

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The representative interpretation of non-macrorole arguments.

It appears that the representative reading is possible with all prepositional adjuncts of the verb. As 6.140 and 6.141 illustrate, it does not matter whether the verb is M-transitive or M-intransitive. More generally, the representative interpretation seems independent of verbal properties with non-macrorole arguments.

6.140 *The child made a drawing with the crayons.*

6.141 *Patrick sat down on the freshly painted boards.*

For noun phrases within prepositional adjuncts of noun phrases, such as *the glasses* in 6.142 (taken to mean that Maria spilled the wine that was in the glasses), the representative reading is also allowed. We will, however, not pursue this case further.

6.142 *Maria spilled the wine in the glasses.*

Negation

As with type 1 representative interpretations, the type 2 representative interpretation is disallowed when the sentence is negated. 6.143 requires the strong interpretation, i.e. that the girl did not pet any of the rabbits, and 6.144 that no crayon was used in a drawing by the child.

6.143 *The girl did not pet the rabbits.*

6.144 *The child did not make a drawing with the crayons.*

Prerequisites

The undergoer argument in a sentence can receive the type 2 representative interpretation if:

- The main verb is M-transitive, i.e. takes an actor and an undergoer argument.
- The main verb is not negated.
- It follows from the discourse context that the verb is s-level.
- The predicate is non-affecting on the undergoer argument or it refers to an action of giving something to the undergoer.

A non-macrorole argument in a sentence can receive the type 2 representative interpretation if is modified by a preposition and forms part of a prepositional phrase which serves as an adjunct to the verb.
6.4.4 Representativity type 3

Desirability

6.145 The glasses are dirty.

6.146 The towels are wet.

6.145 and 6.146 above are typical examples of sentences which may receive the type 3 representative interpretation.

How do we explain that these two sentences, but not normally 6.147 or 6.148, have a representative interpretation?

6.147 The glasses are clean.

6.148 The towels are dry.

Following the discussion in chapter 3 and section 6.3, we will focus on the fact that dirty and wet describe properties which are normally regarded as desirable, while clean and dry are usually viewed as undesirable. Cruse (1980) suggests that pairs of gradable complementaries such as clean:dirty and dry:wet can be described as scales of undesirable properties, in this case scales of dirtiness and bend. The terms clean and dry denote absence of the scaled properties, i.e. absence of dirtiness or wetness, while the terms dirty and wet denote presence of the same property. From this theory we can extract the following explanation for why dirty and wet, but not clean and dry give rise to the representative interpretation: For there to be presence of an undesirable property, e.g. dirtiness, within a group, it is enough that some individual has the undesirable property. Contrarily, absence of an undesirable property within a group, requires that no individual has the property, e.g. that every individual is clean.

As we saw in section 6.3.1, desirability is not just a lexical property of predicates, but also dependent on contextual factors. This context dependence must be taken into account in order to deal with examples such as 6.149 and 6.150 below.

6.149 The bars in the fence are bent, so we need to call a blacksmith to fix them.

6.150 The bars in the fence are bent, just like we wanted them.

In 6.149 representativity is possible, i.e. only some of the bars need to be bent for the sentence to pass as true. In 6.150, however, it seems that all the bars need to be bent. The difference between the two sentences is that in 6.149 bent bars are undesirable since it conflicts with a goal or a standard of the speaker. In 6.150, on the other hand, the fact that the bars are bent is in accordance with the goals of the speaker. This example shows
that only predicates denoting properties which are not in accordance with the goals of the speaker can trigger representative readings.

**Reversibility**

6.151 *The dogs are dead.*

The desirability explanation does not cover all cases, however. *Dead* is surely a default undesirable property, but 6.151 still does not have a representative interpretation. I will suggest that representativity does not only require undesirability, but also a potential for improvement. 6.145 and 6.146 both describe scenarios in which the motivation for demanding improvement is present, i.e. situations where a change from one state to another is both desired and possible. In 6.147 and 6.148 change is not desirable (the glasses and the towels have satisfactory values on their respective scales of demerit), while in 6.151 change is probably desirable, but not possible, since death is irreversible.\(^{17}\) Thus what 6.147, 6.148 and 6.151 have in common is that they describe situations where there is no point in asking for improvement.

Other examples of predicates prohibiting a representative interpretation because they are both undesirable and irreversible are *destroyed, ruined, raped, wrecked, crippled.*

**The i-level/s-level distinction**

6.152 *The boys are eight years old.*

6.153 *The women are doctors.*

It is a general requirement for all types of representative interpretations that the triggering predicate be s-level. When considering the type 3 representative reading, it is important to keep in mind that sentences with attributal predicates such as 6.152 or identificational predicates like 6.153 are excluded. Both these predicate types are i-level.

**Total adverbs**

Recall from section 6.3.2 the so-called total adverbs, *nearly, almost, half,* which according to Talmi (2000) trigger a change in the lexical axiality of certain predicates. When modified by such total adverbs, partial adjectival predicates such as *bent, wet, dirty* appear to lose their ability to trigger the representative reading. 6.154, for instance, seems to imply that the towels are moving towards the end-point, wet. Wet may represent an end-point in situations where someone has set about making the towels wet and is almost

\(^{17}\)Note that *dead* is not mentioned as a partial predicate in Kang (1994, 1996). She seems to classify only gradable predicates as partial.
done with them all at the time of speaking. As an example of a situation
where this may be plausible, take the scenario sketched in section 6.3.1
where a sculptor asks his assistant to wet a large number of towels because
they are needed to cover a clay sculpture. Since wet comes to represent an
end-point, the representative interpretation, where it is sufficient that some
towel is nearly wet, does not seem to be available for 6.154. The same is the
case for 6.155.

6.154 The towels are nearly wet.

6.155 The bars are almost bent.

Adjectival and verbal predicates

6.156 The girl dirtied her clothes.

6.157 The janitor washed the floors.

Although the examples above, and most of the examples Kang uses,
have M-intransitive verbs, type 3 representativity is also possible with M-
transitive verbs. Type 3 representativity with M-transitive verbs seems to
be subject to the same undesirability requirement as type 3 representativ-
ity with M-intransitive verbs. For example, the representative reading is

There are, however, two differences between verbal and adjectival predi-
cates in the prerequisites for type 3 representativity.

First, it seems that reversibility is only relevant for adjectival predicates.
Adjectives denote states, and states can be changed. Verbal predicates de-
note events which, obviously, cannot be undone.

Second, modification by total adverbs does not change the availability of
the representative interpretation for verbal predicates. To see this, compare
6.154 and 6.155 above to 6.158 and 6.159. In 6.158 and 6.159 the represen-
tative interpretation is as available as it would have been without the
adverb.

6.158 The maid nearly wet the towels.

6.159 The smith almost bent the bars.

The reason for this difference between the adjectival and verbal predi-
cates appears to be that when the adjectival predicate is modified by a total
adverb, this creates an implication that the object in question is moving
on the scale, towards the property described by the adjective. When ver-
bal predicates are modified by these adverbs, there is no such implication.
Compare 6.154 and 6.158 for example. 6.154 implies that the towels are
moving on the scale from being dry to being wet, and that there is already
some presence of wetness in the plurality referred to as the towels. 6.158 on the other hand, means that the towels could have become wet, but that this did not happen. Thus the towels did not move on the scale from dry to wet, nor is there any implication that there is presence of wetness in the group of towels. Since 6.158 does not imply any movement on the scale from dry to wet, wet does not achieve the status as an end-point. Consequently, dry is still the end-point, and 6.158 still allows the representative interpretation. Similarly, in 6.159 it seems that the smith almost made a mistake bending the bars, but was fortunate enough to avoid it. Thus being bent is not an end-point, and the representative interpretation is available.

