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Degree modification of gradable nouns: size adjectives and adnominal degree morphemes

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Abstract Degree readings of size adjectives, as in *big stamp-collector*, cannot be explained away as merely the consequence of some extragrammatical phenomenon. Rather, this paper proposes that they actually reflect the grammatical architecture of nominal gradability. Such readings are available only for size adjectives in attributive positions, and systematically only for adjectives that predicate bigness. These restrictions can be understood as part of a broader picture of gradable NPs in which adnominal degree morphemes—often overt—play a key role, analogous to their role in the extended AP. Size adjectives acquire degree readings through a degree morpheme similar to the one that licenses AP-modifying measure phrases. Its syntax gives rise to positional restrictions on the availability of these readings, and the semantics of degree measurement interacts with the scale structure of size adjectives to give rise to restrictions on the adjective itself.

Keywords Degree modification · Gradability · Nominals · Adjectives · Scale structure · Vagueness

1 Introduction

In languages that have them, adjectives and the functional structure they project are the prototypical means by which gradable notions are expressed, and consequently probably the clearest window available onto how degree modification works. But gradability is not a property of adjectives alone (Bolinger 1972; Sapir 1944; and more recently Abney 1987; Doetjes 1997; Kennedy and McNally 2005, among

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many others). Indeed, vagueness, a conceptual cousin of gradability, has traditionally been discussed specifically with respect to nouns.[1]

The mechanisms that underlie gradability in such non-adjectival syntactic contexts remain in many respects mysterious. The big-picture aim of this paper is to shed some light onto one corner of this murky area by examining a variety of degree modification in which a gradable predicate is provided by a noun, and an adjective that normally expresses size characterizes the degree to which the gradable predicate holds. The phenomenon at issue here is exemplified in (1):

(1) a. George is an *enormous idiot*.
 b. Gladys is a *big stamp-collector*.
 c. Three *huge goat cheese enthusiasts* were arguing in the corner.
 d. Most *really colossal curling fans* are difficult to understand.

The most natural readings for the sentences in (1) don't involve any claim of large physical size; rather, the nominal predicate is claimed to hold to a high degree. In (1a), for example, it is George's idiocy that is enormous, not George. Strikingly, these readings persist and are relatively well behaved in a variety of syntactic and semantic contexts, including comparatives, equatives, *how*-questions, and *too*-constructions:

(2) a. Gladys is a bigger idiot than Floyd.
 b. Gladys is as big an idiot as Floyd.
 c. How big an idiot is Gladys?
 d. Gladys is too big an idiot to talk to.

The availability of these readings of such adjectives is not a local peculiarity of English. The following can all receive the degree reading roughly paraphrasable as 'someone who is very idiotic':

(3) *Spanish*
 un gran idiota.
 a great idiot

(4) *Polish*
 wielki idiota
 great idiot

(5) *German*
 ein großer Idiot
 a big idiot

[1] The Sorites Paradox—the Paradox of the Heap—is after all classically framed in terms that exploit the lexical semantics of the noun *heap*.

(6) *Hebrew*
idyot gadol
idiot big

As one might expect, the properties of this construction vary from one language to another, but the parallels are sufficient to suggest that the English facts I will focus on here are broadly representative of a considerably more general phenomenon.

I examine this phenomenon in more detail in Sect. 2, arguing that it is not merely a reflection of some other linguistic (or extralinguistic) process. In the process, two generalizations emerge: that these readings are possible only in attributive (in English, prenominal) positions and that they are possible systematically only with adjectives that predicate bigness rather than smallness. Section 3 lays the groundwork by adopting a syntax and semantics for the extended projection of gradable nouns analogous to the syntax and semantics of the extended AP, in which adnominal degree morphemes play a pivotal role. Section 4 presents a compositional semantics for degree readings of size adjectives in which they are a kind of adnominal counterpart of measure phrases in AP, and restrictions on the construction are brought about in part by the underlying syntax and (contra Morzycki 2005) in part by how the scale structure of the size adjective interacts with the semantics of degree measurement. Section 5 concludes.

2 Two generalizations and some more facts and complications

2.1 The Position Generalization

The degree reading of a size adjective seems to be unavailable in predicative positions—(7a) and (8a) are ambiguous, but (7b) and (8b) have only a literal-size reading:[2]

(7) a. that big stamp-collector
b. %That stamp-collector is big.

(8) a. George is an enormous idiot.
b. %George is an idiot, and he is enormous.

The degree reading is also impossible postnominally:

(9) a. a bigger stamp-collector than any I've met before
b. %a stamp-collector bigger than any I've met before

[2] I will use % to indicate that the degree reading is unavailable.

(10) a. a $\left\{\begin{array}{l}\text{more enormous}\\ \text{bigger}\end{array}\right\}$ idiot than you can imagine

b. an idiot $\left\{\begin{array}{l}\text{*more enormous}\\ \text{*?bigger}\end{array}\right\}$ than you can imagine

(11) a. too big a war-monger to tolerate

b. %a war-monger too big to tolerate

This general pattern has analogues outside English. In Spanish and Polish, for example, degree readings are also impossible postnominally (as these languages can demonstrate perhaps more starkly than English can):[3]

(12) *Spanish*

a. Pedro es un gran idiota.
Pedro is a great idiot
'Pedro is very idiotic.'

b. %Pedro es un idiota grande.
Pedro is a idiot great
'Pedro is an idiot and physically large.'

(13) *Polish*

a. wielki idiota
great idiot
'someone very idiotic'

b. %idiota wielki
idiot great
'an idiot who is physically large'

And, like in English, these readings are impossible in predicative VP positions. All of the following involve physical bigness:

(14) *Spanish*

%Ese idiota es enorme.
this idiot is enormous

(15) *Polish*

%Ten idiota jest wielki
this idiot is great

[3] At various points I will focus on the noun *idiot*, since intuitions about its gradability are particularly robust. A reviewer points out that this is in one respect misleading: it might suggest that the expressive flavor of such nouns is crucial. It doesn't seem to be—nouns without any expressive flavor (e.g., *smoker*, *stamp-collector*) also give rise to degree readings.

(16) *German*
%Dieser Idiot ist groβ.
this idiot is big

(17) *Hebrew*
%ha-idyot hu gado
the-idiot HU big

The generalization, then, can be stated more officially as in (18):

(18) *The Position Generalization*
Degree readings of size adjectives are possible only in attributive positions (in English, prenominally).

2.2 The Bigness Generalization

The other basic generalization in this domain is that adjectives that predicate bigness (that is, upward monotonic size adjectives) are systematically able to receive degree readings, but this is not the case for adjectives that predicate smallness:

(19) $$\text{George is a} \left\{ \begin{array}{l} \text{big} \\ \text{enormous} \\ \text{huge} \\ \text{colossal} \\ \text{mammoth} \\ \text{gargantuan} \end{array} \right\} \text{idiot.}$$

(20) $$\text{George is a} \left\{ \begin{array}{l} \text{\%small} \\ \text{\%tiny} \\ \text{\%minuscule} \\ \text{\%microscopic} \\ \text{\%diminutive} \\ \text{\%minute} \end{array} \right\} \text{idiot.}$$

Two caveats should be issued at this point. One is that adjectives of smallness are possible systematically on either of two superficially similar readings, which I discuss in Sects. 2.4 and 2.5. The other is that there are adjectives that can express what the ones in (1)b fail to, such as *slight* and *minor*:

(21) $$\text{George is a} \left\{ \begin{array}{l} \text{slight} \\ \text{minor} \end{array} \right\} \text{idiot.}$$

These, however, are not size adjectives synchronically. For *minor* this is clear. *Slight* does predicate slenderness, but then so does *thin*—neither expresses generalized size. (The notion 'size adjective' is characterized a bit further in Sect. 4.2.)

