**Negative and positive polarity items:
Variation, licensing, and compositionality**

Anastasia Giannakidou
University of Chicago
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In this chapter, we discuss the distribution and lexical properties of common varieties of negative polarity items (NPIs) and positive polarity items (PPIs). We establish first that NPIs can be licensed in negative, downward entailing, and nonveridical environments. Then we examine if the *scalarity* approach (originating in Kadmon and Landman 1993) can handle the attested NPI distribution and empirical variation. By positing a unitary lexical source for NPIs—widening, plus EVEN— scalarity fails to capture the fact that a significant number of NPIs are not scalar, and does not predict correctly NPI distribution in nonveridical contexts. It also misses the variation within the scalar class between broader (*any)* and narrow NPIs (*either*). Finally, scalarity predicts weaker effects (contradictions, presupposition failures) with ill-formed NPIs than is actually the case. The *variation* approach (Giannakidou 1998, 2001, 2007), on the other hand, posits that besides scalarity, NPIs can be created because of the presence of a variable in the NPI that cannot be interpreted deictically. This approach, by allowing more lexical sources for NPIs, is consistent with the diversity of NPIs, and extends easily to PPIs, which, as a class, appear to be non-scalar (Szabolcsi 2004 for *some*). Here one can again advance the argument that PPI-status is due to various sources including referentiality (*some),* and *speaker commitment* (with PPI adverbs; Ernst 2008).

1   Introduction: common paradigms of polarity items and basic terminology

Polarity phenomena in natural language are pervasive. In this chapter, we study the properties of two of the most famous classes: 'negative polarity items' (NPIs) and 'positive polarity items' (PPIs). This first section offers the background necessary for our discussion, and introduces the terminology that will help identify NPIs and PPIs as distinct among other PI-paradigms.

1. 1   Negative polarity items
NPIs are typologically very common (Haspelmath 1997 reports data from forty languages), and seem to exist in virtually every language we consider. Their hallmark property is exclusion from positive assertions with simple past (i.e. positive episodic sentences that make reference to a single specific event; Giannakidou 1997). English *any, ever* (first identified in Klima's 1964 work on English negation), Greek *tipota,* and Dutch *ook maar iets* are well-known NPIs:

(1)   a   Bill didn't buy **any** books.
         b   * Bill bought any books.   (versus: Bill bought {*War and Peace*/two books}).

(2)   a   * Bill has **ever** read *War and Peace*.
       b   Bill hasn't ever read *War and Peace*.

(3)   a   Dhen idhe   **tipota** o Janis.   Greek
            not   saw   anything the Johh
            John didn't see anything.
       b   * Idhe **tipota** o Janis.
            John saw anything.

(4)   a   Niemand heeft **ook maar iets**   gezien.   Dutch
            nobody has   even   something   seen
            Nobody saw anything.
       b   *Jan heeft **ook maar iets** gezien.
            * John saw anything.

Any, ever, ook maar iets, and *tipota* are ill-formed in positive episodic sentences, but become fine with negation (or in habitual sentences, as we see later). NPIs belong to various syntactic categories: there are nominal NPIs, but als NPI adverbs, NPI-verbs (*hoeven, brauchen* in Dutch and German; van der Wouden 1994), NPI-EVEN particles (Greek *oute*, Giannakidou 2007; Spanish *nisiquiera* Herburger 2003, a common category crosslinguistically), and English *either*:

(5)   a   Bill isn't here yet.
       b   *Bill is here yet.
(6)   a   I haven't seen Bill in years.
       b   * I saw Bill in years.
(7)   a   Bill doesn't like pasta either.
       b   * Bill likes pasta either.
(8)   a   Je hoeft niet te komen.   (Dutch)
            you need not to come
            You need not come.
       b   * Je hoeft te komen.

(9)   Greek NPI-*oute*
       a   Dhen theli na dhi   **oute**   to idhio tou to pedi.
            not want3sg to see.3sg   even.NPI   the self his the child
            He doesn't want to see even his own child.
       b   *Theli na dhi **oute** to idhio tou to pedi.
            #He wants to see even his own child.

(Notice the contrast in (9) between Greek NPI-*oute* and English *even* in terms of status, a point to which we return in section 6). NPIs are said to be *licensed* (or *triggered;* Ladusaw 1980) by negation. Licensing normally says that the NPI must be in the scope of negation, and scope often translates into overt c-command:

(10)   a $\neg \exists x.$ book (x) ∧ bought (b, x)
       b $\exists x.$ book (x) ∧ $\neg$ bought (b, x)

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(11) a   *Anydoby I didn't see.
     b   [Three students]_F I didn't see.

Not all NPIs are subject to overt c-command, and language specific conditions can play a role, but it is certainly a strong tendency for (a subset of) NPIs to appear within the overt scope of their licenser them. In this paper, our focus is on the semantic properties of NPIs, and details of syntactic questions like overt c-command are put aside. In Giannakidou 1998, I offered a semantic explanation for this tendency, by attributing it to the fact that NPIs are not referential: construals like (11a) are not possible because *any* would have to be interpreted as a topic, but it can't (see Giannakidou 1998: 232-242 for details, including certain specificity effects). For an attempt to reanalyze overt c-command as LF licensing, see Uribe-Etxebarria (1994).

1.2   Free choice items

Free choice items (FCIs) are often thought of in relation to NPIs. Because of *any,* which exhibits both NPI and FCIs usage, attempts have been made to attribute NPIs and FCIs to a common source (Chierchia 2006). We see in this paper that such attempts are bound to be unsuccessfull.

FCIs express what Vendler (1967) called *freedom of choice*, a property manifested in the typical FCI use of *any* in generic sentences and with modal verbs:

(12) **Opjadhipote** ghata   kinigai pondikia.   (Greek)
      Any   cat   hunts mice.   (English)
(13) **Opjosdhipote** fititis   bori na lisi afto to provlima. (Greek)
      Any   student   can solve this problem.   (English)

These are sentences about cats and students in general. Freedom of choice is described in terms of *domain widening* (Kadmon and Landman 1993), *indifference* (von Fintel 2000, Horn 2000, Giannakidou 2001), and is also known under the names of *domain vagueness* (Dayal 1995), *non-individuation* (Tovena and Jayez 2005). These characterizations are intended to capture that free-choiceness comes with scalarity, contrasting with NPIs like *tipota* and *ook maar iets* which have been described as non-scalar (Giannakidou 2008, Rullmann 1996 for Dutch).