More on context dependence

That modification by an adverb can change the tendency of certain predicates to trigger the representative interpretation is evidence that the source of the type 3 representative reading is not a purely lexical one. Additional evidence that type 3 representativity is not a pure lexical property, but is dependent upon contextual factors specific to the situation, can be seen by considering the following two situations.

A mother who has four children discovers one morning that two of them are feverish. She calls the company she works for and tells them that she needs to stay at home that day. She utters 6.160 as an explanation of why she cannot come to work. In this situation, she clearly speaks the truth.

6.160 The children are sick.

Consider now the same scenario, only this time the mother calls the school the children go to and says that they cannot come today. Again she utters 6.160 as an explanation. Since the possibility of school attendance is tied to each individual child, we cannot say that she spoke truthfully. What rules out the representative interpretation in this case, is that the focus is on consequences for each individual, not an external consequence which can be attributed to a group.

This example shows that other factors linked to the goal of the speaker, in this case who the property of the predicate has consequences for, also affect the possibility of a representative interpretation.

Negation

Sentences which license the type 3 representative interpretation on their unnegated form, require the strong interpretation in their negated form. 6.161, for instance, can only be interpreted to mean that all the clothes are not dirty.

6.161 The clothes are not dirty.
When a predicate in a sentence is negated in such a way that it comes to denote an undesirable property, however, the type 3 representative interpretation is possible (if the sentence satisfies the other criteria for this interpretation). A negated sentence which satisfies these criteria under normal circumstances, is 6.162, which may describe a situation where only some of the clothes are not clean.

6.162 The clothes are not clean.

Prerequisites

The undergoer argument in a sentence can receive the type 3 representative interpretation if:

- The main verb is either an M-intransitive verb which distributes an undergoer argument or an M-transitive verb.
- It can be inferred from the discourse context that
  - The main verb is s-level (either an s-level stative such as the adjective dirty or non-stative s-level predicate such as the verb dirty).
  - The verb phrase containing the main verb describes an undesirable property.
  - If the predicate is adjectival, the undesirable property is reversible.
- if the predicate is adjectival, it is not modified by total adverbs such as nearly, almost, half etc.
- The focus is not on describing the undergoer individuals themselves, but on the external consequences of the properties of individuals.

6.5 Conclusion

It seems that Kang is right in observing that l-level predicates cannot give rise to weak interpretations. The class of s-level predicates is a large one, however, and several types of s-level predicates are also unable to trigger weak interpretations. In particular, total predicates, which disallow weak interpretations, are claimed to be s-level predicates by Kang (1994) and the rest of the linguistic literature on the i-level/s-level distinction. We have seen that total and partial predicates do in fact behave differently with regard to this distinction. Total predicates have much in common with l-level predicates, while partial predicates are typical s-level predicates. Further, we have observed that a number of other s-level predicates also rule out the
weak interpretation. Kang attempts to account for these predicates as well, but we have seen that her semantic criteria fail to explain a number of cases.

An adjective is total when it represents an end-point on a scale in the sense if Cruse (1980). We have noted that whether an adjective represents an end-point is context dependent in two ways: First, end-points typically denote absence of an undesirable property. But whether the property an adjective refers to is desirable or not is context dependent. Second, as Talm (2000) observes, even when a predicate denotes presence of an undesirable property, it can come to represent an end-point when modified by total adverbs such as almost, nearly or half.

The main part of this chapter is an attempt to improve and extend Kang’s account of when s-level predicates can give rise to representative interpretations. In order to give a detailed description, it has been necessary to distinguish three types of representativity which involve different semantic and contextual factors. For each of these three types, we have presented prerequisites which must be fulfilled for the representative interpretation to be possible. Type 1 representativity is a weak interpretation the predicate’s actor argument, type 2 representativity concerns the undergoer or non-macrorole argument, and type 3 representativity pertains to the undergoer argument.

The type 1 representative interpretation is due to the fact that the focus in the sentence is on a result external to the active participants. Since the result is external to the individuals involved, it can be attributed to a larger group. This property of type 1 representativity can be accounted for by the semantic feature M-transitivity, i.e. that the relevant predicate assigns two macroroles.

In the type 2 representative interpretation, the weak reading is possible because the plurality in the noun phrase denotation is regarded as a mass of indistinguishable individuals. It is only verbs which are non-affecting on their undergoer arguments and verbs which have RECIPIENT undergoer arguments which license type 2 representativity.

Type 3 representativity can be explained by the fact that something is unsatisfactory as long as there is presence of an undesirable property. For something to be satisfactory, on the other hand, there must be a total absence of relevant undesirable properties. In addition to being undesirable, adjectival predicates must denote a reversible property which is not modified by total adverbs for the representative interpretation to be possible.
Chapter 7

Incorporating representativity into a formal framework

In section 7.1, the frameworks presented in chapter 4 are assessed with regard to representativity. We conclude that in order to account for the context dependent parts of representativity, we need a formalism which provides access to the common ground. For this reason, we opt for Discourse Representation Theory (DRT). The remainder of the chapter is an attempt to incorporate the three types of representativity into DRT. Section 7.2 contains a small fragment of English in the grammar employed by Kamp and Reyle (1993). In section 7.3 we attempt to operationalize the criteria specified in 6.4 to fit the DRT framework. A set of construction rules to account for the representative interpretation is presented in section 7.4, and these are followed by some examples of use in section 7.5.

7.1 Selecting a formal framework

Exact truth conditions for the representative interpretation

In this thesis we have seen two types of formal approaches to the representative interpretation.

One of these, represented by Landman (1989, 1996) and Schwarzschild (1996), explicitly refrains from providing specific truth conditions for the representative interpretation. They claim that representative interpretations, or rather the representative instances they are concerned with, have a non-logical aspect to them which cannot be formalized.

The other approach, represented by Link (1983), Dowty (1987), Kamp and Reyle (1993), Kang (1994, 1996) and Brisson (1998), claim that there are important truth conditional generalizations to make. They maintain that
we should attempt to specify exact truth conditions for individual predicates or classes of predicates (recall Link's T-operator, Dowty's sub-entailments, Kamp and Reyle's claim that the shared responsibility reading should have a separate treatment, Kang's lexical criteria for the weak reading and Brisson's ill-fitting covers).

This thesis is motivated by the second approach and represents an attempt to modify and extend the criteria proposed by Kang. As argued in section 5.2, we follow Link and Kang in specifying truth conditions for representativity, but not for other instances of nonmaximality.

Why are Landman and Schwarzschild so reluctant to give exact truth conditions for the representative interpretation? A possible clue in this matter is that they are concerned with the "team credit" interpretation in the sense of Lasersohn (1988). Thus they claim that it is necessary to establish that the members of the plural noun phrase denotation function as a team before weaker truth conditions can be assigned. And since there is no systematic way of determining whether the members function as a team or not, we should refrain from specifying truth conditions.

We have seen, however, that it is not a prerequisite for the representative interpretation that the members of the plural noun phrase denotation function as a team. For example, we may utter 7.1 with a representative interpretation in mind even when we know that some of the demonstrators were opposed to setting fire to the shop.

7.1 The demonstrators set fire to the shop.

7.1.1 Accounting for context dependence

We have established that some of the features which determine whether a representative interpretation is possible are context dependent. The desirability of a property, and the i-level/s-level status of a verb are features which have been shown to depend on the information held by the speaker. What information the speaker holds, for example what he or she regards as desirable, can often be inferred from the linguistic context.

Thus, in an account of representativity, we need a formal framework which is sensitive to context variance. Of the frameworks presented in chapter 4, only the cover approach, introduced by Schwarzschild (1996) and adopted by Brisson (1998), incorporates a context dependent variable.

The framework of Schwarzschild (1996), although context dependent, does not treat "team credit" interpretations any differently than Landman (1989, 1996), i.e. it does not provide specific truth conditions for this interpretation.

