

# A Pragmatic Solution to the Paradox of Absolute Adjectives

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**Abstract.** This paper presents a new solution to a longstanding puzzle in the study of the semantics of gradable adjectives: the *paradox of absolute adjectives*. Absolute adjectives (AAs: ex. *empty, straight, dry, wet, bent...*) display a semantic behaviour that appears to be a hybrid between the behaviour of members of the relative adjectival class (RAs: ex. *tall, short, expensive...*) and the non-scalar adjectival class (NSs: ex. *atomic, prime, hexagonal...*). I argue that this behaviour creates a puzzle for the formal analysis of the basic lexical meaning of these expressions: do they have a semantic denotation that is of the same type as relative adjectives or of the same type as non-scalar adjectives? I argue that there are empirical reasons for adopting a treatment of the semantics and pragmatics of AAs in which these predicates have a semantics that is more parallel to NSs than RAs. Finally, I provide a new solution to the paradox of absolute adjectives within the *Delineation TCS* framework, which is a non-classical logical system developed by Burnett (2012b) for analyzing the interaction between context-sensitivity, imprecision and gradability with adjectival predicates.

**Keywords:** gradable adjectives; scale structure; vagueness; imprecision; context-sensitivity; non-classical logics

## 1. Introduction

This paper presents a new solution to a longstanding puzzle in the study of the semantics of gradable adjectives. I will call this puzzle the *paradox of absolute adjectives*. The expression *absolute adjective* refers to a particular subset of the set of scalar adjectives whose members display certain characteristic properties (to be outlined in the body of the paper). As discussed by Cruse (1986), Kamp and Rossdeutscher (1994), Yoon (1996), Rotstein and Winter (2004) and Kennedy and McNally (2005) (among many others) absolute adjectives (AAs) come in two types: **total** or *universal* AAs (1-a) and **partial** or *existential* AAs (1-b).

### (1) Absolute Adjectives (AAs)

- a. **Total AAs:** *dry, clean, straight, empty, full...*
- b. **Partial AAs:** *wet, dirty, bent, sick, awake...*

As observed by the aforementioned authors, AAs can be distinguished through a variety of linguistic tests from relative scalar adjectives (RAs) (2-a), on the one hand, and from non-scalar adjectives (NSs) (2-b), on the other.

- (2) a. **Relative Adjectives:** *tall, short, wide, narrow, intelligent, friendly...*
- b. **Non-Scalar Adjectives:** *prime, hexagonal, geographical, pregnant, dead, atomic...*

As we will see, AAs display a semantic behaviour that appears to be a hybrid between the behaviour of members of the RA adjectival class and the NS adjectival class. Furthermore, I will argue that this behaviour creates a puzzle for the formal analysis of the basic lexical meaning of these expressions: do they have a semantic denotation that is of the same type as relative adjectives like *tall* or of the same type as non-scalar adjectives like *pregnant*? As I mentioned, the observation of the existence of this puzzle is not new: its discussion in the modern linguistics and philosophical literatures can be traced back to Sapir (1944), if not earlier, and the different approaches to solving the puzzle can be divided into two categories: those that assimilate the semantic denotations of AAs to those of relative adjectives (ex. Kennedy (2007), Sassoon and Toledo (2011), a.o.), and those that assimilate their denotations to those of non-scalar adjectives (ex. Sapir (1944), Unger (1975), Lewis (1979), Récanati (2010), a.o.). In this paper, I argue that there are empirical reasons for adopting a treatment of the semantics and pragmatics of AAs in which these predicates have a semantics that is more similar to that of NSs, than RAs. I then provide a new solution to the paradox of absolute adjectives within the *Delineation TCS* system, which is a non-classical logical framework developed by Burnett (2012b) for analyzing the interaction between context-sensitivity, imprecision and gradability with adjectival predicates.

The paper is organized as follows: in section 2, I describe some of the semantic and pragmatic properties of AAs and present the paradox. Then in section 3, I present my new proposal situated within the DelTCS framework. In section 4, I show how this solution accounts for some empirical properties of absolute adjectives and their relationship with non-scalars, and in section 5 I summarize the main results of the paper and conclude.

## 2. The Paradox of Absolute Adjectives

This section outlines the paradox of absolute adjectives. At its foundations, the puzzle is very simple: in section 2.1, I will present data (following previous authors) that suggest that, contrary to RAs, AAs do not have a context-sensitive semantic denotation and have an absolute, non-scalar meaning. Then, in section 2.2, I will present well-known data that, at first glance, appears inconsistent with the facts in section 2.1; in particular, it will be shown that the meaning of AAs is both dependent on the context and gradable.

### 2.1. The Absolute Properties of AAs

In this section, I present data that shows that AAs are not context-sensitive, at least not in the same way as RAs. The first way in which we can see the difference in context-sensitivity between relative adjectives and both total and partial AAs is through the *definite description* test. As observed by e.g. Kyburg and Morreau (2000), Kennedy (2007), Syrett et al. (2010), Foppolo and Panzeri (2011), adjectives like *tall* and *empty* differ in whether they can ‘shift’ their thresholds (i.e. criteria of application) to distinguish between two individuals in a two-element comparison class when they appear in a definite description. For example, suppose there are two containers (A and B), and

neither of them are particularly tall; however, A is (noticeably) taller than B. In this situation, if someone asks me (3), then it is very clear that I should pass A. Now suppose that container A has less liquid than container B, but neither container is particularly close to being completely empty. In this situation, unlike what we saw with *tall*, (4) is infelicitous.

