

Total Adjectives vs. Partial Adjectives: Scale Structure and Higher-Order Modifiers

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Abstract

This paper studies the distinction that was proposed in previous works between *total* and *partial* adjectives. In pairs of adjectives such as *safe-dangerous*, *clean-dirty* and *healthy-sick*, the first (“total”) adjective describes lack of danger, dirt, malady etc., while the second (“partial”) adjective describes the existence of such properties. It is shown that the semantics of adjective phrases with modifiers such as *almost*, *slightly*, and *completely* is sensitive to whether the adjective is total or partial. The interpretation of such modified constructions is accounted for using a novel *scale structure* for total and partial adjectives. It is proposed that the standard value of a total adjective is always fixed as the lower bound of the corresponding partial adjective. By contrast, the standard value of partial adjectives can take any point on the relative scale. The effects of this theoretical distinction on the behavior of modified constructions are studied in detail, and their ramifications for the semantic theory of adjectives are discussed. Some other phenomena are surveyed that show evidence for total and partial adjectival constructions with various comparatives and exceptive phrases.

1 Introduction

Scales – ordered sets with a measure function – have been a prominent tool in the semantics of adjectives for several decades. The leading assumption of scalar theories of adjectives is that adjectives such as *long-short*, *heavy-light* etc. are associated with subsets of scales that correspond to degrees of length, weight etc. It leads to simple semantics of

the comparative (e.g. *longer than*) and to natural ways of measuring in constructions such as *two meters long*. Of course, the mathematical structure of a scale should be expected to affect the semantics of adjectives with which it is associated. However, although the semantic role of various scale structures has been often observed, it is only fairly recently that they have gained systematic attention in semantic theories, notably in the work of Kennedy and McNally (1999,2002).

In this paper we concentrate on the relations that scale structure bears with adjectival modifiers such as *slightly*, *nearly*, *completely*, *almost* and *very*. These modifiers apply to many adjectives and give rise to meanings that are often hard to capture. We show that the semantic behavior of such modifiers is sensitive to Cruse's (1980) and Yoon's (1996) typology of *total* and *partial* adjectives. These are pairs of adjectives such as *safe-dangerous*, *clean-dirty* or *healthy-sick*, where the first ("total") adjective in each pair describes lack of danger, dirt, malady etc., while the second ("partial") adjective describes the existence of such properties. We analyze the truth and acceptability conditions of constructions such as *almost safe/?dangerous* and *slightly dangerous/?safe* and argue that these represent a systematic opposition between total and partial adjectives. These contrasts are formally accounted for by giving total adjectives and partial adjectives a different scale structure. We propose that the *standard value* of a total adjective is identical with the lower bound of the scale of the corresponding partial adjective. For instance, we consider an entity to be *safe* if and only if its degree on the "danger scale" is not greater than the "zero degree of danger" in the given context. By contrast, for the counterpart partial adjective *dangerous*, the standard value of danger that is sufficient for being considered *dangerous* can be anywhere on the danger scale. We show how these assumptions are implemented and argue that they account for a variety of observations about adjective modifiers. Some more effects that will be illustrated with *comparatives* and *exceptive constructions* give further support for the distinction between total and partial adjectives as a significant opposition in natural language semantics.

The structure of the paper is as follows. Section 2 reviews Cruse's and Yoon's distinction between total and partial adjectives. Section 3 shows some central effects of total and partial adjectives with the modifier *almost*, which are accounted for using their different scale structures in Section 4. Section 5 analyses some further phenomena of total and partial adjectives with the modifiers *slightly* and *completely*, and briefly points out some

other effects of totality and partiality with adjectives.

2 Previous work on partial and total adjectives

In this section we describe some previous work related to the topics discussed in this paper. In Subsection 2.1, we describe Cruse’s (1980) typology of complementary and non-complementary adjective pairs and their interaction with *almost*. In Subsection 2.2, we discuss Yoon’s (1996) typology of total/partial antonyms and their special behavior in plural and donkey sentences. Throughout this paper we will use this terminology of total/partial adjectives.

2.1 Cruse’s typology of complementary adjectives

Pairs of adjectives such as *short-long*, *clean-dirty* and *complete-incomplete* are traditionally called *antonymous* adjectives, or in short *antonyms*. A necessary property of antonyms is that their denotations are disjoint, which is described by the following implication.

- (1) For every x : if x is A_1 then x is not A_2 .¹

Cruse (1980) distinguishes between two kinds of antonymous pairs of gradable adjectives: *complementary* and *non-complementary*. Complementary adjectives are pairs of antonymous adjectives A_1 and A_2 that are furthermore each other’s negation on their domain. For instance, the adjectives *complete* and *incomplete* are classified as complementary because any entity (e.g. a work, a house etc.) that *can* have one of the two properties *must* have one of them. Thus, if we only consider elements x in the domain of the adjectives, then A_1 and A_2 are called *complementary* if they support a strengthening of the implication in (1) into the following biimplication.

¹Throughout this paper we assume a bivalued logical system, hence the implication here is assumed to be equivalent to the implication: if x is A_2 then x is not A_1 . This requirement is not a sufficient condition for defining the pairs of adjectives that are traditionally classified as antonyms. For instance, the denotations of the adjectives *frequent* and *impossible* are disjoint as required by the implication in (1). But usually it is assumed that the antonym of *frequent* is *rare* and the antonym of *impossible* is *possible*. We do not try to give a full typological definition of antonyms in this paper, since it is not necessary for the theory we introduce. A good introduction for the notion of antonymy appears in Cruse (1986:ch.9).

There are some problems for Cruse's proposal that adjectives like *clean* denote points rather than intervals on a scale. One problem is that two objects that are clean can be compared with regard to their cleanliness. For instance, consider the following example.

- (3) Both towels are clean but the red towel is cleaner than the blue one.

If the cleanliness of both towels is represented by the same point on the scale, then it is unclear how the comparison can be accounted for. A similar problem comes from the modifier *completely*. It is quite clear that we would like to allow objects to be *clean* without being *completely clean*³. However, if the scale ends where the denotation of *clean* is located, as in Cruse's proposal, then it is unclear what the denotation of *completely clean* can be.

In this paper we present a theory of C-complementary adjectives that is similar in some respects to that of Cruse, but which takes these problems into account. We will first concentrate on one further difference that Cruse observes between C-complementaries and non-C-complementaries: their interaction with modifiers such as *almost*, *half* and *semi*. Cruse claims that when the pair is not C-complementary, both adjectives are infelicitous when used with such modifiers. Consider for example the following sentences.

- (4) a. #It's almost long.
b. #It's almost short.

These sentences are odd in normal contexts, and can become acceptable only under special conditions, which will be discussed in Section 4.5. However, in C-complementary pairs, one of the adjectives is fine with such modifiers, while the other is as odd as the non-C-complementaries in (4). Consider for instance the following contrast.

- (5) a. It's almost clean.
b. #It's almost dirty.

This difference between the adjectives in C-complementary pairs will be our starting point in this paper. We will aim to show that together with some other new observations on the behavior of C-complementaries with various modifiers, it consists a significant body of evidence that the theory of adjectives and scale structure should account for.

³In Section 5.1 we link the acceptability of *slightly T* to the ability of speakers to distinct between the meanings of *T* and *completely T*.

2.2 Yoon's typology of partial and total adjectives

Yoon (1996) studies pairs of antonymous adjectives that she calls *total/partial*, and describes their behavior in a plural form and in "donkey" sentences. Consider first the following examples.

- (6) a. Are the toys dirty?
b. Are the toys clean?

Suppose that the toys are for small children in a nursery. In this case, according to Yoon, the answer to the first question would be positive even if some of the toys are dirty but not all of them. On the other hand, the answer to the second question can be positive only if all the toys are clean.

Yoon argues that similar contrasts are observed with such adjectives (or more generally, predicates) in "donkey" sentences. Consider the following examples.

- (7) a. Most boys who had a baseball card in their pockets soiled it while playing in the mud.
b. Most boys who had a baseball card in their pockets kept it clean while playing in the mud.