Crosslinguistically free choice is marked with special morphology—e.g. Greek –*dhipote*, in the FCI above (which is distinct lexically from NPI tipota). Many languages follow the pattern of Greek with distinct lexicalizations (see Giannakidou and Cheng 2006, C. Lee 1997, and references for more details). Importantly, FCIs are bad in both positive and negative sentences:

(14) a.   *Idha   **opjondhipote.**   (Greek; Giannakidou 2001)
            saw.perf.1sg   FC-person
            '*I saw anybody.'
      b.   ***Dhen** idha   **opjondhipote.**
             not   saw.perf.1sg   FC-person
            Intended: 'I didn't see anybody.'

Unlike NPIs, FCIs remain bad with negation in an episodic context. In Giannakidou 1998, 2001, and Giannakidou and Cheng 2006, it is shown that anti-episodicity characterizes FCIs in many languages, e.g. Spanish, Catalan, French, Chinese, and renders them polarity sensitive:

(15) Spanish; Quer 1999
     * (Non) Expulsaron del   partido   a   **cualquier** disidente.
       not   expel.3pl from-the party   ACC FC   dissident
     Intended: '*They expelled any dissident from the party.'
     Intended: 'They didn't expel any dissident from the party.'

(16) Catalan; Quer 1998
     * (No) Li   va   comprar **qualsevol** ram.
       not her/him aux.3sg to.buy   FC   bouquet
     Intended: '*S/he bought him/her any bouquet.'
     Intended: 'S/he did't buy him/her any bouquet.'

But not all FCIs are polarity sensitive; e.g. German *irgendein* (Kratzer and Shimoyama 2002) is fine in positive episodic contexts, and so is English *wh-ever* (Horn 2000, 2006):

(17) a   **Irgendjemand** hat angerufen.   (Kratzer and Shimoyama 2002: (6))
         irgend-one   has called
     b   * Opjosdhipote tilefonise.   (Greek)
(18) a   Bill bought **whichever book** he liked.
     b   *Bill bought whichever book.

Indeed, looking across languages, one finds variation in FCIs (see Vlachou 2007 for French). I am not going to discuss how FCIs come to be polarity sensitive here; rather, I use FCIs only to compare to NPIs when it come to assessing the idea that they are d to the same source. Given that (at least some) FCIs remain bad with negation, we must hypothesize that NPIs and FCIs, as classes, cannot be sensitive to the same thing.

1.3   Positive polarity items (PPIs)

AFFIRMATIVE PIS, or POSITIVE PIS (PPIS) are expressions that are 'repelled' by negation and tend to escape its scope. PPIs were first identified as a class in Baker (1970), and are discussed more recently in Szabolcsi 2004, Nilsen 2003, and Ernst 2008. Expressions like *some, already, would rather,* and speaker oriented adverbs have been identified as PPIs in the literature:

(19) a   Bill didn't buy some books.
     b $\exists x.$ book $(x) \wedge \neg$ bought (b, x)
(20) a   Bill would rather be in Montpellier.
     b   # Bill wouldn't rather be in Montpellier.
(21) a   John is here already.
     b   #John isn't here already.
(22) a   Unfortunately, John died.
     b   # John didn't unfortunately die.

As we see, *some books* exhibits the scope outside negation that *any* lacks, and only that. A context where two books were bought by Bill and ten books were not, would verify *John didn't*

buy some books but falsify *John didn't buy any books*. PPIs like *some* are thus the opposite of NPIs in terms of referential properties: they tend to be specific, and take wide scope, properties to which we return in section 8.

Would rather and *already* are odd with negation, and likewise *unfortunately*. This contrasting behavior of NPIs and PPIs prompted analyses of PPIs as *anti-licensed* by negation (Giannakidou 1997, 1998, Progovac 1994; also Ladusaw 1979), but recently attempts have been made to reformulate anti-licensing as a positive condition (Szabolcsi 2004, Giannakidou 2006).

1.4   Roadmap

Polarity phenomena are significant because they provide a case of well-formedness that is not fully determined by syntax: the distribution of PIs is not fully predicted by their syntactic category, and they seem to be sensitive to semantic factors of the sentence (roughly, the presence or not of negation, or modality in the case of FCIs). This sensitivity addresses the fundamental relation between syntactic and semantic well-formedness, and what impact, if any, pragmatics can have on that relation. Polarity thus provides a uniquely complex domain to investigate the relation between syntax-semantics and pragmatics, and the nature of semantic knowledge.

In this chapter, we examine the distribution and meaning of NPIs and PPIs, in the light of the issues that have determined the research in the past 30 years: distributional variation (within and across languages), mode of sanctioning (licensing, anti-licensing), and compositionality. These issues are presented in section 2. In section 3, we examine the basic distribution patterns of NPIs and see that NPIs are licensed in negative, downward entailing and nonveridical contexts (which may be upward entailing). In section 4, we discuss the appearance of some NPIs in *veridical and non-DE* contexts, and propose that this indicates that some NPIs are not actually licensed, but *rescued* under certain pragmatic conditions. In section 6 we discuss the scalarity approach and conclude that it is inadequate empirically and conceptually. In section 7, I discuss the alternative I have been developing in my own work, where at least some polarity phenomena are underlyingly referential dependencies. In my system, NPIs can also be created by variables that cannot be used deictically or referentially. In section 8, we examine PPIs. We find here that the scalar approaches have very little to say about PPIs and PPI-variation (Szabolcsi 2004, Ernst 2008). An approach based on veridicality, referentiality, and speaker commitment seems to be more successful in this respect.

2   Core questions about polarity: sanctioning, variation, and sensitivity

NPI licensing has been a central issue in linguistic theory, and indeed one that has received considerable attention since Klima's (1964) seminal work on English negation. In the earlier works, the main goal has been English, but recent crosslinguistic studies have extended the empirical domain of polarity, and made obvious a complexity that in the earlier works went unnoticed. We now know that *any* is one of many PI paradigms in the world's languages, and that the various NPIs are not subject to identical distributional restrictions.

The central theoretical task in most theories of polarity in the past 30 years has been to delimit the set of potential NPI-licensers. This is known as the *licensing* question (Ladusaw 1996). In order to be able to predict if an expression can act as a licenser or not, we have come to expect a coherent and relatively homogenous characterization of the set of expressions that can

possibly allow PIs within and across languages. There have been two main approaches to the licensing question: the semantic, and the pragmatic negation-based one. The pragmatic approach, best represented by Baker 1970 and Linebarger 1980, 1987, 1991 claims that *all* licensing is done by negation, either by entailment (with negation), or (conventional or conversational) implicature (when there is no negation). Linebarger also proposes that NPIs must be in the *direct* scope of negation (Linebarger 1987), excluding PIs when "harmful" material intervenes between negation and PI; these cases are known as *intervention* phenomena and will not be discussed in the present paper for reasons of space (see Jackson 1994, however, for a good overview).