This contrasts sharply with adjectives that predicate bigness, which have a compatibility with degree readings that is not only systematic but actually productive. To my knowledge, *King Kong-scale* is not an existing English adjective of bigness, and *Chihuahua-scale* is not an existing adjective of smallness. I attempt to coin them in (22) and (23):

(22) a. There's a King Kong scale chunk of rotting meat on your kitchen floor!
b. The bastard had a King Kong scale trust fund all his life.

(23) a. I can almost make out somewhere in the distance the faintest glimmer of a Chihuahua-scale comet.
b. The model had this weird perky Chihuahua-scale nose.

While this sort of judgment is for obvious reasons not entirely straightforward, it seems natural to assign a degree interpretation to (24a), and distinctly less natural to assign such a reading to (24b):

(24) a. He's a King Kong-scale idiot.
b. %?He's a Chihuahua-scale idiot.

If in fact a degree reading comes for free whenever a novel adjective of bigness is coined, it suggests strongly that the availability of degree readings is not an accidental lexical property of these adjectives, but rather an essential part of the job description for adjectives of bigness.

Like the Position Generalization, this pattern is not unique to English:[4]

(25) *Spanish*
%Pedro es un pequeño idiota.
Pedro is a small idiot
'Pedro is an idiot and physically small.'

(26) *Polish*
%mały idiota
small idiot
'an idiot who is physically small'

(27) *German*
%Floyd ist ein kleiner Idiot.
Floyd is a small idiot
'Floyd is an idiot and physically small.'

[4] The German facts may involve a more serious complication I don't understand. The degree reading may be possible for (i):

(i) %?Floyd ist ein kleiner Halunke.
Floyd is a little scoundrel

There is also a German cartoon character whose name translates roughly to 'the Little Asshole' (Britta Sauereisen p.c.). I strongly suspect both of these uses involve the significance reading, but some German speakers seem to be vaguely uneasy about accepting this characterization.

(28) Hebrew

%George	hu	idyot	katan.
George	HU	idiot	small

'George is an idiot and physically small.'

So, to state this generalization more officially:

(29) *The Bigness Generalization*
Adjectives that predicate bigness systematically license degree readings. Adjectives that predicate smallness do not.

Importantly, this is a generalization specifically about degree readings of size adjectives. There is no *conceptual* difficulty associated with low degrees of (say) idiocy:

(30) a. Dick is less of an idiot than George.
b. Dick is really not much of an idiot.

(31) a. Gladys is less of a smoker than Clyde.
b. Clyde is not much of a smoker.

2.3 Not just vagueness, not just metaphor

A natural impulse at first glance is to regard degree readings of size adjectives as simply an instance of some broader cognitive process. Perhaps these readings arise as a kind of metaphor, one might suggest, or perhaps they are the product of a peculiar kind of vagueness. But the facts don't accord with such an understanding.

The contrast between the degree and size readings passes tests for distinguishing ambiguity from vagueness. In (32a), *big* very naturally receives a degree reading, and in (32b), it very naturally receives a size reading; likewise for *enormous* in (33):

(32) a. The other driver was a really big bastard.
b. The other driver was a really big basketball player.

(33) a. Larry is an enormous fan of curling.
b. Larry is an enormous former mafia goon.

If the difference were vagueness, it should be perfectly unremarkable to predicate *big* of a single conjoined NP with different readings for each conjunct, as in (34). So too with *enormous* in (35). But in fact, doing so has the flavor of wordplay—that is, of the telltale sense of oddness characteristic of zeugma:

(34) a. The other driver was a really big bastard and basketball player.
b. The other driver was a really big basketball player and bastard.

(35) a. Larry is an enormous fan of curling and former mafia goon.
b. Larry is an enormous former mafia goon and fan of curling.

These examples are imperfect in that it is possible in principle to alleviate the sense of oddness by construing the size adjective with the left conjunct alone. The intuition seems clear even so.

Setting zeugma aside, this phenomenon behaves like ambiguity when one of the readings is explicitly blocked:[5]

(36) a. Gladys isn't very big, but she is a very big stamp-collector.
b. Harry isn't enormous, but he is an enormous idiot.

(37) a. #This chair isn't very big, but it is a very big chair.
b. #That building isn't enormous, but it is an enormous building.

There is no sense of contradiction in (36), unlike in (37), because two distinct readings are involved, and one can be negated without negating the other.

Another understanding of the phenomenon might be to construe degree readings of size adjectives as the outcome of an extralinguistic cognitive process of metaphorical extension. But this raises numerous difficult questions that such an approach would be profoundly ill-suited to answering. First, why should the availability of such metaphorical extension be sensitive to syntactic position? Second, why should this be possible only for adjectives of bigness? And third, why should these metaphors be apparently so conventionalized? That is, why should they come seemingly for free, with no conscious awareness by either speaker or hearer that something metaphorical has been said? None of these properties would be problematic if this phenomenon were understood in grammatical rather than extralinguistic terms.

2.4 Abstract size readings

There are at least two other uses of size adjectives that must be distinguished from true degree uses. In the first of these, an ordinary reading of a size adjective has a roughly degree-like flavor because of the nature of the modified NP:

(38) a. an enormous mistake
b. a huge snowstorm
c. a big catastrophe
d. a huge problem

[5] It's worth noting that *big mouse* would behave similarly because of independent facts about how modified nominals influence the selection of a comparison class. To control for this, one could consider examples with *for*-phrases, such as *#Mickey isn't enormous for a mouse, but he is an enormous mouse.* In contrast, *very big for a stamp-collector* and *?enormous for an idiot* (the latter is not obviously even well-formed) behave as (36) and (37) would suggest.

These are not genuine degree readings. Rather, they are size readings that make reference to size along a possibly abstract dimension—one that may correlate with some intuitive sense of extremeness or severity. That is, these readings, unlike true degree readings, *do* seem to be in some important sense genuinely metaphorical. They pattern with ordinary size readings rather than with degree readings in several respects.

One of these is a systematic failure to accord with the Position Generalization—these readings can occur in predicative positions:

(39) a. That was a mistake, and it was enormous.
b. That was a snowstorm, and it was huge.
c. a catastrophe bigger than any other
d. a problem too huge to fully comprehend

Another is that they systematically fail to accord with the Bigness Generalization—adjectives that predicate smallness behave just like ones that predicate bigness:

(40) That was a $\left\{\begin{array}{l}\text{big}\\\text{enormous}\\\text{huge}\\\text{colossal}\\\text{mammoth}\\\text{gargantuan}\end{array}\right\}$ mistake.

(41) That was a $\left\{\begin{array}{l}\text{small}\\\text{tiny}\\\text{minuscule}\\\text{microscopic}\\\text{diminutive}\\\text{minute}\end{array}\right\}$ mistake.

And finally, in these abstract-size cases, there is no ambiguity—no sharp distinction between two readings—so sentences like (42) are contradictory:

(42) a. #That mistake wasn't enormous, but it was an enormous mistake.
b. #That snowstorm wasn't huge, but it was a huge snowstorm.
c. #That catastrophe wasn't big, but it was a big catastrophe.
d. #That problem wasn't huge, but it was a huge problem.