Yoon claims that in order to accept the first sentence it is sufficient that most of the boys have each at least one card that got soiled while they played. In order to accept the second sentence, Yoon claims that the boys must have kept all their cards clean while playing.

Yoon refers to the predicates that get the universal meaning in the plural and the strong interpretation in "donkey" sentences as *total predicates*. Their antonyms - predicates that get the existential meaning in the plural and the weak interpretation in "donkey" sentences - are referred to as *partial*. Yoon mentions a previous classification by Rossdeutcher and Kamp (1992), who label adjectives such as *clean*, *healthy* and *closed* "universal" since they signal no amount of dirt, sickness or openness. Accordingly, Rossdeutcher and Kamp refer to the antonyms *dirty*, *sick* and *open* of these adjectives as "existential", since they imply some amount of the corresponding qualities. They claim that in order for a man to be healthy, all his body parts should be healthy, while it is enough that one organ is sick in order for the man to be sick.

Evidently, Cruse's criterion for distinguishing pairs of complementary adjectives is similar to Yoon's total/partial distinction and Rossdeutcher and Kamp's universal/existential

distinction. In this paper we adopt Yoon’s terminology but concentrate on Cruse’s facts regarding the modifier *almost* and other modifiers. We will not deal here with Yoon’s observations concerning plurals and “donkey” sentences, although we believe that they form an interesting test case for possible extensions of our proposal.

3 Partial/Total Adjectives and the modifier *almost*

In this section we first recapitulate Cruse and Yoon’s distinction between total and partial adjectives, henceforth *T/P adjectives*. Then we have a closer look at Cruse’s observation concerning the behavior of these adjectives with the modifier *almost*, which will be accounted for in Section 4.

3.1 Totality and partiality in the typology of adjectives

Cruse and Yoon’s intuitive distinction between partial adjectives and total adjectives can be summarized by the following contrasts, where “ \approx ” means “close in meaning”.

(8)	<i>dirty</i>	\approx	has some degree of dirtiness	$\not\approx$	has no degree of cleanliness
	<i>clean</i>	\approx	has no degree of dirtiness	$\not\approx$	has some degree of cleanliness
	<i>dangerous</i>	\approx	has some degree of danger	$\not\approx$	has no degree of safety
	<i>safe</i>	\approx	has no degree of danger	$\not\approx$	has some degree of safety

We should stress that the contrasts in (8) are not meant as semantic definitions of the meanings of total and partial adjectives: they are not applicable to the whole range of adjectives in this paper, and the empirical typology of total/partial pairs that we will propose will be based on different tests. However, these examples do point to an interesting opposition between many pairs of antonymous adjectives according to judgments that are fairly solid. Some more pairs of adjectives that we classify as total/partial pairs are given in Table 1. Also for pairs in this table for which the test in (8) is not easily applicable, the intuitive distinction seems similar. For instance, although it would definitely be circular to define *pure* as “having no degree of impurity”, it seems roughly like a true statement about its meaning. By contrast, defining *impure* as “having no degree of purity” is an obvious fallacy. Conversely, *impure* implies “some degree of impurity”, whereas *pure*

does not mean “some degree of purity”.⁴ The adjectives that are classified as “partial” are quite un-exceptional in the class of natural language adjectives. Many adjectives, like *tall*, *deep*, *heavy*, *intelligent* etc. entail having some degree of the relevant property. By contrast, the “universal” semantics of total adjectives is quite special among natural language adjectives, and the partial adjectives can therefore be classified as the antonyms of total adjectives.

Most adjectives in Table 1 have a comparative form, and therefore are standardly considered *gradable*. However, some total adjectives are quite infelicitous in the comparative. Consider, for instance, the oddness of the comparative *more dead than a mummy*. In this paper we do not try to account for the circumstances where comparative forms are acceptable. However, we think that there is good reason to assume that also adjectives such as *dead* are associated with a scale, since the meaning of constructions such as *completely dead* or *almost dead* seems to presuppose some way to compare between objects in terms of their “livelihood”. Moreover, even adjectives like *dead* do sometimes appear in the comparative form,⁵ and drawing a line between “definitely gradable” and “definitely non-gradable” total adjectives is a hard task that we do not wish to undertake.

Following Cruse, we distinguish between *complementary* and *non-complementary* antonymous pairs of adjectives. However, unlike Cruse, we do not claim that all total/partial adjective pairs are complementary.⁶ For example, while the pair *complete* and *incomplete* is clearly a pair of complementary adjectives, the pair *wet* and *dry* is not necessarily complementary under all contexts. For instance, in some contexts a moist towel may be considered neither wet nor dry. Similarly, considering the adjectives *naked* and *dressed*, we note that someone who is only wearing a tiny bathing suit may not be considered naked, but to say that he or she is dressed may also be an exaggeration. The adjectives in Table 1 are marked as complementary or non-complementary according to

⁴Two other interesting but problematic pairs of antonyms are *dead/alive* and *empty/full*. In the first case the pair seems like an ordinary T/P pair, but the use of *alive* in the comparative is marginal (cf. *?more alive than this dead man*), which is exceptional among partial adjectives. The pair *full/empty* seems like a pair of total antonyms, but its exact treatment goes beyond the scope of this paper.

⁵Example: a technical text, reviewing speaker models, was caught stating that *The MDF/pine was generally a little bit more dead than MDF alone, and was brought into resonance in a bit smaller frequency range*.

⁶In Subsection 4.5 we will suggest, however, that total/partial pairs are complementary by default, although this default can be overridden by context.

total	partial	complementary?
closed	open	×
healthy	sick	×
dry	wet	×
straight	curved/crooked	×
satiated	hungry	×
whole	cracked	×
smooth	rough	×
safe	dangerous	×
naked	dressed	×
complete	incomplete	✓
clear	unclear	✓
truthful	untruthful	✓
certain	uncertain	✓
perfect	imperfect	✓

Table 1: total and partial adjectives

our informants' judgments in such tests.⁷

3.2 The modifier *almost* with Total and Partial adjectives

Consider the following contrasts between the acceptability of *almost* with complementary T/P adjectives.

- (9) a. The work is almost complete/*incomplete.
b. The patient is almost dead/*alive.
c. The explanation is almost clear/*unclear.

We see that in these cases, the modifier *almost* is OK with the total adjective but unacceptable with the partial adjective.

When we consider non-complementary pairs of T/P adjectives, the status of *almost P* is less clear: some speakers consider this construction acceptable under certain contexts. For instance, a moist towel that is neither wet nor dry can be considered *almost wet* in

⁷Chris Kennedy (p.c.) hypothesizes that most total/partial pairs are more readily assessed as complementary than antonymous pairs of adjectives like *tall-short* or *fast-slow*. If this is correct it may explain Cruse's intuition, but we are not sure what simple tests can support this hypothesis.

certain situations. This property of partial adjectives in non-complementary T/P pairs is further illustrated in the following examples.⁸

- (10) a. John is *almost hungry*: four hours after breakfast, he is already not satiated from breakfast, he is not yet hungry, but he is already starting to think about lunch.
- b. This glass is *almost dirty*. It is certainly not clean, since it has some small spots on it, but it is not really dirty and I am willing to drink from it if you insist.
- c. I am not healthy today. I suffer from minor symptoms of cold and I am *almost sick*, but I am not sick yet and I intend to go to work.
- d. This road is *almost dangerous*: it has many bumps and it is certainly not safe, but a careful driver could cope with it.

Note that also in such pairs of non-complementary T/P adjectives, the *almost T* construction is invariably acceptable as with complementary T/P pairs. Thus, the constructions *almost dry/clean/healthy/satiated* are all OK independently of context.

We have seen that with pairs of non-complementary T/P adjectives the contrast in acceptability of the *almost* modifier is not absolute but heavily dependent on contextual factors. However, we claim that also with non-complementary T/P pairs there is an absolute difference between the adjectives. In each T/P pair of adjectives, the modified total adjective *almost T* does not entail the negation of the partial adjective *P*. By contrast, the construction *almost P*, if acceptable to begin with, does entail *not T*. This is illustrated by the following minimal pairs of sentences.

