

The landscape of EVEN

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Abstract This paper explores the role that the scalar properties and presuppositions of *even* play in creating polarity sensitive *even* meanings crosslinguistically (henceforth EVEN). I discuss the behavior of three lexically distinct Greek counterparts of *even* in positive, negative, subjunctive sentences, and polar questions. These items are shown to be polarity sensitive, and a three-way distinction is posited between a positive polarity (*akomi ke*), a negative polarity (*oute*), and a ‘flexible scale’ *even* (*esto*) which does not introduce likelihood, but is associated with scales made salient by the context. The analysis is a refinement of Rooth’s original idea that negative polarity is involved in the interpretation of English *even*, and establishes further that the “negative” polarity domain of EVEN includes a sensitivity that is not strictly speaking negative (flexible scale *esto*). The distributional restrictions of EVEN items are shown to follow from distinct presuppositions (positive polarity and flexible scale EVEN), or from their lexical featural specification (negative polarity EVEN), a result that squares neatly with the fact that ill-formedness is systematic pragmatic deviance in the former case but robust ungrammaticality in the latter. This result supports the by now widely accepted view that polarity dependencies are not of uniform nature, and that we need to distinguish presupposition failures (which are weaker and possibly

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fixable in some contexts) from cases of ungrammaticality which are robust and cannot be fixed in any context (Giannakidou, 2001).

Keywords Polarity items · *even* · NPI-*even* · Nonveridicality · Zero negation · Downward entailment · Concessive *even* · Flexible scale · Focus additive particles · Ungrammaticality versus pragmatic deviance · Scope of *even* · Negative bias · Crosslinguistic variation

1 Background: English *even* and its Greek counterparts

1.1 The problem of *even*

The status of English *even* has been under debate since Karttunen and Peters (1979; henceforth K&P). The problem is that, when construed with negation, *even* conveys a presupposition that does not follow from its contribution in positive sentences. To solve this problem, K&P (and Wilkinson, 1996) posit scope ambiguity with respect to negation. Rooth (1985), however, argues that the ambiguity is lexical: *even* has a negative polarity (NPI) incarnation which is licensed in the scope of negation.

To illustrate the basic problem, consider the occurrence of *even* in a positive sentence:

(1) The Dean invited **even** Bill.

(2) i. $\exists x [x \neq \text{Bill} \wedge C(x) \wedge \text{invited}(\text{Dean}, x)]$, and

ii. $\forall x [x \neq \text{Bill} \rightarrow \text{likelihood}(\text{Dean inviting } x) > \text{likelihood}(\text{Dean inviting Bill})]$

Even does not affect the truth conditions of a positive sentence: sentence (1) asserts that the Dean invited Bill. However, *even* contributes the presupposition (or *conventional implicature* in K&P's terminology) in (2), i.e., that there is a set of alternatives to *x*, the *even* phrase, that the context makes salient ($C(x)$; a condition that I may occasionally drop in the notation but continue to assume):¹ and that these alternatives are ranked on a scale (Horn, 1989; Kay, 1990), which, according to K&P, is one of likelihood. The existence of alternatives is the contribution of focus (Rooth, 1985), and it is what *even* has in common with other focus additive particles like *too* and *also*; but the scalar presupposition is a specific contribution of *even*. The value of the *even* phrase is to be placed at the lowest or near-lowest end on the scale, which means that the *even* phrase picks out the least likely (or near-least likely) individual(s) from the given set of alternatives. Likelihood is understood standardly as a possibility scale in the sense of Horn (1972, 1989). (There are of course additional lexical nuances that distinguish the predicate *likely* from *possible*, discussed in Horn's work, that we can harmlessly ignore here.)

With negation the presupposition of *even* should survive, as is typically the case with presuppositions and negation; but it does not. Instead of invited individuals, a

¹ The alternatives are variables of type *e* because the focus of *even* is the nominal argument, but *even* can also target other constituents, e.g. adjectives, cardinality predicates, verbs, or clauses, generating in each case alternatives of the appropriate type. Although interesting details arise when we consider the various types of attached constituents, throughout the paper I use *even* and its counterparts with nominals to keep things simple for the comparison with the Greek items. Under standard assumptions about focus projection in the VP, *The Dean didn't invite even Bill* can be equivalent in terms of focal association with *The Dean didn't even invite Bill*. The Greek items to be discussed show a strong preference to attach to the nominal argument rather than the VP in this case.

negative sentence with *even* makes us think of individuals that the Dean did *not* invite; and Bill appears to no longer be the (near-)least likely person, but the (near-)most likely one instead:

(3) The Dean didn't invite even Bill.

(4) i. $\exists x [x \neq \text{Bill} \wedge \neg (\text{Dean invited } x)] \wedge$

ii. $\forall x [x \neq \text{Bill} \rightarrow \text{likelihood} (\text{Dean inviting Bill}) > \text{likelihood} (\text{Dean inviting } x)]$

Rooth (1985) proposed precisely this presupposition with negation; as a consequence, *even* becomes lexically ambiguous between an item with the presupposition in (2), and an NPI with the presupposition in (4). Rooth's NPI-*even* is given below:

(5) Presupposition of NPI *even*

a. $\exists p [C(p) \wedge \text{not} (\overset{\vee}{p}) \wedge p \neq \wedge \mathbf{a}]$, where \mathbf{a} = assertion

b. $\forall p [[C(p) \wedge p \neq \wedge \mathbf{a}] \rightarrow \text{likelihood} (\wedge \mathbf{a}) > \text{likelihood} (p)]$

= the proposition created by the **even**-phrase is **the most likely** alternative
(Rooth, 1985)

Notice that Rooth treated NPI-*even* as a propositional operator. To avoid positing a lexical ambiguity, K&P and Wilkinson (1996) proposed instead that the ambiguity is scopal: *even* must raise outside the scope of negation:

(6) i. $\exists x [x \neq \text{Bill} \wedge \neg \text{invited} (\text{Dean}, x)]$

ii. $\forall x [x \neq \text{Bill} \rightarrow \text{likelihood} (\text{Dean not inviting } x) > \text{likelihood} (\text{Dean not inviting Bill})]$

The resulting presupposition, as can be seen, affords a reading equivalent to that of NPI-*even*, but there is a cost here too: we posit a special movement rule for *even* above negation. This rule (which is extended to *yes/no* questions in Guerzoni (2004)) is extraordinary for a number of reasons. First, it appears to be quite free and is posited specifically for negation and *even*, contrasting *even* with other focus particles that are normally assigned surface scope with negation; e.g. *only*, *also* and *too* (see Rullmann, 1997, 2003 for emphasis on this point). Second, the movement does not happen overtly. In current theorizing, where the status of covert movement is dubious, positing a covert movement rule just for *even* when it occurs with negation seems undesirable, unless we have actual empirical evidence to support it; it will turn out that we lack such evidence. Third, the movement also lacks motivation: what is it exactly in the lexical content of *even* that forces it out of the scope of negation? This connects to another problematic property of the alleged movement: it is obligatory. Essentially, by saying that *even* must scope above negation we are granting to it the status of a positive polarity item (PPI), like e.g. the classical PPI *some* which is also argued to scope above negation (Baker, 1970), and indeed by stipulation: why is the expected scope inside negation prohibited?

We will see in this paper that empirically, scope inside negation should not be ruled out, at least not long distance, as it surfaces indeed with *even* and its counterparts in languages like Japanese (Yoshimura, 2004). In Greek, long-distance movement, overt or covert, of PPI-*akomi ke* will be shown to be prohibited, thus making evident that

if we are to posit movement of an EVEN-item above negation, this movement will have to be of the familiar kind, and not entirely unconstrained (a point to which we return). We will also see in the next section that an item that is truly subject to raising above negation improves if raised past negation *overtly*, or if topicalized, in which case it can be argued that it has not moved at all but is base-generated in the higher position.

Finally, a number of important empirical differences will be established between the raised *akomi ke* and *even*, the joint force of which poses an additional challenge for the movement analysis of *even*. Unlike *akomi ke*, *even* remains acceptable in the surface scope of negation, as we saw, and need not *overtly* scope above it. Furthermore, unlike *akomi ke*, we will see that *even*: (a) remains acceptable in positive *and* negative sentences when combined with the cardinality *one*; (b) is compatible with expressions of high-likelihood; and (c) shows ambiguity between an additive meaning (that does not produce negative bias in questions) and a non-additive one (that is indeed responsible for negative bias). The positive EVEN *akomi ke* lacks the biased reading. Overall, the behavior of *even* will appear extremely difficult to handle within the unitary analysis of low-likelihood *even*.

In the light of the above, we can conclude that opting for movement does not really prove a conceptually more attractive option for *even* than positing lexical ambiguity. Heim and Lahiri (2002) actually go as far as to suggest that the various implementations of the scope theory cannot really eliminate the polarity component in *even*, a conclusion very similar to what I have just said: positing movement above negation renders *even* a PPI. Given this choice between two apparently “costly” options, it will be helpful to look at languages other than English. If we can adduce evidence that there are indeed lexical realizations of polarity *evens* in other languages, and that the relevant scopings of these items differ in a way derivable from their lexical content, then the polarity hypothesis is boosted, and an argument can be made along this line for English.² In this paper I claim that this is indeed the case; and the present analysis of Greek will be offered as part of a larger research agenda which explores the polarity effects with focus particles crosslinguistically (see Hoeksema & Rullmann, 2001 and references therein).

1.2 Multiple EVEN items in Greek

In Greek there are (at least) three items that may be translated into English as *even*, only one of which can occur unproblematically in positive sentences:

² Though, of course, the existence of a lexical item in a language X is not automatically an argument for the existence of the corresponding item in a language Y. However, notice that in most cases where we are faced with such a dilemma, it turns out that we can indeed build arguments that there are two different lexical meanings, often corresponding also to scope differences. An illuminating example involves *until* and negation: Karttunen (1974) posits lexical ambiguity, and Giannakidou (2002) presents novel arguments for it based on the fact that there exists a lexical distinction in Greek. In that case, it was not just the lexical distinction that supported the ambiguity thesis: it was actually shown that English lacks the wide scope negation reading posited by proponents of the scope ambiguity thesis (Mittwoch, 1977). Very much in the same spirit, we will see here that we do not have sufficient evidence that English *even* moves out of the scope of negation. It is, then, the joint force of the lexical distinction crosslinguistically *and* the fact that *even* remains in the scope of negation, along with the substantial empirical differences between *even* and *akomi ke*, that support the lexical ambiguity thesis.

- (7)a. I Maria efaje **akomi ke** to pagoto. (positive EVEN)
 the Maria ate even the ice cream.
- b. *I Maria efaje **oute** to pagoto. (NPI-EVEN)
 the Maria ate even the ice cream
- c. ?#I Maria efaje **esto** to pagoto. (flexible scale EVEN)
 the Maria ate even the ice cream

I use EVEN to refer to the crosslinguistic incarnations of *even* and distinguish them from English *even*. The expressions *oute* and *esto* resist positive sentences; they are both PIs in this sense, though there is a clear difference in status between the two, as we see. I use ‘?#’ to indicate systematic pragmatic deviance which is stronger than mere oddity, but still weaker than ungrammaticality. With negation, *oute* becomes good while *esto* remains bad; *akomi ke*, the positive EVEN, becomes unacceptable:³

- (8)a. ?#I Maria dhen efaje **akomi ke** to pagoto. (positive EVEN)
 the Maria didn't eat even the ice cream.
- b. I Maria dhen efaje **oute (kan)** to pagoto. (NPI-EVEN)
 the Maria didn't eat even the ice cream
- c. ?#I Maria dhen efaje **esto** to pagoto. (flexible scale EVEN)
 the Maria didn't eat even the ice cream

Oute, as we see, can optionally occur with the particle *kan*. Comparing *oute* and *esto*, only *oute* is an NPI proper because it improves with negation, while *esto* remains bad. Comparable items are German *mal* (Kürschner, 1983: 121), and Spanish *ni* (Herburger, 2003; Vallduví, 1994). *Akomi ke*, on the other hand, becomes odd in the surface scope of negation. We will see in the next section, however, that *akomi ke* improves if raised past negation overtly, or if it appears as a topic above negation.

Esto looks like a curious PI—bad in both positive and negative sentences. The fact that we find EVEN items (*akomi ke* and *esto*) that remain bad with negation is hard to reconcile with the scope theory. The observed deviance seems particularly problematic for proposals like Lahiri (1998), which employs an account of Hindi EVEN-containing PIs by using a single low-likelihood EVEN. The evidence for NPI-EVEN removes much of the strength of the enterprise, as Lahiri himself acknowledges (Lahiri, 1998: 85); and the fact that unambiguously low-scalar EVENS, as the Greek items will turn out to be, are bad with negation, as well as with the cardinality predicate *one* under negation as we shall see later, adds considerably to the problem.

Esto improves in polarity environments that are not negative, but nonveridical (Giannakidou, 1998, 1999; or *modal* in Tsimpli & Roussou (1996)): e.g. questions, imperatives, subjunctives, protasis of conditionals, and with modal verbs. NPI *oute (kan)* is ungrammatical, as expected, without a negative licenser:

³ The Greek data discussed in this paper were checked with a total of 14 native speakers of Greek, including myself, using an extensive questionnaire. I wish to thank my informants for their judgments and comments. Most interestingly, some speakers actually starred instances of negation and *esto* like the ones I discuss here; however, all of the informants found them generally unacceptable.

- (9)a. Efajes **esto** to pagoto? (question)
Did you eat even (read as: at least) the ice cream?
- b. *Efajes **oute (kan)** to pagoto?
Did you eat even the ice cream?
- (10)a. Fae **esto** to pagoto. (imperative)
Eat even (read as: at least) the ice cream.
- b. *Fae **oute (kan)** to pagoto.
Eat even the ice-cream.

(More examples will be given in Sect. 4.). Notice that *esto* receives a reading paraphrasable by *at least* that we revisit later, unlike *even* which always retains an additive meaning (that is, *even* in the examples above lacks the *at least* reading).

