Focus Particles in Comparative Sentences

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1 Introduction

This paper deals with comparative sentences in English modified by the focus particle *even*, which I call *even*-comparatives hereafter. This type of comparatives displays peculiar behavior compared to ordinary comparatives, but this has been left unexplained in the literature (cf. Bennet 1982, Ippolito 2007). My contention in this paper is that the behavior of *even*-comparatives may be explained by combining two independent theories about presupposition and focus semantics. More specifically, I claim that we need to introduce a free variable into the focus semantics of *even*-comparatives, instead of a set of alternatives as usually assumed.

This paper is organized as follows: In section 2, I first lay out three properties of *even*-comparatives that differ from ordinary comparatives, and argue that they are not explained by the traditional focus semantic analysis of *even*. Section 3 presents another way to look at focus-induced effects on the *even*-comparatives and introduces the free variable analysis of presupposition given by Beck (2007). In section 4, I propose my own analysis based on the free degree variable in focus-induced presupposition, which unites the results in section 3. The last section concludes the paper.

2 *Even* in comparative sentences

2.1 Properties of *even*-comparatives

One of the hallmarks of comparative sentences with dimensional gradable adjectives (e.g. *tall, wide, long*) is their lack of norm-related entailment: they do not entail the corresponding positive sentence. In the examples below, (1b) does not entail (1a) and thus (1b) can be true under the situation where both John and Bill are short (or not tall).

(1) a. John is tall. / Bill is tall.
b. John is taller than Bill.

This entailment is called *norm-related*, because the semantics of a dimensional gradable positive adjectives is relative to the notion of a "norm" or the standard degree to which an individual satisfies the property denoted by the adjective (cf. Bierwish 1989).

(2) John is tall. ≈John's height reaches and exceeds the degree that is considered to be the standard for tallness, or "norm", in the context.

Adding *even*, a focus particle in English, to a comparative sentence as in (2a) may change this pattern. In *even*-comparatives, unlike the ordinary one in (1b), the compared element exhibits the norm-relatedness:[1), 2)]

(3) a. John is *even* taller than Bill.
b. Bill is tall.
c. John is *much* taller than Bill.

From (3a), one can infer that (3b). Note that this effect is not shared by other (degree) adverbs: (3c) does not entail (1a) or (3b).

Note at this point that *even*-comparatives have to be distinguished from those where *even* scopes a comparative adjective itself:

(5) His psycho-therapy has made him happier than he used to be, as well as calmer, better tempered, more loving toward his wife, and more efficient at work. He is better looking, even. (Bennet (1982: 409))

Here, what is contrasted are the properties such as *happier, calmer, better tempered, ...*, and among them, *better looking* is considered to be the most unexpected one.

The norm-relatedness associated with *even*-comparatives is considered to be a presupposition: it projects in the contexts of interrogatives, conditionals, and negation.

(6) Assumption: Bill is {not tall/short}.
   a. #Is John even taller than Bill?
   b. #If John is even taller than Bill, he (=John) will be a new member of our basketball team.
   c. #It is not the case that John is even taller than Bill.[3)]

In (6), under the assumption that the compared individual is not tall (or short), the sentences sound awkward, since they make sense only if they presuppose that Bill is tall.

The second property of *even*-comparatives also concerns presupposition: when they are preceded by another comparative sentence, the norm-related presupposition disappears.

(7) a. Bill is taller than Chris, and John is even taller (than him (=Bill)).
   b. And none of them is tall.

(7a) can be followed by (7b) without any awkwardness. Assuming that *even*-comparatives always require a presupposition to be satisfied, this means that the presupposition of *even*-comparatives can be satisfied by either of two different propositions: one is a positive sentence, the other is a comparative with no norm-relatedness. This is by no means a usual situation for presupposition satisfaction.

The third observation with regard to *even*-comparatives is that when they are preceded by another comparative, as in (7a), the compared element is optional and it is understood to refer to the subject DP of the preceding comparative. In (7a) above, it should be possible in principle for the pronoun to refer either to Chris or Bill, but its reference is confined to Bill. With other additive particles, such as *too*, reference to Chris is natural:

(8) Bill is taller than Chris, and John is taller than him (=Chris), too.