(3) Pass me **the tall one**.

(4) Pass me **the empty one**.

In other words, unlike RAs, AAs cannot change their criteria of application to distinguish between objects that lie in the middle of their associated scale. Using this test, we can now make the argument that adjectives like *clean*, *straight*, and *bald* are absolute, since (5-a) is infelicitous if neither object is (close to) completely clean/straight/bald. Likewise, we can make the argument that *dirty*, *wet*, and *bent* are also absolute, since (5-b) is infelicitous when comparing two objects that are at the middle of the dirtiness/wetness/curvature scale (i.e. both of them are dirty/wet/bent).

(5) **Absolute Adjectives**

- a. Pass me the **full/straight/bald** one.
- b. Pass me the **dirty/wet/bent** one.

Furthermore, we can argue that *long*, *expensive*, and *wide* are relative, since the (6) is felicitous when comparing two objects when both or neither are particularly long/expensive/wide.

(6) Pass me the **long/expensive/wide** one.

Thus, based on this first class of tests, it would appear that AAs are neither context-sensitive nor gradable. There are other adjectival constituents that have these properties: non-scalar adjectives (2-b). As shown in (7), they uniformly fail the definite description test: they are only licit in contexts in which exactly one object is atomic/prime/hexagonal.

- (7) a. Pass me the atomic one.  
(But neither/both are atomic!)
- b. Pass me the prime one.  
(But neither/both are prime!)
- c. Pass me the hexagonal one.  
(But neither/both are hexagonal!)

Another similarity between absolute adjectives and non-scalar adjectives concerns the gradedness of their meaning or, in this case, the lack thereof. We saw above that the meaning of an AA is (at least partially) tied to a context-insensitive absolute sense. In the case of total adjectives, it is suggested (by Cruse (1986), Kamp and Rossdeutscher (1994), Yoon (1996) and Rotstein and Winter (2004)) that this sense can be paraphrased using a universal statement, i.e. the absolute sense of *empty* would be something like ‘that which contains no objects’; the absolute sense of *flat* would be something like ‘that which has no bumps’; the absolute sense of *straight* would be something like ‘that which has no bends’, and so on. It is suggested that partial AAs are associated with an absolute meaning that can be paraphrased by an existential statement, i.e. the absolute sense of *dirty* would be ‘that which has some dirt on it’; the absolute sense of *wet* would be something like ‘that which has some wetness’, etc. Observe that in all of these cases, this absolute meaning is not gradable: either a container X contains no objects and is *empty* or it contains some objects and it is not *empty*. This property is not one that holds ‘to a degree’. Parallely, either an object has some liquid on it and therefore it is *wet*, or it has no liquid on it and is not *wet*. Thus, *wet* straightforwardly partitions the domain into wet-things and non-wet-things. Non-scalar adjectives have the same property: either an algebra has atoms and it is *atomic*, or it has no atoms and is not atomic. Likewise, either a shape has six sides and is *hexagonal* or it does not have six sides and it is not *hexagonal*.

In summary, based on the linguistic tests described above, it would appear that AAs pattern with NSs in having neither a context-sensitive nor a gradable meaning. However, in the next subsection, we will see other tests in which AAs seem to be both context-sensitive and gradable, like relative adjectives.

## 2.2. The Relative Properties of AAs

Of course, saying that absolute adjectives are not at all context-sensitive is clearly false. As discussed by very many authors such as Austin (1962), Unger (1975), Lewis (1979), Pinkal (1995), Kennedy and McNally (2005), Kennedy (2007), and Récanati (2010), although they may not be able to shift their semantic denotation to distinguish between any individuals on their scales, it is easy to see that their criteria of application can change depending on at least some contexts. For example, if we consider a particular large theatre with two spectators in it, the same theatre might be considered *empty* in the context of evaluating attendance at a play (8-a); however, it might not be considered so in the context of ensuring that no one is left inside during a fumigation or demolition process (8-b).

- (8) a. Only two people came to opening night; the theatre was **empty**.  
 b. Two people didn’t evacuate; the theatre wasn’t **empty** when they started fumigating.

Likewise, a road that has some twists in it might be considered *straight* in a context in which we are trying to avoid getting car sick, but it may no longer be considered so in a context in which we are surveying the land. Thus, it would seem that, contrary to what was suggested in the previous section, AAs are context-sensitive after all. This being said, it is important to observe that the context-sensitivity of predicates like *empty* is more restricted than that of predicates like *tall*. Crucially, the examples above all involve shifting the application of an AA from only objects at the endpoint of the scale to those that lie very close to the endpoint (like theatres with two people, roads with few bends, men with little hair etc.). In fact, all these examples involve what are known in the literature as ‘rough’ (cf. Austin (1962)), ‘loose’ (Unger (1975), Sperber and Wilson (1985)), ‘modulated’ (Récanati (2004), Récanati (2010)), or ‘imprecise’ (Pinkal (1995), Kennedy and McNally (2005) a.o.) uses.

