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59. Adjectives

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Abstract

This chapter focuses on the main characteristics of the semantic category adjective. It presents basic classifications of adjectives in formal semantics and current lines of debate regarding classes of adjectives and their semantic analysis.

In section 1 the standard definition of adjectives as predicates, functions from entities to truth values (type $\langle e,t \rangle$), is introduced. Section 2 addresses the morphosyntactic and semantic properties characterising adjectives: they are modifiers, they are gradable, and show independence of the object. In section 3 the distinction between predicative and attributive adjectives is established and qualified in terms of syntactic position, semantic type (S/N vs. CN/CN) and rules for interpretation (predicate conjunction vs. function analysis). The distinction intersective / non-intersective adjective is explained. Section 4 provides a new analysis of the semantics of adjectives in terms of scales, degrees, standards/norms and boundedness. Adjectives are taken to be type $\langle e,d \rangle$ and they can be relative or absolute. Relative adjectives have an extension that depends on a standard and a comparison class, they give rise to vagueness. Absolute adjectives do not depend on an external norm, they have closed scales which can be lower closed or upper closed. Colour and relational adjectives as well as non-gradable modal and frequency adjectives are finally described.

1. The semantic category adjective

In a common sense ontology of things in the world adjectives can be defined as the class of words that express properties, while verbs and nouns represent, respectively, events and entities (Croft 1991). In more strict terms it could be said that adjectives denote qualities, verbs encode activities / processes, accomplishments, achievements and states (Vendler 1967) and nouns denote 'natural classes' (Carlson 1980).

It is not easy to give a simple semantic definition of adjective. In categorial grammar the three classes of words function as predicates since they express in the majority of cases one-place properties. More strictly, if we take the definition of categories as based on a system of semantic types derived from entities and truth values, adjectives ought to be considered (in an extensional semantics) as functions from entities to truth values, (1c). The same characterization will hold for the intransitive verb in (1a) and the non-relational noun in (1b):

(1)   a. Irene works – λx (works (x))

          b. Irene is a primatologist – λx (primatologist) (x))

          c. Irene is happy – λx (happy) (x))

Consequently, the characterization of adjectives as type <e,t>, (1c), cuts across the syntactic categories adjective, intransitive verb and noun such as *primatologist*. This semantic definition of adjectives as one-place properties is coherent with the fact that many languages do not have a part of speech class of adjectives, and nouns and verbs are then used to cover its prototypical functions (Dixon 1977, Croft 1991). However, the argument for the necessity to represent common sense
ontology in formal semantics is strong since in languages with a productive, open class of adjectives there are very clear general syntactic, morphological and semantic criteria distinguishing adjectives from verbs and nouns.

2. Main characteristics of adjectives

The purpose of this section is to briefly determine which are the specific morphosyntactic and semantic properties that characterize the class of adjectives. There are at least two ways to give support to the assertion that adjectives are a semantic and

syntactic category with specific properties distinct from nouns and verbs. One way is to discuss the differences between adjectives and intransitive verbs and adjectives and nouns (see Hamann 1991: §1.2, §1.3 and Baker 2003 for this discussion). The other is to present what could be called prototypical syntactic and semantic features of the category adjective (Larson & Segal 1995, Demonte 1999). Both approaches will be combined in the following short discussion about the main characteristics of adjectives.

2.1. Adjectives are modifiers

The definition of adjectives as functions from entities to truth values captures adequately the predicative use of adjectives (*This person is intelligent*). However, all authors agree that the primary function of adjectives is to modify nouns directly in structures like *an intelligent person*. As a consequence, adjectives have often been assigned to the category CN/CN. If CN is a primitive both for N and A, the complex category CN/CN defines adjectives as the category able to combine with common nouns to form new common nouns. This definition is standard among researchers working on categorial grammars (Cresswell 1991). In descriptive terms we could say that modifiers are expressions optionally added to other expressions; modifiers are therefore not required by the argument structure of the modified term, in this case, by the semantics of the nominal.

2.2. Adjectives are gradable and they are a locus for vagueness

Degrees and scales. Most adjectives can take degree modifiers like *very, terribly, too, enough, rather*, (2a), they can be used in comparative constructions, (2b), and in certain languages they accept measure phrases, (2c). *Very* is a typical adjectival modifier, and so are polarity intensifiers such as *terribly* or *lightly*.

(2)   a. A very tall man - *A very man

         b. The more happy person - *A more person

         c. Mary is two feet tall

Most degree modifiers, though, are cross categorial. Some verbs (i.e. verbs with incremental themes, Kennedy and McNally 2005) have scales similar to adjectives and share many modifiers with them (see Doetjes 2008 on this regard). Nouns are different from verbs and adjectives (see the right side of (2a) and (2b)) in that they have restrictions in the use of scalar modifiers. In many languages, for example Spanish, only plural and mass nouns accept modifiers such as *mucho/a* 'many' and partitive-like

expressions like *un montón de tomates* 'a bunch of tomatoes'. These expressions do not have a clear degree interpretation even if they calculate quantity.

Semantically speaking, then, most adjectives can be described as being intrinsically gradable predicates (Kamp 1975, Croft 1991, Larson & Segal 1995). In simple terms, the constructions in (2) mean that the properties described by the adjectives hold of their respective modified constituent (or of their subjects) 'to a certain degree'. According to Bierwisch (1989: 78) in *Hans ist gross* 'Hans is big' the gradable adjective has a contrastive interpretation, its truth conditions depend "on a contextually determined comparison class". In terms of Larson & Segal (1995: 130) it can be asserted that adjectives are in fact two place predicates one argument being a thing for which they hold true and the other an extra parameter for "delineations" (Lewis 1970), where a delineation is "a standard according to which something is judged to fall under the predicate".

In a thorough more recent treatment of gradable adjectives (in the line of Bartsch & Vennemann 1972, 1973, Bierwisch 1989, Cresswell 1976, Heim 1985, 2000, Hellan 1981, Kennedy 1999, Kennedy & McNally 2005, Klein 1991, Seuren 1973 or von Stechow 1984), Kennedy (2007) defines gradable adjectives as elements that "map their arguments onto abstract representations of measurements, OF DEGREES". He also assumes a formal notion of SCALE as a totally ordered set of degrees (formalized either as points or intervals) relative to specific dimensions (for instance cost, length and so forth) (2007: 4). This line of research analyzes gradable adjectives either as measure functions (type $<e,d>$) or as relations between individuals and degrees. Below, in §4, I will expand more on this important issue of how to provide a semantic analysis of gradable adjectives.

For the time being it has to be noted that gradability does not hold in the same way for all adjectives. Empirically, only dimensional / measure adjectives (*tall, big, long, round, heavy*), evaluative adjectives (*beautiful, industrious, good, intelligent*)—the two previous terms are due to Bierwisch (1989)— and participial adjectives derived from certain aspectual verbs (*dry, closed, empty*) can be considered strictly speaking gradable. However, these adjectives differ among themselves in the way they structure the *scale* according to which the quality is used to order the objects. They also differ as to whether they do or do not describe a relation to a context dependent *comparison class*

(the standard of comparison) that sets the norm for gradability (we will develop these issues in §4.1 below). However, various lexical classes of adjectives do not fit straightforwardly into this characterization. One example is colour adjectives like *red* or *blue*. Even if they have to be considered gradable since they accept degree modifiers and can be conceived as regions on a continuous spectrum (Sapir 1944, *apud* Barker 2002: 7), nevertheless, they differ from other gradable adjectives, on the one hand, with respect to the content of their scale and, on the other, in that they serve to capture quantity relations. Relational adjectives like *wooden* or *medical* are ambiguous as to gradability (see below §4.3). Privative adjectives like *fake* or *alleged* are not gradable at all.

