

What does *even* even mean?

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1. Karttunen and Peters' semantics for *even*

(Karttunen and Peters 1979, with forerunners in Horn 1969, 1971; formalization as in Rooth 1985, 1992)

(1) Mary even invited [_F Bill]

Assertion: Mary invited Bill

Presupposition (“conventional implicature”):

- **scalar:** Bill was the least likely person for Mary to invite -
- **existential:** Mary invited someone other than Bill

Alternatives: Mary invited Bill >
Mary invited Sam >
Mary invited Joe >
etc.

where ‘>’ means ‘is less likely than’

(2) **Semantics of ‘even φ ’**

Assertion: $[[\varphi]]^\circ$

Presupposition:

- **scalar:** $\forall p((p \in C \wedge p \neq [[\varphi]]^\circ) \rightarrow [[\varphi]]^\circ > p)$
(φ is the least likely alternative)
- **existential:** $\exists p(p \in C \wedge p \neq [[\varphi]]^\circ \wedge p \text{ is true})$
(at least one alternative other than φ is true)

where C = a set of contextually given alternative propositions, such that

- (i) $C \subseteq [[\varphi]]^f$
- (ii) $[[\varphi]]^o \in C$

Some questions:

- Is the scale invoked by *even* really defined in terms of likelihood?
 - unexpectedness (Fillmore 1965, as cited in Kay 1990)
 - pragmatic entailment (Fauconnier 1975a,b, 1979)
 - informativeness (Kay 1990)
 - noteworthiness (Herburger 2000)
 - ‘flexible’ scale (Giannakidou 2007)

- Is there really an existential presupposition?

Prima facie evidence for existential presupposition:

(3) #Mary even invited [_F Bill], but she didn’t invite anyone else.

Compare non-scalar additive particles (*also, too*):

(4) #Mary also invited [_F Bill], but she didn’t invite anyone else.

Potential problems for existential presupposition:

- scales with mutually exclusive alternatives
(cf. Hirschberg 1985, Horn 1972, 1989, von Stechow 1991, Krifka 1991)

- (5) a. Ik had gehoopt dat Marie de bronzen medaille zou winnen, maar ze won zelfs zilver.
b. % I had hoped that Mary would win the bronze medal, but she even won silver.
- (6) a. Hij is niet universitair docent, hij is zelfs hoofddocent.
b. % He is not (just) an assistant professor, he’s even an associate professor.

(7) Bill even danced only with [_F Sue]. (von Stechow 1991)

- contrast *also/too*:

(8) #I had hoped that Mary would win the bronze medal, but she also won silver.

(9) #He is not (just) an assistant professor, he's also an associate professor.

- absence of existential presupposition in certain contexts

(10) Come on, Chris, eat up – even little Billy finished his cereal.
(Horn 1992, p. 183, fn. 12; example attributed to Bruce Fraser)

2. *Even* in negative contexts: two theories

(12) Mary didn't even invite [_F Bill]

Assertion: Mary didn't invite Bill

Presupposition:

- **scalar:** Bill was the most likely person for Mary to invite
- **exist.:** Someone other than Bill was not invited by Mary

(12) can't be the negation of (1); negation is a presupposition 'hole'.
(Horn 1969, 1971)

• The scope theory

(e.g., Horn 1971, Karttunen and Peters 1979, Wilkinson 1996, Lahiri 1998, Guerzoni 2003, 2004, Nakanishi 2006, 2007)

- there is only one *even*
- in negative contexts, *even* can take wide scope over NPI licenser

• The NPI theory

(e.g., Rooth 1985, Rullmann 1997, Herburger 2000, Schwarz 2005, Giannakidou 2007)

- there are two *evens*, regular *even* and NPI *even*
- NPI *even* must appear in the scope of NPI licenser
- the semantics of *even*_{NPI} is as given in (13):

(13) **Semantics of ‘*even*_{NPI} φ ’**

Assertion: $[[\varphi]]^{\circ}$

Presupposition:

- **scalar:** $\forall p((p \in C \wedge p \neq [[\varphi]]^{\circ}) \rightarrow [[\varphi]]^{\circ} < p)$
(φ is the most likely alternative)
- **existential:** $\exists p(p \in C \wedge p \neq [[\varphi]]^{\circ} \wedge p \text{ is false})$
(at least one alternative other than φ is false)

3. Some arguments in favour of the NPI theory

- Many languages have (a) special form(s) for NPI *even*

(e.g., König 1991, von Stechow 1991, Hoeksema and Rullmann 2001, Schwarz 2005, Guerzoni 2003, Nakanishi 2006, Giannakidou 2007)

German: *sogar* (regular ‘even’)
einmal (NPI ‘even’ in immediate scope of negation)
auch nur (NPI ‘even’ in other contexts)

Dutch: *zelfs* (regular ‘even’)
eens (NPI ‘even’ in immediate scope of negation)
ook maar / zelfs maar (NPI ‘even’ in other contexts)

Some languages have an even richer array of *even* items.

I’m not primarily concerned here with explaining distributional differences between different forms for NPI *even*.

- The scope theory often appears to make the wrong predictions about presuppositions (Rooth 1985)

(14) The censorship committee kept John from even reading
[_F *Syntactic Structures*].

Existential presupposition predicted by scope theory: There is a book (other than *Syntactic Structures*) that the censorship committee kept John from reading.

(15) Because they had been stolen from the library, John couldn't read *The Logical Structure of Linguistic Theory* or *Cartesian Linguistics*. Because it was always checked out, he couldn't read *Current Issues in Linguistic Theory*. The censorship committee kept him from even reading [_F *Syntactic Structures*].

However, the force of this argument is not that clear: (Rullmann 1997)

(16) The censorship committee even kept John from reading [_F *Syntactic Structures*].

• Other focus particles can't freely scope over negation. (Rullmann 1997)

(17) a. John didn't even invite [_F Bill].

b. John even didn't invite [_F Bill].

(18) a. John didn't only invite [_F Bill].

b. John only didn't invite [_F Bill].

• In the scope theory, *even* would have to violate standard island constraints in order to raise over an NPI licenser; whereas in other cases such movement would have to be blocked. (Rullmann 1997)

- wide scope reading possible:

(19) They hired no/every linguist who had even read [_F *Synt. Struct.*]

- wide scope reading not possible:

(20) They hired a/the linguist who had even read [_F *Synt. Struct.*]

- wide scope reading possible:

(21) They didn't hire any linguist who had even read [_F *Synt. Struct.*]

- wide scope reading not possible:

(22) They didn't hire the linguist who had even read [_F *Synt. Struct.*]

4. Wilkinson's argument against the NPI theory

(Wilkinson 1993, 1996)

(23) I am sorry I even [_F opened] the book

Alternatives: I memorized the book >

I read the book >

I browsed through the book >

I opened the book

Existential presupposition predicted by NPI theory: at least one alternative (other than 'I opened the book') is false.

However, the sentence does not in fact presuppose that.

But scope theory also makes the wrong prediction here. (Rullmann 1997)

5. Schwarz's 'characteristic implications'

(Schwarz 2005)

• Schwarz: unlike regular 'even' (*sogar*), NPI 'even' (*einmal, auch nur*) has '**characteristic implications**' about other alternatives:

(24) Hans hat nicht einmal die [_F Bronzemedaille] gewonnen. (German)

Hans has not even_{NPI} the bronze medal won

'Hans did not even win the [_F bronze] medal.'

Characteristic implication: Hans didn't win silver or gold

(25) Keiner von uns hat auch nur die [_F Bronzemedaille] gewonnen.

None of us has even_{NPI} the bronze medal won

'None of us even won the [_F bronze] medal'

Characteristic implication: None of us won silver or gold

However, regular 'even' (*sogar*) does not have corresponding characteristic implications:

(26) Hans hat sogar die [_F Silbermedaille] gewonnen.

Hans has even the silver medal won

‘Hans even won the silver medal’

Does not imply: Hans won bronze

Also does not imply: Hans won gold

- Schwarz argues that characteristic implications are part of the assertion, i.e. not presuppositions or conventional implicatures.

