Degree modifiers and monotonicity

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Abstract

This paper concerns the question of what it takes to be a degree modifier.[1] In particular, I propose an account of why only certain predicates can be assigned degree manipulating functions. The proposal relies on a semantic typology of predicates which is based on the (monotonicity) inferences licensed by such predicates. The main observation is that on the assumption that any predicate could in principle be turned into an adverb of degree, only a strict subset will result in informative interpretations.

1   Introduction

In a short squib, Zwicky (1970) wonders what could explain the assignment of certain adverbial functions.[2] He observes that there exist pairs of expressions where the positive of the pair is a sentence adverbial, while the negative one is a degree modifier. For instance, *unusually* in (1) is a degree adverbial. That is, the example expresses that the children are noisy to a degree that is unusual. No such similar reading is available if we replace *unusually* with its positive counterpart *usually*. The example in (2) is instead interpreted as saying that it is usual for the children to be noisy.

(1)   The children are unusually noisy.

(2)   The children are usually noisy.

This contrast appears a general feature of positive-negative pairs. Compare, for instance, *typically* with *atypically* or *possibly* with *impossibly.*

Another observation made by Zwicky in the same squib is that there is a resemblance between negative adverbs like *unusually* and evaluative predicates, like *surprising, amazing, terrible,* etc.[3] Adverbs based on such predicates also have degree functions. For instance, in its most salient reading, (3)

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expresses that the children are noisy to a degree that is amazing, not that the fact that they are noisy is amazing.

(3)   The children are amazingly noisy.

This is not to say that negative adverbs and adverbs based on evaluative predicates do not have an ad-sentential use. This becomes apparent by using comma-intonation around the adverb in (1) and (3) or to place the adverbs in sentence initial position. Note, however, that an example like (2) completely lacks a reading where the adverb is taken to modify degree. It is this contrast that I will try to explain in what follows. I will suggest that the reason behind it is semantic in nature and that my explanation is relevant to a broader range of degree modification phenomena.

   In section 2, I will discuss Zwicky's observation in somewhat more detail, present several ways of extending it and put forward a descriptive generalisation that captures the data. Section 3 discusses aspects of two approaches to evaluative degree modifiers like *surprisingly* and introduces a proposal for their semantics which, when extended to degree modifiers in general, accounts for Zwicky's observation. In section 4, I elaborate on this proposal by investigating the crucial role played by monotonicity. Finally, section 5 discusses some of the assumptions I make and gives pointers for further research.

2   Degree modification and markedness

Zwicky's observations are not restricted to English. In Dutch, for instance, we see a similar distribution of adverbial functions. One difference is that Dutch marks ad-sentential adverbs. Gradable adjectives like *verrassend* (surprising) combine with *genoeg* (enough) to form a sentence modifier *verrassend genoeg*. Only the short form *verrassend* can be used as a predicate modifier.[4] Thus, *verrassend* in (4) is a degree modifier, while *verrassend genoeg* in (5) is a sentence modifier.

(4)   Jasper is verrassend lang.
        Jasper is surprising tall.
        'Jasper is surprisingly tall'

(5)   Jasper is verrassend genoeg lang.
        Jasper is surprising enough tall.
        'It is surprising that Jasper is tall."

The combination of a short form adverb and a non-gradable expression is infelicitous.

(6)   Het is verrassend [#](genoeg) 3 uur.
        It   is surprising (enough) 3 hour.
        Only: 'It is surprisingly 3 o'clock'

This suggests that predicate-modifying adverbials need to operate on a degree argument. There are, however, additional, syntactic restrictions, as becomes apparent from the modification of non-adjectival gradable predicates. An indefinite like *a weirdo* can be degree-modified in various ways, but not by means of an evaluative degree adverb.

(7)   a.   Jasper is very much a weirdo.
        b.   Jasper is such a weirdo.
        c.   Jasper is quite a weirdo.
        d.   Jasper is more (of) a weirdo than Crazy Carl.
(8)   Jasper is surprisingly a weirdo.

The only reading available for (8) is that it is surprising that Jasper is a weirdo, not that Jasper is a weirdo to a surprising degree. We would have to assume that the position *suprisingly* is in in (8) is unavailable for degree adverbs. Such an assumption is supported by Dutch data.

(9)   Jasper is verrassend [#](genoeg) een weirdo.
        Jasper is surprising enough   a   weirdo
        Only: 'It is surprising that Jasper is a weirdo.'

It thus looks like the unavailability of a degree reading for (8) is due to a syntactic rather than a semantic restriction. This is further supported by the fact that the adjectives the degree adverbs are based on can modify degree *within* a noun phrase. That is, Zwicky's observations extend to the degree modifying function of adjectives themselves. Consider (10) and (11).