2.5 Significance readings

There is another, more puzzling use of size adjectives that has a non-size flavor. On this use, size adjectives seem to have an expressive role (in the sense of Kratzer 1999; Potts 2003, 2007; and others) and involve some notion of, very roughly, 'significance':

(43) a. the big political figures of the 20th century
b. a huge corporate mucky-muck
c. a small little man
d. some puny judge somewhere

As is characteristic of expressive meaning, the contribution of the size adjective on this reading is hard to articulate, and seems to involve the speaker's attitudes in some way. Often, it expresses the speaker's estimation of the importance of the modified NP's referent, as worthy of regard, consideration, admiration, scorn, or dismissal.

I have no theory to offer of these readings—only the observation that they do differ fundamentally from degree readings. Unlike degree readings, significance readings don't involve degrees on a scale provided by the head noun (degrees of idiocy, of stamp-collector-hood, etc.). Rather, they always involve degrees of (something like) significance, irrespective of the noun. And unlike degree readings, significance readings don't accord with the Bigness Generalization. Adjectives of smallness give rise to these readings very naturally, as (43) reflects. Like degree readings, though, significance readings are sensitive to syntactic position. The nature of this sensitivity is unclear, though. They usually resist predicative uses, but in rare cases allow them:

(44) a. *?These political figures were big.
b. *?This corporate mucky-muck is huge.
c. ?This man is little.

(45) You'll be *huge* in Bolivia! The biggest![6]

This odd pattern may correlate with the independent fact that expressive adjectives—whether size adjectives or otherwise—are only possible attributively (Morzycki 2008). The use in (45) appears not to be so clearly expressive, and is largely restricted to characterizations of popularity, as (46) further reflects, and to the adjectives *big* and *huge* rather than, say, *gargantuan* or *mammoth*, as in (47):

(46) a. I'm big in Japan.
b. Baby potbellied pigs used to be huge.

(47) ?You'll be $\left\{\begin{array}{c}\text{gargantuan}\\ \text{mammoth}\end{array}\right\}$ in Bolivia!

2.6 In a nutshell

To summarize so far, degree readings involve true grammatical ambiguity, and they are systematically available only for adjectives that predicate bigness and only in

[6] This sentence might be uttered, for example, by a talent agent addressing an actor.

prenominal positions. They are distinct from abstract size readings and significance readings.

3 The Grammar of gradable nouns

To get off the ground in assembling a semantics, it will be necessary to first elaborate the structure of DPs with gradable nouns. This will be the task in this section, which will not directly address size adjectives at all. The analysis of degree readings of size adjectives will come in Sect. 4.

3.1 Assumptions about nominal gradability

One way to conceptualize nominal gradability would be to make use of supervaluations, in which there is no need for degrees as such in the first place (Kamp 1975; Fine 1975; others). Kamp and Partee (1995) explicitly propose that nouns are interpreted in this way.[7] This has the advantage of being compatible with the usual assumption that nouns denote properties. Importantly, though, the kind of nominal gradability involved here may be different from ordinary notions of prototypicality or class membership—a *big stamp-collector* is not necessarily a particularly prototypical or core instance of a stamp-collector, for example.[8] Whatever the other merits of this approach, then, it will not be the course I adopt here. In large measure, this is due to an independent preference for a model that makes (explicit) use of degrees.

Another course is to suppose that nouns—or at least certain nouns—have degree arguments and are associated lexically with scales (an assumption considered in Larson 1998; Matushansky 2001, 2002, and made explicitly in Matushansky and Spector 2005). This is the view I will adopt here. In particular, I will adopt a Kennedy-style understanding of adjectives and gradability (as articulated in Kennedy 1997, 2007; Kennedy and McNally 2005, and elsewhere) and assume gradable nouns work analogously. In such a system, *tall* denotes a measure function from individuals to their degrees of tallness, as in (48a) (though see Heim 2000 for arguments against this view). I will assume correspondingly that *idiot* denotes a measure function from individuals to their degree of idiocy, as in (48b):

(48) a. $[\![tall]\!] = \lambda x \,.\, \iota d[x \text{ is } d\text{-tall}] = \mathit{tall}$
b. $[\![idiot]\!] = \lambda x \,.\, \iota d[x \text{ is } d\text{-idiotic}] = \mathit{idiot}$

For convenience I will subsequently write simply tall or idiot to represent this measure function.

[7] An interesting recent critical re-examination of this approach is Sassoon (2007), which is more broadly relevant to the issues in this paper but came to my attention too late to engage it more fully.

[8] I owe this point to an anonymous Natural Language Semantics reviewer.

This reflects the intuition that gradable nouns are, on a deep level, fundamentally adjective-like. But just as such an understanding of adjectives entails making further syntactic commitments, so too will this understanding of gradable nouns.

Before moving on, it's worth making explicit that these remarks are made with respect to *gradable* nouns specifically, and saying a few words about what this means. In this context, the term should be taken to include just those nouns that admit degree readings with size adjectives. Not all nouns are gradable, just as not all adjectives are. In the nominal domain, of course, the proportion of gradable predicates is likely to be much lower. But as with adjectives, much more could be said about the flavors of gradability different kinds of noun express.

An important difference, though, is that among adjectives, there is a close connection between vagueness and gradability, and one tends to imply the other (possible exceptions include *metallic* or *chemical*). Among nouns, the connection is much less direct, as Kamp (1975) notes in especially explicit fashion.[9] *Idiot* is both vague and gradable. But many nouns that have been called vague or 'scalar' are not gradable in the sense intended here. Among these are *heap, bunch, throng, mound, bevy, shitload*, and *crowd*. For all of these, one can construct a sorites sequence. (Is it still a crowd if one person leaves? How about another? Another still?) The important distinction is, as Kamp (1975) argues, that in general, to satisfy a noun denotation, a collection of distinct criteria must be met. Each of these criteria may in principle allow for borderline cases, bringing about vagueness. Equally important, though, no one of these criteria can be selected as the one whose scale is associated with the noun. Indeed, one might draw the conclusion from this, as Kennedy (2007) suggests, that what nouns manifest is not so much vagueness as *imprecision* (Lasersohn 1999; Pinkal 1995).

Another way of articulating what I intend by 'gradable noun', then, is that gradable nouns are those for which a single criterion can be distinguished from the others as the most salient. For *idiot*, it is stupidity (and not, say, animacy); for *smoker*, it is generally frequency of or affinity for smoking (and not, say, ability to inhale smoke); for *goat cheese enthusiast*, it is enthusiasm for goat cheese. It is this ability to identify a single scale that distinguishes nouns that admit degree readings of size adjectives from those that don't.

3.2 Assumptions about the extended AP

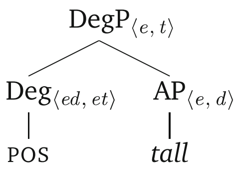
In a Kennedy-style framework, further operations are necessary to introduce the AP denotation—the measure function—into the semantics. An overt degree head such as *more* or *very* often plays this role. In unmarked (i.e., positive[10]) forms of adjectives, this role is played instead by an abstract degree head, POS. The structure

[9] Kamp (1975, Sect. 6) phrases this as a question: 'Yet it appears that nouns too are vague, some of them just as vague as certain adjectives. Why does not their vagueness allow for equally meaningful comparatives?'