The semantic approach originates in Ladusaw 1980, and is modified in Zwarts 1995, von Fintel 1999, and Giannakidou (1995, 1997, 1998, 1999, 2001, 2002, 2006). It maintains that the set of possible NPI licensers must include expressions that are NEGATIVE, DOWNWARD ENTAILING (DE, Ladusaw; Strawson DE; von Fintel 1999), and NONVERIDICAL, in this case often without being negative or DE (Giannakidou, Zwarts). The extension to nonveridicality accounts for NPIs in non-negative and non-DE contexts—questions, disjunctions, modalities, and directive propositional attitudes such as *want* and *hope*. DE expressions are a subset of the nonveridical, hence nonveridicality is an extension of DE that allows licensing by a non-DE expression.

A second important question concerns the *status* of illicit NPIs. Polarity, as mentioned earlier, raises the question of well-fomedness that is not purely determined by syntax. If not purely syntactic, then what is the nature of polarity ill-formedness? Since early on, the intuition has been that sentences with failed NPIs, e.g. **Bill brought any presents, *Bill talked to John either,* are unacceptable in a sense stronger than mere lexical anomaly, or presupposition failure.

(23)   a   #The king of France arrived yesterday.
       b   # Jason has a population of 3 million.

Here we have a presupposition failure and a category mistake (people cannot have populations), and the sentences are perceived as odd, though we can almost figure out what they mean (e.g. *If Jason were a city, then it would have the population of 3 million*, and likewise, *If France had a King then that person could have visited the museum yesterday*). Ill-formed *any* sentences, on the other hand, are odd in a qualitatively different way. But how exactly?[1]

In the more than thirty years of research on polarity, with a few exceptions (Ladusaw 1996, Giannakidou 1998, 2001), scholars were eager to ignore the status question. Recently, the tendency has been to view NPI ill-formedness as some kind of semantic/pragmatic murkiness, with some NPIs being more murky than others along the same dimension (defined usually in terms of some form of *strength*). This premise lies also at the foundation of approaches that seek to reduce polarity to *scalar* deficiency (Lahiri 1998, Krifka 1995, Chierchia 2006); in these approaches, NPI failures are typically reduced to presupposition failures or contradictions.

The desire to reduce all polarity failures, to a unitary source is, understandably, very attractive to a semanticist. However, we saw already that FCIs and NPIs cannot plausibly be reduced to the same source, as the latter improve, but the former do not, with episodic negation;

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[1] That polarity failures have stronger psychological status mere lexical anomalies is supported by recent processing evidence (Saddy at al. 2004, Drenhaus et al 2006, Drenhaus, Blaszczak, and Schutte 2006). This research finds a biphasic N400/ P600 pattern with violating conditions of NPIs, suggesting that the processing of NPIs is linked to both syntactic and semantic factors: the N400s reflect the attempts to integrate the NPI semantically, and the P600 manifests the processing cost relating to syntax. These results are thus very challenging for approaches that try to reduce NPI failures to mere presupposition failures or contradictions.

and there are NPIs that are not scalar (Greek *tipota)* yet exhibit distributions parallel to *any*, which is. PPI indefinites are also not scalar (Giannakidou 1998, Szabolsci 2004). These and more data (that we review in this paper) challenge the feasibility of the scalarity approach as a general theory of polarity, and call for a variation account (Giannakidou 1998, 2001, 2007).

Status is linked to the question of compositionality: for a given PI-paradigm, what exactly is responsible for the limited distribution we see? This question prompts a close examination of the lexical contribution of individual classes of NPIs, but in the earlier days it was overlooked. In those days, polarity conditions were postulated as global, composition external filters on sentences (or grammatical representations), as can be seen in Ladusaw's *semantic filtering*:

(24)   Semantic Filtering   (Ladusaw 1983)
        grammatical (ϕ) $=_{def}$ **Syn** (ϕ) $\wedge$ **Sem** (ϕ);
        where **Syn** is syntactic well-formedness, **Sem** is semantic-well-formedness

Grammaticality is a conjunction of syntactic and semantic well-formedness. Syntactic rules determine which structures will be grammatical and which not, and so do semantic rules. In the case of polarity, a syntactically well-formed structure will be filtered out semantically: a sentence with the NPI *any* is subject to a *semantic* licensing condition (that it requires negation), and this condition is not satisfied if there is no negation. Why PIs are subject to such semantic conditions remains a mystery: there is no obvious link between negation and the NPI in such an account.

In current theorizing, semantic filtering is unsatisfactory. We want to do away with a polarity "module", and understand how the lexical content of a given PI is responsible for its limited distribution. In the new agenda, the polarity status is no longer stipulated but follows compositionally from the lexical semantics, and PIs are no longer "special" or mysterious, but manifestations of more familiar phenomena that exist in grammar anyway (scalarity, referential dependencies). Recent examples of theories inspired by this goal are: Kadmon and Landman 1993, Lee and Horn 1994, Krifka 1995, Israel 1996, 1998, Lahiri 1998, Tovena 1998, Giannakidou 1998, 2000, 2001, 2007, Chierchia 2006. A view of sensitivity has emerged where PIs are 'deficient' because they contain *additional* or *deficient* components in their meanings, thereby creating more demands on the environments of occurrence.

Having outlined these important foundational issues, we now go back to *any* and take a closer look at its distribution.

3   Licensing and downward entailment

It soon became obvious that the distribution of *any* exceeds negation. I will proceed to show this incrementally. First, *any* is fine in sentences with DE quantifiers (*few professors*), and in the restriction of universal quantifiers such as *every*.

(25)   a   Every student who saw anything contacted the police.
        b   {Few professors/*Many professors} invited any students.

The restriction of *every*, especially, makes a remarkable case against negation being the key factor in the appearance of *any*. *Any* also appears in questions, and in *if*-clauses:

(26)   a   If you talk to any students, just let me know.
        b   Did you see anybody?

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The environments here are not negative, as noted already by Klima, who coined the term "affective" to unify negation, questions, and the rest. Affective is just a "syntactico-semantic" feature in Klima, but Ladusaw 1980 hypothesized that there is an underlying semantic property characterizing all affective contexts: downward entailment (DE).

3.1   Downward entailment

Ladusaw proposed the following licensing condition for NPIs:

(27)   *Ladusaw's (1979) licensing condition*
      α is a trigger for negative polarity items in its scope iff α is downward entailing.

