ON COMPOSITIONALITY OF *EVEN*: A CASE STUDY OF GERMAN *AUCH NUR*[*]

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The focus particle *even* triggers different presuppositions depending on where it appears. For instance, *even* in (1a) signals that the focused element *Syntactic Structures* (*SS*) is the least likely book for Al to read, while the opposite presupposition obtains in (1b), that is, *SS* is the most likely book for Al to read.

(1) a. Al **even** read [*Syntactic Structures*]$_F$.
     b. Al didn't **even** read [*Syntactic Structures*]$_F$.

Two theories have been proposed to explain the ambiguity in (1). The scope theory posits scope interaction between *even* and other scope-bearing elements, whereas the lexical theory posits two lexical entries for *even*, namely, regular *even* and negative polarity *even* (henceforth NPI *even*) (see section 1 for details). The lexical theory is often supported by the fact that some languages lexically disambiguate the two readings in (1). For instance, German has two lexical items that correspond to English *even*, namely, *sogar* and *auch nur*: *sogar* is used to express the the-least likely reading, while *auch nur* is used for the most-likely reading (König 1991, von Stechow 1991, Guerzoni 2003, Schwarz 2005).

(2) a. Hans   hat   {**sogar** / *auch nur} [*Syntactic Structures*]$_F$ gelesen.
         Hans   has   {even / even}   *Syntactic Structures*   read
         'Hans even read *Syntactic Structures*.'

     b. Niemand hat   {*sogar / **auch nur}**[*Syntactic Structures*]$_F$ gelesen.
         nobody has   { even / even}   *Syntactic Structures*   read
         'Nobody even read *Syntactic Structures*.'

The goal of this short paper is to point out that a compositional treatment may be required to account for the semantics of *auch nur*, which literally means 'also only'. I first show that *auch nur* cannot simply be treated as a wide scope *even* or an NPI *even* by presenting both old and novel data (sections 2-3). I then introduce Guerzoni's (2003) compositional analysis of *auch nur*, and point out problems of her analysis (section 4). I show that a refined compositional analysis may be capable of accounting for the data that are problematic to Guerzoni's analysis (section 5).

1. The scope vs. lexical theory of *even*

Even is truth-conditionally vacuous, but it introduces the scalar presupposition (ScalarP) in (3) (assuming that *even* is a sentential operator) (Karttunen and Peters 1979).[1] The value for the domain of quantification C is a subset of the set of propositions obtained by replacing the focused element with the elements of the same type (Rooth 1985, 1992). The proposition p that *even* combines with is referred to as a target proposition. The LF of (1a) is provided in (4a): *even* combines with C given in (4b) and the target proposition p 'that Al read *SS*', which yields the ScalarP in (4c).

(3) $[\![even]\!]^{w}$(C)(p) presupposes that p is the <u>least</u> likely proposition in C

(4)   a.   LF: **even** C [Al read [*SS*]$_F$]
        b.   C $\subseteq$ {Al read *SS*, Al read *LGB*, Al read *Barriers*, …}
        c.   'that Al read *SS*' is the <u>least</u> likely in C

In (1b), the scope theory assumes that *even* scopes over negation, as in (5a) (Karttunen and Peters 1979, Wilkinson 1996, Guerzoni 2003, Nakanishi 2008). Then the alternatives include negative propositions, as in (5b), and we obtain the ScalarP in (5c), from which we can infer that *SS* is the most likely book for Al to read. In contrast, the lexical theory claims that *even* in (1b) is an NPI *even* that evokes the ScalarP in (6) (Rooth 1985, von Stechow 1991, Rullmann 1997, Herburger 2003, Giannakidou 2007). The LF of (1b) is given in (7a): the NPI *even* is licensed under negation, and it evokes the ScalarP in (7b). C in (7) is the same as C in (5b) since *even* in both (7a) and (5a) combines with 'that Al read *SS*'.