Brisson (1998) on the other hand, develops a context dependent formalism which does assign exact truth conditions to nonmaximal interpretations.
More specifically, she uses the notion of ill-fitting covers to account for non-involvement interpretations. We noted in section 5.2, however, that the ill-fitting cover approach depends crucially on having the context assign a cover where the relevant individuals are specified. Moreover, we saw that the representative interpretation is used exactly in situations where we do not know the specific cover (i.e., who the relevant individuals are) or do not want to convey any specific cover to the receiver, e.g., because we do not want to bother with details. In these cases Briston’s framework cannot assign any truth conditions.

It seems that Briston (1998), using the context only as a cover-assigner, has a too narrow view of what the context should contribute to the semantic representation. Even in situations when the context cannot give us a specific cover, it may still provide us with information that can help determining the truth conditions of a sentence. The situations where the context, but not the covers, can contribute to establishing an interpretation are contexts where we are not concerned with excluding specific individuals, but for example with the fact that something has been achieved (no matter who in the noun phrase denotation did it) or that something is undesirable (no matter who in the noun phrase denotation has the undesirable property).

Thus what we need to account for representativity is a formalism which provides us with access to the common ground, i.e., to the whole of the preceding linguistic context. As we will point out in section 7.3, a fully-fledged treatment of representativity also needs a mechanism for making inferences from the propositions in the common ground. Unfortunately, I will not be able to include such a mechanism in the present treatment of representativity.

Discourse Representation Theory (DRT) is perhaps the most widely used formalism for modeling the common ground. Also, it has been used by recognized systems of contextual inference such as Monz (1999) and Bos (2001). Thus it seems that DRT, in addition to giving us access to the linguistic context, makes a good point of departure for further research which would include an automated reasoning device.

7.1.2 Discourse Representation Theory (DRT)

When incorporating a new sentence into a Discourse Representation Structure (DRS), we have access to both the syntactic structure of the sentence and the semantic structure of the whole previous discourse.

We saw in chapter 2 that Kang (1994) used DRT to represent weak interpretations. Her grounds for doing so, however, are not the same as the motivation presented here. That is, Kang does not state her motivation for using DRT explicitly, but we may suppose that it is DRT’s ability to represent donkey sentences, a central sentence type to Kang, that made her choose this framework. At any rate, Kang does not make use of the
linguistic context DRT makes available for any other purposes. This may be a natural consequence of her regarding weak readings as triggered by lexical, not contextual factors.

The disadvantage of using DRT, at least as it is formulated in Kamp and Reyle (1993), is its syntactic simplicity. Although Kamp and Reyle maintain that DRT is compatible with many advanced syntactic frameworks, they employ a simple version of Generalized Phrase Structure Grammar (GPSG) in their book. Since the syntactic framework is so simple, there will not be much room for syntactic generalizations in the present DRT account of representativity. The triggering configurations will be very specific, and many syntactic structures will be omitted to avoid a proliferation of triggering configurations and construction rules.

As our main point is accounting for the prerequisites specified in section 6.4 and getting across the context dependence of representativity, we will shut our eyes to the syntactic clumsiness for now. It should be emphasized, however, that adopting a more detailed syntax, such as the one in Van Valin and LaPolla (1997), would make possible a more generalized account of representativity.

### 7.2 A fragment of English

(PS 1) - (PS 10) correspond to, and have the same numbering as, the phrase structure rules used in Kamp and Reyle (1993, pp. 53-54). (PS 20) - (PS 23) are made especially for this fragment. The numbering of lexical insertion rules is made independently of Kamp and Reyle (1993).

**Phrase structure rules**

\[
S \quad [\text{Num} = \alpha] \rightarrow [\text{NP} [\text{Num} = \alpha, \text{Gen} = \beta, \text{Case} = +\text{nom}]] [\text{VP} [\text{Num} = \alpha, \text{Fin} = +]]
\]

\[
VP [\text{Num} = \alpha, \text{Fin} = +] \rightarrow [\text{AUX} [\text{Num} = \alpha, \text{Fin} = +]] \text{not} [\text{VP} [\text{Num} = \delta, \text{Fin} = -]]
\]

\[
VP [\text{Num} = \alpha, \text{Fin} = \beta] \rightarrow [\text{V} [\text{Num} = \alpha, \text{Fin} = \beta, \text{Trans} = +]] [\text{NP} [\text{Num} = \gamma, \text{Gen} = \delta, \text{Case} = -\text{nom}]]
\]
(PS 7) \[ VP \begin{bmatrix} \text{Num} = \alpha \\ \text{Fin} = \beta \end{bmatrix} \rightarrow V \begin{bmatrix} \text{Num} = \alpha \\ \text{Fin} = \beta \\ \text{Trans} = \cdot \end{bmatrix} \]

(PS 9) \[ NP \begin{bmatrix} \text{Num} = \alpha \\ \text{Gen} = \beta \\ \text{Case} = \gamma \end{bmatrix} \rightarrow DET \begin{bmatrix} \text{Num} = \alpha \end{bmatrix} \begin{bmatrix} \text{Num} = \alpha \\ \text{Gen} = \beta \end{bmatrix} \]

(PS 10) \[ NP \begin{bmatrix} \text{Num} = \alpha \\ \text{Gen} = \beta \end{bmatrix} \rightarrow PN \begin{bmatrix} \text{Num} = \alpha \\ \text{Gen} = \beta \end{bmatrix} \]

(PS 20) \[ VP \begin{bmatrix} \text{Num} = \alpha \\ \text{Fin} = \beta \end{bmatrix} \rightarrow VP \begin{bmatrix} \text{Num} = \alpha \\ \text{Fin} = \beta \end{bmatrix} PP \]

(PS 21) \[ PP \rightarrow P \begin{bmatrix} \text{Num} = \alpha \\ \text{Gen} = \beta \\ \text{Case} = -nomin \end{bmatrix} \]

(PS 22) \[ VP \begin{bmatrix} \text{Num} = \alpha \\ \text{Fin} = \beta \end{bmatrix} \rightarrow BE \begin{bmatrix} \text{Num} = \alpha \\ \text{Fin} = \beta \end{bmatrix} \text{ADJ} \]

(PS 23) \[ VP \begin{bmatrix} \text{Num} = \alpha \\ \text{Fin} = + \end{bmatrix} \rightarrow BE \begin{bmatrix} \text{Num} = \alpha \\ \text{Fin} = \beta \end{bmatrix} \text{not ADJ} \]

**Lexical insertion rules**

(1. 1) \[ DET \rightarrow \text{the} \]

(1. 2) \[ N \begin{bmatrix} \text{Num} = \text{sing} \\ \text{Gen} = \text{male/fem} \end{bmatrix} \rightarrow \text{girl, colonel} \]

(1. 3) \[ N \begin{bmatrix} \text{Num} = \text{sing} \\ \text{Gen} = \text{-hum} \end{bmatrix} \rightarrow \text{bridge, drawing} \]

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(L 4) \[ N_{\text{Num} = \text{plur}} \rightarrow \text{children, glasses, soldiers, crayons, towels} \]

PN
(L 5) \[ N_{\text{Num} = \text{sing}} \rightarrow \text{Mary} \]

(ADJ) \( \rightarrow \) clean, dirty, healthy, sick, destroyed, dry, wet

AUX
(L 7) \[ N_{\text{Num} = \text{plur}} \rightarrow \text{do} \]

BE
(L 8) \[ N_{\text{Num} = \text{plur}} \rightarrow \text{are} \]

V
(L 9) \[ N_{\text{Num} = \text{sing/plur}} \rightarrow \text{build, weigh, see, spot, ask, detect, feed, like, dirty} \]

V
(L 10) \[ N_{\text{Num} = \text{sing/plur}} \rightarrow \text{run} \]

V
(L 11) \[ N_{\text{Num} = \text{sing}} \rightarrow \{\text{Pres}, \text{sing}^{3rd}(\alpha), \text{where} \alpha \in \text{V}\text{Num} = \text{sing/plur} \rightarrow \text{Pres, plur}(\alpha), \text{where} \alpha \in \text{V}\text{Num} = \text{sing/plur} \rightarrow \text{Pres, plur}(\alpha), \text{where} \alpha \in \text{V}\text{Num} = \text{sing/plur} \rightarrow \text{Pres, plur}(\alpha), \text{where} \alpha \in \text{V}\]
7.3 Operationalization of the prerequisites

Let us go through the criteria presented in section 6.4 one by one and adjust them to the DRT framework presented in Kamp and Reyle (1993).