⁸Roger Schwarzschild (p.c.) argues that in cases such as in (10), *almost* does not pertain to scale values but to some modal or temporal dimension. For instance, in (10a), Schwarzschild claims that *almost hungry* is interpreted as roughly meaning ‘it is almost the time for John to be hungry’. However, even if this is true, it seems that this kind of ‘modal/temporal proximity’ also entails ‘scalar proximity’. Consider the following story, for instance. *John is now satiated, but as we know him, he’s almost hungry: just bring in some food (or wait a few moments) and see how hungry he is.* According to our judgment, this usage of *almost* is unacceptable. However, in this case John is supposed to be ‘almost hungry’ in the temporal sense though satiated, hence not almost hungry, in the scalar interpretation. The fact that the text is nevertheless unacceptable gives little support to the distinction between two usages of *almost* in such examples.

(11) The towel is wet but it is almost dry.

#The towel is dry but it is almost wet.

(12) The glass is dirty but it is almost clean.

#The glass is clean but it is almost dirty.

(13) I am sick but almost healthy.

#I am healthy but almost sick.

(14) John is hungry but he is almost satiated.

#John is satiated but he is almost hungry.

These contrasts can be strengthened by adding the temporal modifiers *still* and *already* to the adjectives, as in the following example.

(15) The towel is (still) wet but it is (already) almost dry.

#The towel is (still) dry but it is (already) almost wet.

However, most speakers we consulted accept the contrasts in (11)-(14) also without the addition of temporal modifiers.

We can summarize these differences between partial (*P*) and total (*T*) adjectives using the following assumptions.

(16) a. If *x* is *almost P* then *x* is *not T*.

b. If *x* is *almost T* then it is not necessarily true that *x* is *not P*.

These assumptions directly account for the contrasts in (11)-(15). Moreover, from (16a) it follows that *almost P* will always be unacceptable with complementary adjectives. This is because *x* being *almost A* implies, for any adjective *A*, that *x* is not *A* (by the *co-restrictiveness* of *almost*, see below). Thus, in particular, for any partial adjective *P*, *x is almost P* entails *x is not P*. On the other hand, by (16a), *x is almost P* also entails *x is not T*. But when *T* and *P* are complementary *x* must be either *P* or *T*, hence the unacceptability. According to the same principle, with non-complementary adjectives, *x is almost P* can be OK, but only under situations as in (10), where *x* is neither *P* nor *T*. Principle (16b) implies that the acceptability of the sentence *x is almost T* in non-complementary T/P pairs does not depend on whether *x* is *P* or not. Hence the acceptability of the *almost T* constructions in (11)-(15), as well as the equally acceptable status of examples such as the following.

(17) The towel is not wet. To the contrary: it is almost dry.

After this summary of observations concerning *T/P* pairs and the modifier *almost*, we can move on to their account using the notion of adjective *scales*.

4 Scale Structure of T/P adjectives and *almost*

In order to capture the observations of the previous section we will make some assumptions about the scale structure of adjectives and the semantic operation of adjective modifiers. Some of the assumptions are standard and some are new and specific to pairs of T/P adjectives. In addition, we will make some standard assumptions about the (cross-categorical) semantic behavior of the modifier *almost*. This section introduces these assumptions in detail and discusses their empirical implications.

4.1 Standard assumptions about adjectives in theories of scale structure

The first assumption we make is that an adjective *A* in its various forms (positive, comparative, superlative etc.) is associated with a *scale* S_A , fully ordered by an asymmetric ordering relation R_A .⁹ The entities in such a scale are sometimes called *degrees*.¹⁰ For example, any interval of the real numbers, ordered by the \leq relation, is a scale. Linguistically, a scale represents the range of degrees in which we can compare entities in terms of their *A*-ness. For example, we can say that x is more *A* than y if and only if x and y are both associated with degrees on S_A that are not equal and stand in the R_A relation. This assumption is similar to those made in previous works, including Bierwisch (1989), Kennedy (2000), Kennedy and McNally (1999), and Seuren (1978), among others. It is motivated by phrases such as *two meters tall(er)/shorter* and *two years old(er)/younger*, where the measure phrase explicitly pertains to “degrees” relevant for interpreting the adjective in its positive or comparative form. Assume that for the adjective *tall* we use a

⁹It should be mentioned that there are also theories of gradable adjectives that do not use the notion of scales, notably the work of Klein (1980). We will not try to discuss here this kind of theories and their possible implications for the subject of this paper.

¹⁰See Bierwisch (1989), Kennedy (2000), Schwarzcild and Wilkinson (2002), Winter (2001), for theories that replace degrees on scales by intervals, “extents”, or vectors.

scale of real numbers that represent height degrees of entities that are measured in meters or some other length unit. Then the sentence *John is two meters tall* is interpreted as meaning ‘John is an entity that is associated with the degree *two meters* on the height scale’. The sentence *John is 10cm taller than Mary* is interpreted as meaning ‘John and Mary are entities that are associated with degrees on the height scale, the difference between which is 10cm’.

As in other scalar theories of adjectives, we assume that the positive form of an adjective A denotes a subinterval of the scale S_A . This subinterval is determined by a *standard value* d_A in the scale. Given an adjective A , a scale S_A ordered by a relation R_A , and standard value $d_A \in S_A$, we define $\llbracket A \rrbracket$ to be the denotation of the *positive* form of A . This is simply defined as follows.

$$(18) \llbracket A \rrbracket \stackrel{def}{=} \{x \in S_A : R_A(d_A, x)\}$$

The standard value d_A is variable and context-sensitive. This assumption, which is customary in many previous works, is motivated by the vagueness of adjectives. For instance: a small building may be a lot bigger than a big elephant, so obviously, the standard values for *small* and *big* are different in the context of elephants and in the context of buildings.

When the adjectives A_1 and A_2 are antonyms the relation R_{A_1} is usually assumed to be $R_{A_2}^{-1}$, the inverse relation to R_{A_2} . This is motivated by equivalences such as the following.

$$(19) \text{John is taller than Mary} \Leftrightarrow \text{Mary is shorter than John.}$$

The general status of such equivalences with antonymous adjectives is not always so clear. Consider as an extreme case the antonyms *beautiful* and *ugly*. The sentence *Mary is uglier than Sue* clearly has the implication (or presupposition) that both girls are unattractive. By contrast, the sentence *Sue is more beautiful than Mary* surely does not have this implication, and even not the symmetrical one that both girls are beautiful. This issue has also been discussed in Bierwisch (1989) Cruse (1986) and Seuren (1978), among others. See also subsection 4.2 below.

Finally, a point about compositional interpretation. For the interpretation process to be compositional, the set of degrees $\llbracket A \rrbracket$ that the positive form of an adjective A denotes has to be mapped to the set of entities that their degree of A -ness is included in $\llbracket A \rrbracket$. For convenience we will ignore this point throughout this paper.

4.2 The scale structure of total and partial adjectives

In addition to these standard assumptions, we make some new assumptions that are specific to T/P adjective pairs. Before officially presenting the proposed scale structure, consider its graphic illustration in Figure 2. Given a pair T/P of total-partial antonyms, S_T and S_P are the respective scales, with the opposite relations R_T and R_S that are represented by the directions of the arrows. The values T_{min} and T_{max} are the two ends of the total scale, whereas P_{min} and P_{max} are the two ends of the *partial* scale. The respective standard values are denoted d_T and d_P . Our main assumption is that while the standard value d_P of the partial adjective is free to be anywhere between P_{min} and P_{max} , the standard value d_T of the total adjective is always at the minimal point P_{min} of the scale S_P , associated with the antonymous partial adjective. This distinction makes sure that whenever $d_T = d_P$ (i.e. the adjective denotations are complementary), the modified adjective *almost P* does not have room to denote on the P scale, hence its unacceptability in accordance with the facts observed above. By contrast, d_T 's being equal to d_P still leaves room below d_T on the T scale, hence *almost T* is expected to be acceptable independently of whether P and T 's denotations are complementary or not.

