

## More About *At Least*

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### Goal of this talk:

Comparing *at least* to another scalar particle, *even*

### Outline:

1. Summary of CLA talk (epistemic vs. concessive *at least*)
2. Some background on *even*
3. Similarities and differences between *at least* and *even*
4. Cross-linguistic evidence for the relatedness of *at least* and *even*
5. Towards an explanation of the differences
6. A tentative proposal
7. Conclusion and outlook

## 1. Epistemic *At Least* vs. Concessive *At Least*

(Summary of CLA talk)

## Epistemic vs. Concessive *At Least*

### Epistemic *at least*

(Krifka 1999, Geurts and Nouwen 2007, Büring 2008)

- (1) Mary wrote *at least* four novels.  
= *The speaker is uncertain about exactly how many novels Mary wrote*
- (2) Mary won *at least* a silver medal.

### Concessive *at least*

- (3) Mary didn't win a gold medal,  
but *at least* she won a silver medal.  
= *Although winning a silver medal is less preferable than winning a gold medal, a silver medal is satisfactory*

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## Epistemic *at least*

(Based on Krifka 1999, Geurts and Nouwen 2007, Büring 2008)

### Truth conditions

$\exists q \in C[q \geq p \wedge q(w)=1]$

“there is a proposition *q* which ranks higher than or as high as the target proposition *p* and which is true”

### Conventional implicature

$\exists w' [Epist(w, w') \wedge \exists q \in C[q > p \wedge q(w')=1]]$

“it is epistemically possible that some proposition *q* that ranks higher than *p* is true”

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## Concessive *at least*

### Truth conditions

$p(w)=1$

“The target proposition *p* is true”

### Conventional implicatures

i.  $\forall r, r' \in C[r > r' \leftrightarrow r \text{ is preferred to } r']$

“The scalar ranking reflects a preference ranking”

ii.  $\exists q \in C[q > p]$

“There is a proposition *q* that ranks higher than *p*”

iii.  $\exists q \in C[q < p]$

“There is a proposition *q* that ranks lower than *p*”

→ *p* is better than some other alternatives but not the best (“settle for less”)

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## 2. Some Background on *Even*

## Even and Polarity

### • “Positive” contexts

- (4) She has *even* read *Syntactic Structures*.  
– top of the scale (hardest / least likely)

### • “Negative” contexts

- (5) She hasn't *even* read *Syntactic Structures*.  
– bottom of scale (easiest / most likely)

### • Ambiguity in some cases:

- (6) I doubt that she has *even* read *Syntactic Structures*.

## Two Theories of *Even*

- **Scope theory** (Karttunen and Peters 1979, Wilkinson 1996, Guerzoni 2003, Nakanishi 2006)
  - one *even*
  - interaction with polarity is due to scope
  - in “negative” contexts, *even* can take scope over DE operator (which causes scale reversal)
- **NPI theory** (Rooth 1985, Rullmann 1997, Herburger 2003, Giannakidou 2007)
  - two *evens*: “regular” *even* and NPI *even*
  - “regular” *even* is associated with top of scale
  - NPI *even* is associated with bottom of scale
  - NPI *even* has to be in the scope of DE operator

## Lexical Differentiation

- Many languages use different lexical items
  - Dutch
    - regular *even* = **zelfs**
    - NPI *even* = **zelfs maar**
- (7) Hij heeft **zelfs** alle vragen goed beantwoord.  
'He even answered all questions correctly.'
- (8) Ik denk niet dat hij **zelfs maar** een vraag goed beantwoord heeft.  
'I don't think he even answered one question correctly.'

## 3. Similarities and Differences between *At Least* and NPI *Even*

## Synonymy?

- *At least* often seems to be interchangeable with NPI *even*:
- (9) Did I answer **at least** / **even** one question correctly?
- (10) If you answer **at least** / **even** one question correctly, you'll pass.
- Both *at least* and NPI *even* are associated with the bottom end of a scale.
  - But there are some (sometimes subtle) differences.

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## Polarity

- **NPI even is an NPI** (well, duh!)

(11) He didn't answer **even** one question.  
 (12) \* He answered **even** one question.

- **At least is a PPI**

(13) He answered **at least** one question.  
 (14) \* He didn't answer **at least** one question.  
 but OK  
 - if *at least one question* takes wide scope  
 - as 'echo' negation (Baker 1970, Seuren 1976)

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## Biased Questions

### Positive bias:

(15) Did I answer **at least** one question correctly?

### Negative bias:

(16) Did I answer **even** one question correctly?

- **Cf. Some vs. Any** (Lakoff 1969)

### Positive bias:

(17) Did I answer **some** questions correctly?