Vagueness and ambiguity. Adjectives denote qualities and qualities are intrinsically gradable. In certain cases the lexical meaning of the adjective requires its argument to have a given degree (e.g. *empty*); in other cases, although the predicate adjective also measures some gradable concept, a 'standard of comparison' is necessary in order to apply a property to an individual. This standard plays a role in semantic interpretation introducing variation in truth conditions related to vagueness, imprecision or ambiguity. An expression containing an adjective can be said to be vague when truth conditions are undetermined (cf. article XX for a thorough treatment of the topic of Vagueness). The meaning of a vague expression depends both on the lexical meaning and on context. A sentence like (3) is a typical example of vagueness:

(3)   This is a cold cup of coffee.

The variability of meaning in (3) depends on whether we are talking about the coffee we want to drink with a croissant for breakfast or if we talk about a black coffee that is to be drunk with ice; that is, the standard for coldness varies from context to context (Kennedy & McNally 2005, Kennedy 2007).

Vagueness is different from other forms of meaning variability. In fact, in certain cases adjectives have different readings depending on the variable on which the property is predicated, and on its location. In Larson's (1995) well known example:

(4)   *Olga is a beautiful dancer*

we do not find vagueness but ambiguity, (4) can mean 'Olga dances beautifully' or 'Olga is a beautiful person and she dances'. In other words, the ambiguity of (4) seems to depend both on the gradable nature of the adjective and on the argument structure of

the N *dancer*, where the presence of an event argument can be hypothesized. Observe that such an ambiguity disappears in *Olga is a beautiful French woman* since *French woman* does not contain an event argument (see below §3.2).

2.3. Independence of the object

The ability to be a modifier and the nature of gradable predicates exhibited by adjectives are strongly related to another semantic characteristic of this class of words that, following Dixon (1977) as well as Larson & Segal (1995), we will refer to as 'independence of the object'. In expressions like *the yellow flower* or *This flower is yellow* the semantic contribution of the adjective is to assert that a given feature applies to a given object; it is used to describe and/or distinguish objects that are referred to by a single common noun. In other words, semantically adjectives apply to terms able to identify objects, to expressions bearing referential indices (Baker 2003: 112, 191). They do not identify objects, they ascribe properties to entities. In a similar sense, Hamann (1991: 660), based on Dixon (1977), notes that the properties referred to by adjectives are not 'non- criterial' ones but only 'additional' ones. Among the most important properties expressed by adjectives are size, colour, value, age, etc.

3. Attributive and predicative adjectives and classifications of adjectives in formal semantics

The previous section has assumed without further qualification that there is a distinction between predicative and attributive adjectives. This distinction will now be qualified in terms of syntactic position, type (or meaning) and rules used for adjective interpretation.

Syntactically, adjectives are predicative in copular sentences (*The* man *is clever*) and attributive inside NP's (*the clever man*). Predicative adjectives are S/N (semantic type $<e,t>$), that is, they denote functions from entities to truth values. The simplest interpretation of adjectives in predicate position is that they are extensional and denote set intersection. In this use two set denoting expressions, N and A, are combined to form a complex set-denoting expression. In other words, *The man is healthy* is interpreted using predicate conjunction, that is, the intersection between the set of beings which are *healthy* and the set of men.

Typically, attributive adjectives, like in *bright moon*, are CN/CN, they are functions from CN denotations to CN denotations; sometimes, they are 'intensional', namely, they do not express properties but behave like operators that modify the properties expressed by the noun as in *alleged murderer*; thus the noun phrase describes new properties. In more general terms, they take a noun to make a complex noun and are interpreted as functions mapping the meaning (intension) of a noun with which the adjective combines to that of A+N combination, the meaning of *moon* to that of *bright moon*.

In the line of Partee (1995) we will name the predicative analysis 'the conjunction analysis', and the attributive analysis 'the function analysis'. Bolinger (1967) sets up the distinction between the conjunction (or set intersection) and the function analyses in terms of referent modification vs. reference modification, respectively. We will see immediately that other semantic classifications serve better to distinguish classes of adjectives and semantic interpretations.

Actually, it is evident that the two just mentioned rules serve for the interpretation of A + N combinations. It is also evident that the double distinction just reviewed does not match one to one specific semantic classes of adjectives. There is a reduced set of adjectives that can be used only predicatively (*asleep, flush, awake, ready*) and another reduced set of adjectives that cannot be predicative (*mere, main, former—the mere fact* vs. **The fact is mere*). Most adjectives admit both uses, as is well known.

To account for this situation, there have been two approaches (making in fact three lines of analysis) to the basic semantic classification of adjectives. A few authors, focusing on those languages where the distinction attribution vs. predication is morphologically marked, argue for syntactic-semantic categorial distinction between the two classes of adjectives (Siegel 1976/1980). However, most other authors propose reductionist analyses. This second type of analysis allows for two approaches: one of the two types, sometimes predicative adjectives (Bierwisch 1967, 1989, Kamp 1975), most frequently attributive ones (Cresswell 1976, Montague 1970, Heim & Kratzer 1998), is considered as basic and the other as derived. The derived type can be obtained either through meaning postulates, lexical rules of type shifting (Partee 1995, Heim & Kratzer 1998), derivation of attributive adjectives (second-order functions) from first-order properties by means of context-dependent models which sharpen the vagueness of the predicates (Kamp 1975), or through specific *attr* or *pred* operators (Hamann 1991),

among other mechanisms.

In the following subsections the advantages as well as the weaknesses of each of the three approaches will be briefly discussed. Throughout the discussion, we will introduce and try to schematize the most common classifications of adjectives in formal semantics.

A word of caution is necessary before we go any further. It is simply impossible to discuss all the nuances and technical details elaborated in the large literature on these matters. In order to simplify things and for the sake of understanding, in this chapter formal details will not be developed unless unavoidable. The reader should consult Hamann (1991) where the author traces the lengthy debates on these issues and provides interesting examples. Partee (1995) is also an illuminating, exhaustive discussion of classes of adjectives.

3.1. Two classes of adjectives

In certain languages (e.g. the West African languages of Vata and Ghadi) adjectives are used only in attributive environments. Other languages (e.g. Slave or Ika) use adjectives only in predicative constructions (see Baker 2003: 206-207 for examples of both cases). Based on similar facts and on the morphological distinction made in Russian between short-form adjectives (which are used only predicatively) and long-form adjectives (which occur both in predicate position and prenominally) Siegel (1976/1980) argues that there are two distinct adjectival categories which are each assigned one of the two basic semantic types CN/CN and S/N; in addition, some adjectives will have both versions (1976: 54):

(5)   a. Studentka umna [Short Form]

'(The) student (is) intelligent (in general, absolute terms)'

b. Studentka umnaja [Long Form]

'(The) student (is) intelligent (in her role as student)' [Siegel 1976: 11]

As noted by Baker (2003: 207), the cases that motivate Siegel's solution are the exception and not the rule. The main argument against Siegel's approach is the fact that most adjectives, without any external sign, can be both predicates and attributes in languages typologically very diverse: Romance languages, Celtic languages, Australian languages, Semitic languages, Bantu languages, etc. Moreover, adjectives with a single use have common semantic properties: exclusively predicative adjectives (*sorry, ready*)

denote very transitory properties; exclusively attributive adjectives (*main, former*) rather than contributing descriptive content provide information about when and how the context of the noun might apply to its argument.

In contrast with Siegel's approach most semanticists have sought for a unified class of adjectives taking either one or the other meaning depending on factors like presence of the copula, positioning, features of the head noun, and, crucially, their internal lexical properties. In fact, the existence of a single basic class of adjectives should not be seen as an advantage or disadvantage of a theory. However, the strategy of looking for one basic type of adjectives, and for mechanisms to derive from it the alternative interpretation, has been very useful to set the limits of compositionality, to discuss different aspects of lexical rules and to compare alternative semantic models. There is not enough space here to discuss these questions carefully but let us sketch the main elements of the two approaches which seek to unify adjectives under a single category.