(5)   a.   LF: **even** C [not [Al read [*SS*]$_F$]]
        b.   C $\subseteq$ {Al didn't read *SS*, Al didn't read *LGB*, Al didn't read ...}
        c.   'that Al didn't read *SS*' is the <u>least</u> likely in C

(6) $[\![even_{NPI}]\!]^{w}$(C)(p) presupposes that p is the <u>most</u> likely proposition in C

(7)   a.   LF: not [**even$_{NPI}$** C [Al read [*SS*]$_F$]]
        b.   'that Al read *SS*' is the <u>most</u> likely proposition in C

Ambiguity arises when *even* is in downward-entailing (DE) contexts, i.e., contexts that reverse an entailment (e.g., a restrictor of *every* in (8)).[2] Under both

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[1]   It has been argued that *even* also introduces the existential presupposition in (i). I ignore this presupposition since the main focus here is the ScalarP.
      (i)   there is q (q ≠ p) in C that is true
[2]   Negative sentences are DE, but *even* there only has the most-likely reading. Both the scope and lexical theory must posit some constraint to account for this restriction.

scope and lexical theories, the least-likely reading in (8) obtains from the regular *even* that combines with the embedded proposition.

(8)   They hired every linguist who had **even** read [*SS*]$_F$.   (Rullmann 1997: 49)

Under the scope theory, the most-likely reading obtains with the wide scope *even* in (9a). *Even* in (9a) triggers the ScalarP in (9b), from which we can infer that *SS* is a commonly read book. Under the lexical theory, the most-likely reading obtains with the NPI *even* that appears in the scope of a DE expression, as in (10a). I put aside a complication that the target proposition contains a trace that needs to be bound from outside, and assume that the trace is interpreted as *every linguist* (see Heim 1983, Beaver 2001). Then we obtain the ScalarP in (10b) that *SS* is the most likely to be read by every linguist.

(9)   a.   LF: **even** C [they hired every linguist who had read [*SS*]$_F$]
        b.   'that they hired every linguist who had read *SS*' is the <u>least</u> likely proposition in C ('that they hired every linguist who had read x')

(10)   a.   LF: they hired every linguist who$_1$ [**even**$_{NPI}$ C [t$_1$ read [*SS*]$_F$]]
        b.   'that every linguist had read *SS*' is the <u>most</u> likely proposition in C ('that every linguist had read x')

2.   *Auch nur* is not a wide-scope regular *even*

Let us turn to the semantics of German *auch nur*, which only has the most-likely reading. The scope theory would treat *auch nur* as a wide scope regular *even*, and thus it would predict that *auch nur* that occurs in the scope of a DE operator on the surface is semantically equivalent to *sogar* that outscopes a DE operator. However, Gurzoni (2003), citing Schwarz (2002), shows that this prediction is not borne out (see also Schwarz 2005); in (11), *sogar* that outscopes *jeden* 'everyone' is felicitous, but not *auch nur* that is under *jeden* on the surface.

(11)   a.   #Wir   haben jeden   abgelehnt, der **auch nur** ein [A]$_F$ hatte.
                we   have everyone rejected who also only a   A   had
                'We rejected everyone who even had an A.'

        b.   Wir   haben **sogar** jeden   abgelehnt, der   ein [A]$_F$ hatte.
                we   have even   everyone rejected who a   A   had
                'We even rejected everyone who had an A.'   (Schwarz 2002)

The lexical theory can explain why (11a) is infelicitous (Schwarz 2002). The NPI *auch nur* yields the ScalarP that 'that everyone had an A' is the most likely among the alternatives ('that everyone had B', etc.). This is inconsistent

with the general assumption that getting an A is harder than getting other grades.[3]

3.   *Auch nur* **is not a narrow-scope NPI** *even*

Treating *auch nur* as a narrow scope NPI *even* is not without problems. Schwarz (2000) takes up the observation by Linebarger (1980) and Heim (1984) that *even* does not tolerate accidental generalization, as in (12), and argues that the scope, but not lexical, theory can account for this observation.