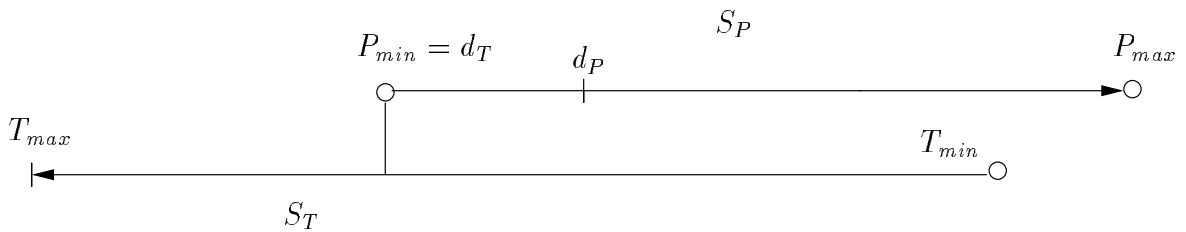


Figure 2: Total and Partial adjective scales

After having introduced the key idea behind the proposal, let us develop it in more detail. The basic intuition that underlies our treatment of total and partial adjectives is adopted from Cruse's work. Recall that Cruse takes total adjectives to denote a point on the relative scale, whereas partial adjectives denote an interval on the scale, with infinitely many points. However, as we have already mentioned, this implies that any two entities in the denotation of a total adjective T should be considered "equally T ". This is problematic in cases such as the following (=3) above).

(20) Both towels are clean, but the red towel is cleaner than the blue one.

To solve this problem, one major change that we make in Cruse’s theory is the following. In our proposal, total adjectives do not always denote a point on the scale but they *can* denote a point depending on the adjective and the context. For instance, as Cruse’s theory expects, it is quite strange (at least in many contexts) to use the following variation of (20) with the total adjective *complete*.

(21) ?Both your painting and my painting are complete, but your painting is more complete than mine.

By contrast, entities in the denotation of a partial adjective P are always P -comparable. For instance, with the partial adjective *incomplete* the following sentence is univocally acceptable.

(22) Both your painting and my painting are incomplete but your painting is more incomplete than mine.

Thus, we claim that some total adjectives (e.g. *complete*) can be *pointal* (=point denoting) in many contexts, whereas all partial adjectives are *non-pointal*. Let us see how this distinction is formally implemented.

Our first assumption concerns the *scales* for total and partial adjectives. For any pair of total and partial adjectives T/P , we define the respective scales as follows (see Figure 2).

$$(23) S_P \stackrel{def}{=} \overrightarrow{(P_{min}, P_{max})} \quad S_T \stackrel{def}{=} \overleftarrow{\{T_{max}, T_{min}\}},$$

where $-\infty < T_{max} \leq P_{min} < P_{max}, T_{min} \leq \infty$.

The scales S_P and S_T are intervals of real numbers, which are determined by their bounds P_{min} , P_{max} and T_{min} , T_{max} respectively. These bounds stand in the numerical order relations as specified above (the order between P_{max} and T_{min} is unspecified). Standardly, we use parentheses to denote *open* ends of intervals – ends that are not included in the interval itself, and braces to denote *closed* ends of intervals – ends that are included in the interval.

Thus, the scale S_P for a partial adjective P is an interval that is open on both sides, bounded by P_{min} from below and by P_{max} from above (in case $P_{max} = \infty$ we say that S_P is *unbounded* from above). The arrow over the interval notation for S_P designates the direction of the order relation R_P for this scale, which is chosen as the less-or-equal

relation ‘ \leq ’. The scale S_T for a total adjective T is an interval that is (i) closed from below and bounded by T_{max} ; and (ii) open from above and bounded by T_{min} . This notation may look a bit confusing because we assume that the ‘maximal’ value T_{max} is less than or equal to the ‘minimal’ value T_{min} . But this convention is felicitous here, in order to stress the fact that the order relation R_T for total adjectives should be chosen to be the greater-or-equal relation ‘ \geq ’, i.e. the inverse of the order relation ‘ \leq ’ for the corresponding partial adjective (see Figure 2 for an illustration of this).

The lower bound P_{min} for the scale S_P of partial adjectives represents the minimal amount of P -ness that can be observed in a given context. For example, when dressing up we would consider a piece of cloth to be free of dirt (or *clean*) if it has no visible spots. However, a nurse that should use it as a bandage would consider it free of dirt only if it is sterilized. We conclude that the lower bound P_{min} of the scale for partial adjectives such as *dirty* is determined by the context.¹¹

Now that we have described the proposed scales of total and partial adjectives, let us consider the *standard values* of these adjectives. Similar to other theories of adjectives, we propose that the d_P standard of partial adjectives is contextually determined to be some value in the *closure* of the scale S_P .¹² However, quite similarly to Cruse’s assumption, we propose that the d_T standard of total adjectives is fixed to the lower bound P_{min} of the respective partial scale in the given context. This is formally expressed as follows, where \overline{S} denotes the closure of a scale S .

$$(24) \quad d_P \in \overline{S_P} \quad d_T = P_{min} \in \overline{S_T},$$

where both d_P and d_T are finite.

This assumption is motivated by our initial intuition in (8): being in the denotation of the positive form of a total adjective, but not of a partial adjective, entails zero amount of the relevant property. As mentioned above, this is not necessarily the absolute zero,

¹¹Note that P_{min} has no constant position in relation to the total scale. This means that the minimal amount of P -ness is not in a constant distance from the maximal amount of T -ness, and this distance is contextually determined. However, in Subsection 5.1, we will revise this and assume that P_{min} is the maximal amount of T -ness, so its location will be constant relative to the T scale, although its absolute location is contextual, for reasons that were mentioned above.

¹²A closure in R of a set $A \subseteq R$ is the smallest closed subset \overline{A} of R that contains A . For intervals we have that the closure of an interval that is bounded by a contains a if (and only if) a is finite. For instance: $\overline{[2, 3)} = [2, 3]$ but $\overline{[2, \infty)} = [2, \infty)$.

but the minimal amount P_{min} that is relevant in the given context. Thus, a dress as in the above example can be in one of three stages concerning its dirtiness: it can be dirty, free of dirt or somewhere in-between the two stages. Our assumption that $d_T = P_{min}$ means that at the moment we start to consider a dress as being free of dirt – at the lower bound P_{min} of the S_P scale – we immediately start to consider it to be clean. At this stage it is no longer located on the scale of dirtiness. One prediction of this account is that when two dresses are clean it is impossible to accept comparative sentences such as *dress A is dirtier/less dirty than dress B*. The reason is that when a dress is outside the scale for *dirty*, no comparison in terms of dirtiness is expected to be possible. By contrast, we expect that sentences such as *dress A is cleaner/less clean than dress B* should in principle be acceptable when both dresses are dirty (at least in certain circumstances). This agrees with an observation of Seuren (1978) concerning the so-called *positive* and *negative* adjectives, and with the Bierwisch’s (1989) account for *evaluative* adjectives. For instance, Seuren claims that *Mary is taller/less tall than John* does not entail that Mary is tall. By contrast, he claims that *Mary is shorter/less short than John* does entail that Mary is short. If these observations are correct they point to a generalization: total adjectives are positive whereas partial adjectives are negative. We leave the exploration of this hypothesis and the status of its empirical predictions to further research.¹³ For more on the positive/negative

¹³This generalization may pose some problems that we will not tackle in this work. One difficulty involves pairs such as *unnecessary/necessary* and *improbable/probable*, where the negative adjective (*unnecessary, improbable*) may be the total one. It is not clear to us that this is indeed the case, because *almost unnecessary/improbable* are not completely acceptable for all speakers. Another potential problem, pointed out to us by Chris Kennedy (p.c.), concerns the possibility of comparison between two entities when one is in the denotation of a total adjective and the other is in the denotation of the partial adjective. For instance, strictly speaking the following sentence is true if it is discovered that the red shirt is dirty and the blue shirt is clean.

- (i) The red shirt is dirtier than the blue shirt.

This goes against the expectation of the proposed theory. However, if sentence (i) is uttered out-of-the-blue, it does seem to imply that both shirts are dirty. Moreover, it is quite strange to utter (i) in conjunction with an explicit statement about the dirtiness of the blue shirt (cf. *#the blue shirt is clean, and the red shirt is dirtier*). Therefore, it may be natural to assume that (i) can be acceptable when the blue shirt is clean only if there is a change of the standard value. Thus, if the blue shirt is considered clean, it is no longer so according to the standard value for cleanliness as evoked by (i). This hypothesis should of course be supported by further evidence.

distinction between adjectives see Kennedy (2000) and Winter (2001).