*3.2. The conjunction or predicative approach. Intersective and non-intersective adj*ectives

This approach, in principle the simplest one, asserts that all adjectives modifying nouns are basically one-place predicates. Being predicative they will all adjust to the set intersection analysis. This analysis can be applied to constructions like (6):

(6)   x is a red table = x is a table and x is red.

Adjectives like *red* are for this reason named 'intersective adjectives'. It is a fact that clear cases of intersective adjectives are not the most frequent ones. Colour adjectives and technical and scientific terms like *endocrine* (Kamp 1975: 124) are the typical examples of this use.

It is well known that most adjectives are not intersective. Let us consider in (7), (8) and (9) the most conspicuous cases of 'non-intersective adjectives':

(7)   A tall kid

(8)   A skilful carpenter

(9)   A former student / The alleged murderer

Before explaining the cases in (7), (8) and (9), a brief note on the terminology is in order. Dimension adjectives like *tall* has been classified as '(non)-intersective', as well as 'subsective' and 'relative' depending on the authors. Value adjectives like *skilful* have been called 'non-intersective', 'relative' and 'special subsective'. Intensional

adjectives like *former* have been classified as 'non-intersective', 'non-subsective', 'privative' and 'non-standard'. The triple distinction 'absolute (no example in the series in (7) to (9), but see (6)), - relative — non-standard' is due to Bartsch and Vennemann (1972). The naming 'subsective-intersective —subsective-non intersective — privative' comes from Kamp (1975) and Partee (1995). Let us go now to the examples.

If *tall* in (7) were a truly intersective adjective the following should be a valid inference, which is not the case:

(10)   x is a (tall) kid $\Rightarrow$ x belongs to the set of tall things

However, vague, context-dependent adjectives like *tall*, *heavy* (*a heavy book*), *hot* (*hot wine*), *new* (*a new cook*) do not mark intersection *stricto sensu* rather they designate only a subset of the set of individuals picked up by N. A *tall kid* can be short as a representative of human females, for example. We can paraphrase *a tall kid* through a '*for*' expression:

(11)   'x is tall for a kid'

This view is controversial, however. Heim & Kratzer (1998) argue that these adjectives are intersective when the context is taken into account (but see Portner (2005) for an argument against this view). A more common assumption is that these adjectives are subsective (non-intersective) because they are gradable. In §4 it will be seen see that the subsective meaning derives from the denotation of adjectives like *tall*; such a denotation involves a relation to a contextually determined standard of comparison.

Skilful carpenter, (8), and most value or evaluative adjectives (*clever* (*clever musician*), *experienced* (*experienced magician*)), have a behaviour similar to *tall* regarding inferences, namely, a *skilful carpenter* can perfectly well be a *clumsy gardener* or *writer*. Nevertheless, in the interpretation relevant to the present discussion, they do not exactly designate a subset of the individuals covered by N. More strictly, even if we could say that they pick up a subset of the individuals designated by N they do so based on some of the properties associated to the N (those that allow somebody to be a carpenter), rather than on a contextual standard. They thus admit an *as* paraphrase:

(12)   'x is skilful as a carpenter'

In the following subsection it will be shown that this special subsective denotation (which is parallel to a regular subsectiveness derived from gradability) can be best accounted for if a Davidsonian semantics is assumed.

Finally, in (9) we find an adjective whose effect is "to produce a complex noun phrase AN that is satisfied only by things that do not satisfy N" (Kamp 1975: 125: *former president, fake gun*, etc.) These adjectives are called privative or non-standard.

If we want to have a single semantic type for all adjectives, intersective and non-intersective, the crucial question for a unified analysis under the conjunction approach or the 'predicative-first analysis' (Hamann 1991: 664), is whether attributive denotations can be considered 'secondary' and derived through specific rules which boost the category change of the adjective. A general modifier rule of this type could be, for example, the one proposed by Bierwisch (1989: 98) according to which the external theta role of the adjective is 'absorbed' by the external theta role of the modified head. Hamann (1991) proposes an 'attr' operator that "changes an α € s///n into a noun modifier of category (s/n)/(s/n) or CN/CN" (1991: 664); material realizations of this operator would be the inflectional affixes appearing on attributive adjectives in German or Russian; recall the examples in (5) and consider the pair *Devuška umna* (short form) 'The girl is smart' vs. *umnaja devuška* (long form) 'the smart girl', where in the long attributive adjective the demonstrative *ja*, which acts as a suffix, is added. In the classical first generation Generative Grammar analysis a similar idea was proposed, namely that all adjectives originate in deep structure relative clauses and there is a rule of 'relative clause reduction' giving rise to constructions with attributive adjectives.

However, there are many reasons to reject the proposal that attributive uses are secondary. The most important one is that some adjectives (privative ones) do not have a predicative counterpart. In addition, attributive adjectives have a reference modification function (Bolinger 1967) that cannot be captured if they are given a predicative origin. Lastly, this analysis does not distinguish adjectives from verbs and nouns in terms of their semantic type. Consequently, a unified analysis appears to be more tenable if all adjectives are treated as functions from intensions to intensions.

3.3. The function or attributive approach

According to this approach all adjectives are of category CN/CN, that is, they map properties onto properties. With this approach there are no problems with possible entailments (recall (10)). As Hamann states, "as we know nothing about the resulting property, all entailments are a priori blocked" (1991: 665). In analyses where the attributive denotation is primary the different entailments coming out from the semantic

relations adjectives establish in (7), (8) and (9) are specified through meaning postulates (Montague 1970, Partee 1995) or in the lexical entry of the adjective (Kamp 1995).

The problem with this solution is that many value adjectives like *beautiful* are ambiguous in structures such as *Olga is a beautiful dancer* and, more importantly, they are only intersective if the common noun designates a general class. *Olga is a beautiful woman* lacks the 'as a' reading and it designates the intersection between the set of women and the set of beautiful things. A comparison class provided by the context, though, is necessary to assert the truth of the sentence, as we will see in §4.

Additionally, the function or attributive solution works only partially for adjectives like the one in *former teacher* since the function account does not provide an explanation for the fact that even if the *teacher* is equivalent, say, to *the man with green glasses*, *former teacher* is not exactly *former man with green glasses*. An explanation for this case needs an account of the way time parameters are encoded in predicates, as observed by Heim & Kratzer (1998).

3.4. The event account of certain non-intersective adjectives

In the following section of this chapter it will be argued that an important part of the discussion about differences between intersective and non-intersective readings of adjectives can be properly recast and illuminated if a degree analysis is assumed establishing that adjectives project the individuals to which they apply onto scales or ordered sets of degrees. Before introducing this view it is interesting to isolate a well known set of adjective constructions ambiguous between intersective and non-intersective interpretations such as the one in (4). To recall, a sentence like *My daughter is an intelligent student* can mean that 'she is student and an intelligent person' (intersective reading) or that 'when she studies she acts intelligently' (non-intersective reading). In standard analyses, the ambiguity of the mentioned sentence is traced back to the semantics of the adjective. However, in a series of works, Larson (1983, 1995, 1998 and Larson & Segal 1995) claims that the source of the ambiguity must be linked not to the adjective but to the noun properties. In a nutshell, adopting a Davidsonian event analysis for adjectival modification in which the semantics of the noun is relativized to events, Larson states that "when an adjective combines with a noun denoting an event-individual pair, the adjective can be predicated of either the x parameter or the e parameter" (Larson 1998: 89). It is in this double possibility where

the ambiguity of these sentences is rooted. For a sentence like *Olga is a beautiful dancer* , when the adjective is predicated of Olga, (13a), it is this person who is considered to be beautiful, when it is predicated of the event variable,(13b), it is the dancing what is beautiful, see Larson (1998: (8)):

(13)   a.   Qe [dancing (e, Olga)... beautiful (Olga, C)]

         b.   Qe [dancing (e, Olga)...beautiful (e,C)]

A claim that Larson's analysis makes is that, aside from the fact that adjectives such as *beautiful, intelligent* or *industrious* indicate the degree to which the property expressed by the adjective holds of its subject, in their second reading (available only with certain N's) they express eventive properties of N, perhaps manner or time. A consequence of this analysis is that "there are no truly non-intersective adjectives" (Larson 1998: 11), the question being with which set the adjective intersects.