(10)   Jasper is an unbelievable weirdo.

(11)   Jasper is a believable weirdo.

In (10), a degree modified reading is salient, where Jasper is said to be a weirdo to a high degree. No such degree reading is available for (11). Instead, it says that Jasper is a weirdo and that one can (easily) believe that he is that.[5]

It would thus seem that Zwicky's observation was not really about adverbs per se, but rather about what kind of predicates can be assigned a degree

modifying function in general. Let us have a closer look at the contrasting sets of expressions at issue. Zwicky mentions the following adverbs in his short squib:

(12)   *Degree adverbs*: unusually, atypically, abnormally, uncharacteristically, impossibly, uncommonly, unnaturally, extraordinarily, particularly, especially, surprisingly, amazingly, disgustingly, alarmingly, bothersomely, shamefully, fantastically, incredibly, unbelievably, marvelously, dreadfully, awfully, preposterously, terribly

        Sentence adverbs: usually, typically, normally, characteristically, possibly, commonly, naturally, ordinarily, generally

A simple observation, and as I will argue a crucial one, is that the degree adverbs are all based on predicates that express some form of markedness. Something that is *unusual*, or *atypical*, or *uncommon*, or *preposterous*, or *fantastic*, etc. will stand out in a way that *usual* things, *typical* things, or *common* things do not. I will call this the *markedness generalisation*:

> **Markedness Generalisation**: Degree modifiers tend to be based on predicates that express some form of markedness. In other words, the objects that satisfy these predicates, in some respect, stand out in their domain.

Note that, in contrast to the generalisation that Zwicky seems to suggests, this means that two opposite predicates could both function as a degree modifier. For instance, *marvelous* and *terrible* seem each other's opposites, yet they both express a markedness feature and so they both have a degree function.

(13)   Jasper is a terribly nice man.

(14)   Polystyrene is marvelously useful.

Support for the markedness generalisation comes from a few further observations on possible degree modifiers. Firstly, expletives like *fucking* or *damned*, by which a speaker may signal a marked emotional attitude to what is said, as in (15), have a role as a degree modifier, as in (16).

(15)   Watch out! That's fucking dynamite!

(16)   Lasagne takes a fucking long time to prepare.

Related to such expletives are interjections like *man* (McCready 2009), *boy*, or *gosh*. Such expressions also seem to be able to do two things: either mark a

proposition in a certain way, or modify degree within that proposition. Take, for example, *man*. McCready (2009) observes that the core function of *man* is to express the speaker's positive or negative emotion with respect to the proposition s/he is asserting. In (17), for instance, the speaker emphasises what a good or bad thing (depending on his or her political inclination) it is that Obama got elected.

(17)   Man, Obama got elected.

Interjections like *man* fit the markedness generalisation. As (17) shows, their function is to express a form of markedness, and, as (18) shows, it turns out that at the same time they have a function as a degree modifier.

(18)   Man it's hot.

There are two available readings for (18), depending on intonation. (See McCready 2009 for details.) With comma-intonation separating *man* from *it*, a reading surfaces in which the speaker expresses his or her emotional involvement in it being hot. Without comma-intonation, (18) expresses that it is hot to an intensified degree.

    In general, the markedness generalisation observes that operations that express the markedness of a proposition double as (degree) intensifiers. This double function is also familiar from exclamative intonation, which is standardly associated with the expression of attitudes like surprise, disbelief, elation, etc. The example in (19) is comparable to (17) and expresses a positive or negative emotion towards the fact that Obama got elected. In (20), however, it is the degree to which the pie is nice that is marked.

(19)   Obama got elected!
(20)   What a nice pie Jack baked!

In sum, I have shown in this section that Zwicky's observation can be generalised as a condition on expressions that act as degree modifiers, be it in adverbial, adjectival or some other form.

3   Analysis

In this section, I will introduce the main considerations that ultimately lead to my analysis of the data. I will do so by focusing on a single running example, (21).

(21)   Jasper is surprisingly tall.

3.1 Predicate modification and sentence modification

It is important to be clear about how (21) is semantically different from an example where *surprisingly* is a sentence modifier, as in (22). Consider (23) as a paraphrase of (22).

(22)   Surprisingly, Jasper is tall.

(23)   *Jasper is tall and the speaker is surprised about this*

For (21), such an analysis seems less promising. The distinguishing context is one in which I expected Jasper to be tall (with respect to the contextual standard of comparison), but in which Jasper is still taller than I expected. In such a context, (21) is true and (22) is false (cf. Morzycki 2008). In other words, (22) expresses surprise at the fact that Jasper is among the tall, while (21) expresses surprise with respect to how tall he is.