According to these assumptions about the scale structure of total and partial adjectives and the standard convention (18), the denotation of *P/T* adjectives are the following.

$$\begin{aligned} \llbracket P \rrbracket &= \{x \in S_P : R_P(d_P, x)\} \\ &= \{x \in (P_{min}, P_{max}) : d_P \leq x\} \\ \llbracket T \rrbracket &= \{x \in S_T : R_T(d_T, x)\} \\ &= \{x \in [T_{max}, T_{min}) : d_T \geq x\} \\ &= [T_{max}, d_T] \end{aligned}$$

There are three possibilities for the denotation of *P*:

$$\llbracket P \rrbracket = [d_P, P_{max}): \quad \text{if } P_{min} < d_P < P_{max};$$

$$\llbracket P \rrbracket = (d_P, P_{max}): \quad \text{if } d_P = P_{min};$$

$$\llbracket P \rrbracket = \emptyset: \quad \text{if } d_P = P_{max}.$$

Thus, whenever the denotation of a partial adjective is not empty, it is an interval that is open from at least one of its ends. By contrast, the interval that is denoted by a total adjective is uniformly closed from both its ends. Consequently, when $d_T = T_{max}$ the denotation of the total adjective is simply a point, but a partial adjective never denotes a point. This derives Cruse's account as a special case of the present theory. However, the proposed distinction between total and partial adjectives is more general than Cruse's.

Finally, we should mention that the scale structure that was proposed above accounts for antonymy entailments. For instance, consider the following entailments:

(25) a. The towel is wet \Rightarrow The towel is not dry.

b. The towel is dry \Rightarrow The towel is not wet.

In order to capture these entailments, we have of course to treat the semantics of negation of adjectives in their positive form. A simple way to achieve that is to map the set of degrees in the denotation of a positive form *A* to the set of entities having these degrees. For instance, the set of degrees in the denotation of *dry* can be mapped to the set of objects that have these degrees of dryness. The negation of *A* then standardly denotes the complement of this set. The antonymy entailments above are directly then explained by the fact that the intervals that are denoted by total and partial adjectives are always

disjoint. In case that $d_P > d_T$, the intervals are disjoint, and furthermore have an interval separating between them. In case $d_P = d_T$, the intervals are disjoint since d_P is not included in S_P and thus not included in the denotation of A . In this case the denotations of the adjectives are *complementary*: any entity that can be measured for dryness is either in the denotation of *dry* or in the denotation of *wet*.

4.3 Scale structure and the cross-categorial modifier *almost*

We can now describe the operation of the modifier *almost* in the proposed scale structure of adjectives. First a straightforward observation. As noted in virtually any account of *almost* (see Hitzenman (1992), Morzycki (2001), Rapp and Von-Stechow (1999), Sevi (1998) and others) *almost* is a cross-categorial modifier. For instance: in (26a) below *almost* modifies a noun phrase (or a determiner), in (26b) it modifies a verb (or a verb phrase) and in (26c) it modifies an adjective.

- (26) a. Almost every/no student came.
 b. Bill almost missed the train.
 c. The work is almost complete.

Thus, any semantics that is proposed for this item should be compatible with its behavior across categories, and semantically speaking, this behavior is remarkably uniform. Consider first the following entailments of the sentences in (26).

- (27) a. Almost every/no student came \Rightarrow It is not the case that every/no student came.
 b. Bill almost missed the train \Rightarrow Bill didn't miss the train.
 c. The work is almost complete \Rightarrow The work is not complete.

We see that simple sentences with *almost* entail their negation. This is accounted for if *almost* cross-categorially denotes a *co-restrictive* modifier. For instance, in (27a), *almost* can be viewed as denoting a function from generalized quantifiers to generalized quantifiers.¹⁴ Standardly, the noun phrase *almost every student* denotes a set of sets of entities (=a generalized quantifier): the sets that include a relatively big subset of the students, but not all of them. Trivially, this set of sets is included in the standard denotation of the

¹⁴On generalized quantifier theory, see Barwise and Cooper (1981) and Keenan and Westerståhl (1996).

noun phrase *not every student*, which includes all the sets of entities that do not include all the students. Similarly in (27c), according to the present theory and most other degree-based theories of adjectives, *almost* should denote a function from intervals on a scale to intervals on the same scale. The predicate *almost A* denotes an interval on S_A which is included in $S_A \setminus \llbracket A \rrbracket$ – the complement of *A*'s denotation.¹⁵

Formally, we can assume that *almost* cross-categorially denotes a *boolean* modifier – a function from a boolean algebra to itself. Co-restrictiveness of such functions is defined as follows.

- (28) **Co-restrictive functions:** For every boolean algebra A with a domination relation \leq and a complementation operator \neg , a function $f : A \rightarrow A$ is called *co-restrictive* iff for every $x \in A$: $f(x) \leq \neg x$.

This is a complementary notion to that of *restrictive* functions, which are defined below.

- (29) A function $f : A \rightarrow A$ is called *restrictive* iff for every $x \in A$: $f(x) \leq x$.

For more on these boolean notions, see Keenan and Faltz (1985). Only few modifiers in natural language are co-restrictive like *almost*, whereas many of them are restrictive. For instance, the higher-order modifier *very* (as in *very early*) and the adverbial or adjectival modifier *early* (as in *came early*, or *early train*) are both restrictive modifiers.¹⁶

Getting back to the modifier *almost*, while its co-restrictiveness is simple and familiar, let us observe a more complex property of this modifier. Consider the following entailments with total adjectives.

- (30) Mary is healthy; John is almost healthy
 \Rightarrow Anyone who is healthier than John and less healthy than Mary is either healthy or almost healthy.

- (31) Your explanation is clear; My explanation is almost clear
 \Rightarrow Any explanation that is clearer than mine and less clear than yours is either clear or almost clear.

¹⁵We do not address here the interpretation of *almost* as a verb (phrase) modifier in (27b), because that would require a digression into the semantics of the VP, which is beyond the scope of this work.

¹⁶Many modifiers, especially intensional ones, are neither restrictive nor co-restrictive. For instance, the sentence *John is hopefully a good student* does not entail that John is a good student, and it does not entail that John is not a good student. Hence, the (sentential or predicational) modifier *hopefully* is neither restrictive nor co-restrictive.

These examples illustrate that for an adjective A and an entity x that is *almost A*, x must be A -er than anything that is neither A nor *almost A*. This property of *almost* means that the interval denotation of *almost A* should be below the interval denotation of A and adjacent to it.¹⁷

Another fact that should be noted is that in our theory, *almost A* is always on the scale S_A . This is motivated by the fact that whenever we claim that an entity x is *almost A*, we implicitly compare its degree of A -ness to other degrees. Thus, x should have a degree on S_A . For example, if John is *almost naked* then he is less naked than anyone who is in the denotation of the positive *naked* and more naked than any degree that represents lack of nakedness. Thus, John must have a degree of “nakedness” – one that is placed on the scale associated with the adjective.

We conclude that *almost A* should denote a short interval in the scale S_A , which is disjoint to the denotation of A but adjacent to it from below. We assume that this interval is open from both ends, like the scale of partial adjectives.¹⁸ *Almost A* should denote an interval (rather than a point) because entities in its denotation, like entities in the denotation of the positive form of partial adjectives, are uniformly comparable. For instance, although entities in the denotation of the adjective *complete* are not always comparable, as was exemplified above by the infelicity of (21), the adjectival phrase *almost complete* behaves differently. Witness the acceptability of the following example in contrast to (21).

- (32) Both your painting and my painting are almost complete, but your painting is more complete than mine.

The assumptions that were made above concerning the scale structure of T/P adjectives and the semantics of *almost* are summarized in Figure 3.

¹⁷A similar property of *almost* can be observed with other categories. For instance, consider the following entailment, with *almost* as an NP (or determiner) modifier.

