

# The Goldilocks effect for evaluative intensifiers

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## Abstract

One large class of intensifiers concern adverbs of degree derived from evaluative predicates (“*terribly*”, “*fairly*”, “*disgustingly*”, etc.) There are two kinds of such intensifiers: those that have lost their evaluative meaning component through some sort of diachronic process of bleaching, and those whose evaluative meaning is still active. In this squib, I show that there is a correspondence between the evaluative polarity of the predicate underlying the intensifier and its degree function. Importantly, this correspondence holds even when the evaluative meaning has been bleached away.

## 1 Intensifiers

This squib concerns so-called *intensifiers* (Bolinger, 1972). I use this term to refer to adverbs of degree that manipulate contextual standards of comparison, which contrasts with degree words that target end-points of some scale, such as “*completely*” and “*almost*” for maxima and “*slightly*” for minima. Intensifiers can express high degree, for instance “*terribly*”, “*extremely*” or medium degree “*fairly*”, “*quite*”. The former kind of adverbs are often called *boosters*, while the latter may be referred to as *moderators* or *compromisers*.<sup>1</sup>

Here, I am focusing on what is presumably the largest subclass of intensifiers, namely evaluative ones. These are adverbs of degree derived from evaluative adjectives, adjectives that express a value judgment by the

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<sup>1</sup>There exists a long history of degree adverb typologies. See, for instance, Stoffel, 1901; Borst, 1902; Fettig, 1934; Biedermann, 1969; Bolinger, 1972; Bäcklund, 1973; Gary, 1979; Van Os, 1989; Klein, 1998; Paradis, 1997.

speaker: “*terrible - terribly*”, “*disgusting - disgustingly*”, “*fair - fairly*”, etc.<sup>2</sup> There are two kinds of such degree words: *bleached* evaluative intensifiers and what I will call *unbleached* ones. A bleached intensifier is an intensifier that carries out its boosting or mitigating function seemingly without any semantic relation to specifics of its morphology. A good example is “*terribly*”. While obviously derived from the adjective “*terrible*”, this adverb contributes no evaluation of terribleness when used as an intensifier. So, when I say that “*Scarlett is terribly nice*”, I am simply saying that she is nice to a high degree. In no way am I communicating that there’s anything terrible going on. Things are different for unbleached intensifiers. A good example is “*disgustingly*”. When I say that “*Scarlett is disgustingly nice*”, I am once more saying that she is nice to a high degree. At the same time, though, I communicate that there’s something about how nice Scarlett is, that I find disgusting.

My goal is to make two empirical claims: (i) the boosting or mitigating effect of unbleached intensifiers is to a considerable extent driven by the evaluative polarity of the adjective the adverb is derived from; (ii) the boosting or mitigating effect of bleached intensifiers is similarly tied to this evaluative polarity, even though the adverb’s original descriptive content is bleached away. I will refer to this correspondence between evaluative content and degree function as *the Goldilocks effect* of evaluative intensifiers.

## 2 The Goldilocks effect

To start things off, consider *pleasantly* and *unpleasantly*, both unbleached intensifiers.

- (1) a. It is pleasantly warm outside.
- b. It is unpleasantly warm outside.

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<sup>2</sup>Other types of adjectives that derive intensifiers are for instance, adjectives of normality (“*abnormal - abnormally*”, “*extraordinary - extraordinarily*”, “*atypical - atypically*”, “*unusual - unusually*”), adjectives of surprise (“*surprising - surprisingly*”, “*unexpected - unexpectedly*”), adjectives of truth and reality (“*real - really*”, “*true - truly*”, “*very*”), modal adjectives (“*unnecessary - unnecessarily*”, “*impossible - impossibly*”). Note that there are also many adjectives in these classes that do not have corresponding degree adverbs. For instance, there are no degree adverbs like “*Scarlett is normally / typically / ordinarily / possibly tall*”. This is sometimes called Zwicky’s observation, after Zwicky (1970). See Nouwen (2010) for discussion. As Morzycki (2008) observes, the class of evaluative intensifiers is open. If I bring a new adjective into the language, say I start evaluating things positively by exclaiming things to be “*fabulicious*”, then the corresponding adverb automatically morphs into an evaluative intensifier: “*It’s fabuliciously warm outside*”.