(27) Es ist möglich, dass Hans nicht einmal die [_F Bronzemedaille]

It is possible that Hans not even_{NPI} the bronze medal

gewonnen hat.

won has

‘It is possible that Hans didn’t even win the bronze medal’

Characteristic implication: It is possible for Hans not to have won silver or gold (**not:** Hans didn’t win silver or gold)

- **Schwarz’s proposal:**

(28) ‘*einmal/auch nur* φ ’ is true iff $\exists p(C(p) \wedge p \geq [[\varphi]]^o \wedge p \text{ is true})$

When *einmal/auch nur* is in scope of negation, the sentence ends up entailing that neither φ itself nor any of the alternatives ranked above φ is true.

6. Some problems for characteristic implications

- When regular *even* has scope over negation it has the same characteristic implications as NPI *even*:

(29) Hans heeft niet eens de bronzen medaille gewonnen. (Dutch)

Hans has not even_{NPI} the bronze medal won

‘Hans didn’t even win the bronze medal’

- (30) a. Hans heeft zelfs niet de bronzen medaille gewonnen.
Hans has even not the bronze medal won
'Hans even didn't win the bronze medal'
- b. Hans heeft zelfs de bronzen medaille niet gewonnen.
Hans has even the bronze medal not won
'Hans even didn't win the bronze medal'

• Moreover, there do appear to be characteristic implications also in positive cases, as long as the alternatives are not mutually exclusive:

(31) Hans even won the last game.

Alternatives: Hans won the last game >
Hans won the next-to-last game >
Hans won the second-to-last game >
etc.

(32) strongly suggests that Hans won all (or most?) previous games.

Note: it's often hard to determine whether the implication applies to all, most, or just some of the alternatives, because it's usually not clear exactly what the set of alternatives in a given context is.

• Also, for the negative case, characteristic implications are not always universal either:

(33) Hans didn't even win the last game.

(34) Hans won the first game, but then he lost the next three. He didn't even win the fifth and last game, against a very weak opponent.

(35) Mary even invited Bill.

(36) Mary didn't even invite Bill.

So maybe Schwarz's characteristic implications are just Karttunen and Peters' existential presupposition/implicature generalized to all or most alternatives?

- Characteristic implications are absent in cases where the alternatives are mutually exclusive....

(37) Hans even won the gold medal.

Alternatives: Hans won the gold medal >
Hans won the silver medal >
Hans won the bronze medal

(No implication that Hans won silver or bronze.)

- but then they do appear if the same predicates are used in negative contexts:

(38) Hans {even didn't / didn't even} win the bronze medal

Alternatives: Hans didn't win the bronze medal >
Hans didn't win the silver medal >
Hans didn't win the gold medal

Characteristic implication: Hans didn't win silver or gold

- **Hypothesis:** the reason why (38) has characteristic implications is that the alternatives are no longer mutually exclusive due to the presence of negation.

- **Interim conclusions:**

- Presence or absence of characteristic implications does not depend on regular *even* vs. NPI *even*.
- For some reason, characteristic implications disappear when they would otherwise result in inconsistency due to mutually exclusive alternatives.
- Maybe Schwarz's characteristic implications are really just a generalized version of Karttunen and Peters' existential presuppositions/conventional implicatures.

- Schwarz also makes the wrong predictions about the Wilkinson examples (as he acknowledges):

(39) I am surprised that Hans even won the [_F bronze] medal.

Predicted presupposition: Hans won bronze or silver or gold
(too weak!)

7. Scalar inferences

- **Basic idea:** try to explain any implications about alternatives in terms of the scalar presupposition of *even* in combination with the asserted content of the sentence.

(cf. Horn 1992, p. 183, fn. 12)

Suppose we have the following contextual ranking of alternatives:

- (40) Mary invited Bill >
Mary invited Sam >
Mary invited Joe >

Regular *even*: positive top-down scalar inference

(41) Mary even invited Bill

Scalar inference: Mary also invited Sam and Joe

NPI *even*: negative bottom-up scalar inference

(42) Mary didn't even_{NPI} invite Joe

Scalar inference: Mary didn't invite Sam and Bill either

But what exactly are such scalar inferences based on?