Thus, the requirement is not reducible to some general discourse principle.

In sum, *even*-comparatives exhibit different properties than ordinary ones in three respects:

(i) They induce a norm-related presupposition, when asserted out of the blue.
(ii) In spite of (i), when preceded by a comparative sentence, the norm-relatedness disappears.
(iii) In the situation of (ii), the reference of the compared element is restricted to the subject DP of the preceding comparative.

In the next section, I will show that these properties cannot be derived from the standard analysis of focus particle *even*.

2.2 Focus semantics and *even*-comparatives

Even, as a focus particle, is associated with a focused element in a sentence, inducing presuppositions (Jackendoff 1972). The consensus about the semantic-pragmatic effects of this particle is that it does not contribute to the assertive/at-issue meaning of the sentence, but only conveys presuppositions (e.g., Horn (1969), Karttunen and Peters (1979)).

The presuppositions that *even* produces have been known to be two-hold: (i) scalar presupposition, where the prejacent proposition (a proposition without *even*) is assumed to be the most noteworthy/surprising one, and (ii) additive presupposition, where something/one other than the focused element is an argument of predication that forms a part of the proposition (e.g., Horn 1969, Jackendoff 1972, Karttunen and Peters 1979, Bennet 1982, Kay 1990).[4] The focused element is indicated by capital letters throughout this paper. In the following example, with the subject DP focused, the assertion, scalar PSP, and additive PSP will be as follows:

(9) Even JOHN came to the party.
  a. John came to the party. assertion
  b. John is the most surprising person to come to the party. scalar PSP
  c. Someone other than John came to the party. additive PSP

I follow the alternative semantics (Rooth (1985, 1992)) in the formulation of focus-induced interpretations. *Even* takes two arguments, one of which is a contextual variable, C, a subset of the focus value of the prejacent, and the other is simply a prejacent proposition.[5]

(10) even(C)(p)＝1, iff
  a. p＝1, defined only if...
  b. ∀q∈C∧p≠q, q＜*noteworthiness* p scalar PSP
  c. ∃q∈C∧p≠q such that q＝1 additive PSP

The contextual variable C is presuppositional, in that its reference is gained from the context. In the case at hand, the propositions in C are obtained by replacing a focused element in the prejacent with a variable of the same type and substituting it with an entity in the set of alternatives to the focused element (= the focus semantic value, $[\![\ ]\!]^f$). Given that ALT(John) = { John, Mary, Sam } for (9), then its assertion, scalar PSP and additive PSP will be calculated as follows:

(11) a. C⊂[[JOHN came to the party]]^f
  ＝{q | q＝λx. x came to the party)(y∈ALT(John))}
  ＝{John came to the party, Mary came to the party, Sam came to the party}
  b. [[Even JOHN came to the party]]＝1 iff...
  Assertion: [[John came to the party]]＝1, defined only if...
  Scalar PSP:
  ∀q∈{Mary came to the party, Sam came to the party},
  q＜*noteworthiness* [[John came to the party]]
  Additive PSP: ∃q∈{Mary came to the party, Sam came to the party} such that q＝1

It is easy to see that these results conform to the observation in (9b) and (9c).

Now let us consider *even*-comparatives. Applying the same computation to *even*-comparatives, we would get the following:

(12) John is even taller than BILL.
  a. Assume that ALT(Bill) ＝{Bill, Sam, Mary}
  C⊂ [[John is taller than BILL]]^f
  ＝{q | q ＝ (λx. John is taller than x)(y∈ALT(Bill))}
  ＝{John is taller than Bill, John is taller than Sam, John is taller than Mary}

b. Assertion of (12): John is taller than Bill
c. Scalar PSP: $\forall q \in$ {John is taller than Sam, John is taller than Mary}, $q <_{noteworthiness}$ ⟦John is taller than Bill⟧
d. Additive PSP: $\exists q \in$ {John is taller than Sam, John is taller than Mary} $\wedge q = 1$

Are these results in congruity with the observation in the last section?