Finally, mere downward entailment (DE) is not sufficient for licensing:

- (11) ***To poli pende** pedhia efagan {**oute (kan)/esto**} to pagoto.
(?)At most five children ate even the ice cream

The relevant notion for the triggering of EVEN expressions then seems to be non-verity (Giannakidou, 1998, 1999, 2001), and not just DE (*pace* Lahiri, 1998).⁴

The Greek data support the polarity hypothesis, in line with related observations for Dutch (Hoeksema & Rullmann, 2001; Rullmann, 1997), Spanish (Herburger, 2003), German (Kürschner, 1983; Schwarz, 2005; von Stechow, 1991), Korean (Lee, 2005). I will not fully compare the Greek data to other languages (besides English) here, because there is considerable variation in the lexicalizations, and delving into this variation runs the risk of creating too loose a picture. Instead, my goal will be to provide a concrete and accurate analysis of the landscape of EVEN in one language, Greek, which will thus set up a detailed enough canvass where the various EVEN lexicalizations can be put in place (see especially Sect. 3.4; data comparing Dutch *zelfs maar* and *ook maar* to Greek *oute* and *kan* in Sect. 3, and comments on the relation between Korean *-(i)lato* and *esto* in Sect. 4).

1.3 Main ideas to be proposed

Two main analytical points will be made in this paper. First, we will go beyond the dilemma of lexical ambiguity versus movement of *even* by suggesting a lexical theory of EVEN (*even* included) in which the polarity status as well as the particular scopings or non-scopings of EVEN items are determined by their lexical (syntactic-semantic, or pragmatic) specifications. In a language like Greek, where we have (at least) three distinct lexical entries for EVEN, it is unquestionable that we need to posit three distinct meanings; the relative scopings must be made to follow from these meanings. For a language like English, it will be helpful to compare the single entry *even* with the

⁴ The fact that *esto* is not licensed by negation is not at odds with this generalization, given that there are PIs that are indeed incompatible with negation, e.g. free choice items (Giannakidou, 2001). In the general theory of polarity that I have been developing in my previous works such variations are not unexpected.

overt realizations of the distinct lexical items, and then ask the question of whether the resulting empirical differences can be derived by scope alone. Most importantly, given that NPI, PPI and flexible scale EVEN scope differently with respect to negation, we need to ask the related question of what drives the distinct scopings. If we deny the lexical basis for the distinctions, it becomes difficult to see the scope variations as anything more than mere stipulations—and in the bare scope theory they seem to remain just that.

The second point will be that likelihood alone is not enough to characterize the kinds of scales EVEN items associate with. Some EVEN items are indeed defined on a scale of likelihood (=possibility), but there are EVEN expressions that are flexible with respect to the scale they rank alternatives on, and depend on the context to provide it. The difference, again, may be blurred in English, but is lexicalized in Greek (*esto*). This result echoes earlier observations by Horn (1989), Kay (1990), and others, that the scalar associations of *even* are complex, and it is also in agreement with the proposal in Hoeksema and Rullmann (H&R) that some polarity items associate with absolute presuppositions (Dutch *ook maar*), while others associate with a relative presupposition (Dutch *zelfs maar*, H&R, 2001: 31). An important consequence of this rather refined view that I propose here is that the polarity involved in EVEN is not always of the positive versus NPI kind—the flexible scale *esto* identified in this paper is a polarity sensitive EVEN which, however, unlike NPI-EVEN, does *not* depend on negation for well-formedness.

Though the mapping from one language to another is hardly straightforward in most cases, the intuition behind H&R is the same as the one I formulate here: that some EVENS are absolute in the scales they introduce, and some are flexible, and that with the latter we expect a more variable distribution and judgments. Crucially, once we allow for relativity in the associating scale, we predict the existence of more EVEN meanings than the main three to be discussed here; and although I will not undertake the task of demonstrating the crosslinguistic implications of this idea, I will propose a typology of presuppositions for EVEN items which can be used as the basis for predicting the varying distributions of EVEN across languages.

The paper is organized as follows. In Sect. 2, I discuss PPI EVEN *akomi ke*, illustrating that this item is a low-likelihood EVEN which remains odd in the scope of negation unless it overtly scopes above it. Its problematic status persists with negation and the cardinality predicate *one*, thus challenging Lahiri's (1998) proposal. In Sect. 3, NPI-EVEN *oute* is shown to be a high-scalar EVEN, and it is further argued that this item is subject to licensing in the syntactic sense: it contains an uninterpretable negative feature that must be checked against negation. This explains why illicit occurrences of *oute* are clear ungrammaticalities rather than systematic deviances, as we noted. PPI and NPI-EVEN are also contrasted in long-distance contexts showing that they do not produce equivalent readings. In Sect. 4, I identify a third lexical item EVEN, *esto*, which is flexible in the scale it depicts, and also polarity sensitive. *Esto* will be shown to be responsible for negative bias in polar (yes/no) questions in Sect. 5. Positive low-likelihood *akomi ke*, unlike *esto* and *even*, will be shown to create no bias.

2 A low-likelihood EVEN in Greek, or, did Karttunen and Peters have Greek in mind?

Greek employs two lexically distinct expressions which translate in English as *even* in positive and negative sentences, respectively. In a positive sentence, Greek uses *akomi* (or *akoma*) *ke* lit. ‘still/yet and’ for *even*.⁵

- (12) O Janis dhiavase **akomi ke** tis *Sindaktikes Dhomes*.
 John read.3sg even the Syntactic Structures
 John read even *Syntactic Structures*.

Akomi ke and the other EVEN particles attach to various constituents, e.g. nominals, PPs and other adverbial phrases, VPs, and clauses (CPs). As I said earlier, I will concentrate on attachment to QPs and will be using these throughout. *Akomi ke* contains the conjunction *ke* (also present in *esto ke*, as well as *ou-te* as we see shortly), which is typologically consistent with their status as focus particles (cf. the use of additive particles with EVEN crosslinguistically, e.g. Dutch *ook* ‘also’ in *ook maar*; Rullmann, 1996, 1997; H&R, 2001; and German *auch* ‘also’ in *auch nur*; von Stechow, 1991; Kürschner, 1983). It is interesting, however, to note a “peculiarity” of Greek *ke*. Unlike its English counterpart *and*, which behaves strictly as a coordinator, *ke* also behaves like a focus additive particle itself, i.e. as a monadic operator attaching to the various constituents such particles usually attach to e.g. NPs, DPs, VPs. Such usage is prohibited with *and*:

- (13)a. Irthe *ke* o Janis.
 came and the John
 John {also/even} came. (Lit. *And John came.)
- b. Fere *ke* fruta.
 bring, imperative and fruit
 Bring fruit too. (Lit. *Bring and fruit.)
- c. Tros *ke* poli!
 eat.2sg and much
 Boy, you eat a lot! (Lit. *You eat and a lot.)

In this use, *ke* receives the additive meaning of *also* and *too*, sometimes with a scalar component like *even*. Such dual behavior is by no means unique to *ke*; double instances of coordinators that behave in a similar way have been observed in other languages, e.g. Korean *-to* (Lee, 2005 and references therein). Though quite remarkable, I am not going to consider the particular role of *ke* in more detail in this paper, and will treat *akomi ke* as one unit.

The sentence in (12) has the low-scalar presupposition proposed originally by K&P for English *even* in a positive sentence:

⁵ As indicated in the literal translation, *akomi* also has a temporal use as *still* and *yet*. Likewise, the temporal particle *mexri* lit. ‘until’ (Giannakidou, 2002) can be used as an equivalent to *akomi* in the typical positive EVEN cases we are looking at, e.g. in example (12). The two seem to be identical in this case, though *mexri* is not used with CPs, unlike *akomi ke*, as will become clear later; this is mainly the reason I am not discussing *mexri* here. *Akomi* does appear as the neutral (default) choice. Given that in the temporal use *akomi* and *mexri* (just like *still/yet* and *until*) are durative, i.e. they introduce time scales, their use as focus scalar particles is expected, and suggests that their main function is to introduce scalarity. Notice, finally, that the temporal uses exclude the conjunction *ke*, the use of which can then be taken to distinguish temporal from non-temporal scalarity.

- (14) Presupposition of *akomi ke*
 $\exists x [x \neq \mathbf{Syntactic\ Structures} \wedge \text{read}(\text{John}, x)]$, and
 $\forall x [x \neq \mathbf{Syntactic\ Structures} \rightarrow \text{likelihood}(\text{John reading } x) >$
 $\text{likelihood}(\text{John reading } \mathbf{Syntactic\ Structures})]$

Akomi ke thus associates with the lowest end of a likelihood scale, typically with the bottom element of it, and its lexical entry is given below:

- (15) $[[\text{akomi ke}(x)(P)]] = 1$ iff $P(x) = 1$; (assertion)
 $\exists y [y \neq x \wedge P(y)] \wedge$
 $\forall y [y \neq x \rightarrow \text{likelihood}(P(y)) > \text{likelihood}(P(x))]$ (presupposition)
- (16) $[[\text{akomi ke}]]: \lambda x \lambda P: \exists y [y \neq x \wedge C(y) \wedge P(y) \wedge \forall y [y \neq x \rightarrow \text{likelihood}(P(x)) >$
 $\text{likelihood}(P(y))]. P(x)$

The low likelihood property of *akomi ke* remains invariant through its various attachments. I illustrate this with a CP: we see that the item expresses low likelihood, this time as a propositional operator *even if*:

- (17) *Akomi ke* {na/an} vrekxi, emis tha kanoume picnic.
 even {subj/if} rains.3sg, we will do.1pl picnic
 Even if it rains we will have our picnic.

Here the proposition *it rains* appears to be the least likely condition for one to have a picnic. We can then define propositional *akomi ke* as having the presupposition below (which is the opposite of that of propositional NPI-*even* defined by Rooth in (5)):

- (18) Presupposition of propositional *akomi ke*
 a. $\exists p [C(p) \wedge p(w) \wedge p \neq \alpha]$, where α = assertion
 b. $\forall p [[C(p) \wedge p \neq \alpha] \rightarrow \text{likelihood}(p) > \text{likelihood}(\alpha)]$

The *even if* use of *akomi ke* is often marked in Greek with the use of subjunctive *na* indicated in (17), and typically creates concessive clauses. The link between focus, concession and the subjunctive is also manifested in Greek free relative clauses (Giannakidou & Cheng, 2006), but as it is not central to our discussion here; since the low-scalar property remains invariant, I will not consider it further, and will be looking only at nominal attachments for consistency.

2.1 Low likelihood and negation: explaining the status of *akomi ke* as a PPI

With negation, *akomi ke* becomes unacceptable:

- (19) ?#O Janis **dhen** dhiavase **akomi ke** tis *Sindaktikes Dhomes*.
 John not read.3sg even the Syntactic Structures
 John didn't read even *Syntactic Structures*.

Notice the contrast with English *even*. In this sentence, *even* can indeed be interpreted, but with *Syntactic Structures* becoming the most likely thing to read (in the NPI-analysis), or the least likely thing not to read (in the scope theory of *even*). If the Greek item *akomi ke* were to move covertly above negation, then it should be able

to receive this reading, and the sentence should be acceptable. But it cannot. We may conclude then that the covert raising of the scope theory is not applicable to *akomi ke*. Apparently this is a low likelihood item that gets interpreted where it surfaces.

What if we move *akomi ke* overtly above negation?

- (20) ?**Akomi ke** tis *Sindaktikes Dhomes* **dhen** dhiavase o Janis.
 even the Syntactic Structures not read.3sg the John
 ? Even *Syntactic Structures* John didn't read.

Overt scoping above negation helps improve *akomi ke*, though it does not make it impeccable. (The marked status of *akomi ke*, however, must be due to the fact that *oute* is the default option with negation.). Now we get the reading that *Syntactic Structures* was the least likely thing not to read, e.g. it was the priority required reading; *akomi ke* must scope above negation overtly to receive this reading. Moreover, there is a contrast between low-likelihood *akomi*, on the one hand, and *even*, on the other, in that the latter, but not the former, receives a reading inside the surface scope of negation.

The movement of the object *akomi ke* phrase in (20) is a case of focus movement, a quite productive movement in Greek, and is always accompanied with a gap (and not a clitic) in the base position (Tsimplici, 1995). Below, we see that the *akomi ke* phrase can also appear as a topic, again in a position higher than negation but this time with a clitic present in the canonical object position, highlighted below:

- (21) **Akomi ke** tis *Sindaktikes Dhomes* o Janis **dhen tis** diavase.
 even the Syntactic Structures the John not them read
 ??Even *Syntactic Structures*, John didn't read it.
- (22) **Akomi ke** to pagoto, i Maria **dhen to** efaje.
 even the ice cream, the Maria not it ate.3sg
 ??Even the ice cream, Maria didn't eat it.

Such cases are typical Clitic Left Dislocations (CLLD), which are the routine topicalization structures in Greek. Interestingly, topicalizations of EVEN give an impeccable result in Greek but are much worse in English. In CLLD, following Anagnostopoulou (1994), we can argue that the Greek *akomi ke* phrase is base-generated in the left peripheral position higher than negation (see also Cinque, 1990 for more discussion on the differences between true movement structures and topicalizations). If *akomi ke* is indeed base-generated in the topic position in (21) and (22) then it contrasts with *oute*, which cannot be generated outside the c-command domain of negation:

- (23) ??/**Oute* to pagoto, i Maria **dhen to** efaje. (OK *without* the clitic)
 even the ice-cream, the Maria not it ate.3sg

This contrast is revealing about the nature of dependency of *oute* and negation: as an NPI, *oute* must be generated inside the scope of negation. If topics are base generated above negation, in this position *oute* is just not licensed (whereas *akomi ke* is fine, as we saw). In this context, the ill-formedness of English *even* as a topic above negation must be seen as evidence that we need to generate *even* inside the scope of negation, just like *oute* and unlike *akomi ke*, a fact that follows only from the NPI-analysis of *even*.

Given that *akomi ke* becomes odd in the surface scope of negation it makes sense to characterize it as a PPI. Just like other PPIs, e.g. *some* (Baker, 1970), *akomi ke* must

escape the scope of negation, and it must do so overtly. But what drives this need? We do not want the PPI wide scoping property to be merely stipulated; rather, we want it to follow from what we know about *akomi ke*. The sentence with *akomi ke*, is, after all, truth-conditionally equivalent to the one below, without a focus particle:

(24) John didn't read the item he was least likely to read.