A feature relevant to all representativity types is i-level/s-level status. In section 6.2.2 we showed that i-level/s-level status is context dependent to a certain extent, in particular for total predicates. As it is beyond the scope of this thesis to give an account of how specific contextual factors influence the i-level/s-level status of a predicate, we operationalize this feature simply by making a list of default i-level and default s-level predicates. The question arises, then, of whether clean, healthy, dry should be classified as i-level or s-level. As the claim that total predicates are default i-level is a controversial one, they will be listed as s-level here. This way we can see that the account works even with a traditional view on the i-level/s-level distinction.

With regard to the grammar specified in section 7.2 we give the following lists:

Default i-level: like, weigh.
Default s-level: run, build, pet, see, spot, ask, detect, feed, advise, clean, dirty, healthy, sick, destroyed, dry, wet.

7.3.1 Type 1 representativity

The following operationalizations are needed to make a construction rule for type 1 representativity in DRT:

**M-transitivity** can be operationalized by requiring a transitive predicate where the first argument is a definite plural noun phrase and the second argument either has a determiner or is a proper name. This way we make sure that the second argument is referential in the sense of Van Valin and LaPolla (1997).¹

To make the construction rules as simple and perspicuous as possible, I have chosen to omit ditransitive verbs.

The operationalization of the M-transitivity criterion rules out a representative interpretation of 7.2 and 7.3, but not of 7.4 and 7.5²

7.2 The graduates ate cakes.
7.3 The students helped old people.
7.4 The graduates ate the cake(s)/a cake/some cake(s).

¹ For an argument to qualify as referential, Van Valin and La Polla require that it is not adpositionally marked, a bare plural or a mass noun (cf. section 6.4.2).
² 7.2 and 7.3 may of course have a generic interpretation.
7.5 The students helped Mrs. Larson.

By switching from the semantic terms "actor" and "undergoer" to the syntactic terms "first argument" and "second argument", we leave out passive sentences. The reason for this omission is that treating passive constructions in the simple phrase structure grammar used in Kamp and Reyle (1993) would lead to a proliferation of triggering configurations for each construction rule.

Non-reciprocity is already operationalized by the requirement above: since the second argument must either have a determiner or be a proper name, it cannot be the term each other.

Reflexivity is only admitted when the second as well as the first argument permit a representative interpretation. We have seen that when a representative interpretation of the second argument is possible, a representative interpretation of the first argument is also possible. Thus a treatment of reflexivity could be left to the construction rule which handles type 2 representativity. As this would make the construction rule more complicated, we will omit a treatment of reflexivity in this framework.

Wide scope for the undergoer argument is secured by introducing the discourse referent for the second argument in the construction rule which handles type 1 representativity. To make this requirement clear, consider the following sentence.

7.6 The children build a raft.

The first DRS corresponds to the wide scope reading, while the second DRS represents the narrow scope reading we want to avoid.\footnote{These DRSs are made from Kamp and Reyle's (1993) construction rules, not the ones to be introduced in section 7.4.}

\begin{tabular}{|c|c|}
\hline
\text{X} & \text{y} \\
\hline
\end{tabular}

\begin{tabular}{|c|c|c|}
\hline
\text{The children} & \text{raft} & \text{X built y} \\
\hline
\end{tabular}
Consequently, it may seem that we must demand that the discourse referent for the second argument is introduced at the same level as the discourse referent for the second argument. Such a requirement would, however, conflict with the negation rule since we want the DRS specified below as a representation of 7.7.

7.7 The children did not build a raft.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$X$</td>
<td></td>
</tr>
<tr>
<td>The children($X$)</td>
<td></td>
</tr>
<tr>
<td>$\neg$</td>
<td>raft($y$)</td>
</tr>
<tr>
<td>$X$ build $y$</td>
<td></td>
</tr>
</tbody>
</table>

To conclude, we need a construction rule which only permits a negation sub-DRS between the discourse referents for the first and the second arguments.

7.3.2 Type 2 representativity

To capture type 2 representativity in DRT, we need two separate construction rules. This is because the requirements on undergoer arguments are different from the requirements on non-role arguments.

Let us take the construction rule for undergoer arguments first.

**M-transitivity** is operationalized as for type 1 representativity.

**The class of predicates which are non-affecting on the undergoer** is operationalized by making a list of such predicates. We define the verb class non-affecting (on the undergoer argument) in relation to the grammar specified in section 7.2:

Non-affecting = see, spot, ask, detect, weigh, like.

**The class of predicates whose undergoer argument is RECIPIENT** is operationalized by making a list of such predicates.

We define the verb class RECIPIENT-undergoer in relation to the grammar specified in section 7.2:

**RECIPIENT-undergoer** = feed, advise.

The construction rule for non-macrorole arguments is simpler.
Non-macrorole argument in prepositional phrase is operationalized by restricting the triggering configuration in the construction rule to definite plural noun phrases inside a prepositional phrase. In addition, we require that the prepositional phrase is an adjunct to the verb. Thus it cannot be nested within a noun phrase.

7.3.3 Type 3 representativity

Undesirability is operationalized by making lists of default desirable and default undesirable predicates. We define the classes of default undesirable and default neutral or desirable predicates in relation to the grammar specified in section 7.2:

Default neutral or desirable = clean, healthy, dry.
Default undesirable = dirty, dirty (verb), sick, wet.

Note that the status variable, with undesirable as one value and neutral/desirable as the other, is in line with Cruse’s (1980) account (cf. section 3.2.3).

If the default status of a predicate is incompatible with the linguistic context, its status will be changed, while if there is no conflict, the default status will remain. For example, when 7.8 is the only sentence in the discourse, there is nothing to conflict with the default status of bent as undesirable. The sentence will therefore permit the representative interpretation. If it is incorporated into a linguistic context where it emerges that being bent is desirable, such as 7.9, the status of the predicate will change to desirable/neutral, and the representative interpretation will be prohibited. To formalize this, a system of contextual inference is needed. Unfortunately, I have not been able to find any automated deduction systems dealing with these issues, and developing such a system falls outside the scope of this thesis. Therefore these problems must be left to further research.4

7.8 The bars are bent.

7.9 I wanted to bend the iron bars in the staircase fence to make them look better. A blacksmith did the job for me. Now the bars are bent, and I am much more pleased with the staircase.

Reversibility is operationalized by specifying which predicates are reversible and irreversible.

We have seen that reversibility is a property which only applies to adjectival predicates. With respect to the grammar in section 7.2 we define

4The majority of current contextual inference systems for computational semantics deal with anaphor resolution and presupposition.
the following lists of reversible and irreversible properties:

**Reversible** = dirty, clean, sick, healthy, wet, dry.
**Irreversible** = dead, destroyed.

The prohibition of total adverbs prerequisite, intended to prevent a representative interpretation of sentences like 7.10, is formalized by specifying triggering configurations which cannot contain adverbs.

7.10 *The bars are almost bent.*

The no-consequence-for-undergoer prerequisite which was introduced to distinguish between such sentences as 7.11 and 7.12 will be omitted as it has proved difficult to formalize.

7.11 *The children are sick, so I cannot come to work.*

7.12 *The children are sick, so they cannot come to school.*

### 7.4 Construction rules

In the preceding section we have made several lists which specify different properties of predicates. For example, we have lists of predicates which denote default desirable and default undesirable properties. How are these lists made accessible in a specific DRS? To answer this, we must look at certain properties of the DRS construction algorithm which converts English sentences into DRSs.