   Another difference between the ad-sentential and ad-adjectival use of expressions like *surprisingly* has to do with the interpretation of the gradable adjective. Whereas, *tall* in (22) is interpreted with respect to the standard of comparison, the interpretation of *tall* in (21) is much more complex. At first sight, it appears that it follows from (24-a) that (24-b).

(24)   a.   Jasper is surprisingly tall.
        b.   Jasper is tall.

However, as Katz (2005) first noticed, a similar entailment is absent from examples with absolute, rather than relative standards. For example, (25-a) does not entail (25-b).

(25)   a.   The lecture hall was surprisingly full.
        b.   The lecture hall was full.

Katz suggests that the examples in (24) are also not in an entailment relation, but that (24-b) is more likely to have the status of implicature. If something is taller than expected, then it will very probably be taller than the standard of comparison given the major role expectation seems to play in establishing the standard. As support for this, Katz provides (26) (Katz 2005, p. 194). If *surprisingly tall* did entail *tall*, then such examples would be infelicitous.[6]

(26)   Although he is quite short, Peter is surprisingly tall, given his background.

In what follows, I will assume, with Katz, that (24-a) does not entail (24-b).

3.2 Morzycki 2008

Morzycki (2008) presents a thorough analysis of the syntax and semantics of degree modification by evaluative adverbs. His approach to the semantics of adverb-adjective combinations like the one in *Jasper is surprisingly tall* is based on an analogy with (embedded) exclamatives. That is, *Jasper is surprisingly tall* is likened to *It is surprising how tall Jasper is.* Based on the proposal of Zanuttini and Portner (2003) that exclamatives involve an operation of domain widening, Morzycki's analysis of (27-a) is (roughly) as in (27-b).

(27)   a.   Jasper is surprisingly tall.
       b.   It is surprising that there is a degree to which Jasper is tall such that this degree is in a widened domain but not in the original domain.

According to Morzycki's proposal, domain widening makes it that someone who is surprisingly tall is tall to a degree that is not contextually salient. Crudely put, it involves being tall to a degree that is off the scale. Domain widening is thus responsible for the intensifying function of the adverb. It is however not part of the lexical semantics of adverbs like *surprisingly*. Morzycki argues that such adverbs combine with adjectives through a mediating null degree morpheme, [R]. While *surprisingly* has a simple semantics like $\lambda p.\text{surprising}(p)$, the feature [R] is responsible for domain widening, and so it is ultimately [R] that is the intensifier. In my view, this aspect to Morzycki's approach is a serious disadvantage. By disconnecting degree intensification from the lexical semantics of the adverb, it will be impossible to get an explanation of why only a certain kind of predicate can be turned into a degree adverb. The semantics I will propose, in contrast, attributes the degree boosting role of adverbs like *surprisingly* directly to their lexical semantics.

3.3 Explaining the markedness generalisation

An important observation in Morzycki (2008) is that there is a difference between being *surprisingly tall* and having a height that is surprising. Someone who was expected to be quite tall, but turns out shorter than expected is clearly not *surprisingly tall*. Moreover, someone who was expected to be tall but not expected to be tall to his or her exact height is also not *surprisingly tall per se*. For instance, following an example from Morzycki (2008) (page 6), I might be surprised to find out that Jasper's height in centimetres equals my bank account number, but that would not make me assert (28).

(28)   Jasper is surprisingly tall.

In the approach of Katz (2005), examples like (28) are excluded from contexts in which it is merely Jasper's height that is surprising by quantifying over degrees. Katz's analysis of (28) is roughly as in (29).

(29)   Jasper is tall to a degree d and
every degree $d' \geq d$ is such that it would be surprising were Jasper tall to degree d'.

This says not only that Jasper's height is surprising, but moreover that, had he been taller, we would have equally been surprised.

Katz did not attempt to connect his proposal to Zwicky's observation. (Like Morzycki, Katz only considers evaluative adverbs.) However, I do think there is a way to exclude the degree modifier use of certain adverbs in this approach. For instance, if we attempt to generalise (29) to apply to an example like (30), we arrive at (31).

(30)   Jasper is usually tall.
(31)   Jasper is tall to a degree d and
every degree $d' \geq d$ is such that it would be usual were Jasper tall to degree d'.