A *trigger* is an expression in the sentence whose presence is necessary in order to make a PI legitimate; a trigger is also known as *licenser*. Unlike upward entailing (UE) functions, which are order preserving and closed under supersets, DE functions are order reversing and closed under subsets. Both are illustrated below (the definitions rely on Zwarts 1986, Kas 1993):

(28)   A function *f* is upward entailing iff for every X,Y: if X≤Y, then $f(X) \leq f(Y)$
(29)   A function *f* is downward entailing iff for every X,Y: if X≤Y, then $f(Y) \leq f(Z)$

UE functions support inference from sets to supersets, and DE functions support inference from sets to subsets. In DE contexts, expressions denoting sets can be substituted for expressions denoting subsets *salva veritate*. Negation, *few students* and the restriction of *every* are DE:

(30)   a   Lucy does not like linguistics.
              [[syntax]] ⊆ [[linguistics]]

              _____
              ∴ Lucy does not like syntax.
        b   Few students like linguistics.
              [[syntax]] ⊆ [[linguistics]]

              _____
              ∴ Few students like syntax.
(31)   Every [student who likes linguistics] came to the party.
              [[syntax]] ⊆ [[linguistics]]

              _____
              ∴ Every student who likes syntax came to the party.

Hence DE successfully captures the occurrence of NPIs with negation and in the restriction of *every*, an environment that had nothing to do with negation. This was a remarkable result, and DE initiated a fruitful research program for semanticists (Hoeksema 1986, Zwarts 1986, 1993, van der Wouden 1994, Kas 1993, Dowty 1994, Lahiri 1998, among many others). One also finds references to licensing environments as non-UE (Postal 2000, Progovac 1994). The shared enthusiasm has been that we can characterize semantically the class of NPI-licensers. Yet this advance brought with it a number of persistent limitations which we explore next.

3.2.   Problems with DE: NPIs appear in non-DE contexts

Critiques of DE are to be found in numerous places in the literature; I will mention here Zwarts 1995, Giannakidou (1997, 1998, 2006), and van Rooy (2003). The problems are empirical as well as conceptual. One major problem with DE-conditions is, as mentioned earlier, that they are not compositional: they are stipulated as global, composition external filters on representations that contain PIs. Why NPIs are subject to licensing rules remains a mystery. In this section, we further see that DE does not predict the correct set of licensing environments either in English or crosslinguistically, and that it is not flexible enough to capture the variation attested.

3.2.1   Non-uniform licensing in the restrictions of universals

Though DE explains nicely the occurrence of NPIs in the restriction of *every,* it fails to capture the contrast below between the restriction of *every*, which allows *any*, and the restriction of *each* and *both*, which doesn't (see Giannakidou 1997, 1998; also Horn 1972, Seuren 1984).

(32)   {Every student/ the students} who saw anything reported to the police.
(33)   a.   */??Each student who saw anything reported to the police.
          b.   */??Both students who saw anything should report to the police.

This asymmetry is problematic for DE which predicts uniform licensing in universal restrictions. The contrast follows if we assume that *each* and *both*, but not *every*, are presuppositional, and in Giannakidou 1998, 1999 I suggested that presuppositional determiners are veridical:

(34)   A determiner δ is veridical iff δ NP V, uttered in c, presupposes that ∃x NP (x) in c; otherwise, δ is nonveridical.

A veridical determiner such as *each, both* can only be defined if the domain is nonempty (or contain exactly two members for *both*). This is what underlies the common characterization of such determiners as D-linked. *Every* has no such restriction and can be used in a context that allows an empty domain: *We reviewed every linguistics candidate; that is, zero, since there weren't any* is OK (for more details see Giannakidou 1998, 1999). The non-sanctioning with *each/ both* suggests that, for NPIs, it is not DE that matters, but whether or not a nonempty domain is presupposed.

3.2.2   NPIs in questions

DE cannot explain the occurrence of NPIs in questions. It is very hard to establish monotonicity patterns in questions, and to my knowledge, there has been no successful attempt to do this, a difficulty noted already by Ladusaw (see also Guerzoni and Sharvit 2007). This is a serious empirical problem, as NPIs are very common in questions. In virtually every language that can be identified to have an NPI with distribution that exceeds negation, the minimal extension is questions, and *not* DE quantifiers. I illustrate below with Greek and Dutch:

(35)   a   Heb   je   **ook maar iets** gezien?   (Dutch)
          have.2sg you anything   seen
          'Did you see anything?'

b	Idhes	tipota?	(Greek)
	saw.2sg	anything	

'Did you see anything?'

The Dutch *ook maar iets*, and its Greek counterpart *tipota*, observed at the beginning to require negation, are fine also in questions (and with no negative bias). Crucially, these NPIs are *not* licensed by *few* or *at most five (*Zwarts 1981, Giannakidou 1998)*:*

(36) a ***Weinig mensen** hebben **ook maar iets** gezien. (Dutch)
few people have.3pl anything seen
'Few people saw anything.'

 b ***/??Liji anthropi** idhan **tipota.** (Greek)
few people saw.3pl anything
'Few people saw anything.'

 c *** To poli 5** anthropi idhan **tipota**.
At most five people saw anything.

The non-occurrence of *ook maar iets* and *tipota* with a DE quantifier, and their improvement with questions (which are not DE), are problematic for the assumption that these items are sensitive to DE. Notice also that even in English, native speakers may be hesitant about the status of NPIs with DE quantifiers that are not readily 'negative'—the judgment with *at most*, especially when combined with higher number is quiet variable: ??/#*At most 50 students received anything* has often been judged as odd by native speakers in my Semantics classes (though of course more targeted research is need to establish this fact).

Finally, attempts to render *ook maar iets* and *tipota* strong NPIs (i.e. licensed by stronger, negative licensers; Zwarts 1993, van der Wouden 1997) would fail too, because it cannot explain their occurrence in questions. *Ook maar iets,* its temporal counterpart *ooit* (Hoeksema 1995), and *tipota* are licensed by a wider array of environments that can be described as nonveridical.

3.2.3 Modal and other non-DE enviroments for NPIs

In addition to questions, there are many non-DE environments where NPIs are fine. Observations about the individual cases can be found scattered in the literature, and here I begin with NPIs in imperatives, with modal verbs, subjunctive/infinitival propositional attitudes, habituals, and disjunctions (Giannakidou 1998, 1999, 2006).

(37) a Patise {kanena/opjodhipote} pliktro.
 Press any key.

 b O Janis bori na milisi me {kanenan/opjondipote}.
 John may talk to anybody.

 c O Janis ine prothimos na milisi me {kanenan/opjondipote}
 John is willing to talk to anybody.

These environments are modal and non-monotone, and the occurrence of *any* here is unexpected if DE is the licensing property. Notice that in Greek, both the non-scalar NPI and the scalar FCI

are good in modal contexts. Other cases that have been identified in the literature as problematic for DE are the following. I illustrate below with *any* as well as the Greek NPIs and FCIs:

(38) An kimithis me **{opjondhipote/kanenan}** tha se   skotoso.
      if sleep.2sg with FCI-person/NPI-person FUT you kill.1sg
      'If you sleep with anybody, I'll kill you.'

Heim 1984 noted the problem with classic DE in conditionals.