This sentence is not odd, hence low likelihood in itself cannot be problematic under negation. I will argue that what creates the problem with *akomi ke* is the very use of the focus particle itself, *together* with the low-scalar presupposition. Importantly, in the absence of such a particle, as in (24), no claim is made as to whether John read anything else. But when we use a focus particle like *even*, we do so because we expect (i.e., want to imply or implicate in neo-Gricean terms; Horn, 1989) a stronger statement of universal negation. This is the intuition underlying the idea of scale reversal with negation (dating back to the early work on scalar predications, e.g. Fauconnier, 1975). It is the conflict between this expectation of a stronger statement due to the use of EVEN, on the one hand, and the weak assertion because of the low ranking, on the other, that creates the problem. Notice below that (24) becomes odd in English too if we add *even*:

(25) ?#John didn't read even the item he was least likely to read.

When EVEN associates with a high-scalar item, by contrast, no problem arises, as we will see in the next section with NPI-EVEN.

Another way of formulating the foregoing is using Krifka's 1995 **Scal.Assert**. This operator is inserted whenever we have a focus structure, and its semantic impact is that "all propositions that are semantically stronger than the proposition made are negated" (Krifka, 1995: 224):

(26) **Scal.Assert** ($\langle B, F, A \rangle$) (c) =
 $\{i \in c \mid i \in B(F) \wedge \neg \exists F' \in A \ [[c \cap B(F')] \subset [c \cap B(F)] \wedge i \in B(F')] \}$
 where $\langle B, F, A \rangle$ is a focus structure with B as the background, F the foreground (a polarity item, or an item in focus), and A is a set of alternatives to F of type identical to F but excluding F itself. (Krifka, 1995: 31b)

Scal.Assert triggers a condition on the use of scalar items that says that such items will be felicitous only if their assertion B(F) is at least as strong as any of the alternatives. Strength is defined on inclusion, and allows inference from the more general to the more specific information. It is obvious that **Scal.Assert** is an attempt to "semanticize" the usual quantity implicature we otherwise get purely pragmatically in neo-Gricean terms. I will remain neutral as to whether we want to talk about this inference (i.e. the underlined negative conjunct of (26)) in pragmatic or more representationalist terms like in Krifka, and use both vocabularies as rough equivalents.

In a sentence without a focus item there is no quantity implicature—or, in Krifka's terms, **Scal.Assert** is not inserted; but when *akomi ke* is used, we expect the stronger (negated) statement, namely that John read nothing at all. The low likelihood of *akomi ke* is thus problematic inside negation because of the need for a quantity implicature triggered by the focal structure. This explains why *akomi ke* must move above negation, hence its PPI status. The problem will surface again with *esto* in Sect. 4, confirming that it is the general inability to create scale reversal with low ranking EVEN that is fatal with negation.

2.2 Two more challenges for the scope theory: PPI-EVEN long distance, and with the cardinality ONE

Before moving on, I would like to note two more facts about *akomi ke* that prove challenging for the scope theory for *even*. First, *akomi ke* is pretty bad with non-local negation:

(27)a. ??/* O Janis dhen ipe oti o pritanis kalese akomi ke tin
 the John not said.3sg that the dean invited.3sg even the
 katharistria.
 cleaning lady
 ?John didn't say that the Dean invited even the cleaning lady.

b. *[Akomi ke tin katharistria]_i o Janis dhen ipe oti o pritanis kalese t_i.
 *[Even the cleaning lady]_i John didn't say that the Dean invited t_i.

In (27a) *akomi ke* is in an indicative *oti* complement, judged as pretty bad; the corresponding English sentence, however, is judged better by native English speakers, though overt movement of *even* is still prohibited ((27b)). *Akomi ke* becomes fine in subjunctive *na* complements, as we see in Sect. 3.1. Subjunctive complements are the Greek equivalents to restructuring and infinitival domains (as Greek lacks infinitives), hence they are expected to be more transparent for long-distance dependencies. The impossibility of overt preposing in (27b) suggests that neither *akomi ke* nor *even* can raise overtly long distance above negation.

A reviewer suggests that the indicative may not be the only relevant factor long distance, and that the aspectual properties of the embedded clause play a role in allowing *akomi ke*. This is suggested by the example below:

(28) ?O Janis dhen ipe oti o pritanis **kalouse** taktika
 the John not said.3sg that the dean **invited.IMPERF**.3sg often
 akomi ke tis katharistries.
 even the cleaning ladies
 John didn't say that the Dean used to invite even the cleaning ladies.

The crucial factor here is the imperfective aspect on the embedded Greek verb which creates a habitual *oti* clause, reinforced also by the plural DP. Habitual sentences contain imperfective verb forms in Greek and *used to* forms in English, and the improvement indeed shows that verbal aspect, in particular the habitual, plays a role in the occurrence of *akomi ke*. The habitual is a polarity triggering context (Giannakidou, 1995, 1997, 1998; Giannakidou & Zwarts, 1999), and the fact that it turns out to play a role in the appearance of a PPI supports the relatively common observation that (at least) nominal PPIs (like *some* in *John didn't say that Bill used to talk to somebody*) are accepted in polarity contexts other than negation (for a recent proposal that PPIs actually get *licensed* in polarity environments, see Szabolcsi 2004). Importantly, the progressive, though also expressed with imperfective aspect in Greek, is not a polarity context (Giannakidou, 1995, 1997). In the PPI analysis I am suggesting, it is no surprise that the progressive does not favor *akomi ke*:

- (29) *O Janis dhen ipe oti o pritanis milouse olo to proi
 the John not said.3sg that the dean talked. IMPERF.3sg all the morning
 akomi ke me tin katharistria.
 even with the cleaning lady
 * John didn't say that the Dean was talking to even the cleaning lady all
 morning.

Notice, likewise, the significant deterioration of English *even* in the progressive. Evidently, then, it is not the imperfective that makes the difference but the habitual, and this in turn supports the idea that *akomi ke*, and *even*, are polarity sensitive.

At this point, it will be useful to consider an EVEN item in Japanese that can indeed scope below negation in the non-local context, *sae*:

- (30) Keiko-wa [Akira-ga MAKARESUTAA DAIGAKU-sae ukatta]-to
 Keiko-top [Akira-nom Macalester college-SAE-com enter]
 shira-nakatta.
 know-didn't
 Keiko didn't know that Akira got into even Macalester college.

Yoshimura (2004), from which this example is drawn, argues that (30) has the presupposition derived by the narrow-scope reading:

- (31) Narrow scope ($\neg > -sae$)
 a. There was some college other than Macalester that Akira entered.
 b. Macalester college was the least likely college for Akira to enter.

One appropriate context for (30) is where Macalester is understood to be a very hard college to get to, and it is implied that Akira is not smart enough to be admitted to it. Keiko, in this context, happens not to know that Akira managed to get into Macalester. The presupposition above is appropriate in this context, and is exactly the one found in a local positive sentence projected now to the entire sentence.

Crucially, *-sae* is just like English *even* in being a single item that is used in positive and negative sentences:

- (32) Akira-ga Mary-sae sasowa-nakatta.
 Akira-nom Mary-even invite-didn't
 Akira did not invite even Mary.

Sae therefore illustrates that we need not exclude the narrow-scope reading of a unitary EVEN at least with non-local negation, as required by the scope theory. If the English sentences (30) and (27a) have a narrow-scope reading equivalent to the Japanese one (which is not impossible according to my informants), then we must acknowledge narrow scope for *even* with non-local negation; and the challenge for the scope theory is to reconcile the fact that *even* may occur inside the scope of negation long distance, against its core prediction, with the requirement that it move above negation locally.

Besides long-distance dependencies, another challenge for the scope theory comes from *akomi ke* with the cardinality predicate *one*. The combination is bad in positive sentences, just like with *even*, and this must be due to the fact that *one* is the most likely and not the least likely cardinality—since *one* is entailed by every other cardinality.

- (33) ?#Akomi ke ENAS fititis irthe.
 ??Even ONE student arrived.

Crucially, the incompatibility of positive EVEN with *one* persists with negation, even if *akomi ke* appears overtly above it:

- (34)a. ?#Akomi ke ENAS fititis dhen irthe.
 even one student didn't arrive.
 b. Oute ENAS fititis dhen irthe.
 Not even one student arrived.
- (35) ?#Akomi ke enan fititi dhen idha.
 even one student I didn't see

This fact contradicts Lahiri's prediction that a low-likelihood *even* will improve with *one* if it moves above negation. The bad result here suggests that the low-scalar presupposition remains problematic with negation as well as affirmation: it is in fact *more likely* that one student came, or did not come, because *one* is the weakest cardinality.

- (36)a. # $\exists n [n \neq \mathbf{one} \wedge n \text{ students arrived}] \wedge \forall n [n \neq \mathbf{one} \rightarrow$
 likelihood (n students arriving) > likelihood (one student arriving)]
 b # $\exists n [n \neq \mathbf{one} \wedge \text{it is not the case that } n \text{ students arrived}] \wedge \forall n [n \neq \mathbf{one} \rightarrow$
 likelihood (n students not arriving) > likelihood (one student not arriving)]

Hence it makes no difference whether we have negation or affirmation: *akomi ke ena* will be odd in either case. Instead, we see that the NPI *oute* must be used (34b). This suggests that we still need NPI-EVEN for ONE and negation, and runs counter to Lahiri's (1998) claim that a low-likelihood EVEN improves with *one* under negation. In our discussion of *esto* in Sect. 4 it will be further demonstrated that the low-scalar *esto* also remains bad with *one* under negation, thus allowing the generalization that there is a fundamental incompatibility between *one* and low-scalar EVEN that cannot be repaired under negation.

Crucially, and again contradicting Lahiri (1998), DE quantifiers do not help improve *akomi ke ena* 'even one', which remains odd in the scope of *to poli pende fitites* 'at most five students':⁶

- (37) * To poli pende fitites aghorasan akomi ke ena vivlio.
 ? At most five students bought even one book.

The non-improvement indicates that DE, at least in some languages, is not a sufficient condition for the occurrence of EVEN ONE. It is important to ask the question of why

⁶ A reviewer notes improvement if we insert the subjunctive *na*:

- (i) ?/?/?/* To poli pende fitites **na** aghorasan akomi ke ena vivlio.
 the most five students subjunctive bought.3pl even one book
 At most five students must have bought even one book.

Let me note that I was unable to replicate the reviewer's judgment (indicated here as "?") with any of the 14 informants that I consulted, myself included. The informants indicated no difference with *na*, and judged the sentence as pretty bad, a judgment reflected in the example above. To the extent that an improvement is indeed possible for some speakers, it indicates again that a polarity environment saves the day: notice that the sentence is intended with an epistemic meaning and is not just an episodic one, as in the case of the example I discuss in the text.

this is so, given that DE contexts are nonveridical (Zwarts, 1995), but I will not explore this question further in this paper. I would like emphasize, however, that the oddity of *akomi ke* with negation and DE quantifiers challenges the view that EVEN ONE improves simply by being able to scope above negation or the DE quantifier. Recall that because ONE is the cardinality entailed by any other, the resulting presupposition of EVEN ONE above negation was shown to remain problematic in (36b).

To sum up, we saw in this section that Greek provides evidence for a PPI EVEN, *akomi ke*. This item must indeed scope above negation locally; and it prefers to do so overtly. If *akomi ke* cannot move above negation, the sentence becomes problematic (either deviant, with local negation, or plainly ungrammatical with long-distance movement). Crucially, movement of PPI-EVEN above negation is not unconstrained, as expected by the wide scope analysis; rather, it was shown to be prohibited across the tensed clause boundary, suggesting that it is a movement of the familiar kind. Given the fact that, unlike *akomi ke*, *even* is fine with local negation, and possibly also yields narrow-scope readings with negation long distance, we are forced to conclude that *even* cannot be identical to *akomi ke*, and need not raise above negation. Finally, we found the oddity of *akomi ke* plus ONE to remain unrepaired by negation and DE quantifiers, a fact arguing against Lahiri's idea that negation and DE are necessary and sufficient conditions for the licensing of EVEN-ONE PIs crosslinguistically.

We are now ready to visit NPI-EVEN.

3 A high-scalar negative polarity EVEN

In this section we broaden our landscape of EVEN by identifying *oute* as a high-scalar NPI-EVEN. We establish first its association with high-scalar values (Sect. 3.1), and then propose (Sect. 3.2) that *oute* is licensed via agreement (Agree in the sense of Chomsky (2000)) with a negative head. This will explain its very restricted distribution in negative and antiveridical contexts only, as well as the fact that when illicit, *oute* is plainly ungrammatical. An argument by Wilkinson against NPI-*even* is discussed, which turns out to be an argument *for* it in Sect. 3.3. Finally, in 3.4 the foundations are laid for a semantic and pragmatic typology for presuppositions of EVEN items crosslinguistically.

3.1 The scalar property of *oute*

For EVEN with negation, Greek employs *oute*, historically “not-and” (*ou* being sentential negation in Ancient Greek and *te* the Ancient Greek particle for conjunction), with the optional addition of *kan* lit. “and-if” (*ke an*), which later will turn out to be another instance of EVEN.

- (38) O Janis **dhen** dhiavase **oute (kan)** tis *Sindaktikes Dhomes*.
 the John not read.3sg even the Syntactic Structures
 John didn't read even *Syntactic Structures*.
- (39) *O Janis dhiavase **oute (kan)** tis *Sindaktikes Dhomes*.
 the John read.3sg even the Syntactic Structures

Oute itself contains a morphological negative feature—*ou*. It is licensed only with negation and antiveridical operators, e.g. *without*, and not simply DE or nonver-

idical environments; hence it appears to be a proper NPI (for additional data, see Giannakidou, 1997):

- (40)a. O Janis efije xoris na milisi oute kan me tin Maria.
 John left.3sg without subj. talk.3sg even with the Mary
 John left without talking even to Mary.
- b. *{Liji fitites/to poli pende fitites} milisan oute kan me ti Maria.
 few students/the most five students talked.3pl even with the Mary
 ?{Few students/at most five students} talked even to Mary.