- (i) Every student came; Almost every student came very early
 \Rightarrow Every student or almost every student came early.

The analysis of this cross-categorial property of *almost* is deferred to further research.

¹⁸Note that the interval denotation of *almost A* must be open from above for any adjective A , because by our definition the denotation of A is always closed from below whenever $d_A \neq A_{min}$. As we shall see below, when $d_A = A_{min}$, *almost A* is undefined (or empty).

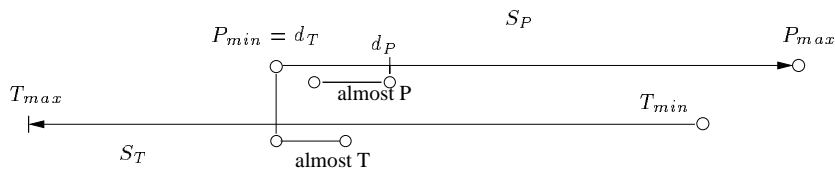


Figure 3: total and partial adjective scales with the modifier *almost*

4.4 Recapitulation: the semantics of *almost* with total and partial adjectives T

We can now see how the proposals above are combined to account for the facts that were observed in subsection 3.2 concerning the behavior of the modifier *almost* with total and partial adjectives.

Let us first examine the acceptability of total and partial adjectives when they are modified by *almost*. For any *total* adjective T , the denotation of *almost T* is always well defined independently of contextual effects on the standard value d_T (which is invariably P_{min}). This is since the standard value $d_T (= P_{min})$ is always different than T_{min} , so there can always be room for a (short) interval denotation of *almost T* in the open interval (d_T, T_{min}) . This accounts for the acceptability of sentences with total adjectives as in (9) and (11)-(15) (e.g. *the glass is almost clean*), which are OK independently of context. By contrast, the denotation of *almost P*, where P is a partial adjective, is well defined if and only if $d_P > P_{min}$. Thus, for *almost P* to be acceptable the interval $(P_{min}, d_P) = (d_T, d_P)$ in S_P should not be empty, which means that entities can be neither P nor T . This accounts for the uniform acceptability of the sentences in (10) (e.g. *the glass is almost dirty*) in contexts where T/P pairs are non-complementary. It also explains the unacceptability of the *almost P* constructions in (9) (e.g. **the work is almost incomplete*), where the adjectives are complementary.

Let us consider now the truth-conditional phenomena we discussed in subsection 3.2. Whether *almost T* contradicts P or not is contingent on the standard value d_P . This accounts for the generalization in (16b), which as we saw describes the uniform felicity of conjunctions such as *wet but almost dry* in (11)-(15). By contrast, we have already seen that in our theory, for *almost P* to be acceptable it must denote an interval that is disjoint from the denotation of T . This accounts for generalization (16a), which as we saw

describes the infelicity of constructions such as *satiated but almost hungry* in (11)-(15).

4.5 Applying the theory to other kinds of adjectives¹⁹

The theory described in the previous subsections is not sufficient as a theory of the acceptability of *almost* with adjectives that are neither total nor partial. We will refer to such adjectives as *relative* adjectives, adopting the terminology of Kennedy and McNally (2002). A typical example of relative adjectives is the pair *tall* and *short*. In normal contexts, *tall* and *short* are not complementary, and hence the standard values d_{tall} and d_{short} are usually assumed not to be equal. According to our theory, from this fact it should follow that *almost tall* and *almost short* are acceptable without any contextual support, since there is enough room on the adjective scale to include the interval *almost A* before the standard. This, however, is not the case for many speakers, who consider the sentences in (33) unacceptable or at least strange (cf. Cruse's examples in (4)).

- (33) a. #John is almost tall.
b. #John is almost short.

Relative adjectives, however, can become acceptable with *almost* when the standard value is made explicit by the context. Consider, for instance, the following sentence:

- (34) A tall basketball player is someone above 2.00 meters high, John is 1.98 meters, so he is almost tall.

Hence, there must be some restrictions on scale structure in addition to the existence of a "mid-interval", which are responsible for the (un)acceptability of *almost A*. We propose that these restrictions are related to the *default* location of the standard value on the scale. Assume that any adjective may be associated with a default "typical" standard value. For total adjectives T , we have already claimed that their constant standard value is P_{min} , the minimal degree of P -ness on scale of the partial antonym of T . By contrast, relative adjectives normally come without any predetermined standard value. For instance, also when the standard value for *short* is known, the standard value for *tall* remains vague,

¹⁹Thanks Chris Kennedy for his remarks on the topic of this subsection, and for his proposal for extending our theory to non-T/P pairs, on which it is based.

since *tall* and *short* are not complementary. The case is different with partial/total adjectives, even with non-complementary pairs such as *wet/dry*, *sick/healthy* or *dirty/clean*. As we have seen, these pairs are not complementary in all contexts, but it is quite natural to assume that in normal contexts they are. This assumption is supported by contrasts like the following ones, between *sick/healthy* and *tall/short*.

- (35) a. John is not tall; moreover/?therefore, he is short.
 b. John is not sick; therefore/?moreover, he is healthy.

We may assume, following the stronger assumption of Cruse, that total/partial adjectives, unlike antonymous relative adjectives, are (at least) *weakly complementary*. That is to say, without contradicting information, they are complementary. Consequently, we assume that any partial adjective P has a default standard value P_{min} , identical to the standard d_T of its total antonym. This default standard value can be overridden by the context, as illustrated by the examples in (10). However, the contextual information in these examples explicitly modifies the standard value of the partial adjective. This hypothesis is compatible with an observation by Hitzenman (1992), that *almost* is acceptable with categories which have clear boundaries. To sum up, we now propose two conditions for the acceptability of *almost* modification with adjectives:

- (36) a. The interval *almost A* is located on the scale below the standard value of A .
 b. The standard value of A is its default value (if there is any) or else it is otherwise recoverable by the context.

Getting back to the claims made so far, we argue that total adjectives have a constant standard, which always allows room on the scale for the *almost T* interval. This is why sentences such as *The towel is almost dry* are acceptable regardless of context. Partial adjectives have a default standard value (P_{min}) that does not leave room for an *almost P* interval. This is why sentences like *The towel is almost wet* are strange when uttered out of the blue. However, when the context forces the standard value to be higher than P_{min} , *almost P* becomes acceptable. This is the case in contexts such as *The towel is very moist... it is almost wet*. Relative adjectives do not have default standard values, thus in ‘normal’ contexts they are incompatible with *almost*. However, when the context provides an explicit standard value, as exemplified by (34), also relative adjectives can become compatible with *almost*.

5 More observations about total and partial adjectives

This section studies more phenomena that will be argued to be related to the meaning and scale structure of total and partial adjectives: the modifiers *slightly* and *completely*, the comparatives *more ... than* and *as ... as* and exceptive constructions with the expression *except for*.

5.1 The modifiers *slightly* and *completely*

Let us first observe that in some cases, the modifier *slightly* is clearly more acceptable with partial adjectives than it is with total adjectives. Consider for instance the following contrasts.

- (37)
- a. The work is slightly incomplete/*complete.
 - b. The argument is slightly imperfect/*perfect.
 - c. The jar is slightly cracked/*whole.
 - d. The line is slightly curved/*straight.
 - e. The child is slightly sick/*healthy.
 - f. The claim is slightly unclear/*clear.

This is also the case with many other pairs of T/P adjectives. However, there are some total adjectives that felicitously appear in constructions with *slightly* and do not show such a clear contrast with their partial counterparts. Consider the following examples.

- (38)
- a. The door is slightly closed/open.
 - b. The man is slightly satiated/hungry.
 - c. The towel is slightly dry/wet.
 - d. The glass is slightly clean/dirty.

In order to explore this acceptability variation of T/P adjectives with *slightly*, let us first consider the natural mismatch between *slightly T* and *completely T*, (also in acceptable cases of *slightly T*), which is illustrated by the following examples.

- (39)
- a. ?The door is slightly closed and it is completely closed.

- b. ?The door is slightly open and it is completely open.
- c. ?The towel is slightly dry, and it is completely dry.
- d. ?The towel is slightly wet, and it is completely wet.