There are, moreover, empirical reasons for the proposal. A central argument for it — although we will not reproduce it in detail here— according to Larson (1998: §2.2), is the parallel behaviour of Adj+N and Adv+V constructions in the phenomenon of 'substitution failure' with non intersective adjectives (Siegel 1976/1980, McConnell-Ginet 1982). Substitution fails from the sentence *Olga dances beautifully* to *Olga sings beautifully*, as well as from *Olga is a beautiful dancer* to *Olga is a beautiful singer*, and vice versa; that is, even if *dancer* and *singer* are coextensive, it will not follow that if Olga is beautiful as a dancer she will also be beautiful as a singer. The inference from *Olga is a beautiful dancer* to *Olga is a beautiful singer* fails because in the two predicates (*dances* vs. *sings* – *dancer* vs. *singer*) there is an additional semantic element, the event argument, to which the adverb *beautifully* and the adjective *beautiful* refer separately. The event approach also provides some hints as to the nature of strictly non-intersective adjectives that apply mainly to events, such as *fast,* and on the restrictions on their coordination with adjectives that would apply exclusively to individuals such as *blonde*: **She is a blonde and fast dancer* (Larson 1998: §3).

We will come back in §4.3 to other types of A+N combinations where the adjective has an adverbial interpretation (a*n occasional sailor, a sporadic shot,* etc.)

4. A new look at semantic classes of adjectives. The role of scales, measures, degree and vagueness in the semantics of adjectives

The category adjective is not the only gradable category, some verbs and nouns also accept degree modifiers (Bolinger 1972, Doetjes 1997, 2008, Neeleman, Van de Koot & Doetjes 2004). Furthermore, as noted by Bolinger (1972), among others, it is not the case that all adjectives accept degree modification. However, as said above, gradability is more general among adjectives, it takes different nuances across different classes of them and it appears to be a prototypical characteristic of this class of words. In this section, after general considerations concerning approaches to the semantics of gradable adjectives, three classes of gradable adjectives will be described: a) relative-absolute adjectives, §4.1, b) colour and relational adjectives, §4.2, and c) modal, manner and frequency adjectives, §4.3. (Incidentally, considerably more space will be devoted to the first set since they have received a more extended treatment in the literature). In the course of this description the main features of adjectival scales will be characterized. Since adjectival modifiers have a crucial role in the identification of subclasses of adjectives, some aspects of the semantics of adjectival modifiers will also be discussed.

4.1. Relative and absolute adjectives

Two approaches to scales, norms or standards and boundedness. The aim of this section is to analyze the distinction between 'relative' and 'absolute' adjectives. However, before addressing this analysis it will be convenient to provide a basic frame of reference. We have noted, in effect, that the main distinctions among adjectives involve not only the dichotomy attribution-predication but also gradability. It is therefore important to recall that there are two basic approaches to the semantics of gradable adjectives.

The first basic approach is developed in Klein (1980). On this approach the semantic type of the adjective is always $<e,t>$ and denotes the set of individuals in the positive extension of the adjective – those which are "A". A negative extension can also be defined – those individuals which are not "A", as can a set of individuals which is neither in the positive nor the negative extension, those that belong to the 'extension gap'. The immediate problem for this approach is how to introduce an ordering among the individuals in these extensions. Klein does this by appealing to 'comparison

classes'. Comparison classes can be arbitrarily small on his analysis and for any well-defined comparison class for an adjective A it has to be possible to say that at least one member is A and the other is not A. By taking all possible comparison class pairs into consideration it is possible to develop a semantics for comparatives and other degree expressions.

A second approach, the one that could now be considered standard, assumes that the semantic type of gradable adjectives includes a degree argument. In this view, also called the relational view, gradable adjectives either denote 'measure functions' (type <e,d>, Kennedy 2007), or relations between degrees and individuals (type <d,(e,t)>, Creswell 1976, Hellan 1981, a.o.). This analysis is the one assumed in what follows in this section even though one criticism which has been made of it by Klein and others is that it effectively entails the comparative relation 'is X-*er* than x' as an unanalyzed primitive of the semantics of any positive gradable adjective, making it mysterious that the syntax of the comparative should consistently be more complex than that of the positive form crosslinguistically (cf. article XX for discussion of comparatives).

Both approaches just schematized reappear in the discussion of the two subclasses of gradable predicates: 'relative' and 'absolute' adjectives. In descriptive terms, relative adjectives, independent of its predicative or attributive use, are those whose extension depends on a norm or standard and a comparison class (*large*, *big*, *short*); vagueness is a consequence of the truth conditions imposed by the unmarked form of the adjective. Absolute adjectives (*empty*, *dry*, *wet*) do not depend on an external norm, they contain, so to say, an internal obligatory scale, they intrinsically relate objects to maximum or minimum degrees of a property and do not give rise to vagueness.

Two analyses of these two classes of adjectives will be summarized below: the first one relies on the 'comparison class' and the second one on the 'measure function' frame of reference.

In the first one, which will be exemplified through Hamann (1991), scales are used which express a context dependent partitioning of a domain into inverse positive and negative extensions. Hamann (1991) distinguishes two subclasses of relative adjectives: dimension adjectives (*tall*) and value adjectives (*good*), which differ in the way they build up their 'norm': dimension adjectives take the average as norm, while value adjectives have a context dependent norm of expectation. This is the reason, according

to this author, why measure phrases can accompany the positive element of a pair of dimension adjectives, (14a). This modification is not possible either with the negative element of the pair or with value adjectives, (14b and c). The examples in (14) are taken from Hamann (1991: 668) (in §4.1 we will provide. a more theoretically founded explanation for (14b)):

(14) a. The board is two meters long.

    b. ???The board is two meters short.

    c. ???Belinda is hundred units beautiful (ugly).

According to Hamann, dimension adjectives give rise to antonym pairs (*tall-short*) whose elements share a common property. In contrast value adjectives occur in clusters with related meanings (*dumb, stupid* vs. *clever, intelligent, wise*). Both classes of adjectives build a 'scale', now, in the scale of dimension adjectives there is a zero point and "isomorphism to an order with a smallest element" applies. In the scale of value adjectives there is no origin and there appear two areas separated by different orientations (1991: 670, her Figure 31.1):
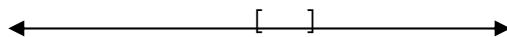

Figure 1. Section of Hamann's (1991) scale for value adjectives

(It has to be noted that in Hamann's view scales are not the same as in degree based semantics). The common property of both subtypes of relative adjectives is that they have a systematic 'extension gap' in between the positive and the negative pole extension of the adjective; in other words, there exists a set of individuals for whom decision about whether they are in the positive or the negative extension of the adjective is not possible.

In contrast to this class, Hamann proposes that 'absolute adjectives' include forms like *dead-alive* or *single-married*, namely, those which are extensional and intersective. Unlike relative adjectives, according to this author and against the common view, they do not give rise to antonym pairs but they are complementary or have many counterparts. Absolute adjectives do not have an extension gap, a condition for gradability according to Hamann (1991: 668); thus, they are not gradable. This author includes colour, nationality and relational adjectives within this class.

There are various shortcomings of this approach that will only briefly be mentioned. First, since this analysis assumes that there are two domains for members of antonymous pairs, each of them taking an opposite direction, it can correctly explain 'indirect comparison' in cases where adjectives have the same polarity, (15). However it has problems to account for the semantic oddness of a sentence like (16), an example of 'cross polar anomaly':

(15)　　　　Mary is more intelligent than she is beautiful.

(16)　　　　??*El Quijote* is longer than *Pedro Páramo* is short.