When the construction algorithm is applied to a sequence of sentences \(S_1, \ldots, S_n\), the first thing it does is to incorporate \(S_1\) into the starting DRS \(K_0\). Subsequently, it incorporates \(S_2\) into the DRS \(K_1\) which results from the first incorporation. Then the construction algorithm continues this way until \(S_n\) has been incorporated. \(K_{i-1}\) is thus the context of interpretation for \(S_i\).

Currently the most relevant part of the construction algorithm is the specification of the initial context \(K_0\). According to Kamp and Reyle the initial context for a given discourse

should be a DRS incorporating that (relevant) information which is available to the recipient of that discourse at the point when he starts processing it. (Kamp and Reyle, 1993, p. 85)

Kamp and Reyle choose to make the assumption that the initial context contains no information at all. In the present account, however, we want the lists specified in the preceding section to be part of \(K_0\). This way
we represent the information the speaker has about what properties are (default) desirable, reversible etc.

In CR.SUM.IND1, CR.SUM.IND2A and CR.SUM.IND3 below, there are conditions on the form $K \vdash x$, for instance $K \vdash \text{undesirable} (\beta)$. Since $K_{i-1}$ is the context of interpretation for a sentence $S_i$, $K_i$, or just $K$, stands for the whole discourse context, including the sentence which is currently being incorporated.

Note that the construction rules specified below represent a minimum of what we need to account for representativity.

We follow Kamp and Reyle (1993) in representing singular discourse referents with non-capital letters and plural discourse referents with capital letters (cf. section 4.7).

**CR.NP[Quant=def/Num=Sing]** As our main concern is definite plural noun phrases, we will keep the rudimentary treatment of definite singular noun phrases given in Kamp and Reyle (1993). The rule below is therefore equal to CR.INDI presented in section 4.7.

<table>
<thead>
<tr>
<th>Triggering configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma \subseteq \bar{\gamma} \in Con_K$:</td>
</tr>
</tbody>
</table>

(i) \[
\begin{array}{c}
S \\
\text{NP} \quad \text{VP} \\
\text{DET} \quad \text{N} \quad \eta \\
\text{the} \quad \beta
\end{array}
\]

(ii) \[
\begin{array}{c}
V \\
\text{NP} \\
\text{DET} \quad \text{N} \\
\eta \quad \text{the} \quad \beta
\end{array}
\]

Introduce into the universe of the main DRS $K'$:

- a singular discourse referent $u$
- Add to $Con_{K'}$:
  - the $N(u)$
- Substitute in $\bar{\gamma}$:
  - $u$ for NP(the N).
CR.PN  CR.PN is the same as in Kamp and Reyle (1993).

<table>
<thead>
<tr>
<th>CR.PN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triggering configurations</td>
</tr>
<tr>
<td>( \gamma \subseteq \bar{\gamma} \in Con_K ):</td>
</tr>
<tr>
<td>(i) ( S )</td>
</tr>
</tbody>
</table>
| \( \begin{array}{c}
    \text{NP} \\
    \text{VP} \\
    \text{PN} \\
    \eta \\
    \alpha
\end{array} \) |
| (ii) \( \text{VP} \) |
| \( \begin{array}{c}
    \text{V} \\
    \text{NP} \\
    \eta \\
    \text{PN} \\
    \alpha
\end{array} \) |
| Introduce into the universe of the main DRS \( K' \): |
| a discourse referent \( u \) |
| Add to \( Con_{K'} \): |
| \( \alpha (u) \) |
| Substitute in \( \bar{\gamma} \): |
| \( u \) for \( \text{NP} (PN \alpha) \) |

CR.NP[Quant=def/Num=Plur]  As we have seen in section 4.7, the only difference Kamp and Reyle (1993) make in the treatment of definite and indefinite noun phrases is that definite discourse referents are introduced into the main DRS while indefinite discourse referents are introduced at the level at which they are processed. Thus, truth-conditionally, definite plural noun phrases are essentially treated the same way as indefinites. For example, 7.13 and 7.14 will receive the same truth value in Kamp and Reyle’s framework.

7.13 Some children built a raft.

7.14 The children built a raft.

Since we seek to distinguish between representative interpretations, which should be represented with existential quantification, and strong interpretations, which should have universal quantification, we must alter the construction rule for definite plural noun phrases. Instead of having the children pick out some children in the universe, we must make this phrase refer to all children in the universe. The new version of CR.NP[Quant=def/Num=Plur] is adapted from the corresponding rule found in Kang (1994) (cf. section 2.5).
**CR.NP[Quant=def/Num=Plur]**

Triggering configurations

\[ \gamma \subseteq \tilde{\gamma} \in \text{Con}_K : \]

(i)

\[
\begin{array}{c}
S \\
\text{NP} \quad \text{VP} \\
\text{DET} \quad \text{N} \quad \eta \\
\text{the} \quad \beta
\end{array}
\]

(ii)

\[
\begin{array}{c}
\text{VP} \\
\text{V} \quad \text{NP} \\
\eta \quad \text{DET} \quad \text{N} \\
\text{the} \quad \beta
\end{array}
\]

(iii)

\[
\begin{array}{c}
\text{VP} \\
\text{V} \quad \text{NP} \quad \text{PP} \\
\eta \quad \zeta \quad \text{P} \quad \text{NP} \\
\epsilon \quad \text{DET} \quad \text{N} \\
\text{the} \quad \beta
\end{array}
\]

where \( \beta \) is plural and \( \epsilon \) is optional

Introduce into the universe of the main DRS \( K' \):

- a new DRS \( D' \)
- Add to \( \text{Con}_{K'} \):

\[
D = \Sigma D' \quad [D' \quad \beta (D')]
\]

Substitute in \( \tilde{\gamma} \):

- \( D \) for \( \text{NP}[\text{the } \beta] \)
CR.LIN  CR.LIN below is as specified in Kamp and Reyle (1993). Note that the $*$-operator is taken from Link (1983) and serves to accommodate non-atomic discourse referents.

The $*$-operator is used to transform a predicate $P$ of individuals into one which is true of both these individuals and all collections consisting exclusively of these individuals. In other words, if $X$ is the extension of the predicate child, then $X^*$ is the extension of the predicate child or children.

LIN.CR adds the $*$-operator for atomic as well as non-atomic discourse referents. This is unproblematic because all individuals described by $\beta$ are described by $\beta^*$ as well. Following Kamp and Reyle, we will write $\beta(x)$ even though the the official notation is $\beta^*(x)$.

<table>
<thead>
<tr>
<th>CR.LIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triggering configuration</td>
</tr>
<tr>
<td>$\gamma \in Con_K$:</td>
</tr>
<tr>
<td>$N(x)$</td>
</tr>
<tr>
<td>$\beta$</td>
</tr>
<tr>
<td>Replace $\gamma$ by $\beta^*(x)$</td>
</tr>
</tbody>
</table>
**CR.ID** CR.ID is as specified in Kamp and Reyle (1993).

<table>
<thead>
<tr>
<th>CR.ID</th>
</tr>
</thead>
</table>
| Triggering configurations  
\( \gamma \subseteq \bar{\gamma} \in \text{Con}_K : \) |
| (i) | (ii) |
| ![Diagram of S, NP, VP, DET, N, a(n)] | ![Diagram of VP, V, NP, DET, N, a(n), \( \beta \)] |

Introduce into the universe of DRS K:
- a new discourse referent \( u \)
- Add to \( \text{Con}_K \):
  - \( N(u) \)
- Substitute in \( \bar{\gamma} \):
  - \( u \) for
  - ![Diagram of NP, DET, N, a(n)]
**CR.NEG**  CR.NEG is as specified in Kamp and Reyle (1993).