(39) Dhialekse **{opjodhipote/kanena}** vivlio.   (Imperatives)
      choose.2sg FCI /   NPI   book
      'Choose any book.'
      With *kanena vivlio:* 'Choose *some book or other.*'

(40) I Eleni dhiavaze sinithos   {kanena/opjodhipote} periodhiko.   (habitual)
      the Ellen read.imperf.3sg usually NPI   magazine
      Ellen used to read {some magazine or other/any magazine}.

Notice that in the habitual sentence Greek employs imperfective aspect. Often, the ambiguity of the English past, which allows both perfective and imperfective readings, creates the illusion of improvement of *any*, if speakers can render the sentence habitual in the context.

(41) a   I bike mesa   kanenas   **i**   afisame to fos anameno.   (disjunction)
             either entered.3sg NPI   OR   left.1pl the light on
             (??/#Either anybody came in OR we left the light on.)
      b   *Bike mesa kanenas **ke**   afisame to fos anameno.   (conjunction)
             * Anybody came in AND we left the light on.

The occurrence of NPIs in disjunctions, quite unexpected under DE, was noted first in Giannakidou 1998 (notice here an asymmetry with *any*, discussed in Giannakidou 1999, 2006). The occurrence of *kanena* in disjunction follows if we assume that the NPI is licensed by nonveridical operators: disjunctions are nonveridical, but conjunction is veridical (Zwarts 1995).

Recall, finally, that *kanenas* is non-scalar (Giannakidou 1998)—there is no *even* meaning associated with it, nor does it make us think of a widened domain. *Kanenas* is simply a non-specific existential, and I employed "some or other" here to indicate this. In the non-DE contexts, then, scalar *and* non-scalar NPIs occur, and given this difference, it seems reasonable to expect that scalar and non-scalar NPIs get sanctioned in these contexts for different reasons.

In sum, DE cannot provide the basis for unification of NPIs and NPI-licensers. We must seek the unifying factor elsewhere; Zwarts 1995 and I suggested to explore nonveridicality.

4   Unifying NPI-licensers as a natural class: nonveridicality

In philosophy, the term *veridicality* is related to truth and sometimes existence; in Montague 1969, the verb *see* is called veridical because if *I see a unicorn* is true, then it must be true that a unicorn exists; *look for*, on the other hand, is nonveridical because if *I am looking for a unicorn* is true, it is not necessarily true that a unicorn exists. Giannakidou (1994 and sequel) and Zwarts (1995) propose that polarity items are excluded from veridical sentences but are allowed in nonveridical ones, and formalized definitions of veridicality based on truth. Truth and existence are obviously related-- as can be seen more clearly in the discussion of nonveridicality of determiners (Giannakidou 1998, 1998), subjunctive relative clauses, and the (non)-referentiality of NPIs and PPIs I discuss in sections 7 and 8. [2]

   Veridicality is a property of sentence embedding functions: such a function F is veridical if Fp entails or presupposes the truth of p. If inference to the truth of p under F is not possible, F is nonveridical; nonveridicality thus captures a state of unknown (or as yet undefined) truth value. Veridicality and nonveridicality thus replace the traditional characterizations of REALIS (veridical) and IRREALIS (non-veridical)). Within the class of the nonveridical expressions, negation is identified as ANTI-VERIDICAL in that *NOT p* entails that *p* is false.

(42)   *(Non)veridicality for propositional operators*   (Giannakidou 2006)
   i. A propositional operator F is veridical iff Fp entails or presupposes that p is true in some individual's epistemic model $M_E(x)$; otherwise F is nonveridical.
   ii. A nonveridical operator F is *anti*veridical iff Fp entails that *not p* in some individual's epistemic model: $Fp \rightarrow \neg p$ in some $M_E(x)$.

(See also Bernardi 2002). Nonveridicality characterizes the meaning of functions that do not ensure truth, e.g. negation, disjunction, volitional verbs *want, suggest, insist*, modal verbs and adverbials, imperatives, questions, habituals, and the subjunctive. E.g. from the truth of *John wants to find a snake*, or *Please find a snake!*, or *Did you find a snake?*, *or John didn't find a snake,* we cannot infer that John (or anybody else) actually found a snake. These are precisely the contexts that we found above to license NPIs. Zwarts 1995 further presents a proof that DE functions are a subset of the nonveridical, hence nonveridicality is not in competition bur rather a conservative extension of DE, that affords a broader empirical coverage and strengthens the semantic theory of NPIs in just the right way.

   In the definition above, I use of a multimodel system where truth of a proposition is evaluated with respect to an individual's epistemic model, $M_E(x)$. $M_E(x)$ is a set of worlds representing the epistemic status of the individual x, and relativization wrt $M_E(x)$ was necessary (Giannakidou 1997, 1998, 1999) for explaining a contrast among propositional attitudes in NPI licensing and mood selection that we examine next. The use of multiple models in assessing truth is also emphasized in Tancredi 2007, where it is proposed that multiple models introduce also multiple (but possibly overlapping) domains, a point to which we come back in section 7.

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[2] Lin 1996 suggests that *non-existence* is the relevant property for licensing NPIs in Chinese, a generalization which Giannakidou and Cheng 2006 reformulate in terms of nonveridicality; for the related connection between *irrealis* and nonveridicality, see Levinson 2006.

4.1 Propositional attitudes, NPIs, mood choice, and nonveridicality

Giannakidou 1995, 1998, 1999 observes a correlation between mood and NPI licensing in Greek: NPIs appear in subjunctive complements (*na*) but not in indicative ones (*oti*), as shown below:

(43) I Ariaδni **epemine** na afiso {**opjonδipote/kanenan**} na perasi mesa.
the Ariadne insisted.3sg subj let.1sg FC-person /NPI-person subj come.3sg in
'Ariadne insisted that I allow anyone in.'

(44) I Ariaδni **θa iθele** na milisi me {**opjonδipote/kanenan**} fititi.
the Ariadne would like.3sg subj talk.1sg with FC- /NPI- student
'Ariadne would like to talk to any student.'

(45) a * O Pavlos **pistevi** oti idhe me {**kanenan/opjonδipote**}.
the Paul believe.3sg that saw.3sg NPI / FCI
* Paul believes that he saw anybody.

b * **Kseri** oti aγorasa {**kanena/opjoδipote**} aftokinito.
know.3sg that bought.1sg NPI / FCI car
* He knows that I bought any car.

This correlation is not confined to Greek: *any* too is fine in the infinitival complements of *would like, insist*, as we see, while it remains unacceptable in *that* complements of epistemic and factive verbs. NPI-licensing thus correlates with mood choice: subjunctive and infinitival complements allow NPIs, but indicatives do not (for data from more languages, including Romance and Russian see Haspelmath 1997, Pereltsvaig 2000, Quer 1998).