The examples in (39) suggest the following generalization: *slightly A* entails *not completely A*. Another fact concerning *completely* is that many speakers have the intuition that for an antonym pair *A* and *B*, *completely A* means *no amount of B*, if a zero amount of *B* is meaningful. This is suggested by the contrasts in (40).

- (40)
- a. #The two towels are completely dry but the red one is (a little bit) wetter than the blue one.
 - b. The two towels are completely wet but the red one is (a little bit) drier than the blue one.
 - c. #The kitchen and living room are completely clean, but the kitchen is (a little bit) dirtier.
 - d. The kitchen and living room are completely dirty, but the kitchen is (a little bit) cleaner.

For partial adjectives, the concept of "zero amount" is very clear: it is just the meaning of the total antonym. Total adjectives, on the other hand, do not have a clear lower bound, and even if they do, it is not linked to the notion of the partial adjective. Intuitively, it is clear that while the modifier *slightly* pertains to small degrees in the relevant scale, *completely* pertains to large degrees on the scale²⁰. For *completely* we assume that the standard value of "completeness" on a scale S_A is a degree d_A^C in the closure of S_A that is greater than or equal to the standard value d_A , as officially stated in (41) below.

²⁰As mentioned by Kennedy and McNally (2002), *completely* has two meanings. One refers to the end of the scale, as in *The room is completely clean*, and the other is similar to *very*, as in *The story is completely boring*. We note that the first meaning is compatible with total adjectives, while partial adjectives that accept the use of *completely*, usually get the second meaning. Kennedy and McNally propose that the scale structure of adjectives *A* that get the first meaning is closed from above, and that this end-point is the degree that denotes *completely A*. This agrees with our account, since such adjectives are assumed to have a constant standard d_A^C which is fixed at the end point of the scale. However, since we would like our account to cover also the other usage of *completely* (e.g. with partial adjectives), we use the standard value for *completely* as a general assumption.

$$(41) d_A^C \in \overline{S_A}, \text{ where } R_A(d_A, d_A^C) \text{ holds.}$$

The denotation of the construction *completely A* is determined using this standard value, in analogy to the way the denotation of the positive form of the adjective *A* is determined in (18) above.

$$(42) \llbracket \textit{completely A} \rrbracket \stackrel{def}{=} \{x \in S_A : R_A(d_A^C, x)\}$$

After making these simple assumptions, let us make our main assumptions regarding the modifiers *slightly* and *completely*, and two antonymous adjectives *A* and *B*.

- (43) a. The denotation of *slightly A* is an interval open at one end (of some arbitrary length) at the beginning of the denotation $\llbracket A \rrbracket$ on the scale S_A .
- b. The standard value d_B^C for the minimal point in the denotation of *completely B* is identical to the point A_{min} whenever A_{min} is finite.

These assumptions about *completely* and *slightly* are formally summarized below.²¹

(44) For any adjective *A* with an antonym *B*:

$$\llbracket \textit{slightly A} \rrbracket \stackrel{def}{=} \{x \in S_A : R_A(d_A, x) \wedge R_A(x, d_A^{Sl}) \wedge x \neq d_A^{Sl}\},$$

where $d_A^{Sl} \in S_A$ satisfies $R_A(d_A, d_A^{Sl}) \wedge R_A(d_A^{Sl}, d_A^C) \wedge d_A \neq d_A^{Sl} \wedge d_A^{Sl} \neq d_A^C$

$$\llbracket \textit{completely A} \rrbracket \stackrel{def}{=} \{x \in S_A : R_A(d_A^C, x)\},$$

where $d_A^C \in \overline{S_A}$ satisfies $R_A(d_A, d_A^C)$, and $d_A^C = B_{min}$ if B_{min} is finite.

These definitions above account for the acceptability of so many partial adjectives with *slightly*, and the unacceptability of so many total adjectives with it. The scale of partial adjectives is always an interval, and can not be a point. This is why *slightly P* can always denote an interval. The denotation of total adjectives, on the other hand, can be a point, which captures the intuition of many speakers that *total* is equivalent to *completely total*.

The assumption that d_T^C is now equal to P_{min} (which was equal to d_T in the original version of the theory) accounts for the difficulty that many speakers have in teasing apart the meaning of a total adjective *T* from the meaning of *completely T*. For instance, consider the following contrasts.

²¹We would like to thank Roger Schwarzschild for his very careful review of this section, which helped us to avoid some problems in a previous version.

- (45) a. ?The line is straight but not completely straight.
 b. ?The child is healthy but not completely healthy.
 c. ?The claim is clear but not completely clear.

These contrasts are accounted for by the fact that for the adjectives *straight*, *healthy*, *clear* most of the speakers presuppose that $d_T = d_C^T$, which is a special case of our theory. However, now that we have assumed that $d_T^C = P_{min}$, we can change our previous assumptions and let d_T be “smaller” than P_{min} (according to R_T): we only require that $R_T(d_T, d_T^C)$ holds as with other adjectives. The assumption $d_T^C = P_{min}$ can *replace* the assumption $d_T = P_{min}$ (We will have to also make the trivial assumption that $d_P > d_T$, so that the adjectives will remain antonyms). This scale structure also accounts for the contrasts in (40), since the denotation of *completely T* is all outside the P scale, while the denotation of *completely P* can overlap the T scale if the T scale is of infinite length.

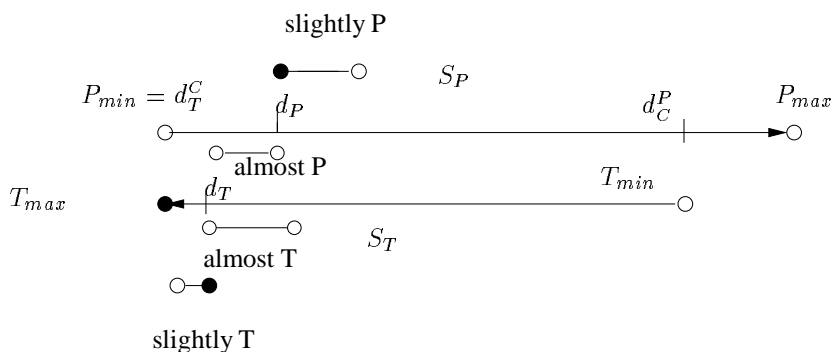


Figure 4: all modifiers

This revised proposal makes the following generalization: a total adjective T is acceptable with *slightly* (only) in contexts where the interpretation of *completely T* is different from the interpretation of T . Thus, the contrast between total adjectives like *perfect* that are unacceptable with *slightly* (cf. (37)) and total adjectives like *closed* that are acceptable with *slightly* (cf. (38)), is accounted for as a result from the fact that in normal situations *completely perfect* is semantically identical (to the degree of pragmatic anomaly) with *perfect*, whereas *completely closed* is not identical with *closed*. A related result of the revised treatment, in combination with our assumptions about *almost*, is the correct prediction concerning the acceptability of sentences like the following.

- (46) The door is closed but not completely closed: it is almost open (slightly closed).

(47) The man is satiated but not completely satiated: he is almost hungry (slightly satiated).

We expect that any speaker that accepts a sentence such as *x is T but not completely T* might also accept in the same situation the claim *x is almost P*. See also Sevi (1998) for a similar analysis of the modifiers *almost* and *barely*. This point may have further implications for the scale structure of *completely*, *slightly* and total and partial adjectives, but we have to leave further investigations of this point to future research.

5.2 Some notes on comparatives, modifiers and exceptive constructions

It is reasonable to expect that the notions of totality and partiality play a role not only in the semantics of simple adjectives but also with more complex constructions. In this section we give a brief overview of two phenomena that seem to be of relevance to this issue: modification of comparatives and exceptive modification of adjectives. We will not attempt to provide here a general theory of these phenomena, but only to point out some possible implications for future work. We will also take another look at the modifiers *almost*, *completely* and *slightly*, this time when playing the role of the modified construction.

5.2.1 Modified comparatives

The comparatives *as .. as*²² and *more .. than* have properties that are similar to those of total and partial adjectives, respectively. For instance, in (48) and (49) below we see that *almost/exactly* and *slightly* are in complementary distribution with the comparatives *as old as* and *older than*, similar to the distribution of *almost/completely* and *slightly* with many total and partial adjectives.