The additive PSP just says that John is taller than other people than Bill, and thus it does not ensure the norm-relatedness. I will not discuss the additive PSP hereafter and simply assume that it holds, because it does not play a crucial role in the present discussion.

What about the scalar PSP? What does it mean that the proposition that John is taller than Bill is the most noteworthy/surprising proposition among these? Following Kay (1990), I take "noteworthiness" as informativeness, and define it in terms of anti-symmetric entailment relation (cf. Zhang and Ling 2016):

(13) Informativeness
Let P and Q be propositions. If P entails Q but Q does not entail P, then P is more informative than Q.

With this characterization of noteworthiness, the scalar PSP says that the prejacent proposition entails the alternative propositions. In the model at hand, this entailment relation is satisfied only when Bill is taller than the other two:

(14) HEIGHT 0————Sam——Mary——Bill——John———>
a. John is taller than Bill. ⇒ ⇍
b. John is taller than Mary.
c. John is taller than Sam.

In (14), (14a) entails (14b) and (14c),but neither of the latter two entails (14a). Thus, in this relation (14a) is the most informative, according to (13). Thus, the scalar PSP would be restated as follows:

(15) Bill is taller than his alternatives.

This restated PSP explains why a comparative sentence satisfies the presupposition of *even*-comparatives. In (7), repeated here as (16), that Bill is taller than another person is supplied, and thus the presupposition for the *even*-comparative is satisfied.

(16) a. Bill is taller than Chris, and John is even taller (than him).
b. And none of them is tall.

Furthermore, the restated presupposition in (15) does not require Bill to be tall: All of Sam, Mary, Bill and John may be short.

The point, however, counters to the observation (i) in section 2.1. When (3a) is asserted out of the blue, the presupposition associated with it is the norm-related one: Bill has to be taller than some standard of height.

In sum, the standard analysis of *even* as a focus particle may predict the comparative presupposition with no norm-relatedness, but it does not explain why we get the norm-relatedness in other contexts.

3 Computing Alternatives

3.1 Degree Alternatives

In the last section, we have seen that from the standard analysis of *even*, we cannot predict why we have the norm-related presupposition. In this section, we reconsider what may serve as alternatives and present the shared presupposition between the norm-related and norm-unrelated ones.

Let us first take a look at the rough semantic representations of the presuppositions associated with *even*-comparatives.

(17) John is even taller than BILL.
a. Bill is tall. ≈ Bill's height $\geq d_s$ (=the contextually given degree of standard for being "tall")
b. Bill is taller than someone. ≈ Bill's height > someone else's height

It is now easily observable that the common value is that Bill's height is greater than some other degree, not individuals. Thus the two presuppositions now can be unified

into the following:

(18) Bill's height＞d*, d* could be the degree of standard or some degree mentioned earlier

If (18) is the presuppositions of *even*-comparatives, they do not have *two* different presuppositions any more. We can assume that d* is a free degree variable, and as such its reference is determined by assignment function g, predicting that it varies depending on the preceding context. The problem is how to compute this presupposition compositionally.

As a first step, let us incorporate degree alternatives into the semantics of *even* given above.

(19) a. $C \subset [\![\text{John is taller than BILL}]\!]^f = \{q \mid q = (\lambda d.\ \text{John is taller than } d)(d' \in \text{ALT}(\text{Bill's height}))\} = \{\text{John's height} > \text{Bill's height}, \text{John's height} > d1, \text{Joh's height} > d2, ...\}$

b. scalar PSP: $\forall q \in \{\text{John's height} > d1, \text{John's height} > d2, ...\}, q <_{noteworthiness} \text{John's height} > \text{Bill's height}$

This amounts to saying that Bill's height is greater than any other degrees that John exceeds, which is the same result as the standard analysis. What is in need is direct reference to the alternative degree(s) without making an intervention of universal quantification to propositions.

3.2 Non-propositional Presupposition Computation

In the above discussion, I take *even* as a sentential operator that takes C as its domain of quantification. In the literature, there is another way to derive a focus-induced presupposition, whereby a focus-sensitive presupposition trigger may be attached to syntactically various positions, introducing the relevant argument into the presupposition.[6] Ippolito (2007), for example, argues that different meanings (temporal, marginal, and discourse-related/concessive readings) of *still* are due to the different positions to which this particle adjoins.