If *p* is less likely than *q*, and *p* is true, then it does not automatically follow that *q* is also true.

Sometimes, unlikely events happen and likely events do not happen. Similar objections apply to other notions such as unexpectedness or noteworthiness.

• Proposal

(in spirit of pragmatic approaches by people like Horn 1972, 1989; Ducrot 1973[1980], Anscombe and Ducrot 1983; Fauconnier 1975a,b, 1979; Hirschberg 1985; Kay 1990; Israel 1996; for related ideas in the formal semantics tradition, see also Krifka 1995, Giannakidou 2007, among others)

- *Even* ranks the alternatives by correlating them with a graded property which is salient in the context.

- Regular *even* is associated with the top of the scale and NPI *even* with the bottom (**absolute even**).

Alternatively: Regular *even* is associated with an element that ranks higher on the scale than some contextually salient alternative; and NPI *even* with one that ranks lower (**relative even**).

See Rullmann and Hoeksema 1997, Hoeksema and Rullmann 2001, Schwenter 2003 for evidence that some language seem to make a lexical distinction between relative *even* and absolute *even*.

- *Even* is used to claim that the associated graded property holds to an extreme degree (very high or very low).

Alternatively: to a degree that is higher/lower than what was previously believed.

- Another crucial aspect of the meaning of *even* is that it must give rise to scalar inferences of some sort.

• Some examples:

Kay 1990:

(43) A: It looks as if Mary is doing well at Consolidated Widget.

George [the second vice president] likes her work.

B: That's nothing. Even Bill [the president] likes her work.

Alternatives:

president likes M's work >
vice-president likes M's work >
2nd vice president likes M's work >
etc.

Associated graded property:

high degree of success at CW



low degree of success at CW

(44) Mary is a very social person. She even gets along with Bill.

Associated property: Mary's degree of "socialness"

(45) I had hoped that Mary would win the bronze medal in the 1000m event, but she even won silver.

Associated property: Mary's degree of success in the 1000m

• **Explanation of apparent existential presuppositions:**

(46) Mary even gets along with [_F Bill].

(context: Bill is hard to get along with)

The point of (46) is to argue (say) that Mary is a very social person. The fact that she can get along with Bill is presented as an argument to support that claim, because Bill is the hardest person to get along with (in a set of contextually salient people). However, if Bill is the **only** person Mary gets along with, we would not in fact be justified in saying that she is very social.

In general, if alternatives $p_1 \dots p_n$ are correlated with some graded property q (with p_1 being the strongest argument for q and p_n the weakest), then in most circumstances it would not be reasonable to argue that q holds to a high degree, if p_1 is true, but $p_2 \dots p_n$ are not.

(47) Mary doesn't even get along with [_F Bill].

(context: Bill is easy to get along with)

Explanation is parallel to (46), except that now the inference is bottom-up.

• **Explanation of lack of existential presuppositions or characteristic implications with mutually exclusive alternatives:**

(48) Mary even won the [_F gold] medal.

Alternatives:

Mary won gold

Mary won silver

Mary won bronze

Associated graded property:

high degree of success



low degree of success

The point of (48) is to argue that Mary had a very high degree of success in the race, in fact the highest possible degree, a gold medal. World knowledge tells us that you can't win gold as well as silver or bronze at the same time, but that's not a problem because just winning gold by itself is the highest level of achievement.

• **Explanation of appearance of characteristic implications in negative contexts:**

(49) Mary didn't even_{NPI} win the [_F bronze] medal.

The point of (49) is to argue that Mary did not have even the lowest degree of (medal-worthy) success in the race. This is incompatible with winning gold or silver.

Note that exactly the same point applies when *even* outscopes negation, due to scale-reversal:

(50) Mary even didn't win the [_F bronze] medal.

Alternatives:

Mary didn't win bronze
Mary didn't win silver
Mary didn't win gold

Associated graded property:

high degree of failure
↑
low degree of failure

• **Explanation of the Wilkinson example:**

(51) I'm sorry I even_{NPI} [_F opened] the book

Alternatives:

I memorized the book
I read the book
I browsed through the book
I opened the book

Associated graded property:

high degree of familiarity
↓
low degree of familiarity

Because *be sorry* is factive, (51) presupposes that the speaker did in fact open the book, i.e., the alternative on the bottom of the scale is **true**. This is perfectly compatible with doing other things with the book as well. Hence, no “upward” scalar inference about the truth value of the higher-ranking alternatives is licensed.