(12)   Every student that handed in **even** [one]$_F$ assignment {got an A / # was
          wearing jeans}.   (taken from Guerzoni 2003:95)

Under the scope theory, *even* scopes over the entire sentence and triggers the ScalarP that 'that every student who handed in at least one assignment {got an A / was in jeans}' is the least likely among the alternatives ('that every student who handed in at least n assignment {got an A / was in jeans}', n>1). This ScalarP makes sense with *got an A* because it suggests a correlation between the number of assignments and the possibility of getting an A. The ScalarP is odd with *wearing jeans* because a correlation between the number of assignments and the possibility of wearing jeans is implausible. In contrast, under the lexical theory, *even* combines only with the embedded sentence, and thus we obtain the same ScalarP regardless of what predicate we have in the main clause. That is, *even* evokes the ScalarP that 'that every student handed in at least 1 assignment' is the most likely among the alternatives, both with *got an A* and *wearing jeans*. Thus, the ScalarP is unable to explain the contrast between the two predicates.

     I would like to point out here that the same contrast obtains with *auch nur*, as shown in (13). If Schwarz's (2000) analysis of English *even* is on the right track, *auch nur* in (13) should be treated as a wide scope *even* rather than as a narrow scope NPI *even*. However, we have seen in section 2 that *auch nur* differs from a wide scope *even*. We need an alternative analysis that is able to explain both (11) and (13).

(13)   Jeder Student, der **auch nur** [ein]$_F$ Übungsblatt abgegeben hat,
          every student   that also only one   assignment   hand in   has
          {bekam   die Bestnote   /   # hatte eine Jeans   an}.
          {received   the best grade /   had   a   jeans   on}

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[3]   The lexical theory would predict that (11a) improves when getting an A is considered to be the most likely. However, (11a) remains infelicitous regardless of how we manipulate the context. Guerzoni (2003:197) points out that this problem can be dealt with by adopting Schwarz's (2005) analysis where *auch nur* is truth-conditionally interpreted as 'at least': since 'that everyone had at least an A' entails all the other alternatives, it is always considered to be the least likely (cf. Chierchia 2004:77, "… being stronger entails being less likely").

4.   Guerzoni's (2003) compositional analysis of *auch nur*

Guerzoni (2003), inspired by Lahiri's (1998) compositional analysis of Hindi NPIs, proposes a compositional analysis of *auch nur*, where the NPI-like distribution of *auch nur* is explained by a semantic compatibility of *auch* 'also' and *nur* 'only'. *Auch* is an additive particle that evokes an existential presupposition (ExistP) given in (14). *Nur* triggers two presuppositions, the exclusive presupposition (ExclusiveP) in (15a) and the ScalarP in (15b).[4]

(14) $[\![auch]\!]^w$(C)(p) presupposes that there is q (q ≠ p) in C that is true

(15) $[\![nur]\!]^w$(C)(p) presupposes that:
      a.   there is no q (q ≠ p) in C that is true
      b.   p is the <u>most</u> likely proposition among the alternatives in C

When *auch* and *nur* combine with the same proposition, there is a conflict between the ExistP of *auch* and the ExclusiveP of *nur*: in (2a), *auch* triggers the ExistP that there is some x≠*SS* such that Al read x, while *nur* evokes the ExclusiveP that there is no x≠*SS* such that Al read x. This conflict explains why *auch nur* is infelicitous in positive sentences. Guerzoni claims that the conflict between the two can be resolved when there is an intervening DE operator at LF. For instance, in (2b), we can assume the LF in (16). *Auch* triggers the ExistP that there is some x≠*SS* such that nobody read x, whereas *nur* evokes the ExclusiveP that there is no x≠*SS* such that everybody read x (assuming that the trace is interpreted as a universal quantifier: see Heim 1983). These two presuppositions are not in conflict, thus (2b) is felicitous. The most-likely reading is due to the ScalarP of the narrow scope *nur*: in (16), *nur* introduces the ScalarP that *SS* is the most likely book for everyone to read.