[10] There is a bit of a terminological morass here, since 'positive' and 'absolut(iv)e' have both been used to describe other properties of adjectives.

will look broadly as in (49) (Abney 1987; Corver 1990; Grimshaw 1991; Kennedy 1997, among others):

(49) Cycle is [POS tall].



The POS morpheme maps the measure function to a property of individuals that can then be applied to Clyde. This can be represented as in (50) (Kennedy and McNally 2005):[11]

(50) $[\![\text{POS}]\!] = \lambda g_{\langle e,d\rangle} \lambda x \,.\, standard(g) \leq g(x)$
$[\![\text{POS}]\!]([\![tall]\!]) = \lambda x \,.\, standard(tall) \leq tall(x)$

The *standard* predicate maps an adjective denotation to the contextually provided standard of comparison associated with its scale. In this case, this will be the minimum height that counts as tall. Thus, to say that Clyde is tall is to say that his height is at least as great as the standard for tallness.

The comparative morpheme works similarly:

(51) $[\![more]\!] = \lambda g_{\langle e,d\rangle} \lambda d \lambda x \,.\, d < g(x)$
$[\![than\ Floyd\ is\ tall]\!] = tall(Floyd)$
$[\![more]\!]([\![than\ Floyd\ is\ tall]\!])([\![tall]\!]) = \lambda x \,.\, tall(Floyd) < tall(x)$

The *than*-clause is taken to denote a degree. I leave this as a sketch here, since comparatives as such will not be the primary focus here. (For further discussion, see Bhatt and Pancheva 2004; Kennedy 1997, 2006; Klein 1980, 1982; Larson 1988; Lechner 1999; Ludlow 1989; McConnell-Ginet 1973; Seuren 1973; Stassen 1985; von Stechow 1984a, b; Xiang 2005, among many others, as well as references cited elsewhere in this paper.)

3.3 The structure of the extended gradable NP

Pursuing further the analogy to adjectives, I will assume that there are degree morphemes in the nominal domain as well. While this follows almost inexorably from adopting a measure-function view of gradable nouns, it is, of course, not an innocent assumption. Independent evidence from a variety of sources will come in the next section (and, later in the paper, from the grammar of size adjectives as well).

[11] For expository purposes I simplify the Kennedy and McNally (2005) denotation in two ways: I suppress the comparison class argument of the *standard* predicate, and I treat it as a function rather than as a relation. Nothing hinges on this.

The result of simply mirroring the structure of adjectives is (52):

(52) Cycle is an [POS idiot].

$$\begin{array}{ccc} & \mathrm{Deg_N P}_{\langle e,\, t\rangle} & \\ \mathrm{Deg}_{\mathrm{N}\langle ed,\, et\rangle} & & \mathrm{NP}_{\langle e,\, d\rangle} \\ | & & | \\ \textsc{pos} & & \textit{idiot} \end{array}$$

The adnominal degree head is $\mathrm{Deg_N}$, and the types are just as above. The denotation of adnominal POS can, in fact, be identical:

(53) $[\![\textsc{pos}]\!] = \lambda g_{\langle e,d\rangle} \lambda x \ . \ standard(g) \leq g(x)$
$[\![\textsc{pos}]\!]([\![idiot]\!]) = \lambda x \ . \ standard(tall) \leq idiot(x)$

Nominal comparative forms of the *more of a(n)* variety can work just like their adjectival counterparts:[12]

(54) $[\![more]\!] = \lambda g_{\langle e,d\rangle} \lambda d \lambda x \ . \ d < g(x)$
$[\![\, than\ Floyd\ is\ \cancel{\text{an}}\ \cancel{\text{idiot}}]\!] \ = \ idiot\ (Floyd)$
$[\![\, more\ of\ an\ idiot\ than\ Floyd\ is\ \cancel{\text{an}}\ \cancel{\text{idiot}}]\!]$
$= [\![\, more\,]\!]([\![\, of\ an\ idiot]\!])([\![\, than\ Floyd\ is\ \cancel{\text{an}}\ \cancel{\text{idiot}}]\!])$
$= \lambda x \, . \, idiot(Floyd) < idiot(x)$

This assumes that *of* and *a(n)* are not interpreted.

3.4 Further evidence for adnominal degree morphemes

Assuming an adnominal degree morpheme has advantages beyond those already mentioned (the analogy to AP, the a priori argument from type-theoretic necessity, and *more-of-a* comparatives). The most compelling of these involve overtly spelled-out adnominal degree morphemes. These are expressions such as *real*, *true*, and *absolute*, which superficially resemble adjectives homophonous with them:

(55) $\text{a} \left\{ \begin{array}{l} \text{real} \\ \text{true} \\ \text{total} \\ \text{complete} \\ \text{absolute} \end{array} \right\} \text{idiot}$

None of these naturally receives anything other than a degree reading here. It is not possible, for example, to construe *true* here in the propositional sense. Assigning these morphemes to $\mathrm{Deg_N}$ immediately makes two predictions, both of them borne

[12] There are other forms of nominal comparatives of less direct relevance here, such as those involving comparative determiners like *fewer* and *more* (Hackl 2000; Nerbonne 1995).

out. The first is that they shouldn't occur in predicative positions, because $\mathrm{Deg}_{\mathrm{N}}$ occupies a position inside DP. This is indeed the case:

$$\text{(56)}\quad \text{That idiot} \left\{ \begin{array}{l} \text{is} \\ \text{seems} \end{array} \right\} \left\{ \begin{array}{l} \text{\%real} \\ \text{\%true} \\ \text{\%total} \\ \text{\%complete} \\ \text{\# absolute} \end{array} \right\}.$$

None of these can have the degree reading. (For all but *absolute*, the non-degree reading associated with a homophonous adjective is available.) The ability to occur in the complement position of *seem* is one of the classic diagnostics for adjectives in English, so the failure of these expressions to occur there is especially significant.

The second prediction is that these expressions shouldn't occur with their own degree morphemes, because (on the degree reading) they are not themselves APs and therefore don't project their own Deg positions. This too is borne out:

$$\text{(57)}\quad \text{\#a} \left\{ \begin{array}{l} \text{very} \\ \text{quite} \\ \text{fairly} \\ \text{kinda} \\ \text{rather} \end{array} \right\} \left\{ \begin{array}{l} \text{real} \\ \text{true} \\ \text{total} \\ \text{complete} \\ \text{absolute} \end{array} \right\} \text{idiot}$$

As expected, the homophonous adjectives *do* project their own degree morphology (modulo independent facts about the compatibility of particular degree morphemes with particular adjectives):

$$\text{(58)}\quad \text{\%a} \left\{ \begin{array}{l} \text{very} \\ \text{quite} \\ \text{fairly} \\ \text{kinda} \\ \text{rather} \end{array} \right\} \left\{ \begin{array}{l} \text{real problem} \\ \text{true observation} \\ \text{complete description} \end{array} \right\}$$

Naturally, there are a variety of semantic parallels between adnominal and adadjectival degree words as well. They can all be assigned denotations of the same type ($\langle$ed, et$\rangle$), and substantively they seem to mean similar things.