Secondly, AAs pattern with RAs in that both of these classes of adjectives are perfectly natural in comparative and other degree constructions (9); whereas, NSs are far less acceptable in these linguistic contexts<sup>1</sup>.

- (9) a. John is taller than Phil.  
 b. This watch is more expensive than that watch.  
 c. John is balder than Phil.  
 d. My cup is emptier than your cup.
- (10) a. ?This algebra is more atomic than that one.  
 b. ?Mary is more pregnant than Sue.  
 c. ?This map is more geographical than that one.  
 d. ?This shape is more hexagonal than that one.

The data in this section suggests that, contrary to the conclusion in the previous section, the meaning of AAs is both context-sensitive and gradable. We therefore find ourselves faced with the following dilemma:

(11) **The Paradox of Absolute Adjectives:**

1. Suppose the semantic denotations of AAs are context-sensitive and gradable.

• **How can we explain their (albeit restricted) context-independence and the non-gradable absolute use?**

2. Suppose the semantic denotations of AAs are neither context-sensitive nor gradable.

• **How can we explain their (albeit restricted) context-dependence and their use in degree constructions?**

<sup>1</sup>Note that the non-scalars can be very easily coerced into scalar adjectives (i.e. *Mary is more pregnant than Sue: she's farther along*). Coerced NSs will be discussed in section 4.

I have framed this puzzle making reference to some recent theoretical and experimental work in the literature; however, it is, in fact, a longstanding problem in the semantics and pragmatics of gradable constituents, having been discussed by authors such as Sapir (1944), Unger (1975), Lewis (1979), Kennedy (2007), and Récanati (2010). In the next section, I will present a new account of the paradoxical nature of AAs within Burnett (2012b)'s *Delineation TCS* framework. Crucially, (following Sapir (1944), Lewis (1979) and Récanati (2010)) I will propose that the solution to this longstanding puzzle lies in the appropriate analysis of the special kind of context-sensitivity that we see with AAs and its relation to the phenomena of imprecision and vagueness.

### 3. A New Pragmatic Solution

The main lines of my solution to the paradox of absolute adjectives are very simple:

1. Total and partial absolute adjectives have semantic denotations that are neither context-sensitive nor gradable. In other words, at the level of their basic meaning, **AAs are non-scalar adjectives**.
2. Total and partial AAs are assigned secondary values that are constructed from a combination of their semantic denotations and pragmatic reasoning processes associated with the phenomenon of 'imprecision' or 'loose talk'. **These pragmatic denotations<sup>2</sup> are both context-sensitive and gradable**, contrary to the pragmatic denotations of non-scalar adjectives.

I believe that this proposal is in the same spirit as previous proposals by Unger (1975), Lewis (1979) and (most closely) Récanati (2010); however, it contrasts with proposals by, for example, Kennedy (2007) and Sassoon and Toledo (2011), who assimilate the semantic denotations of the positive forms of absolute adjectives to those of relative adjectives. Due to space constraints, I will not be able to discuss in depth how my proposal differs from the aforementioned authors (and other 'hybrid' solutions, such as Kennedy and McNally (2005) and Rotstein and Winter (2004)), but the interested reader is referred to Burnett (2012b) for comparisons between the approach developed here and other approaches in the literature. In what follows, I will outline the DelTCS framework for modelling the semantics and pragmatics of scalar predicates, and then I will give my analysis of the non-gradable semantics and gradable pragmatics of AAs.

<sup>2</sup>In the framework that I will present below, tolerant and strict denotations of absolute predicates are constructed from classical (i.e. basic semantic) denotations in conjunction with context-sensitive indifference ( $\sim$  relations). As argued for in Burnett (2012b), these indifference relations should be taken to model general cognitive judgements of very close similarity, which are most likely not exclusive to natural language. Indeed, there is a fair amount of research that suggests that Sorites-type paradoxes involving indifference relations can be constructed based not only on linguistic data but also on perceptual data (see, for example Raffman (2000) and Égré (2009) for some examples). Thus, I consider it to be in line with standard terminology to refer to the tolerant and strict denotations as *pragmatic* objects. Note however that these pragmatic denotations and the scales that are derived from them will have grammatical reflexes (cf. section 2). Given this fact, some readers may prefer to refer to all three denotations assigned adjectival predicates as features of their semantics. Therefore, I caution the reader not to read too much into this particular choice of labels.

### 3.1. Delineation TCS

*Delineation TCS* is so-called because it is a combination of two existing logical systems: *delineation semantics* and *TCS*. More specifically, I combine (a simplified version) of Klein (1980)'s comparison-class-based delineation system for modelling the relationship between context-sensitivity and gradability with Cobreros et al. (2012)'s non-classical *Tolerant, Classical, Strict* system for modelling the relationship between indifference relations and vagueness/imprecision. In this framework (as in Klein's system), scalar adjectives denote sets of individuals and, furthermore, they are evaluated with respect to comparison classes, i.e. subsets of the domain  $D$ . The basic idea is that the extension of a gradable predicate can change depending on the set of individuals that it is being compared with. In other words, the semantic denotation of the positive form of the scalar predicate can be assigned a different set of individuals in different comparison classes (CCs).