So Greek lexically supports Rooth's NPI-*even* and shows further that it is antiveridicality that is needed for licensing and not mere DE. Apart from the lexical distinction, evidence that we are dealing with an item that contributes the top-of-the-scale presupposition, and not the bottom-of-the-scale one of positive *even*, comes from cases like (41):

- (41) # O pritanis dhen proskalese **oute (kan)** tin katharistria.
 the dean not invited even the cleaning lady
 # The Dean did not invite even the cleaning lady.

Under normal circumstances, the cleaning lady is not the most likely person for a Dean to invite, hence (41) is odd. In a more informed context, for instance, if it is part of the common ground that the cleaning lady was actually the Dean's secret benefactor when he was a poor young student, she moves higher on the scale of likelihood, and the sentence becomes fine. Such a shift is possible, given that *the cleaning lady* has no inherent scalar properties itself (as opposed to predicates like *one* that do, as noted earlier). At any rate, the impossibility of *oute* in the neutral context suggests that *oute* associates not with the least likely, but with the most likely alternative:

- (42) $\llbracket \text{NOT } \textit{oute}(\textit{kan})(x)(P) \rrbracket = 1 \text{ iff } \neg P(x) = 1;$ (assertion)
 $\exists y [y \neq x \wedge C(y) \wedge \neg P(y)] \wedge$
 $\forall y [y \neq x \rightarrow \text{likelihood}(P(x)) > \text{likelihood}(P(y))]$ (presupposition)

Association with the highest element allows the universal negation of every lower value, the typical interpretation of such sentences. Association with the highest element also makes the combination with *one* (*oute kan ena* 'not even ONE') possible with negation, as noted in (34), since *one* is the most likely cardinality. I suggest, then, the following lexical entry for *oute*:

- (43) $\llbracket \textit{oute}(\textit{kan}) \rrbracket = \lambda x \lambda P: \exists y [y \neq x \wedge C(y) \wedge \neg P(y)] \wedge \forall y [y \neq x (\text{likelihood } P(x) > \text{likelihood}(P(y))). P(x)$

Just like (non-clausal) *akomi ke*, here *oute* is defined as a function from individuals x to predicates P , inducing a scalar ordering of x on P that is the reverse of that induced by *akomi ke*. In both cases, the ordering is lexically driven, and the scopal properties of the two EVENS— *oute* inside the scope of negation, but *akomi ke* above it— follow from their lexical properties.

Another crucial difference that follows from the distinct presuppositions of *oute* and *akomi ke* as described here is illustrated below:

- (44)a. I logokrisia dhen epetrepse sto Jani na diavasi **oute (kan)**
 the censorship not allowed.3sg to John to read.3sg even
 tis *Sindaktikes Domes*.
 the Syntactic Structures
 The censorship committee did not allow John to read even *Syntactic Structures*.
- b. I logokrisia dhen epetrepse sto Jani na diavasi **akomi ke**
 the censorship not allowed.3sg to John to read.3sg even
 tis *Sindaktikes Domes*.
 the Syntactic Structures
 The censorship committee did not allow John to read even *Syntactic Structures*.

(*Akomi ke* is fine in the above sentence long distance because it is found in a subjunctive *na* complement.). These examples reproduce a contrast noted originally by Rooth. He observed that NPI-*even* is good in a context where John didn't manage to read other books besides *Syntactic Structures* not because the censorship committee prevented him from doing so (as expected by the wide scope analysis), but because the library happened (for some reason or other) not to have these books. This is a reading where EVEN takes local scope under negation, and precisely the context that makes *oute* felicitous. The sentence with *akomi ke* is infelicitous in this context; instead, it requires one where the censorship committee prevented John from reading *Syntactic Structures* as well as other books, in accordance with the idea that *akomi ke* must scope above negation. This empirical contrast confirms Rooth's hypothesis, and indicates further that the scalar presupposition assigned to *even* with negation by the scope theory, i.e. the lowest value on a negatively specified scale, is not identical to that of NPI-*even*, which lexically associates with top elements of positive scales.

Before we proceed with the syntax of *oute* there is one fact I would like to mention for the sake of completeness. Next to its use as a focus particle, the lexical item *oute* appears also as a coordinator in the Greek equivalent of *neither...nor*. This use, which typically involves two *oute*, is illustrated below:

- (45)a. Sto parti o Janis *oute efage oute ipje*.
 at-the party the John neither ate.3sg neither drank.3sg
 At the party John neither ate nor drank anything.
- b. *(Dhen) milisa *oute me to Jani oute me ti Maria*.
 not talked.1sg neither with the John neither with the Maria.
 I talked to neither John nor Maria.
- c. *(Dhen) ine *oute Olandos oute Germanos*.
 not is.3sg neither Dutch neither German
 He is neither Dutch nor German.
- d. *Oute i Maria irthe*.
 Mary didn't come either.

One conjunct can be omitted if it is implicit in the context, as shown in (45d) which presupposes a context where it is understood that at least one other person didn't come (i.e. the standard analysis of *either*; Rullmann, 2003). *Oute...oute* is a coordination structure equivalent to *neither...nor*, and can conjoin VPs, in which case

no negation is used (as in (45a), as well as DPs and predicates (*b* and *c* examples), in which case negation is obligatory in this surface order. With preverbal *oute*, negation can be dropped, as we see in (45d) and in the next subsection. The composition of *oute...oute*, which contains a historical negation *ou* and conjunction *te*, parallels that of English *neither...nor*, which exploits what appears to be negation *n-*, but differs from it in using conjunction (*te*) instead of disjunction (*either/or*). Under the scope of negation, of course, disjunction and conjunction end up equivalent because by de Morgan's Laws, hence the variation in what languages choose to employ.

It is important for our purposes to note that the coordinator *oute* (including the implicit *not...either* case) must not be collapsed with the scalar NPI-EVEN *oute (kan)*. For one thing, there is a difference in syntactic type: the former is a coordinator, i.e., a binary operator, whereas the latter is a focus modifier, thus a unary operator. But more importantly, there is a crucial lexical difference: *oute...oute*, just like its English counterpart *neither...nor* but unlike *oute (kan)*, is not scalar: there is no scalarity involved in the sentences in (45), either high scalar or low scalar (certainly not in the form of a presupposition). The sentences are neutral statements in all the crucial respects that the sentences with unary *oute (kan)* discussed so far are not. Notice also that with binary *oute...oute*, *kan* does not appear, as is freely the case with *oute (kan)*. If it does, as in the case below, we do end up with a scalar statement, and it makes sense to view scalarity as a contribution of *kan*:

- (46)a. Sto parti o Janis *oute* efage *oute kan* ipje.
 at-the party the John neither ate.3sg neither even drank.3sg
 At the party John didn't eat; he didn't even drink.
 Paraphrased as: At the party, John didn't eat, he didn't even drink anything.
- b. *Oute kan i* Maria irthe.
 even the Mary came.3sg
 Even Mary didn't come.

The addition of *kan* transforms the structures into scalar EVEN structures, as can be seen in the translations too; hence it would be a mistake to treat non-scalar *oute...oute* as identical to the scalar EVEN. It may be that scalarity is in fact always a contribution of *kan*, which would lead us to say that *kan* is always present with scalar EVEN *oute*, explicitly or implicitly. This, then, would be another way of distinguishing the bare non-scalar coordinator *oute* from its EVEN counterpart that I concentrate on in this paper.

3.2 The syntax of *oute (kan)*

The distinctive characteristic of *oute* is that it must be in a local relationship to negation—a feature that it shares with other NPIs in Greek (Giannakidou, 1997, 2000; Tsimpli & Roussou, 1996). It is not licensed across clause boundaries long distance, generally, unless it is found in the complement of verbs that are known to be transparent for NPI-licensing (and other long-distance dependencies), e.g., restructuring (i.e. infinitival-like) verbs:

- (47) ?? Dhen ipa oti o Janis diavase **oute kan** tis *Sindaktikes Dhomes*.
 not said.1sg that the John read.3sg even the Syntactic Structures
 ?? I didn't say that John read even *Syntactic Structures*.
- (48) Dhen tu epetrepsan na diavasi **oute kan** tis *Sindaktikes Dhomes*.
 not him allowed.3pl subj read.3sg even the Syntactic Structures
 They didn't let him read even *Syntactic Structures*.

The impossibility of long-distance licensing can be taken to indicate a dependency on negation subject to phases (Chomsky (2000, 2001)), *modulo* the restructuring effects, however they are to be captured. The in situ licensing suggests that *oute (kan)* remains in the scope of negation; it is clear from the examples that it does not have to move overtly. If we implement this locality restriction in terms of Chomsky's (2000) Agree, we can posit an uninterpretable negative feature on *oute*: [uNeg]. *Ou* is plausibly the realization of this feature. This feature of NPI-EVEN agrees with the categorial negative feature of sentential negation *dhen*. Agree can only occur within a phase, hence *oute* cannot be licensed through a CP; with restructuring verbs we remain within the same phase and long-distance licensing is enabled. We can summarize the analysis in the licensing condition below:

- (49) Licensing condition on NPI-EVEN *oute (kan)*
 (i) *Oute (kan)* is grammatical in a sentence S iff it is licensed by an antiveridical operator α in S; and
 (ii) Licensing is an Agree relation between the uninterpretable [uNeg] feature of *oute (kan)* and the interpretable [Neg] feature of α in S.

The licensing of *oute (kan)* thus happens in syntax. *Dhen ... oute (kan)*, is a clear case of negative concord, in the sense of agreement between two expressions 'containing' negation, and the analysis I suggest can be seen as a minimalist reformulation of the 'Neg-criterion' (Haegeman & Zanuttini, 1991; Zanuttini, 1991). Since *oute* itself contains a [uNeg] feature, the need to be licensed by negation is reduced to a feature matching relation between a probe and a goal, which assimilates failure of licensing to other clear cases of ungrammaticality. The non-extension of licensing to DE or nonveridicality follows: there is no negative feature in those cases. The licensing of *oute* and its distributional restriction to negative and antiveridical contexts therefore follows from its lexical specification. As the high scalar properties of *oute* are fully compatible with negation, they require no further discussion.

At this point it will be helpful to elaborate a bit on the assumption that *oute* contains an uninterpretable feature [uNeg]. This proposal makes the licensing of *oute* significantly distinct from the licensing of other Greek NPIs discussed in the literature, namely the ones known as n-words, e.g. KANENAN 'n-person', TIPOTA 'n-thing' etc. These are not morphologically negative, and have been argued to *not* contain a negative feature (Giannakidou, 1998, 2000). Unlike *oute*, Greek n-words have been argued to be licensed as quantifiers at LF (Giannakidou, 2000); their licensing is thus an instance of quantifier raising (QR) and does not involve agreement. Crucially, when preverbal, n-words still require overt sentential negation:

- (50) KANENAN *(**dhen**) proskalese o pritanis.
 n-person not invited.3sg the Dean
 The Dean invited nobody.

In this, n-words contrast with *oute*: when *oute* is preverbal, sentential negation *dhen* can be dropped (though it does not have to be; Giannakidou, 1997):

- (51)a. **Oute (kan)** ti Maria **dhen** proskalese o pritanis.
 even the Maria not invited.3sg the Dean
- b. **Oute (kan)** ti Maria proskalese o pritanis.
 even the Maria invited.3sg the Dean
 Not even Maria did the dean invite.

As noted by Tsimpli & Roussou (1996) and Giannakidou (1997, 1998, 2000), Greek does not typically exhibit such preverbal versus post-verbal differences, characteristic of Romance, with its other NPis. Italian, e.g., requires that negation be omitted with a preverbal n-word, whereas a Catalan n-word can optionally appear with sentential negation, just like *oute* (Quer, 2003). *Oute* is, as far as I know, the only case where a preverbal NPI can exclude negation. However, if *oute* contains an *uninterpretable* negative feature, as I am arguing, why can negation be omitted in the preverbal position in (51)? Since the answer to this question has consequences for other NPis that are licensed via Agreement and exhibit similar patterns preverbally (e.g. the Romance n-words), it is worth considering this question a little bit more.

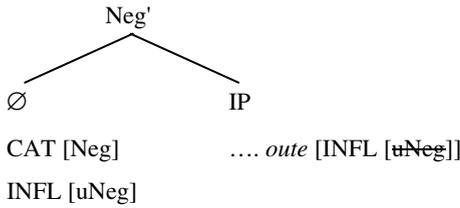
Is the idea that an NPI (*oute*) contains a [uNeg] feature consistent with the absence of negation when the NPI occurs preverbally? The answer I will suggest is positive. Consider first the typical postverbal case, where negation is obligatory:

- (52) O pritanis *(dhen) proskalese **oute** (kan) ti Maria.
 the Dean not invited.3sg even the Maria
 The Dean didn't invite even Maria.

Sentential negation *dhen* is the vehicle of semantic negation which remains invariant, and we can capture this by saying that it contains the categorial syntactic feature [Neg]. *Oute*, on the other hand, contains an *inflectional* [uNeg] feature which agrees with the categorial Neg feature of *dhen*, thereby licensing *oute*, assuming as usual that categorial features of the agreement trigger, e.g., ϕ -features on a nominal, agree with the inflectional features on the target, e.g., ϕ -features on T or little *v*. This explains the need to have *dhen* if *oute* occurs postverbally. Agreement happens in situ and there is no need to move. *Oute* can also move overtly, in which case we would have to say that movement is EPP driven. This would be the case of *oute* in the preverbal position with *dhen* (51a).