(16)   **auch** C [nobody$_1$ [**nur** C [t$_1$ read [[*SS*]$_F$]$_F$]]]

    Guerzoni's compositional analysis is capable of explaining (11), which shows that *auch nur* cannot be treated as a wide scope *even* (see Guerzoni 2003: 196). The LF of (11) under Guerzoni's analysis is provided in (17).

(17)   **auch** C [we rejected everyone who$_1$ [**nur** C [t$_1$ had an [[A]$_F$]$_F$]]]

The ExistP of *auch* and the ExclusiveP of *nur* are consistent, but there is a problem with the ScalarP of *nur* that 'that everyone had an A' is the most likely. This is the same ScalarP as the one introduced by a narrow scope NPI *even*, and

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4 *Only* is generally considered to make a truth-conditional contribution in terms of exclusivity (e.g., *only Al came* is true iff there is no other person but Al who came). Since *auch nur* does not contribute to the truth conditions, Guerzoni is obliged to posit a different lexical entry for *nur* 'only' in *auch nur* that has no truth-conditonal contribution. In this lexical entry, exclusivity is taken as a presupposition, as in (15a).

it is inconsistent with our general assumption that it is more difficult (hence less likely) to get an A than to get other grades.

However, Guerzoni's analysis runs into a problem when we examine the data in (13) on accidental generalization. The LF under the compositional analysis is given in (18).

(18)   **auch** C [every student who$_1$ [**nur** C [t$_1$ handed in [[1]$_F$]$_F$ assgnmnt]] {got an A / was wearing jeans}]

We have seen above that the contrast between *got an A* and *was wearing jeans* is explained by the ScalarP of a wide scope *even*, but not by the ScalarP of a narrow scope *even*. Under Guerzoni's analysis, the ScalarP is derived from the narrow scope *nur*. For example, *nur* in (18) triggers the ScalarP that 'that every student handed in at least one assignment' is the most likely. Just like the ScalarP of a narrow scope *even*, this ScalarP excludes a predicate in the main clause, and thus we cannot account for the difference between *got an A* and *wearing jeans*.

I would like to present another problem of Guerzoni's analysis. As a piece of supporting evidence for her compositional analysis, Guerzoni (2005) shows that her analysis can explain why (19) is infelicitous. Her explanation goes as follows: at LF in (20), *nur* triggers the ExclusiveP that there is no n≠5 such that you have n children, which leads us to assume that there is no n>5 (having 5 children entails having fewer children, and thus we cannot exclude n<5 as long as n=5 is true). *Nur* also evokes the ScalarP that 'that you have 5 children' is the most likely among the alternatives of the form 'that you have n children', which makes sense when n>5 (cf. footnote 3). The two presuppositions are inconsistent, hence (19) is infelicitous.

(19) #Wenn du   **auch nur**   [fünf]$_F$ Kinder   hast,
      if   you   even   five   children   have
      wird   dir   die Kinderbeihilfe   verweigert.
      will   you   the child support   refused
       'If you even have [five]$_F$ children, you are refused child support.'

 (20)   **auch** C [if [**nur** C [you have [[5]$_F$]$_F$ children]] you are refused child sppt]

However, Guerzoni's analysis for (19) cannot explain the contrast between *pass* and *fail* in (21). More specifically, her analysis would predict (21) to be infelicitous both with *pass* and *fail*: the ExclusiveP of *nur* says that there is no n>5 such that you read n books, while the ScalarP of *nur* says that 'that you read 5 books' is the most likely among the alternatives ('that you read n books'). The latter is sensible when n>5, which is inconsistent with the ExclusiveP.