Briefly, (16) shows that comparative constructions where positive and negative forms of antonymous pairs co-occur are anomalous; this suggests that antonymous adjectives map their arguments onto complementary and not inverse regions of the same scale (See Kennedy 2001 for a detailed exposition of this argument). In other words, if distance is measured from the mid-point of a scale and a concept of positive and negative degree has not been assumed it will be difficult to explain why adjectives cannot be compared in cases such as those in (16).

A second weakness of this analysis comes from the fact that it does not explicitly account for vagueness. Vagueness, strictly speaking, appears only with relative adjectives (Kennedy 2007) although both classes are gradable since both relate objects to abstract representation of measurement. Finally, Hamann's approach does not make distinctions within the complex class of absolute adjectives.

A second approach to absolute and relative gradable adjectives starts in Seuren (1978, 1984) and von Stechow (1984) and it has received its most recent formalization in the works by Kennedy (1999, 2001 and 2007), Kennedy & McNally (2005) and Rotstein and Winter (2004). This approach shares some aspects with the previous one but it has a broader empirical coverage and it provides a more conspicuous account of the truth conditional variability of gradable adjectives.

It has been stated above that Bartsch and Vennemann (1972, 1973) and Kennedy (1999, 2007) analyze gradable adjectives as measure functions of type <e,d>. Consequently, they define an adjective like *tall* as a function from the domain of individuals to some positive degree of the dimension 'height' ordered in a scale. Recall that a set of 'degrees' ordered with respect to some dimension (height, cost) constitute a scale; a scale may have a maximum and a minimum value.

The main claims which comprise this general view are roughly the following:

a) Relative adjectives (*tall, expensive, big - short, cheap, small*) do not have standard values by default; in contrast, absolute adjectives have constant standards (*wet / dry, clean / dirty, healthy / sick*) although they are the same type <e,d>. This difference derives from the fact that they project onto different types of scales: 'unbounded' (or open) and 'bounded' (or closed), respectively. *Tall* is unbounded because there is not a maximum height, while *dry* is bounded because there is a maximum degree of dryness, i.e. when there is no water at all. Moreover, boundedness of a scale determines a distinction between what Rotstein and Winter (2004) call 'total' and 'partial' adjectives or, better, what Kennedy and McNally (2005) call 'maximum standard' and 'minimum standard' adjectives. We will come back to this distinction in §4.1.

b) Relative and absolute adjectives also differ in that the former have, and the latter lack, a context dependent standard of comparison.

c) This theory makes fruitful claims for the treatment of comparatives and for 'degree specification' –*two meters tall*. See below in this section for some observations regarding these two questions.

Let us consider now examples of relative and absolute adjectives and let us try to extend on the previous claims and elaborate on the semantic properties of each class.

In relative adjectives the positive form contains the comparison class as a constituent of its semantic representation. In fact, Bartsch and Vennemann (1972) assume a denotation for the positive form of adjectives like *tall* similar to (17) (taken from Kennnedy 2007: (10)):

(17) $[\![[_{\text{Deg}} pos]]\!] = \lambda g \lambda k \in D_{(e,t)} \lambda x . g(x) > \textbf{norm}(k)(g)$

In this formulation of *pos* denotation "k is a property and *norm* is a function that returns the average degree to which the objects in the set defined by k (the comparison class) measure g" (Kennedy 2007: 8).

Given (17), sentence (18a) means that the house has a greater price than the norm for another comparable house, where the relevant similarity (area, type of construction, size, etc.) is contextually determined. In (18b) the comparative term defines an ordering relation between degrees, namely, the average price of houses in London and the average price of houses in Madrid. Now, in both cases the delimiting point between *expensive* and *non-expensive* objects is fixed: it is the average degree to which the

objects in the comparison class have the property denoted by the adjective:

(18)   a. This house is expensive.

               b. Houses in London are more expensive than in Madrid.

Kennedy notes that this way of fixing the comparison class faces problems regarding the truth conditions of the positive form, since it predicts that borderline cases should not exist. Suppose that the average price of apartments in the most expensive area of Madrid is 900.000€; does this mean that an apartment whose price is 880.000€ is not expensive? The analysis of the positive form of relative adjectives should account for the fact that (19) is not a contradiction:

(19)   The price of this apartment is lower than the average price of apartments

               in this area, but it is still expensive.

In other words, the denotation of *pos* would be better if it is assumed that the comparison class is something else (apartments in Europe overall, things an average person buys in his/her lifetime, etc.) contributing to the meaning of the positive form. Kennedy (2007) claims that (20) (identical to his (27)) provides the appropriate formalization:

(20) $[\![[_{\text{Deg}}\, pos]]\!] = \lambda g\lambda x.g(x) \succeq \mathbf{s}(g)$

In (20) **s** "is a context sensitive function that chooses a standard of comparison in such a way as to ensure that the objects that the positive form is true of 'stand out' in the context of utterance relative to the kind of measurement that the adjective encodes" (Kennedy 2007: 17). Given (20), sentence (18a) could be true if the difference between its price and that of less expensive houses in the comparison class is sufficiently big, even if the price of the house is below the average price. A relevant aspect of a proposal in which scale structure and a comparison class are introduced is that it makes a clear distinction between positive and negative adjectives in terms of positive and negative degrees. The reason why negative adjectives cannot be associated with measure phrases (*Bartleby is 40 pages short* vs. *Bartleby is 40 pages long*) would be that negative degrees refer to infinite open intervals while numerals refer to degrees that start at a zero point (see Kennedy 2001: §3.3).

    Let us now consider the semantics of 'absolute adjectives' starting with the examples in (21) and (22):

(21)   a. The towel is wet

b. The towel is wetter that the dress.

(22)   a. The table is dry.

b. The table is dryer than the floor.

The two examples introduce absolute adjectives. The explanation for their meaning is, in general terms, similar to the one just developed but there are also clear differences between the two classes. We will now examine three cases illustrating the aspects in which absolute adjectives diverge from relative ones.

First, since Cruse's (1980) seminal work it has been noted that absolute adjectives have a scale different from that of relative ones. He proposes the scale structure shown in Figure 2 (taken from Rotstein & Winter 2004). In his terms, scale 'a' is for non-complementary adjectives and scale 'b' is for complementary ones:
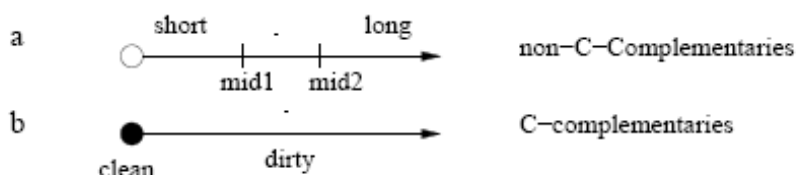

Figure 2. Cruse's (1980) scales for (non-) complementary adjectives

(Incidentally, from now on resource to the distinction complementary / non-complementary will be obviated. The reason is simply that there is no strict correspondence between the complementary / non-complementary distinction and the scale structure facts considered as basic for establishing truth conditions. See Unger (1975), Kennedy & McNally (2005) and also Rotstein & Winter (2004) for a discussion of this issue).

According to these scales, the points delimiting the denotation of adjectives like *tall* or *long* (the standard value) are located in the middle of the scale (we have critically analyzed above a similar conceptualization). Adjectives like *clean* or *wet* have a scale that is bounded on one end and the standard value of both adjectives is situated at this end. Following work by Kennedy and McNally (2005), to which we will return below in the second subsection of §4.1) it will be assumed here that adjectives in 'a' (absolute ones) have closed scales and adjectives in 'b' (relative ones) have open scales. This distinction serves to account for the different distribution of the modifiers *almost* and

completely with both classes of adjectives:

    (23)   a. The house is almost clean.

                    b. (#)John is almost tall.

    (24)   a. The house is completely clean.

                    b. *John is completely tall.