The $\mathrm{Deg}_{\mathrm{N}}$ *real*, for example, can (at least in principle) have precisely the same denotation as the Deg *very*. More interesting parallels can be drawn as well, though. Kennedy and McNally (2005) demonstrate that *completely* is possible only with adjectives whose scales have a maximum (thus *completely full* but #*completely tall*). Both *completely* and the $\mathrm{Deg}_{\mathrm{N}}$ *complete* can have the denotation in (59) (*scale* is a function that maps gradable predicates to their scales):

$$\text{(59)}\quad \begin{aligned} [\![[_{Deg_N}\ complete]]\!] &= [\![[_{Deg}\ completely]]\!] \\ &= \lambda g_{\langle e,d\rangle} \lambda x[max(scale(g)) = g(x)] \end{aligned}$$

This predicts that *complete* should be restricted to nouns whose scales have a maximum. Indeed, it turns out that *complete* is restricted to certain gradable nouns:

(60) a. complete $\left\{\begin{array}{l}\text{idiot}\\ \text{dork}\\ \text{fascist}\end{array}\right\}$

b. #complete $\left\{\begin{array}{l}\text{smoker}\\ \text{goat cheese enthusiast}\\ \text{fan of curling}\end{array}\right\}$

This suggests that there may be no maximum on the scale of *smoker*, but that there may be one on the scale of *idiot*—a surprising result, given one's normal experience of idiocy. So here the lexical properties of *idiot* diverge from what might be expected, in the same way in which the analogous surprising result can be arrived at for the corresponding adjective (*completely idiotic*). And it turns out that nouns, just like adjectives, can be classified according to whether their scales have a maximum or not (among other scale structure properties).[13]

Another argument for recognizing degree heads in the extended NP comes from the diachronic relation between these words and their counterparts in the extended AP. Adnominal degree words are exactly the sort of expressions that develop into ad-adjectival degree words—that is, adnominal and ad-adjectival degree words are often cognate with the same adjective. The degree morphemes *really* and *real* both likely arose from the adjective *real*; *complete* and *completely* from *complete*; *totally* and *total* from *total*; and so on. Even *very* took this path, and retains a (somewhat marginal) adnominal analogue *veritable*. Thus recognizing adnominal degree morphemes identifies a stopping-off point in the evolution from adjective to ad-adjectival degree morpheme.

Recognizing adnominal degree morphemes also provides a natural way to understand adnominal measure phrases. In this kind of framework, measure phrases in the extended AP are arguments of the degree head (see Svenonius and Kennedy 2006 for a recent articulation of this view). Analogously, one might expect an adnominal degree head to introduce adnominal measure phrases. Exactly this has been proposed in various forms (Corver 1998, Schwarzschild 2006; Zamparelli 1995)—*of* may actually spell out such a degree head:

(61) six pounds $[_{\text{Deg}_{N'}}$ $[_{\text{Deg}_{N}}$ of] cheese]

[13] There are interesting complications in spelling out the semantics of *true*, which seems to involve prototypicality and can occur with what appear to be non-gradable nouns: *true sportscar, true American*. Importantly, though, even if this requires a semantics in which *true* can apply to predicates without a degree argument, it would still provide evidence for adnominal degree heads—and it would still provide a new tool for exploring the semantics of adjectival degree morphemes (in this case, the semantics of *truly*) and scale structure.

3.5 Summary

Like adjectives, gradable nouns denote measure functions. An adnominal counterpart of the degree head in the extended AP maps gradable nouns onto properties. Adopting an adnominal degree head is desirable for various independent reasons.

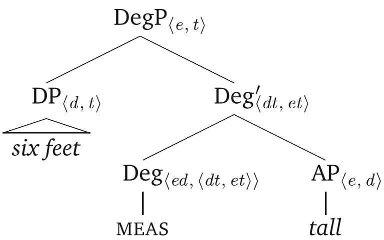
4 Interpreting size adjectives as degree modifiers

4.1 Measure phrases in the AP

A driving analytical intuition in addressing degree readings of size adjectives will be that they in some respects parallel measure phrases in AP. To pursue this analogy further, it will be necessary to make some assumptions about measure phrase interpretation.

With respect to the syntax, I will follow Svenonius and Kennedy (2006) and Kennedy and Levin (2008) in supposing that a particular degree morpheme licenses measure phrases. I will, however, place this degree morpheme—which I'll call MEAS—in Deg rather than assigning it to a distinct position:

(62)



As (62) reflects, I will interpret the measure phrase as a property (again departing from Svenonius and Kennedy 2006 and Kennedy and Levin 2008 and earlier versions of this approach; for a sustained argument for treating measure phrases as predicates, see Schwarzschild 2005). More precisely, MEAS relates an adjective denotation and a measure phrase by requiring that the minimal degree (on the appropriate scale) that satisfies the measure phrase be smaller than the degree to which the adjective holds:

(63) $[\![\textsc{meas}]\!] = \lambda g_{\langle e,d\rangle} \lambda m_{\langle d,t\rangle} \lambda x \, . \, min\{d : m(d)\} \leq g(x)$

(64) $[\![\textit{six feet}\ \textsc{meas}\ \textit{tall}]\!] = \lambda x \, . \, min\{d : \textit{six-feet}(d)\} \leq \textit{tall}(x)$

Further motivation for this particular implementation will come from the use to which it will be put below, but for the moment a few other observations can be made.

First, the *min* predicate in (63) can in principle be done away with if it can be 'installed' inside the denotation of the measure phrase itself. That is, if $[\![\textit{six feet}]\!]$ is true of any degree of at least six feet, the 'at least' itself provides a *min* operator. Thus the denotation of MEAS could be simply (65):

(65) $[\![\text{MEAS}]\!] = \lambda g_{\langle e,d\rangle} \lambda m_{\langle d,t\rangle} \lambda x \;.\; m(g(x))$

Doing things in the longer way suggested above does make this existing minimality component of the meaning a bit more explicit, however—and as the proposal is developed, it will become crucial.

Second, adopting the denotation in (64) establishes a satisfying parallel between MEAS and its close cousin POS:

(66) $[\![\text{POS}]\!] = \lambda g_{\langle e,d\rangle} \lambda x \;.\; standard(g) \leq g(x)$
$[\![\text{MEAS}]\!] = \lambda g_{\langle e,d\rangle} \lambda m_{\langle d,t\rangle} \lambda x \;.\; min\{d : m(d)\} \leq g(x)$

Both of these require that g(x) be at least as large as some degree to which it's being compared. In the simple positive form, it is the standard associated with the adjective; in the measure phrase form, it is the smallest degree that satisfies the measure phrase.

4.2 Size adjectives, indeterminacy, and degree size

Another crucial component of the analysis will be a notion of 'degree size'.

It is a familiar observation that adjectives such as *big* and *small* manifest a kind of polysemy or indeterminacy that allows them to measure along numerous different scales. *Big*, for example, can measure either population or area, so both sentences in (67) are simultaneously true on different readings of *big*:

(67) a. Canada is bigger than the United States. (area)
b. The United States is bigger than Canada. (population)

Big is flexible enough to accommodate various other kinds of measurement (notably, height). Most important for current purposes, it can very naturally measure abstract notions of 'pure' size, such as the cardinality of sets:

(68) This set is bigger than that one.

As might be expected, then, *big* can measure the size of degrees themselves—that is, just as sets can be claimed to be big or small, so too can degrees. Expressions that seem to involve what might be called 'nominalized' degrees (in roughly the Chierchia 1984, 1998 sense), such as (69), reflect this, though the results often have the stilted quality of circumlocutions:

(69) $\left\{\begin{array}{l}\text{George's idiocy}\\\text{Clyde's enthusiasm for goat cheese}\\\text{Herman's dorkiness}\end{array}\right\}$ is $\left\{\begin{array}{l}\text{big}\\\text{enormous}\\\text{substantial}\\\text{small}\\\text{tiny}\end{array}\right\}$.