Besides NPIs, what is also interesting here is the pattern of mood choice itself: why would epistemic and verbs meaning *dream/imagine* select the indicative? This fact, commonly observed in European languages (with the partial exception of Italian that allows both indicative and subjucntive with epistemics; Portner 1992) is very surprising for the traditional assumption that the indicative is the *realis,* and the subjunctive the *irrealis* mood (see also Farkas 1992). I give below the two basic clusters of verbs in Greek:

(46) *Indicative verbs*
assertives: leo 'say', dhiavazo 'read', isxirizome 'to claim'
fiction verbs: onirevome 'to dream', fandazome 'imagine'
epistemics: pistevo 'believe', nomizo 'think'
factive verbs: xerome 'be glad', gnorizo 'know', metaniono 'regret'
semifactives: anakalipto 'discover', thimame 'remember'

(47) Directive *na- verbs* (equivalent to *to*-infinitivals)
volitionals: thelo 'want', elpizo 'hope', skopevo 'plan'
directives: dhiatazo 'order', simvulevo 'advise', protino 'suggest'
modals: (invariant) prepi 'must', *bori* 'may'
permissives: epitrepo 'allow'; apagorevo 'forbid' (negative permissive)

In Giannakidou 1995, 1998, 1999, I argued that all mood choice in Greek is regulated by (non)veridicality (Borschev et al. 2007 extended this to Russian). Indicative selecting attitudes

are veridical. Consider the typical epistemic *pistevo* 'believe'. Propositional attitudes express relations between individuals (*individual anchors* in my system, following Farkas 1992), and propositions. (In fact, *every* sentence is interpreted with respect to an individidual anchor, in the default case the speaker). For α *believes that p* to be true, it must be the case that α, the main clause subject, is committed to the truth of the embedded proposition p. Though the speaker might disagree, a prerequisite for *p* to be true in (48) is that Jacob's epistemic model (i.e. the set of worlds compatible with what Jacob believes) be a subset of the worlds where *p* is true: $M_E(Jacob) \subseteq p$. The speaker may believe or even know that what Jacob believes is false, but this is irrelevant for Jacob's beliefs.

(48)   [[Jacob believes that Ariadne loves Paul]]$_c$=1 iff
        $\forall$w [w $\in$ M$_E$(Jacob) $\rightarrow$ w $\in$ λw'. Ariadne loves Paul in w']

(See also Tancredi 2007 for a very similar formulation). Since all worlds in the model M_E(Jacob) are *p*-worlds, *believe* is veridical: [[pistevo (α, p]]$_c$ = 1$\rightarrow$ [[p]]$_{MB(\alpha)}$= 1; likewise, other epistemic verbs such as *think*, and *imagine*, and fiction verbs (*dream*). Factives are *strongly* veridical: the worlds in the speaker's model too are *p*-words, consistent with the observation that factive complements are presupposed to be true (see Giannakidou 1998, 1999 for more discussion).

The directive class, on the other hand, expresses a weaker relation between the speaker and the embedded proposition: directive verbs do not require an individual's commitment to the truth of the embedded proposition. Consider *thelo* 'want'. Intuitively, "wanting something is preferring it to certain relevant alternatives, the relevant alternatives being those possibilities that the agent believes will be realized if he does not get what he wants." (Stalnaker 1984: 89). In order to capture this, I use the subject's epistemic model again as the anchoring model (instead of a buletic one, as in Portner 1997); and this model may be seen as including worlds representing future realizations of the actual world (as suggested in Farkas 1992), designated as M_{Efut}(su) (though desires can also be about the past, but I ignore these cases here as they do not seem to alter the overall picture). M_{Efut}(su) interects with *p*, and is partitioned into two sets, W_1 and W_2. W_1 is the part that intersects with *p*. W_2, is the remaining part and contains non-*p* worlds: therefore $W_2 \cap p = \varnothing$. The worlds in W_1 are more desired alternatives than the worlds in W_2, but from *want (x, p)* we cannot infer that *p* is true in M_{Efut}(x). *x wants p* is true simply in case there is a world in M_E(x) that is a *p*-world:

(49)   [[Jacob wants that Ariadne leave]]$_c$=1 if
        $\exists$w [w $\in$ M$_{Efut}$(jacob)$\land$ w $\in$ λw'. Ariadne leave in w']

Hence directive verbs selecting typically *to*-infinitivals such as *want, hope,* and other volitional and directives, are nonveridical. A similar analysis can be given for modal verbs (Giannakidou 1998). Nonveridicality thus helps us maintain the generalization that NPIs are admitted in nonveridical contexts, and account for the core mood distinctions at the same time.

4.2   Strict NPIs: NPIs only licensed by antiveridicality

Within the class of of nonveridical functions, we identified antiveridal ones as those that entail the negation of *p*. This category is relevant because it helps make sense of a very common pattern crosslinguistically: NPIs that are licensed very narrowly and appear only with negation

and the antiveridical connective *without* (Giannakidou 1997, 1998, 1999). These NPIs are known as "strong", but I think it is more appropriate to refer to them as "strict", as opposed to *any, kanenas* which are 'broad' (rather than *weak)*. Strict NPIs do not appear in nonveridical environments that are not negative:

(a)   *Either*   (Nathan 1999, Rullman 2003, Giannakidou 2006)
(50)   a   John didn't come either.
        b   *Did John come either?
        c   *I want John to come either.
        d   * Pick this up either!   (OK: Pick this up *too*)

(b)   Minimizers in Greek: Only allowed with negation (Giannakidou 1998, 1999):
(51)   *Dhen dhino dhekara* jia to ti th'apojinis.
        not give.1sg damn   about the what will happen.2sg
        I don't give a damn about what will happen to you!
(52)   *Dhinis dhekara ja to ti tha apojino?
        Do you give a dam about what will happen to me?
(53)   *An dhinis dhekara, tha me akousis.
        (If you dive a damn, you'll listen).

(c)   *mo+ONE* in Japanese (Nakanishi 2007, Yoshimura 2007)
(54)   a.   Watasi-wa   gakusei-o   {dare-mo / hito-ri-mo}   mi-nakat-ta.
                I-TOP   student-ACC   {who-MO / one-CL-MO}   see-NEG-PAST
                'I didn't see any students.'
        b.   *Gakusei-o   {dare-mo / hito-ri-mo}   mita-ra   siras-ero.
                student-ACC   {who-MO / one-CL-MO}   see-if   inform-IMP
                'If you see any student, inform me.'

Yoshimura 2007 argues that *–mo* lexicalizes as an item with ONE and gets special intonation, in agreement with other strict NPIs crosslinguistically (e.g. Greek minimizers and n-words, as argued in Giannakidou 1997, 1998, 2000); we review these in a minute.