Regarding the modifier *almost*, the generalization describing (23)-(24) is that *almost* modifies absolute adjectives or, more explicitly, it "requires a scale that is at least partially closed (contains an end point)" (Amaral 2006). A possible definition of this modifier is that it denotes a short interval in the scale of the adjective "which is disjoint to the denotation of A but adjacent to it from below" (Rotstein & Winter 2004: 277). Another possible definition is that it selects for the maximum value on the scale: "it denotes closeness to the standard (maximum value) in the relevant scale" (Amaral 2006). If the standard value of an adjective like *clean* (an absolute total adjective in Rotstein & Winter's terms, a maximum standard adjective in other) corresponds to the possession of a minimal amount of the relevant property (in their view, the lower bound on the scale of the property associated with the antonymous adjective) then *almost clean* denotes an object that is less clean than anything else in the positive denotation of *clean* and more clean than anything representing lack of cleanness.

The oddness of (23b) (with a relative adjective), on the other hand, indicates that it is not only satisfaction of a 'mid-point' standard value that guarantees the truth of sentences with relative adjectives, otherwise *almost tall* should be acceptable since there is space enough to include an interval before the standard. Note, incidentally, that data are more complicated than it could appear; the acceptability of (25), related to (23b), suggests that the formalization in (20) is stronger than the one in (17); it is the 'significant' height what sets the standard:

    (25)   It is common knowledge that a 14 year old teenager is tall if his height is

                    1.75m. Your son is 1.73, so he is almost tall.

Regarding *completely* and the contrast it introduces let us recall that this 'modifier of maximality' refers to the end of a scale (at least in one of its readings). (24a) indicates that absolute adjectives make reference to (maximal) bounds. The extreme oddness of (24b) shows that maximum and (minimum) values are not relevant in the scale for relative adjectives. Tests with 'proportional modifiers' such as *half* provide similar

results; a glass can be *half empty / half full* contrasting with the impossibility for an object to be **half tall* or **half short*. If the scale of the adjective does not contain a maximum or a minimum it is not possible to calculate the distance from a mid point to a given limit.

A second factor distinguishing the two classes of adjectives is context dependency. We have said that relative adjectives are gradable and vague; what about absolute adjectives on this regard? Of course there is ample evidence that absolute adjectives are gradable. Recall (21b) and (22b), where *wet* and *dry* appear in comparative constructions; truly non-gradable adjectives like *hepatic* or *senatorial* are impossible in such contexts. In this sense, adjectives like *dry/wet, complete/incomplete, open/closed* denote functions from objects to ordered sets of degrees of dryness, completeness or closeness. However, as reasoned by Kennedy (2007), absolute adjectives do not fit into the interpretive scheme in (17), which asserts that the standard value for the objects to which the property applies is fixed contextually.

Observe on this regard the sentences in (26). They show that both relative, (26a), and absolute adjectives, (26b), accept measure phrases. Additionally, the negative forms of each pair reject such phrases:

(26)   a. The 14 year old boy is 1.50m tall / *1.50m short.

          b. The door is 5cm open / *5cm closed.

However, the meaning of the grammatical sentences is quite different. Sentence (26a) does not entail that the boy is tall. In contrast (26b) does entail that the door is open. (27) shows a similar contrast: (27a) does not entail that the flea is big (compared to other animals), while *full* in (27b) entails that there is no room for anybody else:

(27)   a. The flea is big.

          b. The concert hall is full.

This meaning contrast gives support to the idea that absolute adjectives have fixed standards as opposed to the context dependent standard of comparison associated with relative adjectives.

Third, relative and absolute adjectives differ as to the entailment patterns they give rise to. Cruse (1980) and also Rotstein & Winter (2004) correctly describe the entailment relations induced by pairs of antonymous absolute adjectives. In (28) assertion of one form implies negation of the other and vice versa:

(28)	a. The towel is wet ⇒ The towel is not dry

b. The towel is dry ⇒ The towel is not wet.

Rotstein & Winter attribute this pattern to the fact that the intervals denoted by absolute adjectives are always disjoint, that is, on the scale for these adjectives the minimal positive degree of an adjective touches, so to say, a maximal negative degree of the same scale. Now, relative adjectives do not have this entailment pattern as shown in (29):

(29)	This boy is not tall ≠> This boy is short (he could well be at the normal height for his group of age).

The contrast between (28) and (29) follows from the fact that relative adjectives permit borderline cases because they have an extension gap. The standards in this case need not be disjoint or, in other words, they do not partition the set; on the contrary there must be some relation among them if borderline cases exist.

Another difference involving entailments is that comparisons with relative adjectives do not give rise to positive or negative entailments, (30a), compared to the clear positive and negative entailments of comparatives with absolute adjectives, (30b) and (30c), respectively (remind also (21) and (22)):

(30)	a. Table 1 is bigger than table 2 ≠> Table 1/2 are (not) big.

b. Towel 1 is wetter than towel 2 ⇒ Towel 2 is wet.

c. Cup 1 is fuller than cup 2 ⇒ Cup 2 is not full.

Summarizing, the internal structure of scales, context dependency base of standards vs. restrictions imposed by the meaning of the adjective, and entailment patterns are among the phenomena that clearly distinguish between gradable relative and gradable absolute adjectives. Let us now extend on these distinctions.

Defining classes of adjectives in terms of the structure of scales: open and closed scales; total / partial or minimum / maximum standard absolute adjectives. In order to characterize these differences it is important to begin by recalling Cruse's (1980) observation that certain adjectives have closed scales while others have open scales. Namely, adjectives like *clean / dirty, healthy / sick, / full / empty, open / closed, perfect / imperfect, safe / dangerous* describe properties that can have maximum and minimum values; adjectives like *expensive, long, tall* do not. Since Yoon (1996) and Rotstein & Winter (2004) it has been shown that there are crucial differences among absolute

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adjectives. In Yoon's terms some of them are 'total predicates', the other are 'partial predicates'. Briefly, total adjectives (the first members of the previous pairs) describe lack of dirt, malady, closeness, imperfection, etc., while partial ones (the second member of the pairs) describe the existence of such property. More explicitly, Yoon notes that total adjectives like *clean* or *safe* get a universal reading in certain contexts, their basic meaning being that they imply 'no degree of the relevant property'. Their antonyms *dirty* and *dangerous*, partial adjectives, imply possession of 'some degree of the relevant property'. For something to be clean it has to be totally clean, while something is dirty if it simply has some dirtiness on it. In the rest of this section, though, the distinctions between scales that lack maximal and minimal elements (open) and scales with either one of these elements or both (closed)—instead of the total / partial opposition— will be taken as a cue to set up subclasses of absolute adjectives.

Kennedy & McNally (2005) establish four types of scales taking into consideration the just mentioned logical possibilities. The typology in (31), and some of the examples of the adjectives selecting such a scale, is taken from Kennedy (2007: (59)); see also Kennedy & McNally (2005: (23)):

(31)   a. totally open: o————————o

          Tall/short, big/small, long/short, sad/happy, wise/ignorant

          b. lower closed: ●————————o

          Worried/unworried, dirty/clean, bent/straight, famous/unknown

          c. upper closed: o————————●

          Willing/unwilling, safe/dangerous, healthy/sick, naked/dressed,

          d. (totally) closed: ●————————●

          Full/empty, hard/soft, transparent/opaque, sad/happy, dry/wet,
          open/closed), conscious/unconscious, satiated/hungry,

Evidence for this typology comes from the restrictions on adjective cooccurrence with 'end-point oriented modifiers'. As is known, a crucial property of adjectives entering into polar oppositions is that if a positive member of this opposition uses a scale with a minimal degree then its negative counterpart will use one with the maximal degree. Polar modifiers of maximal and minimal degree (*completely*, *perfectly* or *slightly*) will be compatible with the positive or negative members of antonym pairs in a systematic way: those that pick up maximal degrees will appear with positive adjectives only if

they use an upper bound scale, as can be seen in the contrast in (32), where *known* uses a lower bound scale; namely, these modifiers will give rise to unacceptability with the positive form of such adjectives, (32a), and to acceptability with the negative one,(32b):

(32)   a. This song is {??completely / ??fully known}

             b. This song is completely unknown.