### Negative bias:

(18) Did I answer **any** questions correctly?

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## Conditionals: Promises vs. Threats

### Threat:

(19) If you make **even** one mistake, I'll break your legs.  
 (20) # If you make **at least** one mistake, I'll break your legs.

### Promise:

(20) If you answer **at least** one question correctly, I'll give you an A.  
 (21) If you answer **even** one question correctly, I'll give you an A.

- **Cf. Some vs. Any:**

### Threat:

(22) If you make **any/#some** mistakes, I'll break your legs.

### Promise:

(23) If you answer **any/some** questions correctly, I'll give you an A.

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## 4. Crosslinguistic Evidence for the Relatedness of *At Least* and *Even*

## Dutch, Japanese and Greek

- **Dutch:** *zelfs maar* = NPI 'even'  
lit. even only
- **Japanese:** *-dake-demo* = 'at least'  
lit. only even
- **Greek** *esto* is sometimes translated as 'even'  
and sometimes as 'at least' (Giannikidou 2007)

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## Dutch *zelfs maar*

- ***zelfs*** (= regular 'even')
  - top end of a scale
  - occurs in "positive" contexts

(24) Hij heeft *zelfs* zeven vragen goed beantwoord.  
'He even answered seven questions correctly.'

- ***zelfs maar*** (= NPI 'even')
  - lower end of a scale
  - occurs in NPI licensing contexts

(25) Ik denk niet dat hij *zelfs maar* een vraag goed beantwoord heeft  
'I don't think he even answered one question correctly'

(26) Heeft hij *zelfs maar* een vraag goed beantwoord?  
'Did he even answer one question correctly?'

(27) Als je *zelfs maar* een vraag goed beantwoordt, slaag je.  
'If you answer even one question correctly, you'll pass'

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## Japanese *-dake-demo*

- **Imperatives**

(28) Aisu-*dake-demo* tabe-nasai.  
'Eat at least the ice cream.'
- **Questions**

(29) Aisu-*dake-demo* tabe-ta? (positive bias)  
'Did you eat at least the ice cream?'
- **Conditionals**

(30) **Promise** Iti-mon-*dake-demo* seikaisita-ra, gookaku-suru-daroo.  
'If you answer at least one question correctly, you'll pass.'  
**Threat** # Iti-mon-*dake-demo* matigaeta-ra, asi-o oru-zo.  
'If you make at least one mistake, I'll break your legs.'

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## Greek *esto* (from Giannakidou 2007)

- **Imperatives**

(31) Fae *esto* to pagoto.  
'Eat at least the ice cream.'
- **Questions**

(32) Efajes *esto* to pagoto?  
'Did you eat at least the ice cream?'
- **Modals**

(33) *Esto ke* ena atomo bori na sikosi afto to trapezi.  
'Even one person can lift this table.'

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## 5. Towards an Explanation of the Differences

## Preference Ranking?

- **Concessive** *at least*

Conventional implicature about preference ranking:

$\forall r, r' \in C [r > r' \leftrightarrow r \text{ is preferred to } r']$

(34) If you **at least** mow the lawn, I'll give you your allowance.

(35) #If you **at least** fail your math test, you'll be grounded.

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- Does this explanation carry over to **epistemic** *at least*?
- Problem: epistemic *at least* doesn't impose a preference ranking (at least not in simple sentences)

A union member can say:

(36) The manager fired **at least** two workers.

But still, (37) is odd as a threat (but judgements vary!):

(37) ?#If you fire **at least** two workers, we'll go on strike.

Dutch *minstens* – only epistemic

(38) #Als je **minstens** twee arbeiders ontslaat, gaan we staken.

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## Positive Polarity?

- Positive bias has been observed for PPIs generally (Lakoff 1969)

(39) If you make **any** / **#some** mistakes, I'll break your legs.

- Both epistemic and concessive *at least* are PPIs

**Clausemate negation:**

**Epistemic:** \*He didn't answer **at least** one question.

**Concessive:** N/A

**Matrix negation:**

**Epistemic:** \*I don't think he answered **at least** one question.

**Concessive:** \*I don't think Mary **at least** won a silver medal.

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- For **epistemic** *at least*, positive polarity follows from the epistemic uncertainty implicature:

$$\exists w'[\text{Epist}(w, w') \wedge \exists q \in C[q > p \wedge q(w') = 1]]$$

"it is epistemically possible that some proposition *q* that ranks higher than *p* is true"

- (40) \* He didn't answer **at least** one question.  
LF: not [at least [he answered one question]]

- Conventional implicature not affected by negation.
- So (40) conventionally implicates that it is epistemically possible that he answered more than one question.
- But (40) asserts that he didn't answer any questions.
- Conflict between conventional implicature and assertion.