Clearly (31) is false, no matter how tall Jasper is, for it commits us (for instance) to finding it normal had Jasper been taller than anyone alive. In general, we could say that the reason we cannot use unmarked predicates as degree modifiers, is that such use would commit us to extending the unmarkedness to higher points on the scale. Even though 1 metre 75 is a usual height, this does not license (30), for according to (31) this entails that a version of Jasper that is 3 metres tall is also *usually tall*.

In many respects, this reasoning is already close to my final proposal. The main idea is that unmarked predicates are excluded from modifying degree because, as degree modifiers, they would license inferences that make the construction useless. However, as I will now explain, Katz's assumption that degree modification involves universal quantification over degrees is unnecessary.

3.4   The proposal in a nutshell

A major assumption I will make is that gradable predicates are *monotone.* To give an illustration, an effect of this assumption is that someone who is tall to a certain degree, is tall to all lower degrees too. That is, the set of

degrees to which tall people are tall includes all the degrees to which shorter people are tall.[7]

I believe that the explanation for Zwicky's observations lies in the inferences triggered by the adverbs about the degrees to which certain predicates hold. Say, we call John *unusually tall*. What I propose this means is that there exists a degree to which John is tall that is not usual (for someone like John). Had John been taller, he would also have been tall to this unusual degree (by monotonicity), and so we infer that had John been taller, we would have also called him *unusually tall*. This is why we can only use *unusually tall* to refer to someone who is *taller than (what is considered) normal* and why we cannot use it to refer to someone who is just of *an unusual height*.

Now take an expression like *usually tall*, which lacks an interpretation of *usually* as a degree modifier. But, say, we try to interpret it like that anyway, and we claim John to be *usually tall*. This then means that John is tall to some degree which is 'usual'. The problem now is that such a statement is not informative. Given the assumption I made about gradable adjectives, above, anyone is tall to some usual degree. Take the minimal degree: everyone is tall to the minimal degree. Consequently, it is very usual to be tall to that degree. The result is that *usually tall* is a trivial property. This, I will argue in more detail below, is why adverbs like *usual* are not degree adverbs.

Crucial to this explanation is the role of inferences. Statements about degrees license downward directed inferences. If John is tall to degree d, then he is also tall to any degree lower than d. An adverb like *unusually* reverses such inferences and thereby licenses inferences that are upwards directed: if John is unusually tall, then had he been taller, he would also be unusually tall. Evaluative predicates fit neatly in this reasoning. Take *surprisingly*. If John is *surprisingly tall* then this means that John is tall to some degree that was unexpected. Had John been taller, then he would have still been tall to this unexpected degree. As a consequence, his height would still be surprising. Thus, being surprisingly tall comes to mean *taller than expected*. An adverb like *expectedly* could not have a use as a degree modifier. We expect anyone to be tall to the minimum degree and, so, *being expectedly tall* is a trivial property.

Since I claim that the possibility of degree modification crucially depends on the monotonicity of gradable predicates, it is predicted that the contrasts observed by Zwicky disappear once we consider constructions that contain reference to specific degrees only. For instance, it is fine to say that Jasper's height is *usual*. Similarly, something can have a normal width, but that does not make it *normally wide*.

4 The proposal in detail

4.1 Adjective semantics

According to what Beck (2009) calls the *standard theory*, gradable adjectives are relations between individuals and degrees, that is of type $\langle d, \langle e, t \rangle \rangle$ (Cresswell 1976; von Stechow 1984; Heim 2000). One particular way of making this precise is as in (32).

(32) $[\![\text{tall}_w]\!] = \lambda d \lambda x. x$'s height in $w \geq d$

Such a definition entails that such adjectives are monotone in the following sense.

(33) $\forall w, x, d, d' : \text{tall}_w(x, d) \ \& \ d' < d \ \rightarrow \text{tall}_w(x, d')$

The result is that someone who measures 180cm in height will have all the degrees of height that someone who measures 170cm has.

In the absence of any form of degree modification, the degree slot of the adjective is saturated by a covert existential operator *pos*.

(34) $[\![pos]\!] = \lambda A. \lambda x. \exists d [A(x, d) \ \& \ d \geq \text{the contextual standard for } A]$

In analogy to *pos*, I will assume that overt degree modifiers are of a similar type. However, I propose that degree modifiers start out as propositional modifiers of type $\langle \langle s, t \rangle, \langle s, t \rangle \rangle$. That is, an adverb like *surprisingly* is given the following semantics:

(35) $[\![\text{surprisingly}]\!] = \lambda p. \lambda w. p(w) \ \& \ \text{surprising}_w(p)$

Adjectival modifiers are of type $\langle \langle d, \langle e, \langle s, t \rangle \rangle \rangle, \langle d, \langle e, \langle s, t \rangle \rangle \rangle \rangle$ and can be derived from propositional modifiers by means of a simple type shift Δ:

(36) $\Delta = \lambda \mathcal{P}_{\langle \langle s, t \rangle, \langle s, t \rangle \rangle} \lambda A_{\langle d, \langle e, \langle s, t \rangle \rangle \rangle}. \lambda d_{\text{d}}. \lambda x_{\text{e}}. \mathcal{P}(A(x, d))$

I furthermore assume that the degree variable is existentially closed after application of the modifier. (Alternatively, we could make this existential closure part of the semantics of the degree modifier, cf. Katz 2005; Morzycki 2008). Here is a worked out example.