Contrast this with:

(52) I didn't even [_F open] the book.

This asserts that the bottom alternative is **false**, which leads to the scalar inference that the higher-ranked alternatives are false as well.

However, (51) does license other kinds of scalar inferences.

For instance: if the speaker did activity X with the book, and X entails a higher degree of familiarity with the book than just opening it, then the speaker is also sorry about doing X.

Cf. 'Strawson downward entailment' (von Stechow 1999)

8. The scope of *even* revisited

8.1 Does *even* even have scope?

- alternatives calculated "locally" (at the level of the minimal clause containing *even*)
- scalar inferences may be calculated at any level, including "globally" (at the sentence level)

(53) I don't think he's even an [_F assistant] professor

Alternatives: He is a full professor >

He is an associate professor >

He is an assistant professor

Scalar inferences: I don't think he is an associate professor

I don't think he is a full professor

- Some advantages:

- No LF raising of *even* needs to be stipulated
- Avoiding problems with island violations
- At the same time we capture the near-equivalence between (53) and (54):

(54) I even don't think he's an [_F assistant] professor

Alternatives: I don't think he is an assistant professor >
I don't think he is an associate professor >
I don't think he's a full professor

Scalar inferences: I don't think he is an associate professor
I don't think he is a full professor

8.2 Explaining the polarity sensitivity of *even*-items

- Dedicated NPI *even* forms (e.g., German *auch nur*, Dutch *zelfs maar / ook maar*) can only be associated with the bottom end of the scale.
- Scalar inferences are therefore only possible if NPI *even* occurs in the scope of a downward entailing (= scale reversing) element.

(55) * Hij heeft zelfs maar [_F één] kind
He has even_{NPI} one child

Alternatives:

⋮

He has three children >
He has two children >
He has one child

Scalar inferences: none

(56) Ik denk niet dat hij zelfs maar [_F één] kind heeft
I think not that he even_{NPI} one child has
'I don't think he has even one child'

Alternatives: as in (55)

Scalar inferences: I don't think he has two children
I don't think he has three children
etc.

- **Semi-compositionality** of *zelfs maar* (and to a lesser extent *ook maar* and *auch nur*): *zelfs* ‘even’ by itself is unspecified for which end of the scale it associates with, but *maar* ‘only, just’ disambiguates it because it can only refer to the bottom end of the scale. This would explain the fact that NPI *even* in many languages is a particle cluster consisting of an additive particle (‘even’, ‘also’) plus an exclusive particle (‘only’, ‘just’) (e.g., Italian *anche solo*, Japanese *dake demo*). Cf. Guerzoni 2003, Nakanishi 2006. Their account relies on LF movement of the additive particle above negation, whereas the exclusive particle remains in the scope of negation. Note however that there is a certain conceptual similarity between the two theories in that both explain the distribution of NPI *even* in terms of the interplay between conflicting constraints applying at a ‘local’ and at a ‘global’ level.

8.3 Re-unifying the two *evens*

- English unitary *even* can be associated with either end of the scale.
- Potential ambiguity of *even* in downward entailing contexts is neither a lexical ambiguity nor a scope ambiguity, but is due to the fact that *even* is lexically unspecified as to which end of the scale it associates with:

(57) I wonder whether he has even heard of [_F Leonard Bloomfield]

Context for bottom-of-scale reading: *He claims he knows a lot about the history of American linguistics, but wonder whether he has even heard of Leonard Bloomfield.*

Context for top-of-scale reading: *For a psychology major he knows a lot about linguistics. The other day he was talking about people like Chomsky, Pinker, and Lakoff, but I wonder whether he has even heard of Leonard Bloomfield.*

- For the bottom-of-scale reading, scalar inferences are drawn at the matrix level (i.e., a level that includes the downward entailing operator)