Inversely, and in the same line, if something is maximally *safe* it cannot then be minimally *dangerous*:

(33)   a.   Something is perfectly safe.

             b. Something is ??slightly dangerous.

The polar modifiers that can be used to test the existence of the classes b), c) and d) in (31) are the following (incidentally, we will skip here reference to modifiers like *very* (simply) boosting the standard of the adjective. The main function of this modifier appears to be to identify adjectives taking a comparison class, i.e.relative adjectives):

a)   End-point oriented maximality modifiers: *completely, totally, fully, and perfectly*. These are only compatible with adjectives that map their arguments onto scales with maximal elements.

b)   End-point oriented minimality modifiers: *slightly*. These modifiers restrict the degree argument of a gradable adjective to be a minimum (small degree) on the scale of the adjective. In effect, Rotstein and Winter say that "slightly A entails not completely A" (2004: 281).

c)   Proportional modifiers: *half*, *rather*, *quite*. They are compatible with adjectives that select both maximal and minimal elements.

Taking this rough classification as a framework we obtain the following generalizations that provide positive evidence for the typology in (31):

a) Open scale adjectives: both members of the antonyms pair are unacceptable with the two types of end point-oriented modifiers:

(34)   ??completely / ??slightly {tall/short, expensive/cheap}.

b) Lower closed scale adjectives in their positive forms are unacceptable with upper end point-oriented modifiers and compatible with lower end point-oriented ones. The reverse holds for their negative forms (see also (32)):

(35)   a.   ??perfectly / slightly worried

             b.   perfectly / ??slightly unworried

c) Upper closed scale adjectives, in their positive forms are acceptable with upper end point-oriented modifiers and not compatible with lower end-point ones. The reverse holds for their negative forms (see also (33)):

(36) a. perfectly, totally / ?? slightly healthy

        b. ??perfectly / slightly sick

d) Closed scale adjectives: the two members of the antonymous pair are acceptable with both upper and lower end point-oriented modifiers. Proportional modifiers that indicate mid or partial points in the scale of the adjective in relation to a given end-point are also markers of closed scales:

(37)   completely / perfectly / slightly / half / quite {full/empty, hard/soft}

A descriptive generalization can be made to conclude this section. If we review Dixon's (1982) set of universal classes of adjectives: 1) 'dimension' (*tall/short, thin/thick, deep/shallow, big/small, wide/narrow*), 2) 'speed' (*fast/slow*), 3) 'age' (*old/new, recent/past*), 4) 'physical property' (*light/heavy, sweet/sour, liquid/solid, wet/dry, hot/cold, pure/impure, full/empty, tasty/insipid*) 4) 'value' (*ugly/beautiful, perfect/imperfect, good/bad*), 5) 'human propensity' (*greedy/generous, sad/happy, sensible/insensible, wise/dumb, aggressive/calm*), and 6) 'colour', we see that there is no strict correspondence between these classes and the ones established above; that is, members of all Dixon's classes fall into the four classes defined in terms of scales.

4.2. Other types of standards and other classes of adjectives: colour, form and relational adjectives.

As we have suggested above 'colour adjectives' are typical examples of intersective predicates: the expression *a yellow sweater* refers to something that is a member of both the set of sweaters and the set of yellow things. In this regard, they are similar to certain 'form adjectives': *square, round, oval,* and so on. All these adjectives fail to give rise to pairs of forms where one describes lack of a property and the other existence of such property, as well as to 'relative' antonymous.

At first sight most colour adjectives appear to be gradable since they accept various types of degree modifiers:

(38)   This chair is very / too / totally red.

All the combinations in (38) are acceptable but the meanings of *very / too red* and *totally red* are not identical to the ones we have just analyzed. Although we can assert

that gradation is always involved, *very* projects the argument of *red* not onto a scale containing an asymmetrically ordered set of degrees of redness but rather onto a scale containing prototypes and shades of redness. This reading that we could call the prototypicality reading can be obtained, for instance, if we are comparing the *red chair* mentioned in (39) with another one in the same environment and the second one is closer in certain features (brightness, proximity in the spectrum, etc.) to the colour that defines what we might call a 'neutral' red:

(39)   This chair is very red; I like better the other one, which is less red.

In a similar but not identical sense, when we say: *Oh, your dress is very yellow!* we are confronting the object with our subjective expectations regarding the colour. For this reason it is impossible to describe a dress we saw at a store saying simply: *?The dress I saw was very yellow*, some qualifications should follow, for instance: *... compared {to others I prefer / to the type of yellow suitable to my age}*. Observe that, in contrast, it is perfectly possible to describe a person we just met by asserting: *The professor was very tall* ('standing out regarding a context dependent standard'). But there is also a second possibility different from the interpretations we have been describing up to now. If we are describing a complex object such as the interior of a house with many rooms, and we say: *God, this house is very red!* the reading by default is that in which we are talking about the extension of red things in the house: lamps, walls, carpets, that is, about 'quantity of red'. In summary, degree, prototypicality / subjective expectation and quantity are the concepts we need to describe how modifiers interact with nouns in expressions with colour adjectives. From here, various readings there can be suggested, a standard scalar one with two flavours: prototypicality and subjective expectation, and a quantity one.

As to the possible scalar readings, here we will not discuss their precise scale structure or the formalization necessary to account for the suggested semantic interpretations. Intuitively, it is plausible to say that such a scale might be closer to the scale of relative adjectives and not to that of absolute ones. A piece of evidence that the scale associated with colour adjectives in their prototypicality reading is not that of absolute adjectives is that maximality modifiers only pick up the quantity reading:

(40)   a. The sky is totally blue. (that is, 'Without clouds')

               b. The house is totally green. ('It has been painted all green').

As for the quantity reading, it is possible that the scale structure associated with it would have to specify part-whole relations as is the case for certain nouns.

For a better understanding of the previous observations regarding colour adjectives a final comparison with so called 'relational adjectives' might perhaps be useful. Relational, denominal forms, 'classifying adjectives' (Warren 1984, Demonte 1999 for Spanish) like *digital*, *musical*, *republican*, *artistic* or *French* are typical examples of adjectives that are subject to restrictions on being used predicatively: we cannot say *The scientist is nuclear*, or *The archaeology is medieval*, etc., although there are data contradicting this view. For example, it is possible to say: 'The journal is monthly', 'The decision was international' or 'This area is industrial'. The reason for this double behaviour is that relational adjectives belong into two different syntactic-semantic classes (Bosque & Picallo 1996, Demonte 1999): some of them are 'argumental' or 'thematic' (*constitutional reform* in the sense of 'reform of the Constitution'), other are 'classificative'. Only classificative ones appear in predicative position. Additionally, in general terms, relational adjectives are not used with intensifiers or in comparatives (*very hormonal*, *very molecular*, etc. or *This offer is more financial than that one*); and they do not build antonym pairs. However, some of these adjectives, mainly classificative ones, appear to be gradable. Observe the sentences in (41):

(41) a. The singing of canaries is very musical.

    b. This person is very French.

    c. This soil is very sandy.

The semantic interpretation that relational adjectives receive in these sentences suggests a connection with colour adjectives. In effect, (41a) and (41b) show what we may call the reading of prototypicality; (41c) exhibits the quantity reading. The corresponding paraphrases appear in (42):

(42) a. The singing of this bird has properties that remind us central features of music.

    b. If French are, prototypically, well behaved, have good taste for food and have a strong sense of their country, then x can be considered very French (to be above the prototypical standard).

    c. The quantity of sand in this soil is much above what {we need to have / considered good for certain purposes / more than average, etc.}

There are still many questions open as to the possible syntactic and semantic properties of relational adjectives (see McNally & Boleda 2004 and Fábregas 2007 on this regard); however I will not pursue this matter any further here since it falls far away the purposes of this chapter.