(37) $[\![\text{surprisingly tall}]\!]$
          $= \Delta \ [\lambda p \lambda w. p(w) \ \& \ \text{surprising}_w(p)] \ [\lambda d. \lambda x. \lambda w. \text{tall}_w(x, d)]$
          $\rightsquigarrow \lambda A. \lambda d. \lambda x. \lambda w. A(d, x)(w) \ \& \ \text{surprising}_w(A(d, x)) \ [\lambda d. \lambda x. \lambda w. \text{tall}_w(x, d)]$
          $\rightsquigarrow \lambda d. \lambda x. \lambda w. \text{tall}_w(x, d) \ \& \ \text{surprising}_w(\lambda w'. \text{tall}_{w'}(x, d))$

$\leadsto$ (existential closure)
$\lambda x.\lambda w.\exists d[\text{tall}_w(x, d) \ \& \ \text{surprising}_w(\lambda w'.\text{tall}_{w'}(x, d))]$

(38) $[\![\text{Jasper is surprisingly tall}]\!]$
$= \lambda w.\exists d[\text{tall}_w(j, d) \ \& \ \text{surprising}_w(\lambda w'.\text{tall}_{w'}(j, d))]$

At first sight, it might appear that the semantics in (38) is problematic for Morzycki's case of someone who happens to have a freakish height. Say, it turns out that Jasper's height in centimetres is exactly my bank account number. Now it seems, against our intuitions, that (38) is true. Obviously, there exists a degree to which Jasper is tall such that it is surprising that Jasper is tall to that degree, namely the degree corresponding to Jasper's height.

It is instructive to provide a careful explanation of why (38) nevertheless provides the correct truth conditions. Call the degree corresponding to Jasper's height d_j. This is the degree, when expressed in terms of centimetres, corresponds to my bank account number. Notice, that there is a difference between (39-a) and (39-b).

(39) a. $\text{surprising}_w(\lambda w'.max_d(\text{tall}_{w'}(j, d)) = d_j)$
      b. $\text{surprising}_w(\lambda w'.\text{tall}_{w'}(j, d_j))$

In the situation described, (39-a) is true, for (39-a) states that it is surprising (in w) that Jasper's height is d_j. However, (39-b) is false. This is because having d_j as your height is surprising, but not having d_j as one of your degrees of tallness. Imagine, for instance, that after having measured Jasper, we measure his neighbour and find out that he is 12 centimetres taller than Jasper. This entails that Jasper's neighbour is tall to degree d_j, just like Jasper is, but I think it is easy to agree that this fact is hardly cause for surprise.

4.2 Predictions

One result of the way the semantics was set up above is that we predict that the monotonicity characteristics of the predicate that acts as a degree modifier matter. Take a propositional operator O which is upward monotone in the sense that $p \rightarrow p' \Rightarrow O(p) \rightarrow O(p')$. Let T be a monotone degree relation (like that corresponding to *tall*). If we now construct a degree modified property from T using O, we arrive at $\lambda x.\exists d[T(x, d) \& O(T(x, d))]$. (I am omitting world variables here for the sake of readability.) Given the monotonicity of T, for any x, if x has a degree of T, then x has the bottom element on T's scale as a degree of T-ness. Given the monotonicity of O, for any x, if for some d it holds that $O(T(x, d))$, it follows that x being T to the bottom element of scale satisfies O. Since anyone who has a degree of T-ness is T to the bottom element of the scale, it follows that the degree modified property $\lambda x.\exists d[T(x, d) \& O(T(x, d))]$ is a non-discriminant property. Consequently, combinations of upward monotone predicates and degree predicates are infelicitous.[8,9]

To illustrate, take modal operators like *possible* and *necessary*. Clearly if p entails p', then both $\Diamond p$ entails $\Diamond p'$ and $\Box p$ entails $\Box p'$. The proposition that x is tall to degree d entails that x is tall to the bottom element on the scale. Consequently, if it is possible/necessary that x is tall to some degree, then it is entailed that it is possible/necessary that s/he is tall to the bottom degree. As a result, anyone with a height is *possibly/necessarily tall* in the degree-modified sense. This explains why (40-a) and (40-b) lack a degree reading.