<table>
<thead>
<tr>
<th>CR.NEG</th>
</tr>
</thead>
</table>
| **Triggering configurations**  
\[ \gamma \subseteq \bar{\gamma} \in Con_K: \]

(i)  
\[ \begin{array}{c}
S \\
\text{NP} \quad \text{VP}
\end{array} \]

(ii)  
\[ \begin{array}{c}
S \\
\text{NP} \quad \text{VP}
\end{array} \]

Substitute in \( \bar{\gamma} \):

(i)  
\[ \begin{array}{c}
S \\
\text{NP} \quad \text{VP}
\end{array} \]

(ii)  
\[ \begin{array}{c}
S \\
\text{NP} \quad \text{VP}
\end{array} \]

**CR.SUM.IND1–3**  SUM.IND stands for "sum individual".

In the construction rule CR.SUM.IND1 a definite plural noun phrase is either interpreted representatively (the if-alternative) or distributively (the else-alternative). This means that all collectivity is treated like representativity. Since the representative interpretation is weaker than all (other) collective interpretations, it can be used to represent all collective interpretations.

We saw in section 5.1 that, with one exception, all predicates that can have the collective interpretation can also have the representative interpretation. The exception is verbs which denote an adding of the individuals (or a property of the individuals) in the plural noun phrase denotation. Examples of such predicates are *cost, total, equal, weigh, sum up to*. CR.SUM.IND1 assigns the distributive interpretation to sentences with these verbs. In a complete framework, we would have to incorporate a separate construction rule for these verbs. This rule would generate the collective interpretation for sentences with all these verbs, and rule out the distributive interpretation for verbs like *total* and *sum up to*. As we are primarily concerned with representativity, we will omit this rule.

138
Triggering configuration
\( \gamma \subseteq Con_K \):

\[
\begin{array}{c}
S \\
\downarrow \\
NP \quad VP \\
\downarrow \\
X \quad V \quad NP \\
\downarrow \quad \downarrow \\
\beta \quad \delta
\end{array}
\]

where X is a sum individual

if

\( K \vdash s\text{-level } (\beta) \)

and NP(\( \delta \)) can be written on one of the following forms:

(i) \[
\begin{array}{c}
NP \\
\downarrow \\
DET \quad N \\
\downarrow \quad \downarrow \\
\epsilon \quad \delta
\end{array}
\]

(ii) \[
\begin{array}{c}
PN \\
\downarrow \\
\delta
\end{array}
\]

then

Introduce into the universe of the main DRS K’ or DRS K:

(depending on whether \( \delta \) is definite or indefinite)

two discourse referents x and Z or z (depending on whether \( \delta \) is plural or singular)

Add to Con_{K'} (Con_K): \( x \leq X \)

and one of the following:

if NP(\( \delta \)) is a plural definite introduce a new DRS construction:

\( Z = \Sigma U \)

\( \delta (U) \)

if NP(\( \delta \)) is a plural indefinite: \( \delta (Z) \)

if NP(\( \delta \)) is a singular definite: the \( \delta (z) \)

if NP(\( \delta \)) is a singular indefinite: \( \delta (z) \)

Substitute in \( \gamma \):

x for NP(X) and Z(z) for NP(\( \delta \))

else

Introduce into the universe of the DRS K:

the discourse referent x

Replace \( \gamma \) by:

\[
\begin{array}{c}
x \\
x \leq X
\end{array}
\]

\[
\begin{array}{c}
\text{every } x \\
x \beta \delta
\end{array}
\]

139
Triggering configuration
\( \gamma \subseteq Con_K: \)

\[
\begin{array}{c}
S \\
NP \quad VP \\
u \quad V \quad NP \\
\beta \quad X
\end{array}
\]

where \( NP(X) \) is a sum individual
\( K \vdash s\text{-level } (\beta) \)
\( \) is non-affecting (\( \beta \))
\( \) recipient-undergoer(\( \beta \))

Introduce into the universe of the DRS \( K \):
the discourse referent \( x \)

Add to \( Con_K \):
\( x \leq X \)

Substitute in \( \gamma \):
\( x \) for \( NP(X) \)

**else**

Introduce into the universe of the DRS \( K \):
the discourse referent \( x \)

Replace \( \gamma \) by:

\[
\begin{array}{c}
x \\
x \leq X \\
every \quad x \\
u \quad \beta \quad x
\end{array}
\]
CR.SUM.IND2B

Triggering configuration
\( \gamma \subseteq Con_K \):

\[
\begin{array}{c}
S \\
| \\
NP & VP \\
| \\
u & VP & PP \\
| \\
\beta & P & NP \\
| \\
e & X \\
\end{array}
\]

where \( NP(X) \) is a sum individual

Introduce into the universe of the DRS \( K \):
the discourse referent \( x \)
Add to \( Con_K \):
\( x \leq X \)
Substitute in \( \gamma \):
\( x \) for \( NP(X) \)
CR.SUM.IND3

Triggering configurations

\( \gamma \subseteq Con_K \):

(i) \hspace{1cm} (ii)

where \( X \) is a sum individual

**if**

\( K \vdash s\text{-level (} \beta \text{)} \)
\( K \vdash \text{undesirable}(\beta) \)
\( \text{reversible}(\beta) \)

**then**

Introduce into the universe of the DRS \( K \):

the discourse referent \( x \)

Add to \( Con_K \):

\( x \leq X \)

Substitute in \( \gamma \):

\( x \) for \( NP(X) \)

**else**

Introduce into the universe of the DRS \( K \):

the discourse referent \( x \)

Replace \( \gamma \) by:

\[
\begin{array}{c}
\text{\( x \)} \\
\text{\( x \leq X \)} \\
\text{\( \text{every} \)} \\
\text{\( \beta \)} \\
\text{\( x \)}
\end{array}
\]
7.5 Examples

7.15 *The children build a raft.*

7.15 is first treated by the construction rule CR.NP[Quant=def/Num=plur] where the definite plural noun phrase *the children* is substituted by a sum individual, X.

\[
\begin{array}{c|c|c}
X = \Sigma Y & Y & \text{children} (Y) \\
\hline & [X \text{ build a raft}] \\
\end{array}
\]

Next, the resulting construction fulfills the if-clause in CR.SUM.IND1 since: *Build* has two arguments, where the actor, *the children*, is a definite plural noun phrase, and the undergoer, *the raft*, has a determiner. Also, it is clear that *build*, being part of the verb phrase *build a raft*, is s-level. Therefore we follow the then-clause. This involves introducing a singular discourse referent for the indefinite noun phrase and specifying that 7.15 is true in situations where the predicate holds of a subgroup of children \((x \leq X)\). The DRS for 7.15 is given below.

\[
\begin{array}{c|c|c|c|c}
X = \Sigma Y & Y & \text{children} (Y) & x \leq X & raft (z) \\
\hline & & [x \text{ build } z] \\
\end{array}
\]
7.16 *The children did not build a raft.*

7.16 is treated the same way as 7.15, except that after CR.NP[Quant=def/Num=plur], we apply CR.NEG. Note that this results in truth conditions which require that the predicate does not hold of any subgroup of *the children.*

<table>
<thead>
<tr>
<th>$X$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X = \Sigma Y$</td>
</tr>
<tr>
<td>$\text{children (Y)}$</td>
</tr>
</tbody>
</table>

[X do not build a raft]

<table>
<thead>
<tr>
<th>$\neg$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x y$</td>
</tr>
<tr>
<td>[X build a raft]</td>
</tr>
<tr>
<td>$x \leq X$</td>
</tr>
<tr>
<td>raft (y)</td>
</tr>
<tr>
<td>x build y</td>
</tr>
</tbody>
</table>

7.17 *The colonel spot the soldiers.*

First, CR.NP[Quant=def/Num=sing] and CR.NP[Quant=def/Num=plur] are applied to *the colonel* and *the soldiers* respectively.