**Definition 3.1** *CC-relativized interpretation of predicates*<sup>3</sup>.

1. For a scalar adjective  $P$  and a contextually given comparison class  $X \subseteq D$ ,

$$(12) \quad \llbracket P \rrbracket_X \subseteq X.$$

2. For an individual  $a$ , a scalar adjective  $P$ , and a contextually given comparison class  $X \subseteq D$ ,

$$(13) \quad \llbracket a \text{ is } P \rrbracket_X = \begin{cases} 1 & \text{if } \llbracket a \rrbracket \in \llbracket P \rrbracket_X \\ 0 & \text{if } \llbracket a \rrbracket \in X - \llbracket P \rrbracket_X \\ i & \text{otherwise} \end{cases}$$

Unlike degree semantics (cf. Kennedy (2007)), delineation semantics takes the positive form as basic and derives the semantics of the comparative form from quantification over comparison classes. Informally, *John is taller than Mary* is true just in case there is some comparison class with respect to which John counts as tall and Mary counts as not tall.

**Definition 3.2** *Semantics for the comparative*. For two individuals  $a, b$  and a scalar adjective  $P$ ,  $\llbracket a \text{ is } P\text{-er than } b \rrbracket = 1$  iff  $a >_P b$ , where  $>_P$  is defined as:

$$(14) \quad x >_P y \text{ iff there is some comparison class } X \text{ such that } x \in \llbracket P \rrbracket_X \text{ and } y \notin \llbracket P \rrbracket_X.$$

<sup>3</sup>In this paper, the presentation of the system will be given at a somewhat informal level. However, see Burnett (2012b) and Burnett (2012c) for the full definition of the system.



As it stands, the analysis of the comparative in definition 3.2 is very weak and allows some very strange and un-comparative-like relations<sup>4</sup>, if we do not say anything about how the extensions of gradable predicates can change in different comparison classes. A solution to this problem involves imposing some constraints on how relative predicates like *tall* can be applied in different CCs. There are a few proposals of sets of constraints that the contextual variation that relative predicates ought to be subject to (ex. those proposed in Klein (1980), van Benthem (1982) and van Rooij (2011a)); however, the most famous of these constraint sets is that of van Benthem (1982)/van Benthem (1990)<sup>5</sup>. I will not examine in detail van Benthem's proposals for relative adjectives here because the main focus of this paper is the analysis of absolute adjectives. However, the following aspect of his analysis is important for our considerations: van Benthem shows that, with his particular constraint set, the comparative relations ( $>_P$ s) denote *strict weak orders*: irreflexive, transitive and almost connected relations<sup>6</sup>.

**Definition 3.6 *Strict weak order.*** A relation  $>$  is a strict weak order just in case  $>$  is *irreflexive, transitive, and almost connected*.

As discussed in Klein (1980), van Benthem (1990) and van Rooij (2011b), strict weak orders (also known as *ordinal scales* in measurement theory) intuitively correspond to the types of relations expressed by many kinds of comparative constructions<sup>7</sup>. Thus, theorem 1 shows that scales as-

<sup>4</sup>For example, suppose in the CC  $\{a, b\}$ ,  $a \in \llbracket P \rrbracket_{\{a,b\}}$  and  $b \notin \llbracket P \rrbracket_{\{a,b\}}$ . So  $a >_P b$ . And suppose moreover that, in the larger CC  $\{a, b, c\}$ ,  $b \in \llbracket P \rrbracket_{\{a,b,c\}}$  and  $a \notin \llbracket P \rrbracket_{\{a,b,c\}}$ . So  $b >_P a$ . But clearly, natural language comparatives do not work like this: If John is {taller, fatter, wider...} than Mary, Mary cannot also be {taller, fatter, wider...} than John. In other words,  $>_P$  must be asymmetric.

<sup>5</sup>Van Benthem proposes three axioms governing the behaviour of individuals across comparison classes. They are the following (presented in my notation):

For  $x, y \in D$  and  $X \subseteq D$  such that  $x \in \llbracket P \rrbracket_X$  and  $y \notin \llbracket P \rrbracket_X$ ,

- (i) **No Reversal (NR):** There is no  $X' \subseteq D$  such that  $y \in \llbracket P \rrbracket_{X'}$  and  $x \notin \llbracket P \rrbracket_{X'}$ .
- (ii) **Upward difference (UD):** For all  $X'$ , if  $X \subseteq X'$ , then there is some  $z, z' : z \in \llbracket P \rrbracket_{X'}$  and  $z' \notin \llbracket P \rrbracket_{X'}$ .
- (iii) **Downward difference (DD):** For all  $X'$ , if  $X' \subseteq X$  and  $x, y \in X'$ , then there is some  $z, z' : z \in \llbracket P \rrbracket_{X'}$  and  $z' \notin \llbracket P \rrbracket_{X'}$ .

<sup>6</sup>The definitions of *irreflexivity*, *transitivity* and *almost connectedness* are given below.

**Definition 3.3 *Irreflexivity.*** A relation  $>$  is irreflexive iff there is no  $x \in D$  such that  $x > x$ .

**Definition 3.4 *Transitivity.*** A relation  $>$  is transitive iff for all  $x, y, z \in D$ , if  $x > y$  and  $y > z$ , then  $x > z$ .