One way to represent these facts is to suppose that *big* can denote a number of measure functions: $big_{area}, big_{population}, big_{cardinality}, big_{degree\text{-}size}$, etc. This means, of course, that there is a particular scale of degree-size, onto which $big_{degree\text{-}size}$ maps other degrees homomorphically.

As might be expected, the measure function *big* denotes has to be appropriate to what it is measuring: a single person can't be measured by population, for example, though she can be measured by height; a parking lot can be big by area, but not by mass (unlike a parking garage); sets can't be big by area; degrees can't be big by population; and so on. This observation actually provides a way of *defining* what a size adjective is, at least for current purposes: it is any adjective sufficiently indeterminate to have degrees themselves in its domain. Putting this differently, it is any adjective that can measure along the scale of degree-size.[14]

Several conceptual tools can be distilled from this discussion. The first of these is the scale of degree size. As Bale (2006, 2008) shows, there are entirely independent reasons to believe that such an abstract scale may play an important semantic role. Any degree can be mapped onto this scale—both positive and negative degrees, in ontologies in which these are distinct (Kennedy 2001 or Faller 2000 and Winter 2005).[15]

Second, to reflect that *big* can measure both individuals and degrees, I will adopt an ontology with a type *o*, which includes objects of both types:

(70) $D_o = D_e \cup D_d$

The denotation of *big*, then, is of type $\langle o, d \rangle$, as in (71), where S is a scale appropriate for measuring o (and provided by context, subject to lexical restrictions):

(71) $[\![big]\!] = \lambda o_o[big_S(o)] = big_S$

Accordingly, the denotations of degree morphemes will need to be reframed in terms of type o rather than type d. This is not, of course, in itself a theory of indeterminacy, but a way of representing it. I will, in fact, adopt the additional notational convenience of simply writing *big* rather than big_S, with the assumption that an appropriate S is provided.

---

[14] This can provide a way of thinking about examples such as (i), which lack degree readings:

(i) Clyde is a $\left\{ \begin{array}{c} \%\ \text{tall} \\ \%?\text{large} \end{array} \right\}$ idiot.

Neither *tall* nor *large* is a size adjective. For *tall*, this seems natural. *Large* is more problematic, in that it seems to run counter to the Bigness Generalization, but one might understand it in similar terms—as a lexical matter, it measures only physical size and simply does not have degrees in its domain. While this is not particularly surprising, it would be nice to discover an independent reason for it.

[15] There is actually a connection here to Faller (2000) and Winter (2005)—and Vector Space Semantics more generally (see also Zwarts 1997; Zwarts and Winter 2000)—in that the notion of 'degree-size' is rather like VSS's norm function $|\cdot|$.

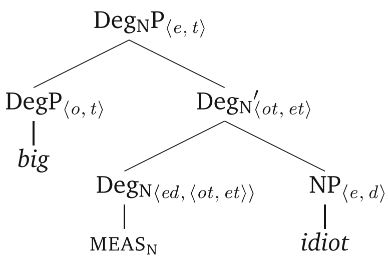
4.3 Licensing degree readings

With these components in place, it is now possible to combine the observations already made into a semantics for degree readings of size adjectives.

The analytical intuition about size adjectives, already mentioned, is that they are roughly like measure phrases, in that both measure phrases and size adjectives predicate of a degree that it has a certain minimum size. Measure phrases and size adjectives differ, of course, in how they determine this minimum size.

In light of this parallel, it seems reasonable to suppose that size adjectives are introduced in the same way as measure phrases are—by a nominal counterpart of the Deg MEAS:

(72)



The adnominal degree morpheme POS proved to have precisely the same semantics as its adjectival counterpart. Presumably, then, MEAS_{N} will reflect MEAS:

(73) $[\![\text{MEAS}_{\text{N}}]\!] = [\![\text{MEAS}]\!] = \lambda g_{\langle e,d\rangle}\lambda m_{\langle o,t\rangle}\lambda x \,.\, min\{d : m(d)\} \leq g(x)$ (tentative)

This is too simple, however, in two respects. The *min* operator requires that there be a single smallest degree that satisfies *m*, which for MEAS_{N} will be provided by the size adjective DegP. Because size adjectives can apply to degrees on many different scales, there is no single smallest degree that satisfies a size adjective DegP. There is, however, a smallest degree *on a particular scale* that satisfies it. So it will be necessary to explicitly indicate the scale, as in (74):[16]

(74) $[\![\text{MEAS}_{\text{N}}]\!] = \lambda g_{\langle e,d\rangle}\lambda m_{\langle o,t\rangle}\lambda x \,.\, min\{d : d \in scale(g) \wedge m(d)\} \leq g(x)$
(less tentative)

There is another complication. As it stands, this doesn't reflect that anyone who is a big idiot is also an idiot. This entailment seems to be general:

(75) a. #Clyde is a big idiot, but not an idiot.
b. #Greta is a huge goat cheese enthusiast, but not a goat cheese enthusiast.
c. #Herman is a colossal curling fan, but not a curling fan.

Here then there is a difference between AP-modifying measure phrases and size adjectives. Measure phrases do not require that an adjective hold absolutely—one

[16] The corresponding change could of course be made to ad-adjectival MEAS as well.

can be *five feet tall* without being *tall*. So the denotation of MEAS_N will need to make reference to the standard of the gradable noun. This can be accomplished by simply elaborating the denotation with an echo of the denotation of POS:

(76) $$[\![\text{MEAS}_\text{N}]\!] = \lambda g_{\langle e,d\rangle} \lambda m_{\langle o,t\rangle} \lambda x \begin{bmatrix} min\{d : d \in scale(g) \wedge m(d)\} \leq g(x) \wedge \\ standard(g) \leq g(x) \end{bmatrix}$$ (final)

This requires that x satisfy the gradable predicate to a degree that:

- is at least as great as the smallest degree that satisfies the size adjective DegP
- is at least as great as the standard for the gradable predicate

It's worth noting that at this point, MEAS_N looks like a combination of MEAS and POS. This may be taken to be simply a fact about the internal semantics of the nominal extended projection. An alternative view would be to suppose that adnominal POS and MEAS_N are in fact separate projections, as Svenonius and Kennedy (2006) argue for their analogues in the extended AP, and that this apparently fused denotation is the result of both of these elements each making their own semantic contribution. I will not pursue this possibility further here.