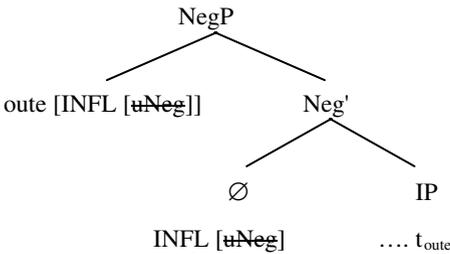
In order to understand what happens in (51b), it will be helpful to think of this case not as one where *dhen* is dropped, but as a situation in which a covert counterpart of negation, which I will call "zero neg", is triggered. Zero neg contains both a categorial feature [Neg], just like overt negation, and an inflectional feature [uNeg]. This would be an NPI-like negation. The derivation then proceeds as follows:

(53) Stage a:



First, the [uNeg] feature of *oute* is checked and eliminated against zero Neg (via Agree). This leaves zero neg Ø with its INFL [uNeg] unchecked. To satisfy checking of this feature, *oute* must move and act as a probe.

Stage b:



What is distinctive in this derivation is that it alters the ordering of the probe–goal relation, and although the idea might seem uncommon at first glance, it is hardly unheard of: a view very close in spirit is found in an earlier comment by Ladusaw (1992), where it is suggested that a preverbal Romance n-word somehow “licenses” (a morphologically null) negation. My tentative proposal here is an attempt to formalize this intuition more concretely, while keeping the basic assumption that the NPI itself (in our case *oute*) contains just an inflectional [uNeg] feature and is not itself the categorial expression of negation (which would make it semantically ambiguous, something that, in the absence of further evidence, we want to avoid).

Finally, a feature of this derivation that merits comment is the fact that the checked inflectional feature of *oute* further serves as a licenser for the [uNeg] feature of zero neg. This might seem extraordinary at first glance, since it renders the licensing of zero neg parasitic on that of the NPI-*oute*.⁷ However, secondary triggering of NPIs licensed by other NPIs is not unattested; our discussion of zero neg can be embedded

⁷ It is useful, in this context, to consider that parasitic zero neg can license n-words, as is the case with KANENAS in the sentence below, from the poem *Dhromi Palji* “Old Streets” by Manolis Anagnostakis:

- (i) Ki oute KANENAS me gnorize.
and NPI-even n-person me knew.3sg
And nobody knew me.
- (ii) * Ke KANENAS oute me gnorize.

It is important to note that, consistent with my suggestions, it is preverbal (moved) *oute* that renders the structure with KANENAS licit by triggering zero neg, as illustrated in the contrast with (ii). If *oute* remains in situ, zero neg is not triggered and consequently KANENAS does not have a proper licenser.

into the more general picture of “parasitic” licensing of precisely this type discussed in den Dikken (2002, 2006).

To sum up, we analyzed NPI-*oute* as an EVEN that, in addition to its presuppositions, must also be syntactically licensed. The distribution of *oute* is thus constrained by a stronger condition than that of *akomi ke*— syntactic licensing— and failure to satisfy this condition yields ungrammaticality and not just deviance. The licensing of NPI-*oute*, I argued, is an instance of agreement, and from this analysis a core empirical difference was shown to follow with respect to the preverbal position between *oute* and Greek n-word NPIs, which do not involve agreement.

3.3 EVEN attaching to the verb: no argument against NPI-*even*

Wilkinson (1996) presents an alleged argument for the scope theory based on *even* attaching to the inflected verb (Rooth’s original *Infl-even*). When we look at Greek, we see that *oute* cannot be used this way without a local higher negation:

- (54)a. *Metaniosa pu aniksa **oute (kan)** to vivlio.
 regret.1sg that opened.1sg even the book.
- b. Metaniosa pu aniksa **kan** to vivlio.
 regret.1sg that opened.1sg even the book
- c. I regret that I *even* opened the book.
- d. I regret that I *so much as* opened the book.

Instead, bare *kan* is used, appearing here in a factive complement without higher negation. *Kan* can be paraphrased with *so much as* (identified as a PI in Linebarger (1980), Heim (1984)). Unlike *kan*, other Greek NPIs are blocked in this context, e.g. *oute* and minimizers:

- (55) *Lipame pou ipa leksi.
 be-sorry.1sg that said.1sg word
 ?I am sorry that I said a word.⁸

Clearly, we are not dealing with NPI-EVEN in (54). This point is worth emphasizing because it voids Wilkinson’s reduction of this *even* to NPI-*even* and the ensuing argument for the scope theory that is claimed to arise from this reduction (see Rullmann, 1997: 58–61 for additional convincing discussion of why Wilkinson’s argument would not work anyway). Given that this is a factive complement, and that *even* does not modify an argument but would have to move from the Infl position, the acceptability of *even* in this example actually suggests that *even* is inside the scope of negation, and not outside of it, on a par with what we observed earlier in (27) and (30).

Note, finally, that the existential presupposition of bare *kan* in (54) is as in (54’):

- (54’) There are other things that I did with the book, i.e. read it, photo-copied it, etc..

⁸ There is a systematic difference between Greek and English minimizers, observed elsewhere (Baker, 1970, Giannakidou, 1999, 2006): the former are strict NPIs appearing only with antivereidical licensors, whereas the latter have a much freer distribution, hence the difference here in status between the English and Greek minimizer.

This is consistent with the presupposition of positive *even* in the English sentence described by Wilkinson. So, bare *kan* seems to combine the existential presupposition of positive *even* with the top-of-the-scale presupposition of NPI-EVEN (which explains why it is compatible with it):

- (56) [[Metaniosa pu aniksa **kan** to vivlio/ I regret that I **so much as** opened the book]] = 1 iff I opened the book.
Presupposition:
 $\exists Q [Q \neq \text{open the book} \wedge I \text{ Q-ed the book}] \wedge \forall Q [Q \neq \text{open the book} \rightarrow \text{likelihood}(\text{I open the book}) > \text{likelihood}(I \text{ Q-ed the book})]$

This combination is predicted by the typology of EVEN items that I have in mind, which I will get to in a minute. *So much as* seems to be the analogue to bare *kan* in English. *Kan* and *so much as* are PIs but not strictly speaking NPIs like *oute*, since they are fine not only with negation, but also in non-negative polarity contexts, e.g. under negative factive verbs as in the example under discussion, questions, and conditionals:

- (57) The solicitor didn't so much as flinch. (Elizabeth George, *Playing for the Ashes*, p. 452)
 (58) I hadn't so much as missed a teeth-cleaning. (episode of 'Sex and the City')
 (Thanks to Jack Hoeksema for providing these examples.)
 (59)a. Anikses **kan** to vivlio?
 opened.2sg even the book
 Did you even open the book?
 (= Did you **so much as** open the book?)
 b. An me kitaksis **kan**, tha se skotoso.
 if me look.2sg even will you kill.1sg
 If you {**so much as/even**} look at me, I'll kill you.

So much as favors V attachment, so structurally as well it is like bare *kan*, which favors verbs and predicates. The presupposition of these items is acceptable with negation because they are high-scalar, just like the presupposition of NPI *oute*, and unlike the low-scalar *akomi ke* (which as we saw remained problematic with negation). This is also consistent with the fact that *kan* combines with NPI-*oute*.

Before we move on, it seems appropriate to offer a few brief remarks on the two Dutch EVEN items that have been treated as equivalent to *so much as*: *ook maar* and *zelfs maar* (H&R, 2001). H&R show that *ook maar* and *zelfs maar* are also licensed in contexts that exceed DE and can be described as nonveridical (H&R, 2001: 150), e.g. conditionals, questions, restrictions of universals, *before* clauses (H&R, 2001: 146, Table 1). In fact, *ook maar* and *zelfs maar* are often claimed to remain odd in the scope of non-negative DE quantifiers such as *weinig* 'few' (Zwarts, 1981, from which the example below is taken):

- (60) *Weinigen zullen ook maar iets bereiken.
 few will even anything achieve
 Few will achieve anything whatsoever. (Translation from Zwarts and H&R)

The incompatibility of *ook maar* with *weinigen* 'few', to the extent that it is general (see H&R, 2001:149, Table 2 for possibly conflicting data), should be taken in the

light of our Greek finding that EVENs do not generally improve in the scope of DE phrases alone. Both Dutch and Greek EVEN-PIs, then, challenge the idea that DE is a sufficient condition for the improvement of items containing EVEN.

In the scope of negative quantifiers and negation (where *akomi ke*, as well as *esto* as we see in more detail shortly, are generally not acceptable), *zelfs maar* and *ook maar* are quite good (to varying degrees, but nevertheless acceptable), suggesting that they align with *oute* and *kan*. I provide the relevant examples below (with glosses from H&R, 2001 (42a and b)):

- (61)a. Jan sprak nooit ook maar een woord.
 Jan spoke never so much as a word
 b. Jan heeft nooit zelfs maar gearzeld.
 Jan has never so much as hesitated.⁹

Additionally, *ook maar* is used typically with indefinite pronouns, and minimum indefinites like emphatic *EEN N* ‘one N’ and non-emphatic *een N* ‘a N’ – in 17% and 22% of the attested cases respectively. This is in contrast to *zelfs maar* which rarely occurs with the minimum indefinites (3% occurrences; H&R, 2001: 151, Table 4), and tends to avoid indefinite pronouns in general: 0.5% of occurrences in the H&R corpus, as opposed to 19% of occurrences of indefinite pronouns with *ook maar* (H&R, 2001: 151, Table 4). In Greek, the interesting fact to note is that *kan* tends to be redundant with minimum indefinites with the cardinality ONE:

- (62)a. O Janis dhen ipe oute MIA leksi.
 John not said.3sg even ONE word
 b. ? O Janis dhen ipe oute **kan** MIA leksi.

Sentence (62a) is the typical way of expressing a minimizer, and the sentence in (62b), where *kan* is used, is unquestionably a marked option. This contrast can be taken to tighten the link between *zelfs maar* and *kan*, a link which is already made obvious by the fact that *zelfs maar*, just like bare *kan*, seems to favor attachment to predicates (50% of the uses of *zelfs maar* in the H&R corpus involve predicate attachment, 2001: 151, Table 4). An interesting future task will be to further quantify this fact in Greek.

H&R argue that *ook maar* always associates with an absolute minimum on a scale, which explains why it is used with conventional minimizers (H&R, 2001: 144) such as *een woord* ‘one word’, whereas *zelfs maar* is used “for conversational (= contextual) minimizers” (H&R, 2001: 144), and denotes a relative minimum. This latter comment opens the possibility of treating *zelfs maar* as an item with flexible scale. I suggested here an account of *kan* that employed likelihood in (56), but it may well turn out to be the case that *kan* is indeed flexible in the scale it picks out (hence what we saw as likelihood in (56) may be in fact a scale of expectedness, which is what *zelfs maar* seems to favor).

3.4 A semantic and pragmatic typology of presuppositions for EVEN items

Before moving on to our final EVEN *esto*, let me offer a few concluding comments on the *akomi ke* versus *oute* alternation observed with negation, and the general issue

⁹ The position right-adjacent to sentence negation *niet* excludes the items for independent syntactic reasons in Dutch as in German (but see van der Wouden, 1994 for an alternative where *ook maar* is both an NPI and a PPI).

of variation. At first glance, another plausible description of the alternation would be to treat *akomi ke* and *oute (kan)* as allomorphs. We could thus suggest that there is one basic lexical item meaning EVEN in Greek with the semantics we assigned to *akomi ke*, and assume further that this expression can be optionally associated with a negative feature. When this happens, EVEN is pronounced *oute*; if there is no association with a negative feature, the expression is pronounced *akomi ke*.

There are, however, reasons to be cautious about going this route. For one thing, there are additional instantiations of EVEN which we would still need to allow for: *kan*, which we just discussed, and *esto*. Second, allomorphy typically comes with strict complementarity, which we do not have in this case; recall the fact that *akomi ke* can improve with negation if it appears overtly above it. Given this case, and assuming that for *oute* to check its negative feature it must be raised to Spec, NegP, we end up with free optionality after movement: we predict that we can either insert *akomi ke* or *oute* with negation. This does not capture the fact that the choice is not really free, and that the use of *akomi ke* with negation is more marked. *Akomi ke* is ‘rescued’, so to speak, by moving above negation (recall that this is never absolutely impeccable), whereas *oute* is *licensed* by it.

At the same time, one would indeed like to be able to bring about a sense of unitary source for the alternation between *akomi ke*, *oute kan*, *kan*, and *esto*, and the analysis I am pursuing offers the following way. What is common in the various instances of EVEN is a family of possible presuppositions depending on whether we have a positive or a negative condition on the alternatives, and a low or high scalar ordering. Immediately, just looking at likelihood scales, the four possibilities below arise, where *x* is the meaning of the EVEN constituent:

(63) Existential presuppositions

- a. $\exists y [y \neq x \wedge P(y)]$ (positive existential)
 b. $\exists y [y \neq x \wedge \neg P(y)]$ (negative existential)

(64) Likelihood scalar presuppositions

- a. $\forall y [y \neq x \rightarrow \text{likelihood}(P(y)) > \text{likelihood}(P(x))]$ (bottom-of-scale)
 b. $\forall y [y \neq x \rightarrow \text{likelihood}(P(x)) > \text{likelihood}(P(y))]$ (top-of-scale)

The existential presupposition is merely induced by the focus-background structure and is not specific to EVEN itself, as I said at the beginning; the scalar ordering is indeed a direct contribution of EVEN. These propositions can combine in four distinct ways in order to produce presuppositions for EVEN expressions, deriving possibly distinct lexical items within and across languages. If we now additionally consider the possibility of flexible scales that will be needed for *esto*, as I will suggest next, we predict the existence of a flexible-scale low-scalar item with a negative condition on alternatives. The four lexicalizations that we find in Greek are summarized in Table 1:

At the same time, we are also making predictions of a high-scalar variant of *esto*, and a low-scalar counterpart that will associate with a positive existential presupposition. Hence we may expect to find across languages lexical realizations of these meanings too, a task that I will not undertake in this paper (but recall Dutch *zelfs maar* which, according to H&R, also associates with a relative scale). Here I will be content with simply suggesting that opening up this wider range of possibilities offers

Table 1 Combinatorics of presuppositions as realized in Greek

<i>Scalar / existential</i>	Positive	Negative
Bottom-of-scale	<i>akomi ke</i>	<i>esto</i>
Top-of-scale	<i>kan</i>	<i>oute (kan)</i>

a viable way of talking about a common core in the various lexicalizations of EVEN that we observe, and indeed, makes us *expect* them.