<table>
<thead>
<tr>
<th>$x Y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>the colonel (x)</td>
</tr>
<tr>
<td>[x spot the soldiers]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$Y = \Sigma Z$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Z$</td>
</tr>
<tr>
<td>soldiers (Z)</td>
</tr>
<tr>
<td>[x spot Y]</td>
</tr>
</tbody>
</table>

The result of these reductions corresponds to the triggering configuration of CR.SUM.IND2A, and it satisfies the if-clause since *spot* is clearly s-level and non-affecting in 7.17. Thus we get a DRS which specifies that 7.17 is true in situations where the colonel spotted a subgroup of the soldiers.

<table>
<thead>
<tr>
<th>$x Y y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>the colonel (x)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$Y = \Sigma Z$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Z$</td>
</tr>
<tr>
<td>soldiers (Z)</td>
</tr>
<tr>
<td>$y \leq Y$</td>
</tr>
<tr>
<td>x spot y</td>
</tr>
</tbody>
</table>
7.18 Mary made the drawing with the crayons.

After CR.PN and CR.NP[Quant=def/Num=sing] have been applied, the reduced structure fits the triggering configuration of CR.SUM.IND2B and satisfies its if-clause. Consequently, we get a DRS which is verified in models where Mary made a drawing with a subset of the crayons.

\[
\begin{array}{c|c|c|c|c}
\hline
x & y & Z & z \\
\hline
\text{Mary}(x) & \text{the drawing}(y) & [x \text{ made } y \text{ with the crayons}] \\
\hline
Z = \Sigma W & W & \text{crayons } (W) & [x \text{ made } y \text{ with } Z] \\
& z \leq Z & x \text{ made } y \text{ with } z \\
\end{array}
\]

7.19 The glasses are dirty.

In reducing 7.19 to a DRS, we first apply CR.NP[Quant=def/Num=plur], and the definite plural noun phrase the glasses is substituted by a sum individual, X. The result of this reduction corresponds to triggering configuration (i) in CR.SUM.IND3, where it satisfies the if-clause: dirty is s-level, undesirable and reversible in a neutral context. Therefore we specify that 7.19 corresponds to a situation where at least a subgroup of the glasses is dirty.

\[
\begin{array}{c|c|c}
\hline
X & x \\
\hline
X = \Sigma Y & Y & \text{glasses } (Y) \\
& [X \text{ are dirty}] \\
x \leq X & \text{dirty } x \\
\end{array}
\]

7.20 The glasses are not dirty.

7.20 is reduced as 7.19, except that CR.NEG is also applied to it. The resulting DRS specifies that 7.20 is true only in situations where none of the glasses are dirty. Thus this DRS account predicts the negation behaviour specified in section 6.4.4: sentences which license the type 3 representativity in the unnegated form, require the strong interpretation on their negated form.
7.21 The glasses are clean.

7.21 does not satisfy the if-clause in CR.SUM.IND3, since clean is default desirable. Therefore we follow the else-clause and specify that 7.21 corresponds to a situation where every glass is clean.

7.22 The glasses are not clean.

7.22 is reduced in the same way as 7.21, except that CR.NEG is also applied. According to the resulting DRS, 7.22 corresponds to a situation where not every glass is clean, which is equivalent to a situation where some glass is not clean. Again, we see that the account matches the predictions made in section 6.4.4: that when a predicate is negated in such a way that it comes to denote an undesirable property, the representative interpretation is made available (if the sentence satisfies the other criteria for type 3 representativity).
Finally, let us consider an example where the context overrides a default property of a lexical item. Recall from section 6.3.1 our example with the artist who has finished a day’s work on his clay sculpture and asks his assistant to wet a bunch of towels to cover it with. Imagine that the artists says 7.23 to the assistant, and after a while, the assistant says 7.24.

7.23 *I am finished with the sculpture for today. Now I want you to go and wet these towels. They should be completely soaked.*

7.24 *The towels are wet."

*Wet* is listed as a default undesirable property in the lexicon. In the situation sketched above, however, it can be inferred from the context that *wet* is desirable. Assuming a mechanism for contextual inference, the reduction of 7.24 in the context of 7.23 proceeds as follows.

7.23 is represented as A in the DRS below. 7.24 is first treated by the construction rule CR.NP[Quant=def/Num=plur] where the definite plural noun phrase *the towels* is substituted by a sum individual, X.

[X are wet] fits with the triggering configuration in CR.SUM.IND3. First, it is tried against the if-clause which checks if it follows from the discourse context K that *wet* is undesirable. Since it does not, the construction proceeds to the else-clause which specifies that 7.24 should hold only if all the towels are wet.
7.6 Conclusion

We have seen that there are two types of formal approaches which have been concerned with representativity. One of these, represented by Landman (1989, 1996) and Schwarzschild (1996), explicitly refrain from specifying exact truth conditions for the representative interpretation. The other approach, in which Link (1983), Dowty (1987) and Kang (1994, 1996) are central, hold that there are significant generalizations to make about weak readings. In developing prerequisites for the representative interpretation, the present thesis falls into the latter group.

In 7.1.1 we established that a formalism which aims to account for representativity must provide access to the common ground. In addition, a full account of representativity needs a mechanism for contextual deduction. DRT is an established framework which gives us access to the preceding discourse, and some important attempts at systems for automated contextual inferences are conducted within this framework. For these reasons we select DRT as our formal basis for a preliminary formal account of representativity.

In our attempt to operationalize the prerequisites from section 6.4, we had to make several simplifications due to the limitations of the grammar employed by Kamp and Reyle (1993).

We chose an adapted version of Kang’s construction rule for definite plural noun phrases. The noun phrases are represented as sum individuals in the sense of Link (1983). In addition, we specified four four construction rules to account for the three representativity types: one for type 1, two for type 2 and one for type 3.
Chapter 8

Conclusion

8.1 Summary

We have a representative interpretation of a sentence when

- The sentence contains a definite plural NP.
- Some member or subset of the noun phrase denotation satisfies the predicate.
- The rest of the individuals in the noun phrase denotation do not satisfy the predicate.
- The predicate is used to characterize the whole group referred to by the noun phrase.

The present thesis is an attempt to account for which semantic and pragmatic factors that make the representative interpretation possible, and how these can be incorporated into a formal framework.

In the course of this thesis we have made the following observations and suggestions:

Kang (1994, 1996) points out that there are weak and strong interpretations of certain quantifiers and definite plural noun phrases. The strong reading is represented with the universal quantifier and the weak reading with the existential quantifier. For definite plural noun phrases, the strong interpretation requires that every individual in the noun phrase denotation satisfies the predicate, while the weak interpretation only demands that the predicate holds of some individual in the noun phrase denotation.

Kang distinguishes a class of predicate pairs, total and partial predicates, and show that the total predicates require a strong reading and the partial predicates allow the weak reading. In addition to partial predicates, there are a number of other predicates which also trigger the weak reading. Kang refers to a number of semantic factors in her attempt to explain why certain predicates trigger the weak reading and others do not.
Cruse (1980) identifies a class of adjective pairs, gradable complementaries, which appears to be identical to Kang’s total and partial adjectives. Some of the semantic factors Cruse uses to explain the distinction between gradable complementaries and traditional antonyms, give us new insight into the properties that make weak readings possible.

The question of non-involvement, i.e. how many individuals in a plural noun phrase denotation must contribute to the property denoted by the predicate, has been discussed by many linguists. Among these are Frege (1892), Link (1983, 1984), Dowty (1987), Lasersohn (1988), Kamp and Reyle (1993), Landman (1989, 1996) and Schwarzschild (1996). Link (1983) proposes that sentences with collective predicates may have weak readings, while sentences with distributive predicates must always be represented with the universal quantifier. Dowty (1987), who seeks to account for the contribution of the quantifier all to the meaning of sentences with plural noun phrases, claims that neither sentences with collective predicates nor sentences with distributive predicates should be represented with the universal quantifier. Kamp and Reyle (1993) essentially follow Link, but propose that sentences with distributive predicates can be represented with a genericity quantifier. Landman (1989, 1996) maintain that all collectivity should be represented as singular collective predication, and thus refrains from providing specific truth conditions for any collective interpretations.