Illustrating all this in practice, here is how the denotation of *big idiot* is computed:

(77) $[_{\text{Deg}_\text{N}\text{P}_{\langle e,t\rangle}}\ [_{\text{DegP}_{\langle o,t\rangle}}\ [_{\text{Deg}_{\langle od,ot\rangle}}\ \text{POS}]\ [_{\text{AP}_{\langle o,d\rangle}}\ \textit{big}]]\ [_{\text{Deg}_\text{N}'_{\langle ot,et\rangle}}\ [_{\text{Deg}_{\text{N}\langle ed,\langle ot,et\rangle\rangle}}\ \text{MEAS}_\text{N}]\ [_{\text{NP}_{\langle e,d\rangle}}\ \textit{idiot}]]]$

Composing the size adjective DegP first, the result is as in (78). I have adjusted the type of POS as indicated above to accommodate indeterminacy, and, also as indicated above, will simply write *big* to reflect whatever flavor of *big* is involved (in this case, $big_{degree\text{-}size}$):

(78) $[\![big]\!] = big$
$[\![\text{POS}]\!] = \lambda g_{\langle o,d\rangle} \lambda o_o\ .\ standard(g) \leq g(o)$
$[\![\text{POS}\ big]\!] = \lambda o_o\ .\ standard(big) \leq big(o)$

Thus something is big if it meets or exceeds the standard for bigness.[17] The computation continues as in (79):

(79) $[\![idiot]\!] = idiot$
$$[\![\text{MEAS}_\text{N}]\!] = \lambda g_{\langle e,d\rangle} \lambda m_{\langle o,t\rangle} \lambda x \begin{bmatrix} min\{d : d \in scale(g) \wedge m(d)\} \leq g(x) \wedge \\ standard(g) \leq g(x) \end{bmatrix}$$

[17] Because this will be applied to a degree below, this is actually the standard for degree bigness.

$$
\begin{aligned}
&[\![[_{DegP}\ \textsc{pos}\ big]\textsc{meas}_{\textsc{n}}\ idiot]\!] \\
&\quad = \lambda x \left[\begin{array}{l} min \left\{ d : \begin{array}{l} d \in scale(idiot) \wedge \\ [\![\textsc{pos}\, big]\!](d) \end{array} \right\} \leq idiot(x) \wedge \\ standard(idiot) \leq idiot(x) \end{array} \right] \\
&\qquad = \lambda x \left[\begin{array}{l} min \left\{ d : \begin{array}{l} d \in scale(idiot) \wedge \\ standard(big) \leq big(d) \end{array} \right\} \leq idiot(x) \wedge \\ standard(idiot) \leq idiot(x) \end{array} \right]
\end{aligned}
$$

The result, then, is that *big idiot* will be true of an individual x iff the degree of x's idiocy is at least as great as the smallest degree that meets the bigness standard, and x meets the idiot standard.

Lest the forest get lost for the trees, it's worth taking a moment to highlight the crucial properties of the analysis so far. Size adjectives are interpreted in a way that resembles how measure phrases in AP are interpreted. They both involve computing the minimal degree that satisfies them, and comparing it to the degree provided by a measure-function-denoting gradable predicate. The principal difference is that size adjectives, unlike measure phrases in AP, require that the standard associated with the gradable predicate be met.

4.4 Deriving the Bigness Generalization and the Position Generalization

The analysis of these structures should account for the two generalizations made at the start of the paper.

The first of these, the Position Generalization, is that degree readings of size adjectives are possible only in attributive positions. That follows trivially from what has already been said. Degree readings of size adjectives are possible only in a particular syntactic configuration, in which the size adjective occurs in the specifier of the nominal degree projection. It *must* occur there to serve as an argument to the degree morpheme that brings about degree readings, so such readings are not possible in any other position.

The Bigness Generalization is that adjectives that predicate smallness do not systematically license degree readings, as adjectives of bigness do. The account of that too emerges from what has already been said, and from the relatively standard assumption that antonymous adjectives measure along scales with opposite orderings (Faller 2000; Kennedy 2001; Rullmann 1995, among others). To illustrate how, consider %*small idiot*, which does not have a degree reading. If it were to have a degree reading, it would have to be interpreted as *big idiot* is above. The denotation would be computed very similarly:

(80) $[\![\textsc{pos}\, small]\!] = \lambda o_o\ .\ standard(small) \leq small(o)$

(81) $[\![[_{DegP}\ \textsc{pos}\ small]\ \textsc{meas}_{\textsc{n}}\ idiot]\!]$

$$= \lambda x\left[\begin{array}{l} min\left\{d : \begin{array}{c} d \in scale(idiot)\wedge \\ standard(small) \le small(d) \end{array}\right\} \le idiot(x) \wedge \\ standard(idiot) \le idiot(x) \end{array}\right]$$

This denotation actually says something very strange. It will be true of an individual x iff the degree of x's idiocy is at least as great as the smallest that meets the smallness standard, and x meets the idiot standard.

Articulating this a bit further, a degree satisfies $standard(small) \le small(d)$ if it is small enough to count as small. There is a minimum degree on the idiocy scale: d_0, corresponding to 'not idiotic at all'. There can be no smaller degree than this.[18] Thus irrespective of where the standard for smallness lies, it will always be the case that d_0 is small enough to meet it: it will always be the case that $standard(small) \le small(d_0)$. And since d_0 is on the scale of idiocy, it is also the case that $d_0 \in scale(idiot)$. As a result, the minimum computed in (81) will always be the same—it will always be d_0:

(82) $$min\left\{d : \begin{array}{c} d \in scale(idiot)\wedge \\ standard(small) \le small(d) \end{array}\right\} = d_0$$

As a consequence, no matter where the standard of smallness lies, (81) will be equivalent to (83):

(83) $$[\![[_{DegP}\ \textsc{pos}\ small]\ \textsc{meas}_{\textsc{n}}\ idiot]\!] = \lambda x\left[\begin{array}{l} d_0 \le idiot(x)\wedge \\ standard(idiot) \le idiot(x) \end{array}\right]$$

But to say that the idiocy of x must meet or exceed d_0 is to say nothing at all. Because d_0 is the minimum of the idiocy scale, every degree of idiocy meets or exceeds it. This requirement, then, will always be trivially satisfied. Thus (83) is equivalent to (84):

(84) $$[\![[_{DegP}\ \textsc{pos}\ small]\ \textsc{meas}_{\textsc{n}}\ idiot]\!] = \lambda x\ .\ standard(idiot) \le idiot(x)$$

All that remains of the denotation is that x must be sufficiently idiotic. This is precisely the same denotation that would have been arrived at in the absence of the size adjective:

(85) $$[\![\textsc{pos}\ idiot]\!] = \lambda x\ .\ standard(idiot) \le idiot(x)$$

So, on the degree reading, *small* simply melts away. It has no effect on interpretation at all. Given that there are alternative ways to construe the size adjective that *do* have an effect—the literal size reading, for example—small size adjectives will always be interpreted in these other ways.

[18] That is, $small(d_0)$ is the maximum of the smallness scale.

Importantly, this will be the case for all adjectives that predicate smallness. Any adjective that inverts the scale associated with the degrees it applies to (that is, any A such that $d \leq d' \leftrightarrow A(d') \leq A(d)$ for any d, d') will behave this way.

None of this requires that there be anything inherently or conceptually wrong with characterizing an idiocy degree as small. There is nothing amiss in, say, $small(idiot(Clyde))$. Rather, it is a fact about this construction—about how a minimum degree is 'recovered' from a size DegP denotation—that is incompatible with adjectives of smallness.