(20) a. John is still cooking. temporal

$[\![\text{still}]\!]^{c,g,w}=\lambda t\in D_i.\ \lambda e\in D_l.\ \lambda P\in D_{\langle l,\langle i,t\rangle\rangle}$: $\exists t'<t[P(e)(t')=1].\ P(e)(t)=1$

b. Compact cars are still safe; subcompacts start to get dangerous.
marginal
$[\![\text{still}]\!]^{c,g}=\lambda x.\lambda P$: $\exists y\neq x[\exists d.\ C(d)\wedge P(y)\geq d].\ \exists d.\ C(d)\wedge P(x)\geq d$.

c. Even if the doctor tells him not to, Harry will still run the marathon.
concessive
$[\![\text{still}]\!]^{c,g,w}=\lambda p\in D_{\langle s,t\rangle}.\ \lambda q\in D_{\langle s,t\rangle}$: $\max_{\leq,wc}\{w: w\in p\wedge w\in q\}<_{likely}\max_{\leq,wc}\{w: w\in\neg p\wedge w\in q\}.\ q(w)=1$.

(21) LF: [Disc [IP ... [**still**$_{(20c)}$ [IP PRES [AspP **still**$_{(20a)}$ [Asp′ ing [VP/AdjP **still**$_{(20b)}$[VP/AdjP ...]]]]]]]]

For example, the temporal reading in (20a) is obtained when *still* is attached to AspP, taking [$_{Asp'}$ John cooking] in its scope, while the marginal reading in (20b) takes DegP/AdjP in its scope. The concessive reading arises when *still* is higher up in the propositional level, affecting the assertive force of that proposition.

In this analysis, the triggered presuppositions differ accordingly: when *still* is an aspectual adverb as in (20a), the presupposition refers to the temporal ordering between two temporal arguments (t′ and t), while when it takes propositional scope, the presupposition is associated with the (unlikeliness) ordering between propositions. The first argument of *still* is assumed to be a focused phrase, and the other argument in the presupposition are alternative to that phrase. Thus, the syntactic (LF) position of the focus particle determines the type of its alternatives.

While in Ippolito (2007) the presupposed time variable (= t′ in (20a) in temporal reading is existentially bound, Beck (2016) takes that argument to be free. This is because the presupposition induced by *still* is not about just *some* time before the prejacent event, but about some specific time, yesterday, for example. The same discussion applies to the presupposition gained by *again*. The following is taken from Heim (1990), attributed originally to Kripke.

(22) a. We will have pizza on John's birthday, so we shouldn't have pizza again on Mary's birthday.

b. We will have pizza on John's birthday, so we shouldn't have pizza on

Mary's birthday.

The crucial observation is that the natural interpretation of (22a) is that John's birthday precedes Mary's, while without *again*, as in (22b), this does not have to be so. Beck (2007) argues that this is explained by the introduction of an index to *again* at LF, which is interpreted to be a free variable whose reference has to be assigned in the context by assignment function g:

(23) a. $[\![\text{again}]\!] = \lambda t'.\lambda p.\lambda t.\lambda w\text{: } p(t')(w) \wedge t' < t.\ p(t)(w)$

b. $[\![\text{PRES}\ [1\ [[\text{we have pizza again'}]\ t1]]]]^g\ (w) =$ if we have pizza at $g(t')$ in $w \wedge g(t') < t_{now}$, we have pizza at t_{now} in w.

c. $g(t') =$ John's birthday

Applying this to the temporal interpretation of *still*, we would get the following (cf. Beck 2016):

(24) a. LF: [IP [PRES [1 [still′ [t1 [AspP ing [VP John cook]]]]]]]

b. $[\![\text{still}]\!]^g = \lambda t'.\lambda t.\ \lambda p \in D_{\langle i,\ t\rangle}\text{: } t' < t \wedge p(t').\ p(t)$

c. $[\![(24a)]\!]^g =$ John cooking at t_{now} is true, defined only if $g(t') < t_{now}$ and John cooking at $g(t')$ is true.