(d)   NPI even (Giannakidou 2007; for Spanish, German see Herburger 2003, Schwarts 2005)
(55)   a   Dhen theli   na dhi   **oute**   to idhio tou to pedi.
                not want3sg   subj see.3sg   even.NPI   the self his the child
                He doesn't want to see even his own child.
        b   *Theli na dhi **oute** to idhio tou to pedi.
        c   * Idhe **oute** to idio tou to pedi?

   (e)   N-words (Laka 1990) in strict negative concord languages (Giannakidou 2000, 2006)
(56)   a   * (Dhen) theli na dhi KANENAN.   Greek
                Not want.3sg   subj. see.1sg n-person
                He doesn't want to see anybody.
        b   *(Non) ho visto nessuno.   Italian (Zanuttini 1991)
                He didn't see anybody.
(57)   a   *Idhe KANENAN?

Did he see anybody?
b   * Ho visto nessuno?
          Did he see anybody?

N-words are typical cases of NPIs, since they need negation for legitimacy, especially in strict negative concord languages. Space prevents me from expanding on this topic here, so I refer to my earlier works for details. Importantly, n-words come often with special intonation, as indicated above with upper case for Greek. I took the emphatic paradigm to be lexically distinct from the non-emphatic paradigm we have seen so far. Emphatic intonation is systematically licensed only under negation and *xoris* 'without', suggesting a clear split, observed also in Japanese (Yoshimura 2007), as I mentioned earlier.

Besides negation, strict NPIs appear also in the scope of negative particles such as *without* and its equivalents. *Without p* entails *not p*, hence *without*, just like negation, is antiveridical (Giannakidou 1997, 1998):

(58)   a   …**xoris** na dhi oute to idhio tou to pedi.
                without seeing even his own child.
       b   …without talking to Bill either.
       c   xoris na dhi KANENAN
                Without seeing anybody.

We can then claim that the stricter class of NPIs is limited to antiveridical contexts only. Crucially, the stricter NPI class is *not* licensed with weak DE quantifiers (*at most n, few N*):

(59)   a   ***To poli pende fitites** dhiavasan **oute ena** arthro.
                'At most 5 students read even one article.'
                (Greek; Giannakidou 2007)
       b   ***To poli pende fitites** dhiavasan **KANENA** arthro.
                'At most 5 students read any article.'

(For the relevant data in Japanese see Yoshimura 2007). The inability of non-negative DE quantifiers to license strict NPIs prompted a distinction within the class of DE functions between regular DE and more 'negative' functions: anti-additive and anti-morphic ones (Zwarts 1986, van der Woudenn 1994):

(60)   A function f is anti-additive iff $f(a \lor b) = fa \land fb$.
(61)   A function f is antimorphic iff it is antiadditive, and additionally $f(a \land b) = fa \lor fb$.

An antimorphic function is equivalent to classical negation, and is antiveridical. An anti-additive function is more negative that mere DE, but not fully negative (it reverses only disjunction). Negative quantifiers (*nobody, nothing*) denote anti-additive functions—though it is also possible that these can be analyzed as negations plus indefinites. The gradiance here is in terms of 'strength' of negation: strict (or strong') NPIs require more negative licensers; antiveridicality and antimorphicity are useful notions to define the sensitivity of this class.

Besides their severely restricted distribution in antiveridical contexts, strict NPI classes are also distinct from the broader NPIs in that they obey syntactic locality restrictions: they are

only licensed by a clause-mate antiveridical expression. I emphasized this in Giannakidou 1998, 2000, and especially 2006, where examples are given with n-words from numerous languages including Greek, Slavic, Hungarian, Romance (for the original data see also Progovac 1994, Zannuttini 1991, Przepiorkopski and Kupc 1997, and others); in Giannakidou 2007 it is further shown that NPI-*oute* is also licensed within a clause.

(62)   ?? Dhen ipa oti o Janis diavase **oute kan** tis *Sindaktikes Dhomes.*
         ?? I didn't say that John read even *Syntactic Structures.*
(63)   Dhen tu epetrepsan na diavasi **oute kan** tis *Sindaktikes Dhomes.*
         They didn't let him read even *Syntactic Structures.*

Notice the contrast with the broader NPIs *any* and *kanenas*, which can be licensed long distance even through syntactic islands (Giannakidou and Quer 1995,1997, Giannakidou 1998, 2000):

(64)   a   Dhen tou ipan oti o Bill milise me kanenan.
             They didn't tell him that Bill talked to anybody.
       b   Dhen prodose mistika pou eksethesan kanena.   (relative clause)
             He didn't reveal secrets that exposed anybody.
             (form Giannakidou and Quer 1997)

The impossibility of long-distance licensing of strict NPIs, and the fact that it is observed systematically in a number of (often unrelated) languages, suggests that with this class the need to be in the semantic scope of their licenser is mediated by syntax. Locality can be implemented as agreement: strict NPIs must have antiveridical features that must agree with the categorial features of sentential negation *dhen* and *without*; agreement can only occur within a phase, hence the locality (this is suggested in Giannakidou 2007). The stricter distribution to antiveridical contexts follows, as there is no negative feature in nonveridical contexts that are not negative. Alternatively, locality can be correlated with QR, as I argued in Giannakidou 1998, 2000 for Greek n-words (an analysis extended further to Japanese by Shimoyama 2003, Yoshimura 2007; and Hungarian, Suranyi 2006).

To sum up, we have seen in this section that the notion of nonveridicality allows us to unify the polarity environments as a natural class, and predicts that NPIs may appear in contexts that are unrelated to negation or DE as long as they are nonveridical: with modalities, directive propositional attitudes, disjunctions, and questions. Antiveridicality, on the other hand, is the notion we need as a criterion for the stricter NPI classes that are licensed narrowly by more 'negative' licensers. For this class, finally, we have seen that licensing is mediated by syntax, e.g. as agreement (NPI-even) or QR (n-words and similar items).

5 NPIs in non DE and veridical contexts: two modes of sanctioning

In this section, we review unexpected occurrences of NPIs in veridical contexts, such as sentences with *only*, emotive factive verbs, *hardly, barely*, and *most*. These cases were used by Linebarger as an argument against the attempt to characterize semantically the class of NPI licensers. I start with English minimizers, which as a class seem to behave more liberally than strict NPIs:

(65) a   Ruth didn't *lift a finger* to help me.
     b   Ruth doesn't *give a damn* about what I think.
     c   Did Ruth *lift a finger* to help?
     d   If you *you give a damn*, you'll listen.