What do these sentences mean? Well, a good approximation is that (1-a) says that the temperature is pleasant, while (1-b) says that it is not. Beyond that, (1-b) will generally be about higher temperatures than (1-a). This is a very general tendency, which I will refer to as a *Goldilocks effect*: positive evaluative adverbs are mitigating intensifiers, while negative evaluative adverbs are boosting intensifiers.<sup>3</sup> The effect is driven by the fact that positive evaluations tend to be about the middle, non-extreme parts of a scale. Extreme parts of a scale tend to be where there is some kind of excess, which results in negative evaluation. If you judge the tomato soup I made you to be “*pleasantly salty*”, then it has a high but not too high degree of saltiness. On the other hand, if you judge it to be “*unpleasantly salty*”, your negative evaluation will be brought about from there being too much salt.

More examples: Compare a pillow that is “*pleasantly soft*” to a pillow that is “*unpleasantly soft*”. The latter is too soft. At the other end of the scale, we have: “*a pleasantly hard pillow*” versus “*an unpleasantly hard pillow*”. The latter pillow is too hard. Extremes, in other words, lead to negative evaluation. As in the Goldilocks story, the ideal middle range of a scale is associated to positive evaluation, while the extremes are associated to excess and (consequently) negative evaluation.

To demonstrate the Goldilocks effect more forcefully, I conducted a

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<sup>3</sup>In the story of Goldilocks and the three bears, two parent bears and their child bear get ready to eat their breakfast, but find the porridge they prepared to be too hot. They decide to go for a stroll through the woods, leaving their breakfast bowls to cool. In their absence an impish golden-haired girl, Goldilocks, sneaks into their house. Among many other mischievous things she does, she tries out the bears’ breakfast: Daddy’s bowl of porridge is too hot, Mummy’s bowl is too cold, but the little bear’s porridge is *just right* and she proceeds to finish it off. While the Goldilocks fable does not excel in moral clarity, a common interpretation is that the story intends to show how the ill-natured selfish actions of Goldilocks affect the everyday life of the good-natured bears, where the girl’s actions are particularly selfish because she takes only what is *just right*. The lasting legacy of the story, however, is simply this notion of *just right*-ness. Science has made productive use of this notion. A typical *Goldilocks Effect* in science involves some ideal state of affairs that is positioned between states of affairs that are less ideal. Or stated differently, from the perspective of many different sciences, ideal situations tend to not be extreme situations, but rather moderate in some sense. One generally well-known example is from planetary science, where the so-called *Goldilocks zone* is the stretch of space around a star that allows liquid water to occur on a planet: it is sufficiently far from the sun to not let all water evaporate away but also not too far to only end up with ice. In cognitive science, there’s the *Goldilocks effect* (Kidd, 2012), the observation that the visual attention of infants tends to be highest when the stimulus is of intermediate complexity: while low complexity stimuli tend to already be familiar, too much complexity wastes valuable computational resources. In economy, there’s the concept of a *Goldilocks economy*, which is an economy that has *Goldilocks growth*: growth that is prosperous but not so extreme that it causes excessive inflation.

small study in which I compared measures of degree function to measures of evaluative polarity of 24 hand-selected evaluative adverbs. I used Amazon Mechanical Turk to ask 61 participants to associate modifications of the adjective “*warm*” to temperatures. Participants saw sentences of the form in (2) and were asked to indicate what temperature they thought it was, given that this sentence was produced on a spring day in New York City.

(2) It’s ADVERB warm today.

Participants had to provide the temperature they associated to the stimuli in degrees Fahrenheit by moving a slider to the desired position. The slider scale ranged from -10 to +110 degrees Fahrenheit. The aforementioned 24 adverbs took the place of ADVERB in (2) and there was an additional condition in which the adjective was left unmodified.<sup>4</sup> All participants saw all stimuli, which were presented in randomised order. There were no fillers.<sup>5</sup>

I normalized responses by converting each response of a participant to the distance to the mean of all responses by that participant. I removed all observations that were more than 2 standard deviations removed from the mean response per adverb condition. This removed exactly 100 of the 1525 observations.