Without an existential quantification in the presupposition, this is the most natural way to get an anaphoric interpretation of the temporal variable.

In the next section, I propose that this free variable approach should be applied to *even*-comparatives, and show that the proposed analysis explains the observation in 2.1.

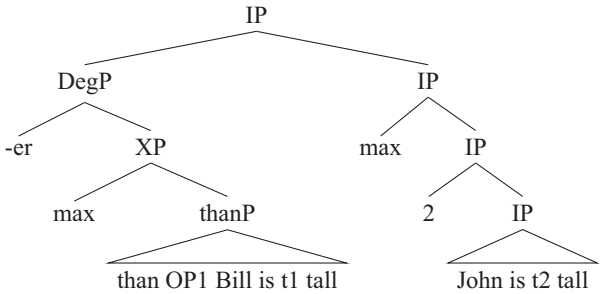
4 Proposal

4.1 Free Degree Variable Approach

Let me first present the assumptions that I make here. I assume the following LF for comparative sentences:

(25) John is taller than Bill.

a. LF:



b. ⟦-er⟧=λd.λd′. d′>d Beck (2010)

c. max(D):=ιd∈D. ∀d′∈D. d′≤d, where D is a set of degrees.
von Stechow (1984)

(25a) is quite usual except for one thing: the max-operator, whose denotation is given in (25c), is an LF object, rather than being incorporated into the semantics of the comparative morpheme as traditionally assumed. This is the proposal by Beck (2010), and I follow it.[7] Accordingly, the comparative morpheme denotes just a relation between two degrees, of type ⟨*d*, ⟨*d*,*t*⟩⟩ (= (25b)). I also assume that the semantics of gradable adjectives is a relation between degrees and individuals. The semantic computation of (25a) is as follows:

(26) a. ⟦tall⟧=λd.λx. x is d-tall

b. ⟦thanP⟧=λd. Bill is d-tall

c. ⟦XP⟧=max(λd. Bill is d-tall) (=Bill's height)

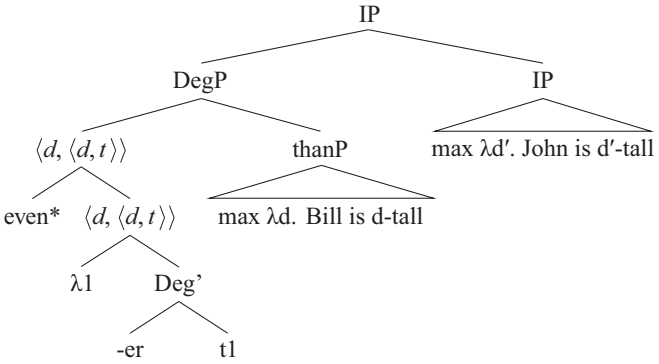
d. ⟦IP⟧=max(λd′. John is d′-tall) (=John's height)

e. ⟦(25a)⟧=max(λd′. John is d′-tall)>max(λd. Bill is d-tall)
=John's height>Bill's height

Now let us turn to *even*-comparatives. Since *even* scopes over the first degree argument of the comparative morpheme, I propose that it is situated above Deg', with abstraction of the focused material:[8]

(27) John is even taller than BILL.

a.



b. ⟦even*⟧=λd*.λD∈$D_{\langle d,\ \langle d,\ t\rangle\rangle}$.λdλd′: **D(d)(d*) <** $_{noteworthiness}$ **D(d′)(d)**. D(d′)(d).

In LF (27a), *even* bears index *, which is a syntactic reflex of a free variable. I propose that *even* has the denotation given in (27b). As in the cases of *still* and *again*, *even* takes as its first argument index *, which is to be interpreted as a free degree variable. Then it takes the comparative relation and turns it into a comparative relation with a scalar presupposition, without changing the type of the predicate. The scalar presupposition is crucially different from those we have seen above in that this free variable serves as one of the arguments of *-er*. The proposed analysis also says that *even* in *even*-comparatives does not universally quantify propositions but introduces a particular proposition into the presupposition.

