Deriving evaluativity in *even*-comparatives via presupposition accommodation

Ruyue Agnes Bi
Massachusetts Institute of Technology

Sentences involving the scalar particle *even* result in unexpected positive or negative inferences (henceforth, "evaluative inferences") when combined with gradable predicates. As (1) shows, the nature of these inferences varies depending on where the focus is placed:

(1) a. Alex is even taller than $[\text{Blake}]_\text{F}$. [$\rightsquigarrow$ Both Alex and Blake are **tall**]
b. $[\text{Alex}]_\text{F}$ is even taller than Blake. [$\rightsquigarrow$ Both Alex and Blake are **short**]

Note the corresponding comparatives without *even* do not give rise to evaluative meanings. The sentence *Alex is taller than Blake* is felicitous regardless of whether either party would be judged tall or short in the context. Hence, the inferences must have been triggered by the addition of *even*. This observation has motivated analyses enriching the meaning of *even* with an presupposition that would generate the comparative-to-positive inference (Greenberg 2015, Daniels & Greenberg 2020). I'll argue, instead, for a reductive approach, deriving these inferences from the classic (un)-likelihood analysis of *even* and general conversational principles.

From a Stalnakerian point of view, the presupposition φ of an utterance *S* can be accommodated when the listener recognizes that the speaker intends φ to be in the common ground and then, if φ does not contradict the listener's existing beliefs, adjusts their own understanding of the common ground accordingly. Here, I focus on how the likelihood presupposition of scalar particles such as *even* is accommodated in comparative sentences, and argue that abductive reasoning plays an essential role in presupposition accommodation in general.

Background The classic (un)likelihood analysis of *even* (Karttunen and Peters 1979; Rooth 1992; Chierchia 2013, a.o.) only requires that the prejacent *p* be the least likely among its alternatives in C. The presupposition is stated on the scale of likelihood:

(2) **Classic (un)-likelihood analysis**: $[\![even]\!]^{g,c} = \lambda C.\lambda p : \forall q \in C\,[q \neq p \rightarrow p <_{\text{likely}} q].\, p = 1$

Greenberg (2015, 2018) revises the presupposition condition to be based on the scale of a contextually supplied gradable property G so that we can make use of its standard $\textbf{Stand}_\text{G}$ to enforce a Positive Condition (highlighted in (3)):

(3) **Greenberg's gradability-based analysis** (Greenberg 2015, 2018)
$[\![even]\!]^{g,c} = \lambda C.\lambda p.\lambda w : \forall q \in C\big[q \neq p \rightarrow \forall w_1, w_2[w_1 R w \wedge w_2 R w \wedge w_2 \in p \wedge w_1 \in [q \wedge \neg p]] \rightarrow [max(\lambda d_2.G(d_2)(x)(w_2))) > max(\lambda d_1.G(d_1)(x)(w_1)) \wedge \boxed{max(\lambda d_1.G(d_1)(x)(w_1)) \geqslant \textbf{Stand}_G}\,]\big].$
$p(w) = 1$, where *x* is a non-focused entity within the prejacent *p*

This line of analysis derives the evaluative inferences in the semantics, and thus predicts these inferences always arise, which is not borne out. It also cannot easily explain the apparent scale reversal effect triggered by the change in focus placement without additional stipulations.

Analysis Suppose *even* takes scope over matrix TP and associates with focus. I propose that listeners go through three steps to arrive at the evaluative inferences. Take (1-a) as an example. When the sentence is asserted, the presupposition of *even*, given in (2), mandates that the proposition *Alex is taller than Blake* is the least likely among its alternatives {Alex is taller than x}. Either this presupposition is already entailed by the common ground, in which case no accommodation is needed and, as shown later, evaluative inference does not necessarily arise; or, the listener learns that this probability ranking is entailed by the speaker's intended common ground, and commences an additional abductive reasoning attempting to find the most likely justification for this ranking. I propose the following general condition holds, and that in the absence of further information, absolute height status is the best and most salient explanation:

(4) **Presupposition Accommodation Condition (PAC)**: In cases where a presupposition is not entailed by the common ground, listeners can accommodate it only if its best explanation is either already entailed or can be accommodated at the same time.