**Definition 3.5 *Almost Connectedness.*** A relation  $>$  is almost connected iff for all  $x, y \in D$ , if  $x > y$ , then for all  $z \in D$ , either  $x > z$  or  $z > y$ .

<sup>7</sup>For example, one cannot be taller than oneself; therefore  $>_{tall}$  should be irreflexive. Also, if John is taller than Mary, and Mary is taller than Peter, then we know that John is also taller than Peter. So  $>_{tall}$  should be transitive.



sociated with relative gradable predicates can be constructed from the context-sensitivity of the positive form and certain relatively weak axioms governing the application of the predicate across different contexts.

**Theorem 1** *van Benthem (1982); van Benthem (1990): For all  $P$ ,  $>_P$  is a strict weak order.*

The Klein/van Benthem analysis presented above is appropriate for relative adjectives, which have a context-sensitive semantic denotation. In order to account for the ways in which AAs appear to have a context-independent meaning, I will pursue an analysis in which their semantic denotation is not context-sensitive, just like the denotation of non-scalar predicates. To incorporate this idea into the delineation approach, I propose (following an idea in van Rooij (2011b)) that, in a semantic framework based on comparison classes, what it means to be non-context-sensitive is to have your denotation be invariant across classes. Thus, for an absolute or non-scalar adjective  $Q$  and a comparison class  $X$ , it suffices to look at what the extension of  $Q$  is in the maximal CC, the domain  $D$ , in order to know what  $\llbracket Q \rrbracket_X$  is. I therefore propose that a different axiom set governs the semantic interpretation of the members of the absolute and non-scalar classes that does not apply to the relative class: the singleton set containing the *absolute adjective axiom*.

(15) **Absolute Adjective Axiom (AAA).**

If  $Q$  is an absolute or non-scalar adjective, then for all  $X \subset D$  and  $x \in X$ ,  $x \in \llbracket Q \rrbracket_X$  iff  $x \in \llbracket Q \rrbracket_D$ .

In other words, the semantic denotation of an absolute/non-scalar adjective is set with respect to the total domain, and then, by the AAA, the interpretation of  $Q$  in  $D$  is replicated in each smaller comparison class. The AAA is very powerful: as shown by theorem 2, the scales that the semantic denotations of absolute constituents give rise to are very small, essentially trivial. In particular, the relations denoted by the absolute and non-scalar comparative ( $>_Q$ ) do not allow for the predicate to distinguish three distinct individuals.

**Theorem 2** *Burnett (2012b); Burnett (2012c): If  $Q \in AA$ , then there is no model  $M$  such that, for distinct  $x, y, z \in D$ ,  $x >_Q y >_Q z$  in  $M$ .*

Thus, we correctly predict that both AAs and NSs should have an absolute, non-gradable semantic denotation. In the next subsection, I extend the delineation analysis with the structure of Cobreros et al. (2012)'s non-classical logical to show how we can model their context-sensitive, gradable pragmatic denotations.

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Finally, suppose John is taller than Mary. Now consider Peter. Either Peter is taller than Mary (same height as John or taller) or he is shorter than John (same height as Mary or shorter). Therefore,  $>_{tall}$  should be almost connected.

### 3.2. Imprecise Uses of AAs

The *Tolerant, Classical, Strict* (TCS) system was developed as a way to preserve the intuition that vague and imprecise predicates<sup>8</sup> are *tolerant* (i.e. satisfy  $\forall x\forall y[P(x) \ \& \ x \sim_P y \rightarrow P(y)]$ , where  $\sim_P$  is a ‘little by little’ or indifference relation for a predicate  $P$ ), without running into the Sorites paradox<sup>9</sup>. Cobreros et al. (2012) adopt a non-classical logical framework with three notions of satisfaction: classical satisfaction, tolerant satisfaction, and its dual, strict satisfaction. Formulas are tolerantly/strictly satisfied based on classical truth and predicate-relative, possibly non-transitive *indifference relations*. For a given predicate  $P$ , an indifference relation,  $\sim_P$ , relates those individuals that are viewed as sufficiently similar with respect to  $P$ . For example, for the predicate *empty*,  $\sim_{empty}$  would be something like the relation “differ by a number of objects that is irrelevant for our purposes/contain roughly the same number of objects”. Since these relations are given by context, we assume that they are part of the model. I give the definition of the indifference relations (within a comparison class-based framework) below.

**Definition 3.7** *CC-relativized indifference relations.* For all scalar adjectives  $P$  and comparison classes  $X \subseteq D$ ,

(16)  $\sim_P^X$  is a binary relation on the elements of  $X$ .

In this framework, we say that *Room A is empty* is tolerantly true just in case Room A contains a number of objects that do not cause us to make a distinction between it and a completely empty room in the context. We say that a sentence like *This towel is wet* is strictly true just in case all the objects to which this towel is indifferent in the context are wet, i.e. if the towel is really or clearly wet. The tolerant and strict interpretations of predicates are shown in definition 3.8 and tolerant and classical satisfaction are shown in definition 3.9.