The next step in this study is to connect these results to evaluative polarity. Luckily, since Osgood, Suci, and Tannenbaum (1957), factor analysis studies have confirmed time and time again that evaluative polarity is one of (usually) three factors that determine a word’s connotative meaning. This means that there is ample of work on establishing lexicons that record affective measures, including those related to evaluation. For the current study, I used the NRC valence-arousal-dominance lexicon (Mohammad, 2018) to obtain estimates of evaluative connotations associated to the adjectival stem of the adverbs used in the mechanical turk survey. Here, “*valence*” corresponds to a numerical score that represents what I (following Osgood) have been calling evaluation. In the NRC lexicon, valence is quantified on a 0 to 1 scale: 0 corresponding to extreme negative evaluation and 1 to extreme positive evaluation.<sup>6</sup>

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<sup>4</sup>Another manipulation was that the 25 sentences that are thus constructed were also offered to the participants with a negation added into them: “*It isn’t ADVERB warm today*”. This condition was intended to gather data for a different study and will not be discussed in this squib.

<sup>5</sup>This setup is similar to experiment 2 of Bennett & Goodman, 2018.

<sup>6</sup>The NRC VAD lexicon is available at: <https://sai.fmohammad.com/WebPages/nrc-vad.html>. This lexicon was built by asking annotators to rank four adjectives according to the relevant property (e.g. valence). The results is a reliably consistent annotation. See

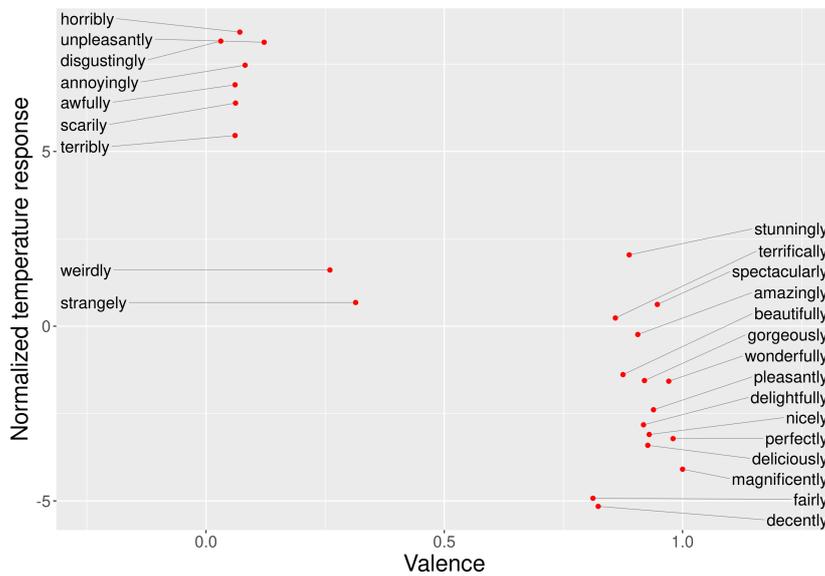


Figure 1: Mean centered temperature response versus valence

Figure 1 plots the mean centered temperature response from the mechanical turk survey against the NRC VAD valence score of the adverbs. As can be seen, there is a clear negative correlation between the two.<sup>7</sup> The higher the valence score of the underlying adjectival predicate of an adverb, the lower the region on the scale that this adverb is associated with.

What is also clear from this plot is that the adverbs form two groups. In fact, what drives the correlation seems to be the fact that most adverbs have a valence close to either 1 or 0, which is not surprising given the evaluative nature of the adverbs in the study. High valence adverbs correspond to low degrees, while low valence adverbs correspond to the higher degrees.