The computation is given below:

(28) a. ⟦even* λ1 -er t1⟧^{g}=λd.λd′: [d′>d*]<$_{noteworthiness}$ [d′>d]. d′>d.

b. ⟦DegP⟧^{g} =λd′. [d′>d*]<$_{noteworthiness}$ [d′>Bill's height]. d′>Bill's height.

c. ⟦IP⟧^{g}=John's height>Bill's height
defined only if... [John's height>g(d*)]<$_{noteworthiness}$ [John's height >Bill's height]

In (28c), we get the scalar presupposition that says: That John's height exceeds Bill's height is more noteworthy than that John's height exceeds some relevant degree in

the context. If we follow the definition of noteworthiness in (13), this is tantamount to saying that that Bill's height exceeds some relevant degree in the context is presupposed.

4.2 Data Explained

The analysis of *even*-comparatives in the preceding section explains properties (i)-(iii) in Section 2.1.

Let us start with (ii) and (iii). In (28c), we have the following semantics:

(29) ⟦John is even taller than BILL⟧ = 1,
= John's height > Bill's height
defined only if... [John's height > g(d*)] $<_{noteworthiness}$ [John's height > Bill's height]
= Bill's height > g(d*)

When preceded by a comparative sentence, as in the following example, the most plausible candidate for d* is Chris's height:

(30) a. Bill is taller than Chris, and John is even taller than him (= Bill, *Chris).
b. Bill's height > Chris's height

Thus, this explains how a comparative sentence satisfies the presupposition of *even*-comparatives. Furthermore, just like ordinary comparatives, Bill's height > Chris's height does not ensure that Bill is tall. This explains the norm-unrelated property of the comparative presupposition.

This analysis also predicts property (iii): since the compared element is required to be taller than d*, the presupposition that "Chris's height > d*" is not satisfied in this context, when we assume "him" = Chris.

The norm-relatedness (property (i)) is also explained by assignment of reference. Let us see first how a positive adjective is related to the norm. Following von Stechow (1984), I assume that a null degree head, *pos*, maps a gradable adjective to an individual-taking predicate, and at the same time it introduces the standard degree:

(31) a. Bill is tall.
b. LF: [IP Bill [is [DegP [Deg′ pos [AP tall]]]]]
c. ⟦pos⟧ = λG∈D⟨d, et⟩.λx. ∃ d. G(x)(d) ∧ d ≥ ds
ds: the degree of standard for G in the context
d. ⟦(31a)⟧ = ∃ d. Bill is d-tall ∧ d ≥ ds

As may be seen from (31d), if there is a degree d such that Bill reaches d and exceeds ds, then the maximum degree of degrees that Bill's height reaches has to be greater than ds. This conforms to the requirement of the presupposition in (29): Bill's height has to be greater than g(d*). Thus, if g assigns d* to ds, the presupposition is satisfied.

One might wonder why and how the standard degree, ds, is ensured being accommodated when it is not explicitly stated in the context. If the standard degree has been provided by the preceding discourse, as in (4), repeated below, it is the most plausible candidate for the referent of d*.

(32) Dubai is reaching for the sky once again, *with the developer of the world's tallest building* vowing to build an even taller tower bedecked with rotating balconies and elevated landscaping inspired by the mythical hanging gardens of Babylon. (emphasis mine, *Guardian*, April 10, 2016)

When asserted out of the blue, ds is usually accommodated. In the analysis here, d* is taken to be an alternative to the compared element, and thus it should be a degree comparable to the degree of the compared element. In the case at hand, Bill's height is contrasted with other degrees on the height scale. Among these degrees, ds is considered to be more salient than other degrees on the scale unless an explicit reference to these degrees has been made, because it is the degree by which one can judge whether an individual is tall or not. Thus, without an explicit comparison, g assigns d* the standard degree, which results in the norm-relatedness.

Before moving on to the next section, I would like to mention Umbach's (2009) analysis of German *noch* 'still', and compare it with the proposal here. Umbach (2009) points out almost the same range of data in German, and proposes that *noch* in comparatives is a special case of additive use of the particle:[9)]

(33) ⟦[AP noch [AP größer]]⟧=λyλx: height(y)>d. height(x)>height(y).