**Definition 3.8** *Tolerant ( $\llbracket \cdot \rrbracket^t$ ), and strict ( $\llbracket \cdot \rrbracket^s$ ) interpretation of predicates.* For all scalar adjectives  $P$  and comparison classes  $X \subseteq D$ ,

1.  $\llbracket P \rrbracket_X^t = \{x : \exists d \sim_P^X x \text{ and } d \in \llbracket P \rrbracket_X\}$ .
2.  $\llbracket P \rrbracket_X^s = \{x : \forall d \sim_P^X x, d \in \llbracket P \rrbracket_X\}$ .

<sup>8</sup>The system in Cobreros et al. (2012) was proposed to model the puzzling properties of vague language with relative predicates like *tall*; however, it clearly has a natural application to modelling similar effects with absolute adjectives.

<sup>9</sup>Note that on their imprecise use, absolute predicates like *bald* and *empty* give rise to Soritical-type reasoning: how many hairs must someone have before they stop being considered bald? How many seats must be filled before a theatre is no longer considered empty?

**Definition 3.9 Tolerant, and strict satisfaction.** For all individuals  $a$ , scalar predicates  $P$ , and comparison classes  $X \subseteq D$ ,

$$1. \llbracket a \text{ is } P \rrbracket_X^t = \begin{cases} 1 & \text{if } \llbracket a \rrbracket \in \llbracket P \rrbracket_X^t \\ 0 & \text{if } \llbracket a \rrbracket \in X - \llbracket P \rrbracket_X^t \\ i & \text{otherwise} \end{cases}$$

$$2. \llbracket a \text{ is } P \rrbracket_X^s = \begin{cases} 1 & \text{if } \llbracket a \rrbracket \in \llbracket P \rrbracket_X^s \\ 0 & \text{if } \llbracket a \rrbracket \in X - \llbracket P \rrbracket_X^s \\ i & \text{otherwise} \end{cases}$$

The definitions of the tolerant and strict comparative relations are parallel to the classical comparative (definition 3.2).

**Definition 3.10 Tolerant/strict comparative .** For two individuals  $a, b$  and a scalar adjective  $P$ ,  $\llbracket a \text{ is } P\text{-er than } b \rrbracket^{t/s} = 1$  iff  $a >_P^{t/s} b$ , where  $>_P^{t/s}$  is defined as:

$$(17) \quad x >_P^{t/s} y \text{ iff there is some comparison class } X \text{ such that } x \in \llbracket P \rrbracket_X^{t/s} \text{ and } y \notin \llbracket P \rrbracket_X^{t/s}.$$

In order to account for how AAs can have, at the same time, a semantic denotation that is constant across CCs, but at the same time be associated with non-trivial scales, I propose that what can vary across CCs are the indifference relations i.e., the  $\sim_Q^X$ s. For example, if I compare Homer Simpson, who has exactly two hairs, directly with Yul Brynner (who has zero hairs), the two would not be considered indifferent with respect to baldness (Homer has hair!). However, if I add Marge Simpson into the comparison class (she has a very large hairdo), then Yul and Homer start looking much more similar, when it comes to baldness. Thus, I propose, it should be possible to order individuals with respect to how close to being completely bald (or empty or straight) they are by looking at in which comparison classes they are considered indifferent to completely bald/empty/straight individuals<sup>10</sup>.

In Burnett (2012b), I propose a set of constraints on the establishment of indifference relations across comparison classes<sup>11</sup>, which are, as much as possible, motivated by common proposals in

<sup>10</sup>The idea is conceptually similar in some sense (although extremely different in its execution) to a suggestion made by Récanati (2010), with respect to how an adjective like *empty* can be both absolute and gradable.

<sup>11</sup>Burnett (2012b) and Burnett (2013) propose the following general constraints that indifference relations are subject to across comparison classes. See the aforementioned works for an indepth discussion of their properties.

1. **Tolerant Convexity (TC):** For all adjectives  $P$ , all comparison classes  $X \subseteq D$ , and all  $x, y \in X$ , if  $x \sim_P^X y$

the linguistics, philosophical and psychological literatures about the properties of cognitive similarity judgments. Furthermore, I show that the contextual variation in the definition of  $\sim_Q$  across comparison classes and the resulting contextual variation in the tolerant and strict denotations of AAs predict that total predicates can be associated with non-trivial tolerant scales (theorem 3) and partial predicates can be associated with non-trivial strict scales (theorem 4).

**Theorem 3** (Burnett, 2012b) *If  $Q$  is a total AA,  $>_Q^t$  is a (possibly non-trivial) strict weak order.*

**Theorem 4** (Burnett, 2012b): *If  $Q$  is a partial AA,  $>_Q^s$  is a (possibly non-trivial) strict weak order.*

We therefore predict that, even though they have a non-gradable semantic denotation, total and partial AAs should be licit in the comparative and other degree constructions since they have context-sensitive pragmatic denotations that can be used to construct non-trivial tolerant or strict scales<sup>12</sup>. This concludes the solution to the paradox of absolute adjectives. In the next section, I present an analysis of the pragmatics of non-scalar adjectives and discuss the consequences of the proposals made in this paper for the empirical relationship between AAs and NSs.