(21) Wenn Sie **auch nur** [fünf]$_F$ Bücher gelesen haben,
      if   you   also only   five   books   read   have
      warden   Sie {bestehen / # durchfallen}.
      will   you {pass   /   fail}
      'If you read even five books, you will {pass / fail}.'

In sum, we have seen that *auch nur* cannot be considered as a wide scope regular *even* or a narrow scope NPI *even*. We may instead adopt Guerzoni's (2003) compositional analysis where *auch* takes wide scope and *nur* takes narrow scope. However, this analysis is unable to deal with the cases where the wide scope ScalarP is required. This is because the analysis derives the ScalarP of *auch nur* from the narrow scope *nur*.

5.   A refined compositional analysis of *auch nur*

Guerzoni's analysis nicely accounts for the distribution of *auch nur* from the independent properties of *auch* and *nur*. However, as pointed out above, the analysis is unable to account for examples that call for a wide scope ScalarP. To solve this issue, I propose to make a refinement in a way of deriving the ScalarP of *auch nur*. In particular, I propose that the wide scope effect of *auch nur* with respect to the ScalarP can be derived from the ExistP of *auch*, the ScalarP of *nur*, and the assertion. As a way of illustrating how the proposal works, let us apply it to the example of accidental generalization in (13), which is repeated below. The LF, the relevant presuppositions, and the assertion are provided in (22).

(13) Jeder Student, der **auch nur** [ein]$_F$ Übungsblatt abgegeben hat,
      every student that also only one assignment hand in   has
      {bekam   die Bestnote / # hatte eine Jeans an}.
      {received the best grade /   had   a   jeans   on}
      'Every student that handed in even one assignment {got an A / was wearing jeans}.'

(22)   LF: **auch** C [every student who$_1$ [**nur** C [t$_1$ handed in [[1]$_F$]$_F$
      assignment]] {got an A / was wearing jeans}]   (=(18))
      a.   ScalarP of *nur*: 'that every student handed in 1 assignment' is the
           <u>most</u> likely among the alternatives of the form 'that every student
           handed in n assignments' (n$\neq$1)
      b.   ExistP of *auch*: there is n (n$\neq$1) such that every student who
           handed in n assignment {got an A / was wearing jeans}
      c.   Assertion: every student that handed in 1 assignment {got an A /
           was in jeans}

The ScalarP of *nur* in (22a) is sensible when n>1. The ExistP is then that every student who handed in n assignments {got an A / was wearing jeans}, where n>1. Sentence (13) asserts that every student who handed in one assignment {got an A / was wearing jeans}, as in (22c), and presupposes that every student

who handed in more assignments also {got an A / was wearing jeans}. From here, we can infer that, if a student had handed in one or more assignments, he had {gotten an A / been wearing jeans}. This is plausible with getting an A, but not with wearing jeans. It is very difficult, if not impossible, to imagine a context where there is a relation between the number of assignments and the possibility of wearing jeans.

The proposed analysis is also capable of accounting for the contrast between *pass* and *fail* in conditionals (21). The LF, the relevant presuppositions, and the assertion are given in (23).

(23) LF: **auch** C [if [**nur** C [you read [[5]$_F$]$_F$ books]] you will {pass / fail}]
  a. ScalarP of *nur*: 'you read 5 books' is the <u>most</u> likely
  b. ExistP of *auch*: there is n (n≠5) such that you will {pass / fail} if you read n books
  c. Assertion: you will {pass / fail} if you read 5 books

The ScalarP of *nur* in (23a) makes sense when n>5. Then the ExistP of *auch* is interpreted as follows: you will {pass / fail} if you read more than 5 books. These presuppositions together with the assertion suggest that, the more books you read, the more likely you are to {pass / fail}. This is plausible with passing, but not with failing.

If *auch nur* in (21) is replaced with the wide scope *sogar*, as in (24), both *pass* and *fail* are felicitous. However, different implications arise depending on which predicate is used: 5 is interpreted as "small" with *pass* and "large" with *fail*. The LF and the ScalarP of *sogar* are provided in (25).