4.5 Degree modification of the size adjective

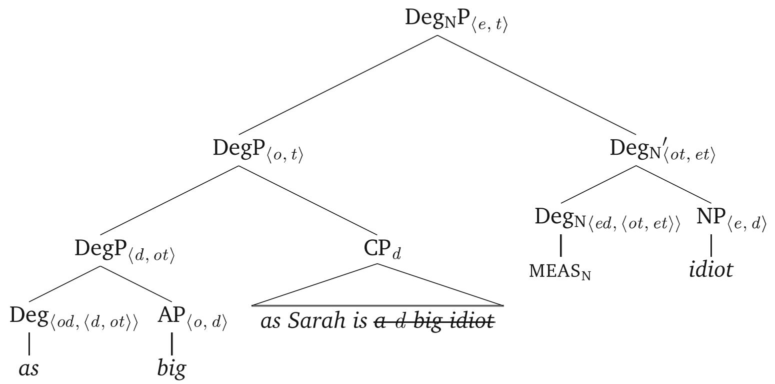
The size adjective projects a full DegP, on the syntax provided here. This is necessary to accommodate degree modification of the size adjective itself:

(86) a. George is a bigger idiot than Dick is.
b. George is as big an idiot as Sarah is.
c. George is a really big idiot.
d. George is the biggest idiot in the room.

These can in principle be accommodated in this approach. Certainly, the syntax and compositional semantics open up enough theoretical room for them. The actual denotations computed, of course, depend on what one assumes about these forms of degree modification, and in each area would take us too far afield. A complete theory of this indirect kind of degree modification will be left to future research.

That said, here is a thumbnail sketch of how an equative might work. *As big an idiot as Sarah is* would have the structure in (87), and a denotation computed as in (88):

(87)



(88) $[\![as]\!] = \lambda g_{\langle o,d\rangle} \lambda d \lambda o_o \,.\, d \leq g(o)$
$[\![as\ Sarah\ is]\!] = big(idiot(Sarah))$
$[\![as]\!]([\![big]\!])([\![as\ Sarah\ is]\!]) = [\![as]\!](big)(big(idiot(Sarah)))$
$= \lambda o_o \,.\, big(idiot(Sarah)) \leq big(o)$
$[\![\text{MEAS}_\text{N}]\!]([\![idiot]\!])([\![as\ big\ as\ Sarah\ is]\!])$

$$= \lambda x \left[\begin{array}{l} min\left\{ d : \begin{array}{l} d \in scale(idiot) \wedge \\ [\![as\ big\ as\ Sarah\ is]\!](d) \end{array} \right\} \leq idiot(x) \wedge \\ standard(idiot) \leq idiot(x) \end{array} \right]$$

$$= \lambda x \left[\begin{array}{l} min\left\{ d : \begin{array}{l} d \in scale(idiot) \wedge \\ big(idiot(Sarah)) \leq big(d) \end{array} \right\} \leq idiot(x) \wedge \\ standard(idiot) \leq (idiot)(x) \end{array} \right]$$

This can be further simplified because it is possible to identify the minimal degree of idiocy whose bigness meets or exceeds the bigness of Sarah's degree of idiocy—that degree will always be the degree of Sarah's idiocy itself. So the final line of (88) is equivalent to (89):

(89) $$\lambda x \left[\begin{array}{l} idiot(Sarah) \leq idiot(x) \wedge \\ standard(idiot) \leq idiot(x) \end{array} \right]$$

So for x to be a *as big an idiot as Sarah is*, x must be an idiot (meet or exceed the standard for idiocy) and be an idiot to a degree that meets or exceeds Sarah's degree of idiocy. This seems an appropriate denotation. Comparatives could work similarly, modulo some non-trivial complications.[19]

Keeping the assumptions about equatives in (88) constant, it is possible to determine what this predicts for equatives built around adjectives of smallness. Substituting *small* for *big*, the result would be as in (90):

(90) $$\lambda x \left[\begin{array}{l} min\left\{ d : \begin{array}{l} d \in scale(idiot) \wedge \\ small(idiot(Sarah)) \leq small(d) \end{array} \right\} \leq idiot(x) \wedge \\ standard(idiot) \leq idiot(x) \end{array} \right]$$

It is possible to simplify this as well, along the same lines as in Sect. 4.4. Suppose once again that the smallest degree of idiocy is d_0. Because d_0 is the smallest degree on its scale, its smallness will be at the top of the smallness scale, and therefore meet or exceed the smallness of any other degree, including the smallness of Sarah's idiocy degree. So d_0 will be the degree the minimality operator in (90) picks out:

(91) $$\lambda x \left[\begin{array}{l} d_0 \leq idiot(x) \wedge \\ standard(idiot) \leq idiot(x) \end{array} \right]$$

And, as before, because $d_0 \leq idiot(x)$ is a tautology, (91) is equivalent to (92):

(92) $\lambda x \ . \ standard(idiot) \leq idiot(x)$

[19] There is a gremlin lurking here. A comparative such as *bigger idiot than Sarah is* would have as part of its denotation that the idiocy degree of x exceed the minimal idiocy degree whose size exceeds the size of Sarah's idiocy degree. This requires that there *be* such a minimum. If scales are dense as ordinarily assumed, this will not be the case. One (fairly radical) workaround might be to assume that scales are not in fact dense. There may be independent evidence that scales have limited granularity. Kennedy and McNally (2005) raise this possibility in connection with imprecision, for example.

Thus an equative built around an adjective of smallness would melt away in precisely the same way as an adjective of smallness on its own does, leaving behind only the meaning of *idiot* itself. This predicts, then, that such equatives should not have degree readings.

This is in fact what happens. Equatives built from adjectives of smallness are distinctly ill-formed on the degree reading, as are comparatives and superlatives:

(93) a. %George is as small an idiot as Sarah is.
b. %George is a smaller idiot than Dick is.
c. %George is the smallest idiot in the room

As expected, then, the Bigness Generalization persists in these forms.

5 Final remarks

To summarize, I have argued that degree readings of size adjectives are a distinct linguistic phenomenon, and not merely a consequence of vagueness or metaphor or some extragrammatical mechanism. Two generalizations particularly in need of capturing were recognized. The first, the Position Generalization, is that these readings are possible only in attributive positions; the other, the Bigness Generalization, is that these readings are systematically possible for adjectives that predicate bigness, but not for adjectives that predicate smallness.

The account provided relies on a structure for the extended NP of gradable nouns which mirrors the structure of the extended AP both syntactically and semantically. In support of this, a natural class of overt adnominal degree morphemes, corresponding to the familiar adjectival ones, was identified, and some observations were made about their semantics.

Degree readings of size adjectives were explained by analogy to measure phrases in the AP. Size adjectives were argued to have degrees themselves in their domain, and in this construction to be predicated of a degree supplied by a gradable noun, much as an AP-modifying measure phrase is predicated of a degree supplied by a gradable adjective. As has independently been proposed for AP-modifying measure phrases, size adjectives were taken to be interpreted as arguments of a particular degree morpheme. The semantics of this degree morpheme is framed in terms of a minimality operator that, due to its interaction with the scale structure of size adjectives, renders adjectives of small size meaningless on degree readings, thereby accounting for the Bigness Generalization. Because it is only in the specifier position of this degree morpheme that degree readings are available, the Position Generalization follows as well.

To the extent that it is successful, the explanation of the Bigness Generalization advanced here provides novel evidence for the view that antonymous adjectives have scales with inverse orderings.

There are, of course, many unanswered broader questions in this domain, only a few of which could be addressed here. Among them: What kinds of adnominal degree morphemes are there? One might expect there to be some of the same richness one finds in their adjectival counterparts. What cross-linguistic variation is there in this area? What might nominal degree morphology reveal about degree modification more generally, about the semantic parallels across syntactic categories, about the gradability of nouns, and about nominal scale structure? And—perhaps the most general question, and in some respects the most consequential—how do the grammatical mechanisms that underlie gradability in nouns relate to vagueness and imprecision?

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