#### 4. Gradability as a Pragmatic Phenomenon

The analysis presented in the previous section solves the puzzle of how AAs can appear to be both gradable and non-gradable at the same time. However, non-scalar adjectives like *prime* or

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and there is some  $z \in X$  such that  $x \geq_P^t z \geq_P^t y$ , then  $x \sim_P^X z$ .

2. **Strict Convexity (SC):** For all  $P$ , all  $X \subseteq D$ , and all  $x, y \in X$ , if  $y \sim_P^X x$  and there is some  $z \in X$  such that  $x \geq_P^s z \geq_P^s y$ , then  $y \sim_P^X z$ .
3. **Granularity (G).** For all  $P$ , all  $X \subseteq D$  and all  $x, y \in X$ , if  $x \sim_P^X y$ , then for all  $X' : X \subseteq X'$ ,  $x \sim_{P'}^{X'} y$ .
4. **Minimal Difference (MD).** For all  $P$ , and all  $x, y \in D$ , if  $x >_P y$ , then  $x \not\sim_P^{\{x,y\}} y$  and  $y \not\sim_P^{\{x,y\}} x$ .
5. **Contrast Preservation (CP).** For all  $P$  all  $X, X' \subseteq D$ , if  $X \subset X'$  and, for  $x, y \in X$ ,  $x \not\sim_P^X y$  and  $x \sim_{P'}^{X'} y$ , then  $\exists z \in X' - X : x \not\sim_{P'}^{X'} z$ .

Furthermore, to account for certain asymmetries in judgments of similarity observed with total and partial predicates (see Burnett (2012a)), Burnett (2012b) proposes the following axioms that distinguish the two subclasses of AAs:

1. **Total Axiom (TA):** For all total AAs  $Q$  and for all  $x, y \in D$ , if  $x \in \llbracket Q \rrbracket_D$  and  $y \notin \llbracket Q \rrbracket_D$ , then  $y \not\sim_Q^X x$ , for all comparison classes  $X \subseteq D$ .
2. **Partial Axiom (PA):** For all partial AAs  $Q$  and for all  $x, y \in D$ , if  $x \in \llbracket Q \rrbracket_D$  and  $y \notin \llbracket Q \rrbracket_D$ , then  $x \not\sim_Q^X y$ , for all  $X \subseteq D$ .

<sup>12</sup>I note here that this analysis also makes predictions concerning the properties of the non-trivial scales associated with AAs, namely that total AAs should be associated with scales with a top endpoint and partial AAs should be associated with a scale that has a bottom endpoint. The question of scale structure within DeITCS is explored in great detail in Burnett (2012b) and Burnett (2013).

*atomic* are never gradable. How can we account for the differences between AAs and NSs in this framework? In order to derive the non-gradability of NSs, I propose that these predicates (and only these predicates) are subject to an additional constraint that enforces all of their interpretations to be precise. This is stated as the constraint *Be Precise* in (18).

(18) **Be Precise (BP):**

For all non-scalar adjectives  $S$ , all comparison classes  $X$ , and all  $x, y \in X$ , if  $x \sim_S^X y$  and there is some  $z \in X$  such that  $x \geq_S z \geq_S y$ , then  $x \sim_S^X z$  and  $y \sim_S^X z$ .

The introduction of this constraint has the following important consequence: all the scales that are associated with NSs are trivial. This fact is stated as theorem 5 and is proved in Burnett (2012b).

**Theorem 5** (Burnett, 2012b) *If  $S$  is a non-scalar adjective, then,*

1. *There are no models  $M$  such that, for distinct  $x, y, z \in D$ ,  $x >_S^t y >_S^t z$  in  $M$ .*
2. *There are no models  $M$  such that, for distinct  $x, y, z \in D$ ,  $x >_S^s y >_S^s z$  in  $M$ .*

Therefore, we correctly predict the non-gradability of non-scalar adjectives. This proposal makes the additional prediction that NSs should never be context-sensitive, even in the way that AAs are. Is this correct? A famous example in the literature of a context-sensitive use of *hexagonal* (originally due to Austin (1962) and discussed in the context of vagueness and imprecision in Lewis (1979)) is the one in (19).

(19) France is hexagonal.

If we are comparing France to shapes in geometry textbooks, it will not be considered hexagonal (its coastline has very many more ‘sides’ than six!); however, when we are comparing it to other countries, all of whom also have bumpy coastlines, it may be considered hexagonal. Thus, we have found a case where the criteria for application of the predicate *hexagonal* vary depending on comparison class. Thus, we can conclude that *hexagonal*, in what Austin calls its ‘rough’ use (what we would call the ‘imprecise’ use), is context-sensitive, and, at first glance, it may look as if we do find a context-sensitive imprecise use of a non-scalar adjective. But this conclusion would be premature. In fact, ‘rough’ *hexagonal* is perfectly natural in the comparative construction (20).

(20) France is more hexagonal than Canada.

So, as soon as we are licensed by the context to apply *hexagonal* to France, we are licensed to compare things in terms of how close they are to being in the extension of the non-scalar use of the predicate. (20) shows that, while the imprecise use of *hexagonal* is context-sensitive, it is also scalar. In other words, it is a *coerced* non-scalar adjective. In order to incorporate the scalar coercion process into our model, I propose the following analysis of ‘coerced’ non-scalar adjectives:

(21) **Scalar Coercion:**

Coerced non-scalar adjectives are subject to all the same constraints as regular NSs, except *Be Precise*.