What is "additive" for Umbach (2009) is the order of mention. In the following, (b) is not felicitous because only the former preserves the height order of Berta, Adam and Chris.

(34) a. Adam ist größer als Chris. Berta ist noch größer als Adam.
'Adam is taller than Chris. Berta is still taller than Adam.'
Order of mention: Adam>Chris, Berta>Adam
Height order: Berta>Adam>Chris
b. #Chris ist größer als Adam. Berta ist noch größer als Adam.
'Chris is taller than Adam. Berta is still taller than Adam.'
Order of mention: Chris>Adam, Berta>Adam
Height order: Chris, Berta>Adam

This analysis has much in common with the analysis proposed here. There are, however, several points that I am not comfortable with.[10] First of all, the additive presupposition of *even* does not help us to give the presupposition given in (33), because it must be something like "subject DP > ALT(compared element)". Second, her analysis of *noch* does not seem to extend to cases where *even* is attached to the subject DP:

(35) a. Even JOHN is taller than Bill.
b. John is not tall (short).

(35a) presupposes that (35b). Since Umbach (2009) takes *noch* in *noch*-comparatives as a case of additive use of the particle, the presupposition is just another comparison. In this case, the comparison should be made with the focused subject NP, yielding d > height(J). This result, however, cannot be obtained compositionally:

(36) a. ⟦[AP taller than Bill]⟧=λx. height(x)>height(B)
b. ⟦even⟧=λQ∈$D_{\langle e,\, t\rangle}$.λx: Q(d). Q(x)
c. ⟦[even [DegP taller than Bill]]⟧
=λx: d>height(B). height(x)>height(B)

As shown in (36c), what we would get is the presupposition that some relevant degree is greater than the height of Bill, which is not what we need.

In the analysis presented, a minimal revision would suffice to capture the fact:

(37) a. $[\![\text{even*}]\!] = \lambda d^*.\lambda D' \in D_{\langle d, t\rangle}.\lambda d$: $[D(d^*)] <_{noteworthiness} [D(d)]$. D(d)

b. [[[IP John's height [even* [λ1 [[DegP -er than Bill's height] [t1]]]]]]]
=1 iff John's height > Bill's height
defined, only if [d* > Bill's height] $<_{noteworthiness}$ [John's height > Bill's height]
= d* > John's height

Since *even* is higher than the subject DP, its type is changed accordingly. Then we would get the presupposition that d* > John's height, because that John's height is greater than Bill's is more informative than that some other degree is greater than Bill's height, and John's height has to be shorter than that degree.

Thus, the two proposals differ in that the present analysis derives the properties of *even*-comparatives from the scalar presupposition of the particle, while Umbach(2009) reduces the similar properties of *noch*-comparatives to additive use. It seems to me that Umbach's (2009) analysis would work for German *noch*, but it cannot be true for *even*-comparatives.

5 Conclusion

This paper has focused on the seemingly peculiar behaviors of *even*-comparatives: that they may be associated either with a norm-related or norm-unrelated presupposition depending on the context, and when the norm-unrelated or comparative presupposition is satisfied, the subject NP of the presupposition has to be the compared element. I argue that these are derived by the scalar presupposition induced by *even*, but their computation is not as simple as traditionally assumed. I introduce a free degree variable into the presupposition of *even*-comparatives, which may refer to the (implicit) degree of standard or an explicitly mentioned degree in the preceding discourse. This explains why we have variable presupposition in the case of *even*-comparatives.

There are remaining issues to determine that this analysis is a really viable

option for the interpretation of focus particles. If this analysis is on the right track, we also could predict that *even*-comparatives show other pronominal behaviors, such as modal subordination or other cross-sentential anaphoric dependency. I also would like to note that this analysis faces a problem, too. It is usually assumed that focus particles are quantificational, while this analysis does not rely on the quantification in the presupposition. The strong argument for the traditional quantificational analysis comes from a bound variable reading of *her* in an example like *Even Mary is taller than her mother*, where Mary is taller than her mother, Sally is taller than her mother, Beth is taller than her mother. Whether all these data can be dealt with in my analysis is left for future work.