4.3. (Non-gradable) modal, manner and (in)frequency adjectives and the adverbial behaviour of certain adjectives.

In §3.1 and §3.2 the distinction between predicative and attributive adjectives was presented. In §3.3 it was seen that predicative adjectives are amenable to an intersective or conjunctive analysis and that there are also various classes of non-intersective adjectives the latter having a predicative modifier analysis. In §3.4 a proposal was presented that reanalyzes a subset of non intersective modifiers by using an event based approach. In §4, we focused on different approaches to gradability.

In this last subsection a schematic approach to the characteristics of the adjectives illustrated in (43) through (45), that is: (non-gradable) intensional modal, manner and frequency adjectives, will be provided:

(43)   Mary interviewed a *possible candidate.* (Modal) [from Larson 2000]

(44)   The *brutal aggression* against Albania. (Manner) [from Cinque 1994]

(45)   The / An *occasional sailor* strolled by. (Frequency) [from Bolinger 1967 and Stump 1981]

All the previous sentences have adverbial counterparts; all of them are ambiguous and the ambiguity can be traced back to the adjective. Generally speaking, we can say that they have an 'external' (outside of NP) reading and an 'internal' (closer to the N) reading, although aside from this generalization there is no uniform analysis for the three cases. To be more specific, in the example in (43) there is both an 'implicit relative reading' (the adjective modifies the noun through an implicit relative clause) and a 'direct modification reading' (the adjective directly modifies the noun, Larson 1999, 2000), see (46). In (44) we find a subject-oriented reading as well as a manner reading of the adjective, see (47). In (45) the adjective can have both the 'external' reading corresponding to a sentential adverb and an attributive reading (Zimmermann 2003), see (48). More explicitly, let us consider in (46) to (48) the suggested paraphrases, corresponding, respectively, to the examples in (43) to (45):

(46)   Mary interviewed every possible candidate.

a. Mary interviewed everyone that was a *possible candidate*. [Direct modification reading]

b. Mary interviewed every (actual) candidate that it was *possible* for her to interview. [Implicit relative reading][Larson 2000]

(47)　　The *brutal* aggression against Albania.

a. It was *brutal* of them to invade Albania. [Subject oriented reading]

b. The aggression against Albania was *brutal*. [Manner reading]

(48)　　The / An *occasional* sailor strolled by.

a. *Occasionally*, a sailor strolled by [External reading].

b. Someone who sails *occasionally* strolled by [internal / attributive reading]. [Zimmermann 2003]

Stump (1981) refers to (48a) as the 'adverbial usage of frequency adjectives' and also distinguishes a 'generic usage of frequency adjectives' such as in (49):

(49)　　An occasional cup of coffee helps keep John awake.

In the remainder of this section we will discuss separately the case of *possible* and that of *occasional*. Manner adjectives will not be further addressed; they have been introduced simply to emphasize a common property of these three types of adjectives that can be characterized by saying that all of them can be interpreted outside the DP in which they occur. Another common characteristic of these cases is that their semantic ambiguity might be due to a structural ambiguity that we cannot observe directly. If the appropriate structural analysis is established, the basis for semantic composition is straightforward.

'Possible' and Implicit Relative Reading. Larson (2000) notes that the ambiguity found in (43), gloss (46), is restricted to *possible* and is not attested with other adjectives close in meaning to it, (50a). Moreover, the determiner plays a crucial role in the phenomenon: only universal quantifiers and superlatives induce the 'Implicit Relative Reading', (50b):

(50)　　a. Mary sampled every potential / probable food.

'Mary sampled everything that was potentially / probably a food'.

*'Mary sampled every food that it was possible / probable to sample'.

b. Mary interviewed a/no/three/more/ taller possible candidate.

*'Mary interviewed a / no / three / more / taller candidate(s) that it was

possible to interview'.

Related to these restrictions is the fact that ambiguity disappears when *possible* appears postnominally; in (51) only the Implicit Relative Reading is available:

(51)   Mary interviewed every candidate possible.

'Mary interviewed every candidate that it was possible for her to interview'.

It is interesting to notice that in languages like Spanish where adjectives can appear pre and postnominally a clear correlation shows between position and reading, only 'Direct Modification Reading' is found in prenominal position, only Implicit relative reading shows when the adjective is postnominal (Demonte 2008):

(52)   a. Atendió a todos los *posibles* visitantes.

'He attended all the (people that were) possible visitors'. [Direct Modification Reading]

b. Atendió a todos los visitantes *posibles*.

'He received all the visitors it was possible for him to attend'. [Implicit Relative Reading]

Now, recall that in English postnominal adjectives are permitted by universal determiners but not by the rest of them. Based on these facts and correlations, Larson (2000) claims that a sentence like (43), gloss (46), "in its Implicit Relative Reading might actually derive from a source equivalent to (9) [our (53)] where the A originates postnominally and is subsequently fronted, and where the adjective takes an infinitival complement that remains elliptical":

(53)   Mary interviewed every possible$_i$ candidate [t$_i$ [for her to interview t].

We will not develop here the derivation of (43) and (51) (through 'Antecedent Contained Deletion') that follows from (53); the reader is referred to Larson (2000) for its details. It is evident, moreover, that pronominal adjectives with Direct Modification Reading will have a different structural source, one in which they have a position closer to the noun. A fact suggesting this double generation is that sentences like (54) with two instances of the same adjective with different readings (marked in the examples) are possible in English:

(54)   Mary interviewed every possible [IRR] possible [DMR] candidate.

To close this subsection it could be interesting to simply witness another construction

with an adverbial adjective that is possibly amenable to a similar analysis with an implicit event; see (55) where *quick* can well refer to an (implicit) event of drinking a cup of coffee quickly, even if it appears as a nominal modifier:

(55)   A quick cup of coffee helps keep John awake.

The 'occasional' construction. Another case of mismatch between overt syntactic structure and semantic structure is the one instantiated by so called '*occasional constructions*' like the one in (45), to which the two readings annotated in (48) are associated. Let us provide another relevant example:

(56)   A sporadic shot was heard

            'Sporadically, a shot was heard'

The mismatch that the reading in (56) represents is a puzzle for compositional semantics. As noted by Larson (1999, 2000) and Zimmermann (2003), the problem is how to account for the DP external reading of these 'infrequency' adjectives (the label is such because the phenomenon shows only with forms like *sporadic*, *occasional*, *infrequent* but not with *frequent* and similar ones).

The external reading in (56) is sanctioned by specific conditions: a) the presence of articles (definite or indefinites) is required: *Two / most sporadic shots...* has only the attributive reading; b) the infrequency adjective must be adjacent to the determiner: in *A loud sporadic shot was heard* the intermediate adjective blocks the external reading; c) coordination with another adjective also blocks the intended reading: in *An occasional and clear shot was heard* the adjective cannot be interpreted as having scope over the entire sentence. If we interpret a sentence like (56) as a fact of adverbial quantification over events, it is evident that a syntactic configuration in which the adjective is inside the DP does not provide an appropriate structure for semantic interpretation, if we take for granted, as is standard, that syntactic binding is the basis for semantic binding. There are various options to derive the appropriate structure with the adjective in a position from which it can bind an event. Among them, there appear to be stronger arguments to choose the one defended by Larson (2000) and Stump (1981), namely, that of movement and incorporation of the adjective to the Determiner in order to form a complex quantifier able to bind the event, as in (57) (corresponding to (45)), from Zimmermann (2003: 254):

(57)   [$_{IP}$ [$_{QP}$ [$_Q$ the/an+occasional$_1$] [$_{NP}$ t$_1$ sailor]] [$_{VP}$ e(vent) strolled by]]

The arguments for this option as opposed to that of LF extraction of the adjective, or LF movement to Spec of DP, the other logical options, will not be reproduced here; but see Zimmermann (2003) for a detailed discussion of these matters.

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