(40)   a.   Jasper is possibly cute.
         b.   Jasper is necessarily cruel.

In contrast, the examples in (41) do have a degree reading.

(41)   a.   Jasper is impossibly cute.
         b.   Jasper is unnecessarily cruel.

This can be explained by the fact that the inferences are reversed once we consider downward monotone operators. This allows such operators to construct discriminating properties in their role as degree modifiers. For instance, $\neg\Diamond$ is downward monotone: if p is impossible, then anything that entails p will be impossible too. So, if it is deemed impossible that x is tall to degree d, then it is equally deemed impossible that x is tall to degree $d + n$. It could be, however, that x being tall to degree $d - n$ is not deemed impossible. The property $\lambda x.\exists d[T(x, d) \& \neg\Diamond T(x, d)]$ thus describes individuals who map to

some upper part of the scale associated with T.

I predict then Zwicky's observation amounts to a contrast of monotonicity. Let me illustrate with some examples. In the pair *usual / unusual*, the former is upward monotone, while the latter is downward monotone. To see this, consider first of all the fact that (42-a) entails (42-b).

(42)　　a.　Jasper usually wears a black sweater to work.
　　　　b.　Jasper usually wears a sweater to work.

Since Jasper wearing a black sweater to work entails that Jasper wears a sweater to work, (42) shows that *usually* preserves this entailment, and consequently that it is upward monotone. In contrast, if it is unusual for Jasper to wear a sweater to work, then it will be also unusual for Jasper to wear a black sweater.

For the case of evaluative predicates, the downward monotonicity is observable in that they license negative polarity items.[10] For instance, Kadmon and Landman (1993) observed the following.

(43)　　a.　She was amazed that there was any food left.
　　　　b.　I was surprised that he budged an inch.
　　　　c.　We were astounded that she lifted a finger.

(44)　#She expected that there was any food left.

It is not easy to check for the monotonicity characteristics of such predicates on the basis of entailment relations. For instance, *John read a boring book* entails that *John read a book* and so we expect *She was amazed that John read a book* to entail *She was amazed that John read a boring book*. This entailment does not arise, however, and one of the reasons is that these examples are factive. *She was amazed that John read a book* presupposes that John read a book. Similarly, *she was amazed that John read a boring book* presupposes that John read a boring book. But the latter presupposition is not entailed by the assertion that someone was amazed at John reading a book. What is needed for such cases, then, is the notion of *Strawson entailment*. This modification of standard entailment relations was proposed by von Fintel (1999) as a way of working around presuppositions in tests for monotonicity patterns. A sentence S Strawson-entails S' if and only if S entails S' on the premise that all presuppositions of S' hold.

Unfortunately, von Fintel's suggestion is not completely helpful with evaluative predicates like *surprising*, *amazing*, etc. This is because *surprise* can be directed at certain specific aspects of the world. For instance, following von Fintel, the following would have to hold if *surprise* were downward monotone.

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Premisse 1:	John read a boring book. *(by presupposition of the conclusion)*	
Premisse 2:	It is surprising that John read a book.	
Premisse 3:	John read a book $\Leftarrow$ John read a boring book.	
Conclusion:	It is surprising that John read a boring book.	

Intuitions might not be clear about an example like this, for even if we did not expect John to read a book, we might know that John is an extremely boring fellow and that he has no taste whatsoever. So, if he were to read a book, we would actually expect him to read a boring one. This makes it that we will be hesitant to accept the conclusion of the above argument. Nevertheless, what is crucial here is that there is an element of truth in the conclusion. If the news that John read a book leads to surprise, then so would the news that he read a boring book, even though the boring aspect of this latter bit of news is expected.

Kadmon and Landman say about examples like this that there is evidence for downward monotonicity if we enforce a constant perspective throughout such tests. In their discussion they compare *I'm sorry he bought a car* to *I'm sorry he bought a Honda*, where the former should entail the latter if *sorry* were downward entailing. They explain:[11]

> If I'm sorry he bought a car, I clearly wish he had bought no car. What ought I to feel, then, about his buying a Honda? I ought to be sorry about it, qua car. In fact, [...] I MUST be sorry about it, qua car. That is because refraining from buying a Honda is an absolute requirement for satisfying my wish. I cannot prefer for my wish to be satisfied in 'another way'. Hence, *sorry* is [downward monotone] (on a constant perspective). (Kadmon and Landman 1993, p.383).