- (48) a. John is almost/exactly as old as Bill.
b. John is ?almost/#exactly older than Bill.

²²Sentences such as *John is as old as Bill* have two interpretations in English: *John is exactly as old as Bill*, and *John is at least as old as Bill*. We will only consider to the first interpretation. In Hebrew the parallel comparative *kmo* (= ‘like, as...as’) has only the first meaning.

- (49) a. John is slightly older than Bill.
 b. #John is slightly as old as Bill.

It is natural to assume that the comparative *as..as* x denotes a point that represents the degree of x on the relevant scale. This may be the reason why it is felicitous with *almost* and *exactly*, and unacceptable with *slightly*. The comparative *more..than* x is an interval that does not include the degree of x , much like a partial adjective. As with partial adjectives, this modifier is not felicitous with *almost*, unless there is an explicit contextual support. For example, the sentence *John is not taller than Bill, but he is almost taller than him: they have the same height* can be acceptable, even though speakers will probably prefer to simply say that John is exactly as tall as Bill. The modifier *exactly*, on the other hand, is not felicitous with *more..than* in any context. *Exactly* can be thought of as the parallel of *completely* as denoting the end of a scale. Like partial adjectives, *more..than* is felicitous with *slightly*, while *as..as* is not, like most total adjectives.

5.2.2 Exceptive modification

Another distinction between total and partial adjectives concerns the construction *except for*. Consider the following sentences.

- (50) a. John is healthy except for an occasional flu.
 b. #John is sick except for his healthy leg.
- (51) a. The poem is complete except for the last stanza.
 b. #The poem is incomplete except for the first three stanzas.

As in the case of *almost* and *slightly*, there are sentences with partial adjectives and *except for* that are acceptable. But then truth-conditional contrasts appear between total and partial adjectives. Consider the following examples.

- (52) a. The road is dangerous except for a safe straight part at its end \Rightarrow The road is not safe.
 b. The road is safe except for some very dangerous curves \nRightarrow The road is not dangerous.

Previous works on exceptive constructions (Hoeksema (1996), Lappin (1996), Moltman(1995), Von-Fintel (1993) and others) argue that these items are compatible with universal quantification but not with other forms of quantification. Yoon (1996) independently conceives of total predicates as being “universal” and partial adjectives as being “existential”. This intuition may help to account for the distribution of exceptive constructions with T/P adjectives, but the exact way this can be achieved within our system still requires further research.

5.2.3 Almost, Slightly and Completely - another point of view

In previous sections, we discussed the interaction of the modifiers *almost*, *slightly* and *completely* with total and partial adjectives. Let us now briefly examine the behavior of *almost A*, *slightly A* and *completely A* as modified constructions, in terms of their “totality” or “partiality”. It is intuitively clear that *completely A* is a total construct, since it is acceptable with *almost* but not with *slightly*. This is illustrated in (53).

- (53) a. The towel is almost completely dry.
 b. #The towel is slightly completely dry.

The modifiers *slightly* and *almost*, however, seem to be neither partial nor total. This is demonstrated by the following examples:

- (54) a. #The towel is almost slightly wet.
 b. #The towel is slightly slightly wet.
 c. #The towel is slightly almost dry.
 d. #The towel is almost almost wet.

These facts can possibly be explained by an extension to the theory proposed in this work. Note that the denotation of *completely A* is very similar to that of a total adjective. It is an interval that can be reduced into a point. The denotations of *slightly A* and *almost A*, however, are not similar to denotations of adjectives. They are intervals that can not be infinite (unlike partial adjectives) and also can not be reduced into points (unlike total adjectives). A more comprehensive analysis of total and partial constructs might use these facts as a starting point.

6 Conclusions

In this paper we have aimed to show that the intuitive distinction between total and partial adjectives is reflected in various linguistic contexts with modifiers like *almost*, *slightly* and *completely*. It was shown that this distinction can be explained in an elegant way using simple assumptions about the different *scale structures* of these adjectives and their modification process. According to the proposed theory, the main difference between total and partial adjectives is in the possible location of the standard value on the scale: while with partial adjectives the standard value can fall anywhere on the scale, with total adjectives the standard value is constant as the minimal value of the partial adjective's scale. We have seen how this basic distinction accounts for a variety of phenomena that motivate more general and refined theoretical developments. We believe that these developments, and the study of modification processes in general, can lead to a broader picture of the semantics and typology of adjectives.

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References

- Barwise, J. and Cooper, R. (1981). Generalized quantifiers and natural language. *Linguistics and Philosophy*, 4:159–219.
- Bierwisch, M. (1989). The semantics of gradation. In Bierwisch, M. and Lang, E., editors, *Dimen-*

- sional Adjectives*. Springer-Verlag, Berlin.
- Cruse, D. (1980). Antonyms and gradable complementaries. *Perspektiven der Lexikalischen Semantik: Beiträge zum Wuppertaler Semantikkolloquium vom 2-3*, pages 14–25.
- Cruse, D. A. (1986). *Lexical Semantics*. Cambridge University Press, Cambridge.
- Hitzenman, J. (1992). The selectional properties and entailments of almost. *Papers from the 28th regional meeting of the Chicago Linguistic Society, CLS28*, pages 225–238.
- Hoeksema, J. (1996). The semantics of exception phrases. In van der Does, J. and van Eijck, J., editors, *Quantifiers: Logic and Language*, pages 145–177. CSLI Publications, Stanford.
- Keenan, E. and Faltz, L. (1985). *Boolean Semantics for Natural Language*. D. Reidel, Dordrecht.
- Keenan, E. and Westerståhl, D. (1996). Generalized quantifiers in linguistics and logic. In van Benthem, J. and ter Meulen, A., editors, *Handbook of Logic and Language*. Elsevier, Amsterdam.
- Kennedy, C. (2000). Polar opposition and the ontology of 'degrees'. *Linguistics and Philosophy*, 24:33–70.
- Kennedy, C. and McNally, L. (1999). From event structure to scale structure: degree modification in deverbal adjectives. In *Proceedings of Semantics and Linguistic Theory, SALT9*.
- Kennedy, C. and McNally, L. (2002). Scale structure and the semantic typology of gradable predicates. unpublished ms.
- Klein, E. (1980). A semantics for positive and comparative adjectives. *Linguistics and Philosophy*, 4:1–45.
- Lappin, S. (1996). Generalized quantifiers, exception phrases and logicity. *Journal of Semantics*, 13:197–220.
- Moltmann, F. (1995). Exception sentences and polyadic quantification. *Linguistics and Philosophy*, 18:223–280.
- Morzycki, M. (2001). Almost and its kin, across categories. In *Proceedings of Semantics and Linguistic Theory, SALT11*.
- Rapp, I. and Von-Stechow, A. (1999). Fast 'almost' and the visibility parameter for functional adverbs. *Journal of Semantics*, 16.2:149–204.
- Rossdeutcher, A. and Kamp, H. (1992). Remarks on lexical structure, drs-construction and lexically driven inferences. *Arbeitspapiere des Sonderforschungsbereichs*, 340.
- Schwarzchild, R. and Wilkinson, K. (2002). Quantifiers in comparatives: A semantic of degree based on intervals. *Natural Language Semantics*, 10:1–41.
- Seuren, P. A. M. (1978). The structure and selection of positive and negative gradable adjectives. In Farkas, D. et al., editors, *Papers from the Parasession on the Lexicon, CLS14*. University

of Chicago.

Sevi, A. (1998). A semantics for almost and barely. Master's thesis, Tel-Aviv University, Tel-Aviv.

Von-Fintel, K. (1993). Exeptive constructions. *Natural Language Semantics*, 1.2:123–148.

Winter, Y. (2001). Measure phrase modification in Vector Space Semantics. In *Proceedings of WCCFL 20*. can be downloaded from <http://www.cs.technion.ac.il/winter/>.

Yoon, Y. (1996). Total and partial predicates and the weak and strong interpretations. *Natural Language Semantics*, 4:217–236.

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