- For the top-of-scale reading, scalar inferences are drawn at the level of the embedded clause (i.e., a level that does not include the downward entailing operator)
- In positive context, only top-of-scale reading is possible, because otherwise no scalar inferences can be drawn:
(58) He has even heard of Leonard Bloomfield
(59) # He even has [_F one] child

9. Some speculations on the typology of *even*-items

- My explanation of the polarity sensitivity of *even* is very similar to some earlier analyses of polarity in terms of two interacting lexical semantic properties.
- Kadmon and Landman 1993: **widening** and **strengthening**
Any is licensed iff widening the denotation of the common noun leads to a strengthening of the overall statement
Note: widening is “local”, strengthening is “global”
- Israel 1996: **quantitative value** vs. **informative value**
q-value: high or low
i-value: emphatic or understating

Table 1: Israel’s four-way typology of polarity items

		i-value	
		emphatic	understating
q-value	high	<i>scads, totally, as hell, far Xer</i> (PPIs)	<i>much, long, any too, all that</i> (NPIs)
	low	<i>a drop, a wink, so much as, at all</i> (NPIs)	<i>a little bit, sorta, rather, a tad</i> (PPIs)

- Giannakidou 2007: **scalar vs. existential presupposition**
scalar presupposition: top-of-scale vs. bottom-of-scale
existential presupposition: positive vs. negative

Table 2: Giannakidou’s four-way typology of Greek *even*-items:

		existential presupposition	
		positive	negative
scalar presupp.	top*	<i>akomi ke</i>	<i>esto</i>
	bottom*	<i>kan</i>	<i>oute (kan)</i>

* Note: Giannakidou’s own terminology is actually the reverse: what I call the top of the scale, she calls the bottom, and vice versa.

- In my analysis, apparent existential presupposition effects associated with *even* are derived from the scalar presupposition. Hence, the existential presupposition cannot be lexically specified for a given item as either positive or negative.
- Giannakidou’s discussion brings the interesting item *esto* into the discussion, which sometimes translates into English as ‘even’ and sometimes as ‘at least’. This raises the further question if any other scalar items belong in the same paradigm of *even*-items.
- If my analysis is correct, the typology of *even*-items might be expected to be analogous to Israel’s classification.

Table 3: Tentative alternative typology of *even*-items

		global scalar inferences?	
		yes ('emphatic')	no ('understating')
local scalar value	top	Eng <i>even, as much as</i> Ger <i>sogar</i> Du <i>zelfs</i> (Gr <i>akomi ke</i> ?) (Jap <i>mo, demo</i> ?)	???
	bottom	Eng <i>even, so much as</i> Ger <i>auch nur, einmal</i> Du <i>ook/zelfs maar, eens</i> (Gr <i>kan, oute (kan)</i> ?) (Gr <i>esto</i> ?) (Jap <i>dake demo</i> ?)	Eng <i>at least</i> Du <i>tenminste</i> (Gr <i>esto</i> ?)

- Possibly, Gr *esto* should occur in both the lower left-hand and the lower right-hand cell (in other words, maybe it is a low scalar item that is unspecified as to whether it is 'emphatic' or 'understating').

- Additional constraints on distribution of individual items, e.g.:

- Ger *einmal* and Du *eens* only in immediate scope of negation
- Gr *oute (kan)* only in scope of antiverdical operators (Giannakidou 2007)
- Gr *esto* only in non-veridical contexts (?) (Giannakidou 2007)
- Jap *dake demo* cannot occur in scope of negation (?) (Nakanishi 2006)

Cf. van der Wouden 1997 and Giannakidou 1998 for similar "idiosyncratic" restrictions on other NPIs.

- Also blocking effects: Ger *auch nur* and Du *ook maar / zelfs maar* blocked from occurring in immediate scope of negation

- Are there any items that belong in the upper right-hand cell; i.e. *even*-items that are high-scalar understaters? These should be NPIs. The following items have been suggested to me for this cell: Eng *necessarily*, Ger *unbedingt*, Du *per se*, and Gr *aparetita*.

Øystein Nilsen, Berit Gehrke, Henriëtte de Swart, Rick Nouwen, Giorgos Spathas, Alexis Dimtriadis, p.c.

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