It is now time to turn to flexible scale EVEN.

4 Flexible scale EVEN

In this section we identify an instance of EVEN that does not associate with likelihood (as PPI and NPI EVENS do), but depends on the context to provide a salient scale. The lexical realization of this meaning is the expression *esto*, which I call ‘flexible scale EVEN’.

4.1 Distribution

Esto attaches to various categories, just like the other EVENS, and often it is paraphrasable by *toulaxiston* ‘at least’, which is not polarity sensitive, as we see:

- (65) ?#O Janis dhiavase **esto** tis *Sindaktikes Dhomes*.
 the John read.3sg even the Syntactic Structures
 John read even *Syntactic Structures*.
- (66) O Janis dhiavase **toulaxiston** tis *Sindaktikes Dhomes*.
 the John read.3sg at least the Syntactic Structures
 John read *Syntactic Structures* at least.

The limited distribution of *esto* has escaped attention so far. Let me also repeat that the item’s ill-formedness in a positive context is a weaker effect not akin to ungrammaticality, and which can be fixed occasionally as we shall see shortly. Addition of *ke* may be marginally possible, but is considerably more constrained than with *akomi* (see Kalokerinos, 1997 for some comments on what may determine the choice to use *ke* or not).

Esto, as we saw, is unacceptable in a positive sentence. But unlike *oute*, *esto* does not improve with negation, not even with the predicate ONE, as would be expected by Lahiri’s account:

- (67)a. ?#Esto (ke) i Maria dhen ipe kalimera.
 even and the Maria not said.3sg hello
 Not even Maria said hello.
- b. ?# Esto (ke) ENAS fititis dhen ipe kalimera.
 even and one student not said.3sg hello
 Even one student didn’t say hello.

It is not a matter of surface c-command here, although certainly the fact that *esto* is unacceptable in a position higher than negation suggests either that it cannot be given scope above negation or that it does, but wide scope does not produce improvement with negation. In other words, *esto* is another EVEN problematic for Lahiri’s generalization. In the examples below, where *esto* modifies a post-negation object NP, it is equally unacceptable. The well-formed version is with *oute*:

- (68) ?# O Janis dhen milise **esto (ke)** me tin Maria.
the John not talked.3sg even with the Maria
John didn't talk to at {least/even} Maria.
- (69) O Janis dhen milise **oute** me tin Maria.
the John not talked.3sg even with the Maria
John didn't talk even to Maria.

Recall also that *esto* remains unacceptable with DE quantifiers:

- (70) ?# To poli pende fitites diavasan esto (ke) tis *Sindaktikes Dhomes*.
? at most five students read even *Syntactic Structures*.
- (71) ?#LJI fitites diavasan esto (ke) tis *Sindaktikes Dhomes*.
?few students read even *Syntactic Structures*.

Hence DE is not sufficient for licensing *esto*. It should also be noted that if we do add *ke*, the indicated ill-formedness in all cases becomes even more severe (which explains, I believe, why many informants gave * to the unacceptable examples with *esto*).

Consider also that *esto* is good in the nonveridical restriction of the universal quantifier meaning *every* but not *each* or *both*, though they are all uniformly DE or at least Strawson DE in von Fintel's (1999) sense (as shown in Giannakidou, 2006). The facts are illustrated below (and parallel the ones in Linebarger (1980) and Heim (1984) which use *so much as*, retained in the translation):

- (72) Kathe estiatorio [pu xreoni **esto ke mia draxmi** ja ena potiri nero]
every restaurant that charge.3sg even one drachma for a glass water
xriazete ena gero mathima apo tin eforia.
need.3sg a strong lesson from the IRS
Every restaurant that charges {so much as/even} a cent for a glass of tap-water
needs a good lesson from the IRS.
- (73) ***To kathe estiatorio** [pu xreoni esto ke mia draxmi ja ena potiri
each restaurant that charge.3sg even one drachma for a glass
nero] xriazete ena gero mathima apo tin eforia.
water need.3sg a strong lesson from the IRS
***Each restaurant** that charges {so much as/even} a cent for a glass of tap-water
needs a good lesson from the IRS.
- (74) ***Ke ta dhio estiatoria** [pu xreonun esto ke mia draxmi ja ena potiri
both restaurants that charge.3pl even one drachma for a glass
nero] xriazonde ena gero mathima apo tin eforia.
water need.3pl a strong lesson from the IRS
***Both restaurants** that charge {so much as/even} a cent for a glass of tap-water
need a good lesson from the IRS.

Esto and *so much as* are unacceptable in the veridical restrictions of *each/both*, in accordance with the pattern observed with more familiar PIs like *kanenas* and *any*; see Giannakidou (1997, 1998, 1999) for data and discussion, from which the examples below are drawn.

(75)a. Every student who saw anything should report to the police.

b. *Each student who saw anything should report to the police.

c. *Both students who saw anything should report to the police.

Besides nonveridical determiner restrictions, *esto* is accepted in other nonveridical contexts like subjunctive clauses, questions, conditionals, imperatives, the scope of modal verbs, and directive propositional attitudes. (Many of these contexts were described as *modal* in Tsimpli & Roussou (1996).) These are illustrated below, where for the sake of completeness, I also indicate that the NPI *oute* is ungrammatical.

Yes/no questions

(76)a. Tu exis milisi **esto ke mia** fora?
Have you talked to him even once?

b. *Tu exis milisi **oute kan mia** fora?

Wh-questions

(77)a. Pjos tu exi milisi **esto ke mia** fora?
Who has talked to him even once?

b. * Pjos tu exi milisi **oute kan mia** fora?

Conditionals

(78)a. An diavasis **esto ke mia** selida ap' afto to vivlio, kati tha mathis.
If you read even one page from this book, you will learn something.

b. *An diavasis **oute kan mia** selida ap' afto to vivlio, kati tha mathis.

(79)a. An diavasis **esto ke tus Chicago Sun Times**, kati tha mathis.¹⁰
If you read even the Chicago Sun Times, you will learn something.

b. *An diavasis **oute kan tus Chicago Sun Times**, kati tha mathis.

Subjunctives

(80)a. Na lisis **esto** to provlima 1.
(Please) solve {even/at least} Problem 1.

b. * Na lisis **oute (kan)** to provlima 1.

Modal verb

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

b. ***Oute kan ena atomo** bori na sikosi afto to trapezi.

¹⁰ For readers unfamiliar with the Chicago newspapers, the *Chicago Sun Times* is a sensationalist tabloid.

Habituals

(82)a. Erxete stis sinandisis, **esto ke me kathisterisi**.
He comes to the meetings, even though with delay.

b. *Erxete stis sinandisis, **oute kan me kathisterisi**.

Directive intensional verb

(83)a. **Tha ithela** na mou egrafe **esto ke mia leksi**.
?I would love it if he wrote **even one** word.

b. ***Tha ithela** na mou egrafe **oute kan mia leksi**.

The crucial contrast in this final case is with veridical epistemic verbs like *believe* or *remember*, which block completely *esto ke*, just like they block other PIs in general (Giannakidou, 1999):

(84)a. ***Thimithika** pu mou egrapse esto ke mia leksi.
*I remember that he wrote even one word.

b. ***Pistevo** oti mou egrapse esto ke mia leksi.
*I believe that he wrote to me even one word.

It is thus confirmed that the licensing pattern of *esto* follows that of weaker PIs like *kanenas* ‘any’ and is regulated by nonveridicality.¹¹ It is also important to note that many of the above examples contain *esto* with *ena*, the Greek counterpart to ‘one’. The fact that *esto (ke) ena* appears in nonveridical contexts that are not negative or DE runs counter to Lahiri’s (1998) idea that negation and DE are the only factors needed for improvement of *even ONE* PIs. Obviously this is not the case, and we have reached a similar conclusion earlier in our discussion of *akomi ke ena* (Sect. 2). The improvement with nonveridicality (which is also observed with the parallel Hindi *bhii*-Pis that motivated Lahiri’s proposal, and which are good in examples such as the above) seems to be entirely missed in the DE-based account.

In the nonveridical contexts *esto* shares its distribution with *akomi ke*. We compare the two in Sect. 5 when we consider negative bias in questions (and see that only *esto* expresses negative bias). But first, we are going to ask the question of what accounts for the distribution and status of *esto*, which is to say: what accounts for the oddity under both negation and affirmation, and the sensitivity to nonveridical contexts other than negation?

¹¹ A reviewer provides additional support for this conclusion with examples involving implicit modality (as indicated with *tha* in (i)) or an embedded indicative that receives a habitual interpretation (as in (ii)):

(i) Pistevo oti (tha) mou agorase kanena doraki.
believe.1sg that epistemic future me bought.3sg some present.
I believe that he must have bought me a present.

(ii) Thimame pou mou egrafe esto ke mia leksi.
remember.1sg that me wrote.imprf.3sp even one word
I remember that he used to write to me even one word.

Here the PIs are licensed within the embedded clause by the implicit modality expressed by the future in (i) (for such use of the future see Tsangalidis, 1999, Giannakidou to appear), and the habitual in (ii), hence by local nonveridical operators.

4.2 The presupposition of *esto* : flexible scale

The key idea is that *esto*, unlike the other EVENS which associate with likelihood, is flexible with respect to the scale it ranks alternatives on. *Esto* does not introduce a scale itself the way likelihood EVENS do, but relies on the context to make a scale salient. This property makes its distribution more variable than that of likelihood-EVENS, with significant repercussions in certain cases, e.g. with negation and questions, as we shall see. Apart from this difference in the nature of the scale, *esto*'s ordering is similar to that of positive EVEN: it associates with the lowest element(s):

- (85) $\llbracket \text{esto (ke) (x) (P)} \rrbracket = 1$ iff $P(x) = 1$; (assertion)
 $\exists y [y \neq x \wedge C(y) \wedge \neg P(y)] \wedge$
 $\exists \mathbf{Q}_{\text{scalar}} [C(\mathbf{Q}) \wedge \forall y [y \neq x \rightarrow \mathbf{Q}(y) > \mathbf{Q}(x)]]$ (presupposition)
- (86) Lexical entry for *esto* (*ke*):
 $\llbracket \text{esto (ke)} \rrbracket = \lambda x \lambda P: \exists y [y \neq x \wedge C(y) \wedge \neg P(y)] \wedge \exists \mathbf{Q}_{\text{scalar}} [C(\mathbf{Q}) \wedge \forall y [y \neq x \rightarrow \mathbf{Q}(y) > \mathbf{Q}(x)]] . P(x)$

The scalar presupposition is reminiscent of *akomi ke*, comprising a bottom-of-scale condition; but *esto* combines this bottom-of-scale condition with the negative existential presupposition of *oute*. The negative presupposition of *esto* and *oute* is very much like the assertion of *only* (Horn, 1996), though of course it is slightly weaker (it doesn't say that *nobody other than x P*, but rather that *there are y other than x that not P*):

- (87) Only John ate a vegetable.
Presupposes: Someone ate a vegetable.
Asserts: Nobody other than John ate a vegetable. (Horn, 1996)

So in terms of format, *esto* looks a bit like the converse of *only*, which comes with a positive presupposition but a universal negative assertion in a positive sentence. The link to *only* is a fact consistent with crosslinguistic practice to employ equivalents of *only* for PI-EVENS (e.g. German *nur* in *auch nur*). But why is this combination bad in positive sentences?

To see why, consider first the non-PI with a similar meaning, *at least*, which is good:

- (88) I Maria dhiavase **tulaxiston** to arthro tis Heim.
 the Maria read. past.3sg at least Heim's article
 Maria read at least Heim's article.

In standard neo-Gricean reasoning (Horn, 1972, 1989), reading *at least P* does not imply that you read *only P* (or *exactly P*), but it can certainly *implicate* it (via the maxim of Quantity) as in the sentence above. When this happens, crucially, *at least* associates with a top-of-scale element: Heim's article was among the most expected or desired by the speaker to be read. The sentence asserts that some person read the most expected item, and implicates that nothing else was read.

In the absence of a scalar item altogether, again we have a well-formed sentence, but this time lacking the implicature of universal negation that is licensed with the scalar *at least*:

- (89) I Maria dhiavase to arthro tis Heim.
 the Maria read. past.3sg Heim's article
 Maria read Heim's article.

Hence the use of the scalar *at least* is decisive in allowing a defeasible inference of universal negation, as well as for ranking the NP along some dimension. Importantly, the stronger statement of universal negation is licensed when the scalar item places the NP on the higher end of the scale. This is reminiscent of the pattern we observed earlier in the discussion of *akomi ke* and *oute* under negation. But here the question is why *esto* is bad— *akomi ke* is, after all, good in a positive sentence despite the fact that it is low scalar.

The key to understanding the oddity of *esto* in a positive sentence, and its contrast with *akomi ke*, lies in the form of their existential presupposition. Unlike *akomi ke*, *esto* requires the context to settle a negative proposition— the one that arises only as an implicature with *at least*. The status of this negative proposition as a *presupposition* creates the deviance: such a strong statement cannot be assumed to be readily satisfied, or accommodated, in a neutral (or discourse initial) context. Importantly, if the preceding context makes such an inference, or something close to it, part of the common ground (i.e. part of the mutual knowledge of the speakers prior to the assertion), *esto* improves, and can be used roughly as an equivalent to *toulaxiston* ‘at least’. We witness this in (90):

- (90) Speaker A: Pali i Maria dhen proetimastike ja to mathima.
 Maria isn’t prepared for class again.
 Speaker B: ?Ma dhiavase **esto** to arthro tis Heim.
 but read. 3past.3sg at least Heim’s article
 But at least she read Heim’s article.

Here, the assertion of Speaker A, together with the presupposition of *pali* ‘again’, sets up an assumption that Maria often does not prepare for class, which of course can be understood in this context as not having done the readings for the particular class at issue. This clearly facilitates the use of *esto* in Speaker B’s assertion. The slight markedness is probably due to the fact that *toulaxiston* is what is expected to be normally used in this case.

In other words, in a positive sentence a problematic assertion is created because of the difficulty in satisfying the negative existential presupposition of *esto*. Recall again that I am talking about unacceptability and not ungrammaticality, as the effect is much weaker, and can be partially improved if the context can be manipulated in the appropriate way, as we just saw.