(24) **Sogar** wenn Sie   [fünf]$_F$ Bücher   gelesen   haben,
  even if   you   five   books   read   have
  werden   Sie   {bestehen / durchfallen}.
  will   you   {pass / fail}
  'Even if you read five books, you will {pass / fail}.'

(25) LF: **sogar** C [if you read [5]$_F$ books, you will {pass / fail}]
  ScalarP: 'you'll {pass / fail} if you read 5 books' is the <u>least</u> likely

With *pass*, the ScalarP makes sense when 5 is taken to be the smallest among the alternatives, i.e., passing after reading 5 books is less likely than passing after reading n (n>5) books. The opposite holds with *fail*: failing after reading 5 books is less likely than failing after reading n (n<5) books.[5] Under the current analysis of *auch nur*, we obtain the wide scope effect with respect to

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5 In the examples discussed so far, *p entails q* is a sufficient condition for *p is less likely than q*. That is, when p is semantically stronger than q, then p is less likely than q (cf. footnote 3). However, the opposite holds in (24) with *fail*. For example, 'you will fail if you read one book' semantically entails 'you will fail if you read five books', but pragmatically it makes sense to say that the latter is less likely than the former.

the ScalarP by examining the interaction among the ScalarP of *nur*, the ExistP of *auch*, and the assertion. However, unlike the genuine wide scope ScalarP of *sogar* in (24), the scalar interpretation of *auch nur* is restricted by the narrow scope *nur* (e.g., in (21), n>5 because of (23a)). For this reason, the conditional (21) with *fail* is infelicitous.

I now compare (21) with (26), where *auch* scopes over *wenn* 'if' on the surface and *nur* remains in the scope of *wenn*.

(26) **Auch** wenn Sie **nur** [fünf]$_F$ Bücher gelesen haben,
also if you only five books read have
werden Sie {bestehen / #durchfallen}.
will you {pass / fail}
'Even if you (just) read five books, you will {pass / fail}.'

Auch that appears before *wenn* 'if' is known to be interpreted as 'even' (König 1991), thus both (24) and (26) are taken to be concessive conditionals (*even if*). However, unlike (24) that shows no contrast between *pass* and *fail*, (26) is infelicitous with *fail*. This is the same contrast as the one found with *auch nur* under *wenn* 'if' in (21). I claim that (26) has the same LF structure as (21), where the ScalarP of *nur* forces n to be larger than 5 (see (23a)). We have seen above that n needs to be smaller than 5 to be sensible with *fail*, and thus (26) as well as (21) is infelicitous with *fail*.

The propose analysis predicts that *auch wenn* 'even if' can occur with *fail* when *nur* 'only' is not in the antecedent. This prediction is borne out, as in (27). Just as in (24), 5 is interpreted as "small" with *pass* and "large" with *fail*.

(27) **Auch** wenn Sie [fünf]$_F$ Bücher gelesen haben,
also if you five books read have
werden Sie {bestehen / #durchfallen}.
will you {pass / fail}
'Even if you read five books, you will {pass / fail}.'

6. Conclusion

I showed that German *auch nur* 'even' may require a compositional treatment since it is neither a regular nor an NPI *even*. While I adopted here Guerzoni's (2003) analysis that permits island-insensitive movements of *auch*,[6] we may alternatively adopt an analysis that allows the presupposition of the narrow scope *auch* to be computed "globally" (at the sentence-level) without movement (cf. Rullmann 2007). However, even under the latter analysis, it is crucial to bring in the ScalarP of *nur* in order to explain the differences between *auch nur* and the wide scope *sogar*. The purpose of the paper is not to choose between the two theories of *even*, but to show that compositionality of some *even* items (such as *auch nur*) need to be taken into account regardless of what theory we adopt.

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[6] See Rullmann (1997), among others, for problems of island-insensitive scope of *even*.

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