A similar reasoning exists for *surprise*. If I did not expect Jasper to read a book, then I will be surprised to find out that he did, irrespective of what kind of book he read. The upshot is that evaluative predicates are presumably downward monotone. According to my proposal, this explains why they can function as degree modifiers.[12]

5   Discussion

In this short paper, I have proposed a way of capturing the generalisation that only a specific subset of predicates can be assigned a degree manipulating function, a generalisation that, to my knowledge, has never been under

semantic scrutiny before. My approach assumes that, in principle, any predicate can modify degree, but that many such modifications would not yield an informative interpretation. The distribution of adverbial functions to predicates is governed by the inferences, in particular by the monotonicity inferences, triggered by the predicate. There are a few questions and connections I have left unattended, however. I will discuss some of them briefly.

To start, the adverbs *fortunately* and *unfortunately* are apparent counterexamples to the markedness generalisation, for it is difficult to assign them a degree modifying function.

(45)   Jasper is fortunately tall.

(46)   Jasper is unfortunately tall.

The preferred reading for (46) is not one where Jasper is so tall that it is unfortunate. Instead, it can only be interpreted as saying that it is unfortunate that he is tall. To make matters worse, there seems to be some regularity behind this exception, for the same exception occurs in Dutch.

(47)   #Jasper is onfortuinlijk lang.
          Jasper is unfortunate long.

Even if we were to find natural occurrences of *unfortunately* in a degree-modifying role, we would still need to explain what makes degree readings with this adverb generally dispreferred. I will leave such complex matters to further research.

A further topic that deserves attention is a phenomenon from the psychological literature called *framing.* So-called *framing* is exemplified by contrasts like that between (48) and (49) (Sanford, Dawydiak, and Moxey 2007). Even though *very few people died* and *a few people died* can be truth-fully used in similar situations (say where there were 5 fatalities), their evaluative effects are much different.

(48)   Very few people died, which is #terrible/marvelous.

(49)   A few people died, which is a terrible/#marvelous.

The semantic mechanism behind the typology of degree-modifying predicates that I presented above was based on the inferences such predicates give rise to. Interestingly, this makes the proposal applicable to framing. In examples like (48) and (49) monotonicitiy properties might provide an explanation. Given that *a few* is upward monotone, it follows that *a few people died* would have remained true had more people died. Conversely, *very few people died* remains true in case fewer people die. In line with the reasoning explained above,

evaluating the fact that *a few people died* as *marvelous* is infelicitous because it triggers the inference that the speaker would have found it marvelous too had more people died. Similarly, calling the fact that very few people died *terrible* commits the speaker to finding it terrible had nobody died. See Geurts (2010) for a recent account of framing that, although arguing that the semantic mechanism behind framing is more intricate than simple monotonicity, is based on inferences in much the same way as the above explanation of the typology of degree modifiers is.

A more general issue has to do with the characterisation of those predicates that can act as degree modifiers. A further crucial difference between degree-modifying adverbs and adverbs that lack such a function is that the former but not the latter are factive.[13] This is illustrated by the ad-sentential use of both classes of adverbs: (50-a) entails that the children are noisy, (50-b) does not.

(50)   a.   Unusually, the children are noisy.
        b.   Usually, the children are noisy.

As I discussed in section 3.2, Morzycki (2008) considers combinations like *surprisingly noisy* as analogous to embedded exclamatives. In the approach of Zanuttini and Portner (2003), exclamatives are assumed to be factive (as well as involving a mechanism of domain widening). However, this connection by itself does not *explain* why non-factive adverbs cannot modify degree; it is merely part of the observation that factivity appears to be somehow relevant. The factivity of exclamatives and degree modifiers like *surprisingly* and *unusually* form a parallel generalisation to the markedness generalisation I made in section 2. Apparently, markedness signals tend to be factive predicates (but, obviously, not vice versa). For instance, emotives like *man* or *gosh* are clearly factive, while adverbs that do not fit the markedness generalisation like *allegedly* are not.