Let us see now why *esto* is unacceptable with negation.

4.3 Flexible scale EVEN and negation

Consider an example with negation:

- (91) ?#O Janis dhen diavase esto (ke) tis iposimiosis.
 the John not read.3sg even the endnotes
 #John didn’t read even the endnotes.

Notice also that if instead of “the endnotes” we have “the title”, *esto* improves (though it is still marked because with negation *oute* is the expected option):

- (92) ?O Janis dhen diavase esto (ke) ton titlo.
 John didn’t read even the title.

According to our analysis, *esto* carries the following presupposition, for (91):

(93)i. Assertion: John didn't read the endnotes.

ii. Presupposition:

$$\begin{aligned} &\exists x [x \neq \text{endnotes} \wedge \neg \text{John read } x] \wedge \\ &\forall x [x \neq \text{endnotes} \rightarrow \text{expected-to-read}(x) > \text{expected-to-read}(\text{endnotes})] \end{aligned}$$

Both conditions are met in a negative sentence. But why is the sentence bad? The problem here is the low-scalar conjunct; and it is the problem we noticed earlier with *akomi ke* in Sect. 2. The sentence says that John didn't read the least expected items, but this assertion is not informative enough because of the use of the focus particle, which wants to trigger scale reversal and allow a universal negative statement. Or, in Krifka's terms, the scalar particle lexically inserts **Scal.Assert**, thereby making it part of the LF of the sentence to require the universal negative conjunct. **Scal.Assert** is, as mentioned in Sect. 2, an introduction to the semantics of a condition on scalar items that says that such items will be felicitous only if their assertion is at least as strong as any of the alternatives. Here the assertion *John didn't read the least expected item* is clearly the weakest proposition among the alternatives, **Scal.Assert** is not satisfied, and the sentence is ill-formed.

Again, remember that there would be no problem had no focus particle been used:

(94) John didn't read the endnotes.

This bare assertion does not say anything about having read anything else or not, since in the absence of focus we have no alternatives. However, when a scalar particle is used with negation, for the sentence to be fully informative we expect a stronger statement, namely that John read nothing at all (i.e. a statement that would be consistent with scale reversal). Association with a higher value, as in the case with NPI-EVEN, produces such a case. But the low values of *esto* and *akomi ke* do not enable scale reversal, thus making them incompatible with negation. Luckily, *akomi ke* can escape the scope of negation and improve. *Esto*, however, is trapped inside it and cannot be 'rescued', unless scale reversal, or something equivalent to it, is supported independently in the context.

It is this that happens when "the title" is used instead of "the endnotes", as in our sentence (92) which improved with *esto*. Here *esto* associates with *likelihood to ignore*:

(95)i. Assertion: John didn't read the title

ii. Presupposition:

$$\begin{aligned} &\exists x [x \neq \text{title} \wedge \neg \text{John read } x] \wedge \\ &\forall x [x \neq \text{title} \rightarrow \text{likelihood to ignore}(x) > \text{likelihood to ignore}(\text{title})] \end{aligned}$$

This combination produces an assertion very close to the one with NPI-EVEN, since the least likely thing to ignore is the most likely thing to read. Our explanation of the oddity of the low-scalar EVEN with negation is therefore confirmed, and a further prediction is made and borne out: that a low value on a context-provided scale will occasionally be able to rescue low-scale EVEN if it produces, by reversal of entailment, a high value on a likelihood scale, rendering the presupposition of *esto* (almost) equivalent to that of NPI-EVEN. This explains the intuition that in such cases the readings with *esto* and NPI *oute* feel identical.

These cases suggest that in the flexibility of *esto* we must allow for the admittedly marginal possibility of *esto* picking up a scale of likelihood too. This is what just hap-

pened with “the title”. Obviously, this is expected under the idea that *esto* will pick up a (=any) context salient scale; in fact what has to be answered is why *esto* doesn’t pick up likelihood scales more often. I am not going to give an answer any more exciting here than simply saying that the existence of lexically distinct likelihood EVENS affects conventionalization of *esto* with likelihood. If the speaker intends to make a point about likelihood, Greek is generous enough to supply her with not one, but two EVEN items that introduce likelihood readily, a low-likelihood (*akomi ke*) and a high-likelihood one (*oute*). *Esto* is thus doomed to always be the marked choice with likelihood.

Finally, it is worth iterating that *esto*, just like *akomi ke*, remains bad with negation when combined with the cardinality ONE. I illustrate below, including all EVENS for clarity:

- (96)a. ?#Dhen idha **akomi ke ENAN** fititi.
 b. ?# Dhen idha **esto ke ENAN** fititi.
 c. Dhen idha **oute ENAN** fititi.
 not saw.1sg even one student
 I didn’t see even one student.

(Some of my informants actually starred (96a,b)). Here we are witnessing the problem that we have noticed a few times already: negation cannot fix the unacceptability of the bottom-of-scale presupposition that arises because of an ill-defined scalar assertion, i.e. an assertion that cannot induce scale reversal. Recall from Sect. 2, crucially, that (overt or covert) scoping of positive *akomi ke* does not allow improvement in this case either, a fact that obviously runs counter to Lahiri’s (1998) prediction, but follows in our account from the fact that ONE is the most likely predicate (thus clashing with low-likelihood *akomi ke*). On the present analysis, the oddity of the bottom-of-scale inference with negation seems to follow easily with *esto*:

- (97) *Esto ke ena*
 $\exists n [n \neq \mathbf{one} \wedge \neg (\text{I saw } n \text{ students})] \wedge$
 $\forall n [n \neq \mathbf{one} \rightarrow \text{expected-to-see } (n \text{ students}) > \text{expected-to-see } (\text{one student})]$

There is nothing wrong in placing *one* at the bottom of the speaker expectation scale, if the speaker expected to see more than one student in a context. What goes wrong is what went wrong in the general case of *esto* and negation that we noted earlier: the sentence merely asserts that the speaker did not see the least expected number of students (*one*), but because one is the weakest amount it does not satisfy the quantity requirement of **Scal.assert**.

The only way to explain why an NPI containing *even* is perfect with negation must appeal to NPI-EVEN. This is confirmed also by the fact that the minimizer use of *one* is typically possible in Greek with *oute*, much less so with *esto* (due to its scale flexibility that we noted), and absolutely impossible with *akomi ke* (thanks to a reviewer for bringing this up, and to my informants for their judgments; more on minimizers with *oute* in Sect. 5):

- (98)a. ??Dhen ipe **akomi ke mia lexi**.
 b. ? Dhen ipe **esto ke mia lexi**.
 c. Dhen ipe **oute mia lexi**.
 not said.3sg even one word
 He didn’t say even ONE word. (= He didn’t say a SINGLE word.)

Akomi ke is, crucially, hopeless since (a) it invariably associates with low-likelihood which is logically violated by *one*, and (b) it cannot escape the scope of negation because the minimizer must be *inside* negation for licensing. This fact, and the contrast with *even*, is fatal for the wide scope analysis: *even* is used in English minimizers, and just like their Greek counterparts, these, and consequently *even*, would have to be licensed inside the scope of negation.

To sum up, we have seen ample evidence that what excludes *esto* in positive and negative sentences is its presupposition. The negative conjunct remains problematic with affirmation because it is hard to accommodate, and the low scalar *one* creates a conflict with negation because the low value cannot create scale reversal (nor can *esto* switch to high-likelihood in order to achieve this result, unlike *even*, apparently). This conflict renders *esto* also incompatible with ONE under negation. In nonveridical contexts other than negation, on the other hand, the low-scalar presuppositions of both *akomi ke* and *esto* become unproblematic, and the items can therefore be used felicitously. I discuss below in detail the case of the subjunctive.

4.4 Non-negative nonveridical contexts

Nonveridical contexts are consistent with the presupposition and the low scalar structure of both *esto akomi ke*. Consider a request,

(99)a. Na lisis **esto to provlima 1.**
 subj solve.2sg even the problem 1
 (Please) solve {even/at least} Problem 1.

b Na lisis **akomi ke to provlima 1.**
 (Please) solve {even/also} Problem 1.

(100) *Esto*
 $\exists x [x \neq \text{Problem 1} \wedge \neg (\text{you solve } x)] \wedge$
 $\forall x [x \neq \text{Problem 1} \rightarrow \text{difficult } (x) > \text{difficult } (\text{Problem 1})]$

Here *esto* ranks alternatives on a difficulty scale. The sentence presupposes that the speaker considers Problem 1 to be the least difficult to solve, and presumes that the addressee will not be able to solve any problems other than this one, so they would be happy to see just that one problem solved. We will call this the *at least* reading. Of course, the least difficult problem is in fact the easiest one, hence the flavor of easiness that Problem 1 acquires in this context.

Akomi ke presupposes a different context producing the opposite effects: Problem 1 now seems to be the hardest one, and the request seems to be about *also* solving this problem:

(101) *Akomi ke*
 $\exists x [x \neq \text{Problem 1} \wedge \text{solve } (\text{you, } x)] \wedge$
 $\forall x [x \neq \text{Problem 1} \rightarrow \text{likelihood } (\text{you solving } x) > \text{likelihood } (\text{you solving } \text{Problem 1})]$

Here the context imposes an excess of problem solving. The addressee is taken to be somebody smart, who would be able to solve *in addition to* other problems also the

least likely problem (which should be, under normal circumstances, the most difficult one). We will call this purely additive reading the *also* reading. The contrast with *esto* in terms of the status of Problem 1 as the easiest or the hardest problem is a result of the fact that likelihood and difficulty have reverse entailments. This fact will be significant when we discuss negative bias in questions. It is also important to note that English *even* appears as a low-scalar item here, which can optionally associate with a flexible scale, rather than just likelihood, contrary to *akomi ke*. Guerzoni (2004) captures this variability by suggesting that *even* is flexible in its ranking, and can associate with high difficulty (*at least* reading) and low difficulty (*also* reading). This suggestion is very close to saying that *even* is ambiguous, and in itself is a considerable retreat from the idea of unitary low-likelihood *even*. Certainly, if we admit high ranking for *even* in a non-negative context, it is not obvious why and how we should exclude it in the case of negation as is required by the wide scope theory.

In case *akomi ke* is forced to associate with a high-likelihood item, it becomes odd. We witnessed this in the case of *one* already, but we also see it in the sentence below:

- (102) ?? Na lisis **akomi ke to ekkolotero provlima.**
(Please) solve even the easiest problem.

(The * and ?? go to the *scalar* additive meaning; a non-scalar additive meaning ‘too’ is still OK, but it lacks the scalarity, explaining its acceptability.) The easiest problem ranks *high* on the likelihood scale, and this rules out low-likelihood EVEN. In Greek, the incompatibility of *akomi ke* with high values produces ill-formedness since this item unambiguously associates with only low likelihood. In English, *even* is fine either because it is able to switch to a scale other than likelihood, or because it can switch its ranking: the easiest problem is the most likely one to solve. In either case, *even* behaves quite flexibly.

Before we move on, it is worth pointing out that Greek is not unique in employing items like *esto*; Korean, according to Lee (2005), has a similar item: *-(i)lato*. Although it would be impossible to consider all the details here, we must note that *-(i)lato* appears to share the distribution of *esto* in nonveridical contexts, as well as its association with the *at least* reading. For an illustration, consider the following examples, from Lee (2005: 17), where *-(i)lato* is interpreted as ‘at least’ and is contrasted with *-to*, which remains an additive EVEN:

- (103)a. Aisukurim-**to** mek-epo-a.
ice cream-even eat-try-Comp
Try to eat even(=also) ice cream.
- b. Aisukurim-**ilato** mek-epo-a.
ice cream-even eat-try-Comp
Try to eat even (=at least) ice cream.

The contrast is parallel to our (99a,b). Crucially, when *-to* combines with high likelihood, as with the predicate ONE, the result is unacceptable, but *-(i)lato* is fine, just like *esto*:

(104)a. *Hanpen-to ha-yla.

b. Hanpen-ilato ha-era.

one time-even do-Comp

Do it even (=at least) once.

(Lee, 2005: (24))

The behavior of *-(i)lato* in questions described in Lee (2005) further supports the parallel with *esto*, and I refer to this work for more details. Here, suffice it to note that in Korean too we find a contrast between a likelihood and a flexible scale EVEN, a fact that ties in nicely with the general predictions of the theory I am proposing.

To sum up, nonveridical contexts are consistent with the low-scalar presuppositions of both *esto* and *akomi ke*. The particles exhibit two distinct readings: the *at least* reading (*esto*) and the *also* reading (PPI). *Even* seems to be ambiguous (or flexible) in allowing both reading. The contrast between the *even-at least* and *even-also* readings is generally visible in the other contexts in which both items are admitted, we examine further questions, where we see that negative bias is produced by the *at least* reading.

5 Polar questions: negative bias revisited

In this final section we examine the distribution and presuppositions of *akomi ke* and *esto* in questions. It is first shown that NPI *oute* is not licensed in questions, thus challenging the assumption that NPI-EVEN is responsible for negative bias. Then it is shown that negative bias arises only with *esto*, and never with positive low-likelihood *akomi ke*, which remains additive. As in the case of the request, English *even* turns out to be ambiguous in the nonveridical context, and admits both readings.

The literature offers two observations. First, questions with *even*, and *even*-containing PIs (i.e., minimizers, e.g. *lift a finger*, *sleep a wink*) express negative bias (Borkin, 1971; Ladusaw, 179, among others):

(105)a. Did Beatrix lift a finger to help?

Expected answer: No, she didn't.

b. Have you talked to him even once?

Expected answer: No, I haven't.

Negative bias surfaces in what counts as an expected answer: a negative proposition is expected. But the bias is a conversational implicature: we can still answer the questions positively without contradiction (see also Guerzoni, 2004; van Rooy, 2003).