Given the **transitive** and **antisymmetric** properties of ordering relations, we observe (5) is always true, and, in turn, we can derive a corollary of PAC specific to gradable predicates.

(5) For a gradable predicate G with corresponding scale S_G, $\forall x, y, z \in D_e$,

$$\begin{cases} S_G(x) > S_G(y) \Longrightarrow \mathit{Prob}\big(S_G(z) > S_G(x)\big) \leq \mathit{Prob}\big(S_G(z) > S_G(y)\big) & \text{(a)} \\ S_G(x) < S_G(y) \Longrightarrow \mathit{Prob}\big(S_G(x) > S_G(z)\big) \leq \mathit{Prob}\big(S_G(y) > S_G(z)\big) & \text{(b)} \end{cases}$$

(6) **PAC Corollary: *Likelihood-to-degree Mapping***
Given a gradable predicate G and its corresponding scale S_G, for $x, y, z \in D_e$,
a. accommodating $\mathit{Prob}\big(S_G(z) > S_G(x)\big) < \mathit{Prob}\big(S_G(z) > S_G(y)\big)$ requires that $S_G(x) > S_G(y)$ is either entailed in the common ground or can be accommodated;
b. accommodating $\mathit{Prob}\big(S_G(x) > S_G(z)\big) < \mathit{Prob}\big(S_G(y) > S_G(z)\big)$ requires that $S_G(x) < S_G(y)$ is either entailed in the common ground or can be accommodated.

An immediate predication of this account is that when a presupposition of likelihood ranking(s) is already entailed in the common ground, since there is no strict need for abductive reasoning any more, the evaluative inferences do not necessarily arise. This is borne out empirically.

(7) *Context: The speaker is talking about the three kids in the Smith family. So far, it has been established that Alex is taller than her twin Aaron and that Blake is their older sibling.*
Alex is even taller than [Blake]$_F$. cf. (1-a)

Since common knowledge suggests that twins are usually of similar height, and older siblings tend to be taller than the younger ones, *p* 'Alex is taller than Blake' is less likely than *q* 'Alex is taller than Aaron.' Crucially, these kids can be tall, short or average height; we don't necessarily infer anything about their absolute height status from the *even*-sentence above.

(6) leads to an interim conclusion of where the standard or target sits relative to other members of the comparison class on the relevant scale. For (1-a), the corollary guarantees that Blake is the tallest within the comparison class. When it is uttered out of the blue, in other words, when the comparison class is not explicitly restricted in the discourse, I propose that the listener assumes the most basic scenario where the comparison class forms a representative sample.

(8) **Alternative-sampling Hypothesis (ASH)**: When the alternative set is not explicitly specified, assume individuals included in the computation of alternatives form a representative sample of the contextually determined relevant population with respect to G.

The complete derivation of (1-a) inference goes: First, the likelihood-to-degree mapping corollary of the Presupposition Accommodation Condition guarantees that *Blake is the tallest person in the comparison class*. Second, since height of a population is normally distributed and, by the *Alternative-sampling Hypothesis*, the comparison class reflects a representative sample, for Blake to be at least as tall as everyone else in that set, Blake is almost certainly taller than standard, i.e., Blake is *tall*. Third, since *even* asserts the truth of its prejacent, Alex is taller than Blake, which, in turn, indicates that Alex is tall as well.

The reversed, negative, inference of (1-b) falls out straightforwardly from the same reasoning process. Starting with the alternative set $\{x$ is taller than Blake$\}$, the classic (un)-likelihood analysis requires that *p* 'Alex is taller than Blake' is the least likely among its alternatives. By part (b) of the Likelihood-to-degree Mapping corollary, to accommodate the said probability rankings, we accommodate that Alex is the shortest within the comparison class. By the Alternative-sampling Hypothesis, Alex is most likely shorter than standard. Lastly, assuming the prejacent to be TRUE, Alex, albeit short, is taller than Blake, so Blake must be short as well.

Conclusion I have proposed two general cooperative principles, the PAC and ASH, that govern how rational agents reason about discourse. This analysis accounts for the optionality of the evaluative inferences in sentences with *even* and gradable predicates, and straightforwardly derives the scale reversal noted in the minimal pair (1).