Another issue that I have left open is how the discussion above relates to expressions like *clearly*, an adverb that has earned a prominent place in the vagueness literature (cf. Cohen & Wolf, this volume; Barker, this volume). This adverb, however, behaves more like a sentence adverb than like a degree modifier. Truth-conditionally, there appears to be no difference, for instance, between saying *Clearly, Japer is tall* and *Jasper is clearly tall*. Furthermore, *clearly* can precede intensified adjectives, as in *Jasper is clearly very tall*, while evaluative adverbs can not: *#Jasper is surprisingly very tall*. Finally, being *clearly tall* is not about clarity with respect to the degree of tallness, but rather about clarity regarding the category membership. So, saying *Jasper is clearly tall* is not the same as saying that it is clear *how tall Jasper is*.[14] If

we were to try to interpret *clearly* as an adverb of degree in my theory, then *Jasper is clearly tall* would end up meaning that there is a degree to which Jasper is tall such that it is clear that Jasper is tall to that degree. To be sure, this could be true even when it is not clear how tall Jasper is. Since Jasper is human, it is clear that he is taller than 5 centimetres. Thus, there is a degree to which he is tall, for which it is clear that he is tall to that degree. This, however, would make anyone *clearly tall*. On a degree modifier reading, in other words, *clearly* parallels *usually* and *possibly* in its inability to form discriminant properties.

Notes

[2]Thanks to Chris Kennedy for directing my attention to this piece.

[3]The expressions I call evaluatives here were called "psychological predicates" in Zwicky 1970.

[4]Ad-sentential adverbs are derived from non-gradable adjectives by the suffix *-erwijze*. For instance, the sentence modifier *mogelijk-erwijze* (possibly) is based on the adjective *mogelijk* (possible).

[5]There is a considerable amount of idiosyncrasy in the use of adjectives to modify degree. For instance, it is not easy to get a degree modified reading for something like *Jasper is an unusual weirdo*. However, in line with Zwicky's observations, only those adjectives that have degree modifying adverbial counterparts are such that they are capable of modifying degree within a noun phrase.

[6]I do not think that examples such as (26) provide definitive evidence against *surprisingly* modification entailing the positive, for it seems to me that riders like *given his background* could be interpreted as shifting the comparison class. Still, there is a clear contrast between (26) and (i).

(i) ??Although he is quite short, Peter is tall, given his background.

In general, it seems to me that, given the context-dependence of vague predicates, we lack a fully reliable method for testing whether occurrences of such predicates are interpreted akin to the positive form or not.

[7]Due to this assumption, the present proposal is rather tied to a particular framework, namely the degree semantics approach to adjectives. (In particular, the approach that takes adjectives to be relations between individuals and degrees.) It remains to be seen whether a similar approach could be successful in, say, a delineation approach such as that of Klein (1980). However, such approaches often end up stating constraints on gradable predicates that are reminiscent of monotonicity. See for instance Doetjes et al. (2008) for a proposal for degree semantics that lacks degree arguments but is otherwise very close to the assumptions I am making in this paper. I will leave a detailed comparison to further research, however.

[8]See Morzycki 2009, page 197, for related reasoning with respect to a specific group of adjectival modifiers. As Morzycki notices, some size-adjectives can modify degree, but only those that express *largeness*, as opposed to *shortness*:

(ii) a.   He is a { big / huge / enormous / gigantic / mammoth } idiot.
      b. #He is a { small / tiny / minute / microscopic } idiot.

There is an obvious and interesting connection to Zwicky's observations. Here, too, the function of degree modification is assigned only to one part of a polar division of predicates. However, adjectives like *big* and *small* differ from predicates like *surprising* and *usual* in that they lack propositional uses. I will therefore leave the interesting question of how a contrast like (ii) fits in my proposal for further research.

[9]For the proposal to work, it is important to assume a strong relation between *uninformativeness* and *ungrammaticality*. I will refrain from spelling out the details of this relation, but see Gajewski (2002) and Fox and Hackl (2006) for discussion.

[10]Note that non-evaluative downward monotone predicates do not license negative polarity items, as shown in (iii).

(iii) #It is unusual that he budged an inch.

I do not have an explanation for why this is the case.

[11]Bart Geurts (p.c.) suggested to me that a more straightforward way of testing for monotonicity with these predicates is by using sentences that eliminate factivity and minimise the role perspectives might play. For instance, the test would be whether *It would be surprising if John found 10 marbles* entails that *It would be surprising if John found 11 marbles.*

[12]The proposal further predicts that non-monotone operators, like downward monotone operators, form discriminating properties if they are used as degree modifiers of gradable predicates. Bart Geurts (p.c.) suggested to me that adverbs like *pleasantly*, *cosily*, etc. would be a case in point, as in (51).

(iv) a. The water is pleasantly warm.
      b. The city centre of Utrecht is cosily small.

We might also find support in cases of modification by size-adjectives (see footnote 8):

(v)   I'm an enormous fan of Motörhead,   (upward)
      a. ... #but a small fan of Mötley Crüe.   (downward)
      b. ... but only a small fan of Mötley Crüe   (non-monotone)

[13]Thanks to an anonymous reviewer for stressing this point.
[14]Thanks to Paul Egré for suggesting these data to me.

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