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- But this explanation does not carry over to **concessive** *at least*.
- Maybe concessive *at least* is a speech act operator, and therefore resists embedding under logical operators like negation?
- But positive bias effect also occurs with concessive *at least* in questions and conditionals (where it IS embedded)

- (41) Could you **at least** take out the garbage?

- (42) I know you're not going to clean the whole house,  
but if you **at least** take out the garbage, I'll give you  
your allowance.

- Moreover, we don't really know WHY PPIs cause the positive bias effect.

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## 6. A Tentative (and Way Too Informal) Proposal

- Hypothesis:** *at least* and NPI *even* differ in whether the target proposition *p* represents the lowest value on the scale or not.

*At least:*  $\exists q \in C[q < p]$

*Even:*  $\neg \exists q \in C[q < p]$

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- With *at least* the target proposition can't be the bottom element of the scale.
- **Concessive *at least***: This is part of the conventional implicature.
  - iii.  $\exists q \in C[q < p]$   
"There is a proposition q that ranks lower than p"
- **Epistemic *at least***: If the target proposition is at the bottom of the scale, the truth conditions make the statement uninformative.  
Truth conditions:  $\exists q \in C[q \geq p \wedge q(w)=1]$   
"there is a proposition q which ranks higher than or as high as the target proposition p and which is true"

- NPI *even* implicates that the target value is the **lowest** of all the relevant possibilities.

(43) Is Mary **even** an assistant professor?  
assistant prof < associate prof < full prof

- *At least* implicates that the target value is **not the lowest** of all the relevant possibilities.

(44) Is Mary **at least** an assistant professor?  
postdoc < assistant prof < associate prof < full prof

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Similarly:

(45) Did you answer **even** one question?  
one < two < three < ...

(46) Did you answer **at least** one question?  
zero < one < two < three < ...

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### Kadmon & Landman 1993 on *Any*

- *Any* **widens** the denotation of the noun.
- This widening has to result in a **strengthening** of the overall proposition.
- "Widening by strengthening" is only possible in a downward entailing context.
- This explains the NPI behaviour of *any*.

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## Scales and Widening/Narrowing

- NPI *even* **includes** the lowest value of the scale, thereby causing a **widening** effect (just like *any*).



- At least* **excludes** the lowest value on the scale, which results in a **narrowing** effect.



- Assume that both *at least* and *even* must result in strengthening of the overall proposition.

→ NPI *even* only occurs in **downward entailing** contexts.

→ *at least* only occurs in **upward entailing** contexts.

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## Bias in Questions

(47) Is he **even** an assistant professor?

- By widening the scale, the speaker **raises** the chance of getting a positive answer (Krifka 1995: "lowering the threshold").
- This conversationally implicates that the speaker expects the answer to be negative.

(48) Is he **at least** an assistant professor?

- By narrowing the scale, the speaker **lowers** the chance of getting a positive answer ("raising the threshold").
- This conversationally implicates that the speaker expects the answer to be positive.

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## Krifka 1995 on Bias in Questions

- In **rhetorical questions**, the speaker tries to lower the threshold for a positive answer, showing that he is certain that the answer would be negative. For example, in *Did Mary ever lift a finger to help you?* the speaker wants to demonstrate how certain he is that Mary didn't help you at all by making the condition for a positive answer as weak as possible.
- In **information questions**, the speaker intends to construct the question in such a way that every suggested answer would be roughly yield the same amount of information increase. The principle can be illustrated by a game where one player draws a card from a deck of cards and the other has to guess it with as few questions as possible. It would be uneconomical to start with guesses like "Is it the seven of diamonds?"; it is better to start with questions like "Is it a seven?", or "Is it diamonds?". A question like *Have you ever been to China?* indicates that the speaker has a reason to prefer the more general state question over any alternative, presumably because his information state is such that he expects a better overall information gain from an answer to the more general question.

(Krifka 1995, p. 253)

## Promises vs. Threats

- Promise:** incentive to move **upward** on the scale.

(49) If you answer **at least** one question correctly, I'll give you a cookie.

- Threat:** incentive to move **downward** on the scale.

(50) If you make **even** one mistake, I'll break your legs.

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## 7. Conclusion and Further Questions

- Can this idea be formalized?
- Why the asymmetry between *at least* and *even*? (*at least* incompatible with threats, but *even* can be used in both promises and threats)
- What about regular *even*?
- How to deal with crosslinguistic data (e.g., *zelfs maar* vs. *-dake-demo*)? Is a compositional analysis of such particle combinations possible?<sup>37</sup>

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