The second observation is that the bias is due to the fact that (many) strong NPIs contain *even* (Heim, 1984; Linebarger, 1980). The appearance of strong, *even* containing NPIs in questions poses another challenge to the assumption that DE alone is a necessary condition for the occurrence of EVEN-PIs (Lahiri, 1998). This *even* is associated with a minimal amount, thus making the NPI itself denote a minimal amount. We see in this section that Greek confirms that the intuition about minimal amounts is correct, and that, most importantly, we should not collapse minimal amount with low-likelihood. At the same time, we extend minimal amount to include in general low ranking on a contextually defined scale other than likelihood. The EVEN meaning we need is that of *esto*. English *even* will again show variable association indicative of both *esto* and low-likelihood *akomi ke*, which, crucially, yields no bias.

Crosslinguistically, an overt *even* in a declarative negative sentence may, and in some cases must, occur with bias-inducing minimizers, e.g. in Catalan, Spanish (Herburger, 2003; Vallduví, 1994), or Greek (Giannakidou, 2003). This EVEN is the NPI one (see Herburger, 2003; Vallduví, 1994 for the NPI status of *ni*):

- (106)a. No va dir ***(ni)** paraula en tota la tarda. Catalan
 b. No dijo **(ni)** palabra en toda la tarde. Spanish
 c. Dhen ipe **(oute)** mia lexi oli nixta. Greek
 He did not say even a word all evening

Recall that *oute* is the unmarked option for Greek minimizers and negation, but, crucially, NPI-EVENs are disallowed in questions:

- (107)a. *Va dir **ni** paraula en tota la tarda? (Catalan)
 b. *Dijo **(ni)** palabra en toda la tarde? (Spanish)
 c. *Ipe **oute mia** leksi? (Greek)
 Did he say even one word (all evening)?

The ungrammaticality follows from the NPI status of *oute* and *ni*, and obviously, at least in these languages, negative bias cannot be derived from NPI-EVEN. This fact in itself challenges the attempt to render wide scope and NPI-EVEN equivalent in questions (Guerzoni, 2004) in order to derive the bias. In questions, *esto* and *akomi ke* are the items to be used, and negative bias arises only with *esto*.

5.1 EVEN with minimal amount

Consider first the case of EVEN with an expression denoting a minimal amount:

- (108)a. Tu exis milisi **esto ke mia** fora?
 him have.2sg talked even one time
 b. ?#Tu exis milisi **akomi ke mia** fora?
 him have.2sg talked even one time
 Have you talked to him even once?
 Expected biased answer: No.

Interestingly, *akomi ke* is unacceptable with minimal frequency *once*, which we expect in our account (recall also Korean *-to*). The low likelihood of *akomi ke* conflicts with the high likelihood of the minimal frequency ONE:

- (109) *Akomi ke*
 $\exists n [n \neq \mathbf{once} \wedge \text{you talked to him } n\text{-times}] \wedge$
 $\# \forall n [n \neq \mathbf{once} \rightarrow \text{likelihood (talking to him } n \text{ times)} > \text{likelihood (talking to him } \mathbf{once})]$

Since “*I talked n-times*” entails that *I talked one time*, one is the most likely cardinality hence the oddity with *akomi ke*. Let me point out again that this fact is problematic for Lahiri’s (1998) account of the occurrence of Hindi EVEN-ONE PIs in questions. According to Lahiri, the Hindi *bhii* that participates in the formation of these PIs is a low-likelihood one, but what the Greek facts have shown consistently in this paper is

that a true low-likelihood EVEN, *akomi ke*, actually remains unacceptable with ONE also in questions, because of the high likelihood of ONE.

Generally, the prediction is that the combination of positive EVEN with inherently high likelihood items will be problematic; we confirm again that this is the case.

- (110) ?# Boris na prosthesis **akomi ke 1 + 1?**
 can.2sg subj add.2sg even 1+1
 Can you add even 1+1?
 (1+1 is the easiest addition to do, hence the MOST likely).

Unlike *akomi ke*, *even* appears to be fine with high likelihood, contradicting again the idea of unitary low-likelihood *even*. *Esto* is also compatible with high likelihood, as long as it scores low on the context given scale:

- (111) Boris na prosthesis **esto 1 + 1?**
 can.2sg subj add.2sg even 1+1
 Can you add even 1+1?
 (1+1 is the *least difficult* one to do).

Likewise for the frequency *once* in the case of (108a):

- (112) *Esto*
 $\exists n [n \neq \text{once} \wedge \neg (\text{you talked to him } n \text{ times})] \wedge \forall n [n \neq \text{once} \rightarrow \text{frequent}$
 (n-times) > **frequent** (once)]

This explains the use of *esto* with the cardinality predicate *one*. In the light of what we saw here, we have to conclude that a low-likelihood *even*, *akomi ke*, cannot be responsible for negative bias in questions, and it cannot associate with minimal amount.

5.2 Variable likelihood

With predicates of variable likelihood, both *esto* and *akomi ke* are fine. But notice the difference in interpretation:

- (113)a. Elises **esto to Provlima 1?** (Problem 1 is the easiest; negative bias)
 Did you solve even (*at least*) Problem 1?
- b. Elises **akomi ke to Provlima 1?** (Problem 1 is the hardest; no bias)
 Did you solve even (*also*) Problem 1?

Akomi ke has only the expected *also* reading:

- (114) *Akomi ke*
 $\exists x [x \neq \text{Problem 1} \wedge \text{you solved } x] \wedge \forall x [x \neq \text{Problem 1} \rightarrow \text{likelihood (you solve } x) > \text{likelihood (you solve Problem 1)}] = \text{Problem 1 is the least likely one to solve (hence the most difficult one)}.$

This presupposition does not create negative bias: the speaker assumes that other problems were solved. Additionally, because *akomi ke* must pick out the least likely element, Problem 1 ends up being the hardest one. This correctly describes the conditions under which a polar question with *akomi ke* can be used. Notice that if we force *akomi ke* to combine with high likelihood, the result will be unacceptable, in accordance with what has been observed so far:

- (115) ?#Elises **akomi ke to efkolotero provlima?**
Did you solve even (= also) the easiest problem?

This is odd, because the easiest problem is the most likely one to solve and *akomi ke* cannot combine with high likelihood. With *esto*, on the other hand, we have the following presupposition:

- (116) *Esto*
 $\exists x [x \neq \text{Problem 1} \wedge \neg (\text{you solved } x)] \wedge$
 $\forall x [x \neq \text{Problem 1} \rightarrow \text{difficult } (x) > \text{difficult } (\text{Problem 1})]$

This presupposition creates negative bias: the speaker assumes that there are other problems besides Problem 1 that were not solved; and if Problem 1 is the least difficult one, then the question is about whether *at least* the least difficult problem is solved, hence the bias. This presupposition is consistent also with the more detailed account given in van Rooy (2003), and if van Rooy's account is correct, then *even* must be equivalent to *esto* in the way it licenses negative bias.

As expected, *esto* will be impossible with *the most difficult problem* exactly because of a conflict with its scalar presupposition:

- (117) ?#Elises **esto to diskolotero provlima?**
Did you solve even the most difficult problem?

As an overall conclusion, then, we can say that the behavior of EVEN-items in questions supports the polarity hypothesis in its entirety. The low-likelihood EVEN of the scope theory actually predicts no bias, and this is in fact what we have seen with Greek *akomi ke*.

It will be helpful in this connection to go back to the Japanese particle *-sae*:

- (118) Akira-wa **mondai 2-sae** toita no?
Akira-TOP problem 2-even solved Q
Did Akira solve even (=also) Problem 2? (Yoshimura, 2004: (23))

Yoshimura (2004) notes that Japanese is unlike Greek, but like English, in employing *-sae* in positive and negative sentences. But unlike *even*, in questions, *-sae* does *not* create negative bias:

- (119)i. There are other problems besides problem 2 that Akira **solved**.
Positive (no bias)
ii. Problem 2 is the **least likely** problem for Akira to solve.

Consequence: Problem 2 is a difficult one.

Japanese *sae* is just like *akomi ke*: it is only compatible with the context (119), consistent with the *also* reading of positive low likelihood. Hence, we again have evidence that negative bias is not derivable from low likelihood. The behavior of English *even* in questions suggests that *even*, unlike *akomi ke* and *sae*, is in fact ambiguous between a reading with negative bias (akin to *esto/at least*) and an additive reading without bias (akin to *akomi ke/also*). This flexibility is in agreement with what we observed generally to be the case in nonveridical contexts, including negation.

To sum up, the behavior of the two lexicalizations of EVEN in questions seems to be entirely predictable by the refined presuppositions of *esto* and *akomi ke* we have

suggested. Negative bias is derived by the presupposition of minimal amount or low flexible ranking that comes with *esto*, along with a negative existential presupposition that is also part of the contribution of this item. Crucially, low likelihood yields no bias in questions, but contributes the expected additive meaning that low likelihood items contribute in positive contexts in general.

6 Conclusions

In exploring the landscape of EVEN expressions in Greek, the main goal of this paper was to show that the scalar properties of what can be identified as an *even* meaning crosslinguistically are quite complex, certainly much more than expected by the unitary low likelihood analysis of Karttunen and Peters. This result supports earlier observations (Horn, 1989; Kay, 1990) that we need a more refined theory of the kinds of scales *even* can associate with.

In trying to go beyond the dilemma of scope versus lexical ambiguity of *even*, I proposed that in the larger crosslinguistic picture (English included), instead of talking about a unitary low-likelihood EVEN, it is preferable to delimit a family of possible presuppositions of EVEN depending on the scale depicted (likelihood or not), how the scale is structured by EVEN (high scalar versus low-scalar EVEN), and whether there is a negative condition of the alternatives. These options allow for a number of possibilities, some of which may be lexicalized within and across languages. We have identified four such lexicalizations in Greek: *akomi ke*, which is indeed a low-likelihood EVEN that must scope above negation (thus its status as a positive polarity item); *oute*, which is a well-behaved high-scalar negative polarity item (NPI) licensed in the scope of negation; flexible scale EVEN *esto*, which is a low-scalar EVEN defined not on likelihood but on a contextually specified scale; and *kan*, which is a high-scalar EVEN that comes with a positive existence presupposition (unlike NPI *oute* whose high-scalar value comes with a negative existence statement). Because of their high-scalar values both *oute* and *kan* were shown to be fine in the scope of negation, and compatible with each other.

A great part of the discussion was devoted to showing that it is the presuppositions of the EVEN items, and in one case also lexical featural specification (NPI-*oute*), that motivate their scopal behavior. This is an important conceptual point, as it shows that polarity status and scopal behavior are lexically driven, by contrast with the bare scope theory where raising of *even* above negation is merely stipulated. The scalar presupposition of bottom-of-scale EVENS (positive as well as flexible scale) was shown to remain problematic in the scope of negation because of a clash between the assertion with a bottom of scale item, and the expectation of a stronger statement (i.e. one with scale reversal) induced by the use of the scalar particle. In the case of low-likelihood EVEN (*akomi ke*) the problem can be fixed by *overt* raising above negation – though, as I pointed out, this is more of a ‘rescuing’ operation typical of PPI-behavior, rather than actual sanctioning (hence the relative markedness of such cases with respect to NPI *oute*).

Crucially, even after *overt* raising above negation, low likelihood *akomi ke* remains incompatible with the cardinality predicate ONE. Likewise, low-scalar *esto* does not improve with ONE under negation. These facts challenge the usefulness of bottom-of-the-scale inferences in explaining the distribution of EVEN-*one* PIs that are actually fine in the scope of negation (Lahiri, 1998). Additionally, the fact that *akomi ke ena*

and *esto (ke) ena* ‘EVEN ONE’ appear in nonveridical contexts — such as, *inter alia*, subjunctives, imperatives, and questions — while remaining problematic with negation and mere downward entailment, runs counter to Lahiri’s idea that downward entailment alone is a necessary and sufficient condition for the licensing of EVEN ONE PIs. The improvement with nonveridicality (observed with the Hindi *bhii*-PIs discussed by Lahiri) seems to be entirely missed in Lahiri’s account.

The link between polarity and EVEN, then, was shown to have far-reaching consequences. One final question remains: What are the implications of this theory for *even*? Would it still be plausible, given what was shown in this paper, to use the low likelihood analysis to account for the distribution and interpretation of *even*?

The bare wide scope theory, i.e. the combination of low likelihood and raising, renders *even* comparable to *akomi ke*. However, we identified here a number of important empirical differences between *akomi ke* and *even* that cannot be glossed over. Specifically, *akomi ke* (a) is odd in the surface scope of negation, locally as well as long distance; (b) remains odd in positive as well as negative sentences when combined with the cardinality *one*; (c) is incompatible with expressions of high likelihood in general; and (d) always conveys an additive meaning that does not produce negative bias in questions. These are all properties expected from an unambiguous wide scope low likelihood EVEN, as I suggested. But *even* exhibits the opposite pattern: (a) it is fine in the scope of negation generally; (b) it is fine with the predicate *one* under negation, (c) it allows narrow-scope readings with negation long distance; (d) it combines with expressions of variable likelihood; and (e) it is ambiguous in questions and other nonveridical contexts between the additive meaning of *akomi ke*, and the negative bias reading of *esto*. Unlike *akomi ke*, *even* was also shown to be fine in the scope of negation with minimizers, indicating in this case an NPI-like behavior.

This variable pattern suggests a flexible association, i.e. one that enables *even* to introduce various scales besides likelihood, and attach to low as well as high-scalar values—a fact that became particularly clear in the nonveridical contexts of requests and questions. But if indeed *even* associates with high-scalar values in these cases, then why not also in the scope of negation, as suggested with the NPI analysis? At the same time, *even* behaves like both likelihood *akomi ke* and non-likelihood *esto* in questions in allowing biased and non-biased readings. I cannot see how we can correctly characterize this pattern in a non-stipulative way without resorting to some sort of lexical ambiguity. Certainly, in the context of the typology I proposed in Sect. 4, *even* appears as a cover for a number of actual lexicalizations in Greek and other languages. Whether we call this ambiguity or just ‘flexible association’ is not so important, since there does not seem to be much contentful difference between the two labels. What is important to note is that, either way, the low likelihood analysis of *even* cannot be maintained, and that if indeed it is uniform, then in order to be made consistent with the variable scope facts observed in this paper, *even* must be rendered scopeless.

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