This approach is very different from certain other current views (such as the ‘degree semantics’ framework) that propose both a semantic and a syntactic difference between these predicates. In this section, I give three arguments in favour of the position that the AA/NS distinction should be reduced to facts about the use of these predicates, in particular, how precisely we tend to use them.

The first argument that the AA/NS distinction has to do with precision concerns the nature of the inventory of non-scalar adjectives. In particular, if we look at the inventory of NSs discussed throughout the literature (many common examples are in (22)), we can notice that the vast majority (if not all of them) of them come from domains in which precision is important: logic and mathematics (*atomic, hexagonal, square, even, odd, prime*), biology (*pregnant, dead, male, female*), physics (*opaque, transparent, visible, invisible*), and the law (*legal, illegal, Canadian, French*).

(22) **Non-Scalar Adjectives:**

atomic, geographical, polka-dotted, pregnant, legal, illegal, dead, hexagonal, square, male, female, even, odd, prime, Canadian, French, perfect, imperfect, opaque, transparent, visible, invisible...

The connection between the register and communicative domain in which a term is used and whether or not it is scalar is straightforwardly expected in a theory in which scalarity can be pragmatic matter. Although one could perhaps invent a historical explanation for them, these lexicalization patterns are somewhat puzzling for an analysis in which AAs like *empty* and *straight* have an inherently gradable meaning, but NSs like *illegal* and *atomic* do not.

Secondly, although a characteristic property of non-scalar adjectives is their strangeness in comparative constructions, another characteristic property of these predicates is the ease with which, given an appropriate context, they can become gradable. In other words, although we noted that the adjectives in (22) sounds strange in the comparative out of context, it is perfectly natural to use

many of them as follows<sup>13</sup>:

- (23) a. This dress is *more polka-dotted* than that one; it has more dots on it.  
 b. This room is *more square* than that room.  
 c. Sarah is *more pregnant* than Sue; Sarah is showing more.  
 d. Murder is *more illegal* than smoking pot.  
 e. Zombie A is *deader* than zombie B.  
 and so on...

In sum, it seems to be a general property of non-scalar adjectives that, with very little effort, they can appear in degree constructions and when they do so, it is on their imprecise use. Of course, an analysis in which there was a productive scalar coercion process in the grammar (perhaps some sort of degree argument adding operation) could account for the ease of coercion (the coercion process could be highly productive). However, the pragmatic analysis that I have given needs no such morpho-semantic operation: non-scalar adjectives are simply absolute scalar adjectives that tend to be used with a higher level of precision. Alternatively, we could describe AAs as simply non-scalar adjectives that tend to be used loosely.

My final argument in favour of an analysis in which non-scalar adjectives are semantically identical to absolute scalar adjectives comes from an empirical observation about the properties of coerced NSs. The generalization is the following:

- (24) **The NS<sup>c</sup> → AA Dependency:**  
 Non-scalar adjectives are coerced into absolute scalar adjectives.

For example, although they are context-sensitive, coerced NSs appear to uniformly fail the definite description test:

- (25) a. Pass me the hexagonal one.  
 (But both/neither are hexagonal!)

<sup>13</sup>Even some of the more ‘mathematical’ terms in (22) can acquire a gradable meaning. For example, Armstrong et al. (1983) show that even if they admit that a particular well-defined concept like *odd* or *even* is not inherently gradable, participants can still order individuals with respect to how well they exemplify the concept. With this in mind, we could form comparatives like those in (i-a) and (i-b), as well as in the example (i-c) from Rett (2012) (p.9), which is also inspired by the results of Armstrong et al. (1983).

- (i) a. 4 is more even than 34.  
 b. 3 is more odd than 447.  
 c. 7 is more prime than 2.



- b. Show me the illegal one.  
(But both/neither are illegal!)
- c. Show me the dead one.  
(But both/neither are dead!)

An analysis in which coercion is a morpho-semantic operation would have to build (24) into the operation, and this would raise the question of why we cannot coerce a NS into a relative scalar adjective. However, the dependency between coerced NSs and AAs is a consequence of the pragmatic analysis that I have given: NSs have context-independent semantic denotations, just like AAs. I therefore conclude that a pragmatic analysis of the AA/NS distinction has a ready explanation for an important set of data associated with ‘coerced’ NSs.

## 5. Conclusion

In this paper, I presented a new solution to the paradox of absolute adjectives: I proposed that AAs have the same kind of semantic denotations as NSs, which explains their lack of context-sensitivity (compared to RAs) and absolute nature. Furthermore, I proposed that their gradability arises due to their context-sensitive pragmatic denotations. I set this analysis within Burnett (2012b)’s *Delineation TCS* non-classical logical framework and showed how we could construct non-trivial scales from the contextual variation of the tolerant and strict denotations of total and partial predicates. Finally, I gave an analysis of the AA/NS distinction as resulting from a difference in the level of precision with which the different classes of predicates are generally used, and I presented a view of scalar coercion as a pragmatic loosening process. I then argued that this account can explain certain dependencies between AAs and NSs and suggested that the general framework presented in this paper opens the door a novel pragmatic approach to gradability in natural language.

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