Brissin (1998), who builds on Dowty’s work, introduces the notion nonmaximality, which embraces all cases where not every member of a plural noun phrase denotation is involved in the property the predicate refers to. She claims that her formal framework for nonmaximality can account for non-involvement across predicate types. We follow Link in maintaining that weaker truth conditions than the universal are generally only possible with collective predicates. Further, we present a number of arguments to show that nonmaximality is a different phenomenon than representativity.

Collectivity is closely tied to representativity. Still, we point out that there are a few predicates that have a collective interpretation in the sense of Verkuyl (1999), but not a representative interpretation, and vice versa. We also show that representativity cannot be equated with cumulativity or genericity.

In an attempt to specify what semantic and pragmatic factors make representativity possible, we distinguish three types of representative interpretations which are tied to different lexical and contextual properties. Some of the factors we refer to in this specification have already been mentioned by Kang or Cruse, others are new. Among the new propositions is the attempt to incorporate context-dependence into the account. Context sensitivity does not receive much attention in the works of Kang and Cruse. In particular, we suggest that the i-level/s-level distinction is more context dependent than what has traditionally been assumed in the semantic literature.
Further, we assess the various formal frameworks proposed by the linguists mentioned above with regard to representativity. Since an account of representativity demands a context sensitive formalism, most of the frameworks we have introduced are judged insufficient. The cover framework proposed in Brisson (1998) is context dependent, and also claimed to account for representativity. We show that Brisson's cover theory does not make use of context to a sufficient degree to account for the representative interpretation. What we need is a framework which provides access to the common ground. Discourse Representation Theory (DRT) is perhaps the most widely acknowledged such framework.

We operationalize the conditions for our three types of representativity to make them fit into the DRT framework presented in Kamp and Reyle (1993). Kamp and Reyle's framework is based on very simple phrase structure rules. Consequently they do not give us room for all the syntactic generalizations we want to make. Our DRT incorporation must therefore be said to be at a preliminary stage. Rather than being a fully-fledged account in itself, our work may serve as an example for later accounts in a more detailed grammar.

8.2 Challenges for further work on representativity

8.2.1 Other syntactic constructions

The present thesis is restricted to sentences with definite plural noun phrases beginning with the. To what degree is the representative interpretation possible with other noun phrase constructions?

It is evident that the representative interpretation is impossible with indefinite noun phrases such as many children, three men, a few women.

But what about conjunctions of proper names (or singular pronouns)?

8.1 John and Mary lift the piano.

Lasersohn (1988) claims that the collective reading of 8.1, i.e. the reading where the lifting is attributed to the group of John and Mary, may correspond to a situation where only one of John and Mary actually lifts the piano. To illustrate that 8.1 may be true even though only one of them did the lifting, Lasersohn (1988) sketches a situation where we have a competition between two teams: one consists of John and Mary, the other of Bill and Sue. The teams are required to attempt various stunts. During the competition John lifts the piano, while Mary performs some other stunt, such as shooting herself out of a canon. Bill and Sue perform most of the stunts John and Mary do, but fail to lift the piano.
In this sort of situation, it seems fair to say that John and Mary won the competition because they lifted the piano, while Bill and Sue didn't. This is despite the fact that Mary played no role in the actual lifting. (Lasersohn, 1988, p. 75)

Lasersohn (1988) emphasizes that it is not ordinarily the case that the action of some individual can be attributed to the conjunction of this individual and any other individual. He maintains that it is necessary to regard the individuals in the conjunction as a team for the weak interpretation to be possible.

Kang seems to disagree with Lasersohn (1988) in this question. She points out that 8.2 and 8.3 differ with regard to the weak interpretation.

8.2 The children built the raft.
8.3 John, Mary, Bill, Sue and Bob built the raft.

While 8.2 may be true in a situation where only some of the children worked to build the raft, this is not the case for 8.3, she claims.

Intuitively, this sentence, in which the participants are identified, seems to be felicitous only in situations in which all five children actually participated in the event of building the raft. (Kang, 1996, p. 230)

In my opinion Lasersohn (1988) argues convincingly that 8.1 can receive the weak reading in the situation he sketches. It seems, however, that the representative reading of sentences with conjuncts of proper names or singular pronouns is not generally available even in situations that clearly fall in under one of the three types of representativity. More specifically, it appears that with conjuncts the representative interpretation is more dependent on contextual factors than with definite plural noun phrases. This is perhaps because members which are referred to by the same noun phrase are automatically predicated as belonging to a group. They need not be regarded as a team with common intentions, but at least they must be regarded as a unit in some sense or another. With individually identified conjuncts, however, this is not necessarily the case. Thus the representative interpretation is only available when the context makes clear that the conjuncts are regarded as a unit in some sense.

Consequently, it seems difficult to give a systematic account of the representative reading with conjuncts.

8.2.2 Other semantic and contextual factors

We have specified three types of representativity; three combinations of semantic and pragmatic factors which give rise to the representative interpretation. Further work on representativity should attempt to determine
whether there are more types of representativity or whether the types already mentioned can be given a more unified treatment.

We have noted that we need a context dependent account of representativity, and pointed to a few contextual factors which are relevant in this regard. It should be emphasized, however, that the formalization of these factors is preliminary. As we have suggested, a fully-fledged account of representativity would have to involve a mechanism for contextual inferences, for example along the same line as those specified in Monz (1999) or Bos (2001).

8.2.3 A singular counterpart of representativity

8.4 Napoleon lost the war against the Russians.

In representative interpretations, the property of one (some) is described as the property of many. 8.4 illustrates the opposite situation, where an action of many is described as the action of one. Thus, in representative cases, a term denoting a whole is used in place of a term denoting a part, while in sentences such as 8.4, a term denoting a part is used instead of a term denoting a whole. In this thesis we have only been concerned with the first case. It might be fruitful, however, to regard representativity and its singular counterpart as two subtypes of the same phenomenon. A unified treatment of these two cases could perhaps lead to a more profound understanding of the semantic and pragmatic factors that underlie the representative interpretation.

8.2.4 Null involvement as representativity

During the preceding discussion we have presupposed that representative predication requires at least one member of the noun phrase denotation to be directly involved in the property denoted by the predicate. This may, however, be a too strict requirement. The scenario sketched below illustrates why.

8.5 The Larsons built a house.

Imagine a situation where the Larsons call some construction workers and arrange that they build a house for them. Neither Mrs. nor Mr. Larson lifts a finger to engage in any building. Still, 8.5 is an acceptable, and, in fact, common description of the above scenario.

Such a null participation situation is also likely in 8.6, 8.7 and 8.8: In all likelihood no Spaniard extracted silver from the mines in Potosí. They administered the process, but left the actual mining to the indigenous population. Similarly, it is more probable that the surviving relatives ordered
and paid for the statue than that they physically raised it. And it is perfectly possible that the new owners hired someone to cut down the trees for them. Still, 8.6, 8.7 and 8.8 are felicitous renderings of what happened.

8.6 *The Spaniards extracted silver from Cerro de Potosí.*

8.7 *The surviving relatives raised a statue in his memory.*

8.8 *The new owners cut down all the trees.*

Should we change our description of representativity so as to include the above cases?

We will not take a decisive stand in this question, but only point out that if we want to include null involvement situations, we will have to make certain amendments to our framework. Specifically, we will need a way to distinguish between primary action, directly involved in the property referred to by the predicate, and secondary action, causing the primary action. Perhaps this relationship could be represented with an instigation operator *Inst* where *InstPz*, reads “x instigates P” or “x brings it about that someone brings about P”.
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