[Notes]

1) *Still* has the same effect. I will not discuss this in this paper, but I believe almost the same analysis applies to *still*-comparatives. See König (1977) and Umbach (2009) for German *noch* 'still' in comparative sentences.
2) Bennet (1982) mentions this use of *even* and argues that it should not be identified with other uses of the particle, as that its French counterpart *même* 'even' does not contribute to comparatives in the same way as *even*. This seems to apply to German *sogar* 'even' as well, according to Umbach (2009). Thus, English may be peculiar in this regard.
3) It is well known that *even* also serves as an NPI (Karttunen and Peters 1979, among many others). In that case, the scalar implication is reversed: compare *John read even Syntactic Structures* (SS is difficult) vs. *John didn't read even Syntactic Structures* (SS is easy). *Even* in *even*-comparatives also shows this scalar reversal:

(i) If a man is not even taller than the average man, he is a fortiori not "tall". (*What? Where? When? Why?: Essays on Induction, Space and Time, Explanation*. ed. by Robert McLaughlin)

4) The scale in the scalar presupposition is usually assumed to be "unlikeliness"; the prejacent is the least likely proposition. I adopt Kay's (1990) analysis that the scalarity of *even* is ordered along the "noteworthiness" in information.
5) The definition in (10a) has to be relative to possible worlds. I omit the world variable for the sake of simplicity here.
6) I am not saying that the computation of the focus semantic value at other syntactic positions than S is not possible in the alternative semantics. Rooth (1992) assumes that the squiggle (~) operator, which computes the focus value of its argument, can be attached to any syntactic node. *Even*, in contrast to *only*, has been assumed to be a

sentential operator, maybe because unlike *only*, it can take a sentential scope in the auxiliary position (see Jackendoff 1972).

7) Beck's (2010) intention is to solve the problem of quantified expressions in *than*-clauses when combined with the max-operator. See Beck (2010) for details.

8) It might be problematic to assume focus movement, for it is well-known that the focus movement is not sensitive to island-constraints (Rooth 1985, 1992). I would like to leave this problem for future work.

9) "*height*" in the following semantic representation represents the measure function that maps individuals to the height scale. Umbach (2009) gives the semantics in (ia) to *groß* "tall", but I suspect that this should be (ib) (the Kennedy-style analysis of gradable adjectives):

(i) a. [[groß]]＝λd.λx. height(x)≥d (of type ⟨d, et⟩)
b. [[groß]]＝λx. height(x)(of type ⟨e, d⟩)

(ib) can be combined with [[-er]], resulting in the semantics given in (iib).

(ii) a. [[-er]]＝$\lambda G_{\langle x, d\rangle}$. λy. λx. G(x)＞G(y)
b. [[größer]]＝λy. λx. height(x)＞height(y)

10) Apart from the points mentioned, I doubt that the presupposition is compositionally obtained.

(i) [[noch]]＝$\lambda P_{\langle e, et\rangle}$.λy.λx: P(d)(y). P(x)(y)

(ii) [[größer]]＝λyλx. height(x)＞height(y).

Since the second argument of the presupposition is of type d, not e, [λyλx. height(x)＞height(y)](d)(y) should not be computed due to type mismatch.

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ABSTRACT

Focus Particles in Comparative Sentences

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This paper tackles the problems that are produced by what I call *even*-comparatives (e.g., *John is even taller than Bill*). *Even*-comparatives exhibit the peculiar behavior in that (i) they are accompanied by a presupposition that the compared element is norm-related when asserted out of the blue, (ii) but when preceded by a comparative, the norm-relatedness is absent, and (iii) in the case of (ii), the compared element has to be identified with the subject of the preceding comparative. I show that these properties cannot be derived from the traditional focus semantic analysis of *even*. I propose the introduction of a free degree variable as an alternative to the degree in the focused phrase in the prejacent, keeping the insight from the literature that *even* is a scalar particle that orders propositions along their noteworthiness. The properties in (i) and (ii) are explained by the variable assignment to the free degree variable, and the fixed reference problem in (iii) is solved in terms of the requirement of the most noteworthiness to the prejacent.