In sum, the degree function of evaluative intensifier is – at least to some degree - determined by evaluative polarity. Degrees on the middle part of the scale tend to be positively evaluated, while degrees on extreme parts of the scale tend to be receive negative evaluation. This is a Goldilocks effect. As in the story, the best porridge is neither too warm, neither too cold. Excess tends to be bad, while the absence of excess is generally a good thing.

Mohammad (2018) for details on the methodology.

<sup>7</sup>Spearman’s rank correlation:  $\rho = -0.73$ ,  $p < 0.0001$ . I’m using Spearman correlation, since neither variable is normally distributed.

### 3 Discussion

This Goldilocks effect I demonstrated in the previous section is perhaps not so surprising given the fact that almost all adverbs I used in this study were unbleached. If an unbleached adverb has a semantically active evaluative predicate, and if the general Goldilocks tendency of how evaluative polarity corresponds to regions on the scale holds, then we fully expect to see negative evaluations being able to highlight more extreme degrees and positive evaluations being able to refer to less extreme degrees.

The Goldilocks effect persists, however, also with bleached intensifiers. We see this with “*terribly*” and “*fairly*” in the study above, both of which are clearly bleached intensifiers.<sup>8</sup> We see it much more generally if we take a closer look at bleached intensifiers derived from evaluative predicates in English and related languages. For instance, Paradis (1994) distinguishes between *boosters*, i.e. adverbs of high degree, and *compromisers*, i.e. adverbs of moderate degree. Among the boosters she notes “*awfully*” and “*terribly*”, both derived from evaluatively negative predicates and among the boosters she notes “*pretty*” and “*fairly*”, both evaluatively positive.

Similar data is available in Dutch and German. Bleached adverbs of moderate and high degree include the following:

- (3) DUTCH
  - a. Moderate degree: “*aardig*” (nice), “*redelijk*” (reasonable), “*best*” (best), “*tamelijk*” (fitting), “*vrij*” (free)
  - b. High degree: “*zeer*” (sore), “*verschrikkelijk*” (terrible), “*erg*” (bad), “*ontzettend*” (disrupting)
- (4) GERMAN
  - a. Moderate degree: “*leidlich*” (tolerable), “*ziemlich*” (fitting)
  - b. High degree: “*sehr*” (etymologically related to Dutch “*zeer*” and English “*sore*”), “*furchtbar*” (terrible), “*fuerchterlich*” (terrible)

In other words, we observe the same correspondence that we observed for unbleached intensifiers: the function of the bleached intensifier (high versus moderate degree) is directly connected to the meaning that was bleached out of the adverb (the evaluative predicate). This suggests a rather straightforward diachronic process. Initially, these adverbs express positive or negative evaluation, which is (typically) associated to respec-

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<sup>8</sup>In short: “*terribly nice*” communicates a positive evaluation of niceness and no negative evaluation of terror; similarly “*fairly nasty*” communicates a negative evaluation of nastiness, but no positive evaluation of fairness.

tively medium or high regions of the adjective's scale. Once the evaluative meanings is bleached away, the association to medium or high degree remains and becomes the functional semantics of the intensifier.

The ensuing picture has consequences for theories of the semantics and pragmatics of bleached intensifiers. One prominent idea in the literature is that intensifiers manipulate the contextual threshold of the adjective (e.g. Katz, 2005; Sæbø, 2010). For instance, if "*Scarlett is tall*" is true whenever Scarlett's height exceeds some threshold  $\theta$ , then "*Scarlett is terribly tall*" is true whenever her height exceeds  $\theta + d$ , where  $d$  is some boosting value contributed by the intensifier. Opposed to this view is the view supported by Bennett and Goodman (2018), that intensification by bleached intensifiers is the result of a manner implicature. That is, the bleached adverb of degree is void of semantic content, but its very presence in the sentence leads to the implicature that the intended meaning is narrower than that of the unmodified variant. The effect is that the presence of an intensifier leads to an interpretation that concerns a more specific part of the scale. The Goldilocks effect I introduced above shows that intensifier meaning cannot be a purely pragmatic affair. If it was, then the intensifiers degree function would be severed from its original evaluative meaning. As I showed in this squib, it is not.

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