Minimizers are also fine with directive propositional attitudes, as is shown in the following data, retrieved with Google, 10/17/2006; *gratia* Jason Merchant:

(66)   She's still funny and cute and smart and I wish she gave a damn that we aren't friends anymore. I miss Candice. www.xanga.com/betweenIDs
(67)   "I just wish you gave a damn about something besides your television set." Mr. Smith' threw the remote control across the room stomped out of the room ...www.deadmule.com/content/word.of.mule.php?content_id=952
(68)   till the pianist finished, we left, and I dropped off tom and went home. Now I wish I had said a word. It would have come out lame though, I just know it. everything2.com/index.pl?node_id=1166781

Minimizers crosslinguistically do not form a natural class in terms of strict NPI status: English ones are broad NPIs, but the Greek and Japanese minimizers are strict NPIs. English minimizers and *any* are fine too in the scope of *only*, and in the complement clauses of emotive factive verbs.

(69) a   I am glad he said a word!
     b   I'm glad we got any tickets.   (from Kadmon and Landman)
     c   Mary regrets that she lifted a finger**.**
     d   Only Mary {gives a damn/said anything}.

These data are well known (see Atlas 1993 and Horn 1996), and pose a puzzle for both DE and nonveridicality, since factives and *only* are veridical and not DE: [3]

(70)   Only Bill left   →   Bill left.
(71)   Only Larry ate a vegetable   -/→ Only Larry ate broccoli.

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[3] Von Fintel (1999) and Hoeksema 1986 propose weaker versions of DE to deal with the problem, by allowing the inference to the subset to be part of the common ground. For instance, if we know in the context that John ate spinach, then from *Only John ate a vegetable* we can infer that *Only John ate spinach*. By making this move, however, i.e. by allowing context knowledge to influence reasoning, such weak DE overgenerates (Atlas 1993, Giannakidou 2006), and predicts that NPIs should occur also in positive sentences, thus failing to provide a true explanation (see Giannakidou 2006 for discussion of more specific problems).

Larry may have eaten spinach.
(72)   Larry regrets that I bought a car.   -/→ Larry regrets that I bought a Honda.
        Because, in fact, I bought a Ferrari, and Larry might not regret this at all.

The absence of DE in *only* and with emotive factives was used by Linebarger to claim that there can be no semantic explanation for NPI-licensing at all. According to her, *only* and emotive factives sanction NPIs because they convey the following negative inferences:

(73)   Nobody other than Larry ate spinach.
(74)   Larry wishes that I hadn't bought a car.

For Linebarger, negation (as an abstract operator NOT) is the only true licenser of NPIs. In case negation is not present in the sentence (i.e. the LF representation), she claims that NPIs can be licensed derivatively by conveying a negative inference which is itself associated with an appropriate LF representation: "the use of an NPI in a sentence whose LF does not license it represents an allusion, one might say, to some entailed or implicated proposition, the negative implicature, in which the NPI does occur in the immediate scope of negation" (Linebarger 1991: 167). Such an allusion to negation further explains the following examples:

(75)   John hardly knows any syntax.
        "Licensed" by: John does not know much syntax.
(76)   John barely knows anybody.
        "Licensed" by: John doesn't know many people.

Hardly and *barely* sanction NPIs in virtue of their conveying negative propositions. They are, however, not DE (Horn 2002, Giannakidou 2002):

(77)   a John barely studied linguistics -/→ John barely studied syntax
        b John hardly talked to anybody -/→ John hardly talked to his mother

Likewise, the non-monotone *exactly,* and even non-DE *most* can sanction NPIs (the data are taken from Israel 2004 who cites an earlier source):

(78)   Exactly two students said anything.
        "Licensed" by: No more that two students said anything.
(79) a   Most children with any sense steal candy.
     b.   Most people who would lift a finger to help Bill now are either very foolish or very
             well-paid.

        I am not going to criticize Linebarger's theory at length here— see Giannakidou 1997, and Israel 2004 for recent discussions. The main problem is that appeal to implicated negation predicts unconstrained licensing, contrary to fact. Linebarger's system predicts a direct communication between syntax and pragmatics via LF, which hosts pragmatic information, an assumption that we have reasons to believe is not correct (see my discussion next). The most striking problem, however, is empirical: NPI sanctioning in these unexpected cases is not general (Giannakidou 1997, 1998, 2006) but limited: it is allowed only with some NPIs.

Greek NPIs, either strict or broad, do not appear in these environments:

(80) a   ***Xerome** pou dhinis dhekara.
            I am glad you give a damn.
      b   */# **Mono** i Maria dhini dhekara.
            Only Mary dives a damn.
      c   #I Maria metaniose pou kounise to daktilaki tis.
            Only literal interpretation: Mary regrets that she lifted her finger.
(81) a   ***Meta vias** milise se kanenan.
            He hardly talked to anybody.
      b   * Akrivos dio fitites ipan tipota.
            Exactly two students said anything.

The Greek NPIs need nonveridicality: they are ungrammatical with *only*, emotive factives, *meta vias* 'barely' and *exactly two* (more data see Giannakidou 1997, 2006), as expected. Greek items, then, are NPIs for which just implicatednegation does not suffice; such negation won't work with strict NPIs in English either: **Only Bill saw John either, *Bill regrets that he saw Jane either* (see Giannakidou 2006 and Atlas 1993 for more illicit data with strong English NPIs).

    In Giannakidou 2006 I built on the more marginal nature of this exceptional sanctioning, and suggested that the variation can best be captured if we assume that *any* and minimizers instantiate a class of NPIs that can either be licensed, or *tolerated* in a context if that context gives rise globally to a nonveridical inference. In this case, the NPIs are *rescued,* not licensed:

(82) *Rescuing by nonveridicality*   (Giannakidou 2006)
      A PI α can be rescued in the scope of a veridical expression *β* in a sentence S, if (a) **the global context C** of S makes a proposition S' available which contains a nonveridical expression *β*; and (b) α can be associated with *β* in S'.

 "Association with a nonveridical proposition" means "be in the scope of a nonveridical expression at a level other than LF", however we are to define it, perhaps at the expressive *Emph-layer* (suggested in Yoshimura 2007, building on Potts 2005). The global context C of S is the set of propositions that arise from S without necessarily being *entailed* by it. C thus contains the assertion (entailments), and presuppositions, implicatures. The negative proposition that is responsible for rescuing will be conventionally contributed by some expression in the sentence. In the case of *only*, it is the non-cancelable conjunct *no x other than y P;* with a negative factive, e.g. *regret,* it is the counterfactual *I wish that not p* that is conventionally contributed by it. With *barely* and *hardly* the NPIs are rescued via association with a background negative proposition (whose precise status is still a matter of debate, see Horn 2002).

    Rescuing builds on what I called *indirect licensing* in earlier work (Giannakidou 1998, 1999). Most importantly, rescuing happens in violation of scope at LF— an idea consistent with Horn's 2002 *assertoric inertia,* intended to capture precisely the state of affairs where an NPI appears in the syntactic scope of an expression that does not have the semantic potential to license it. The contrast between the Greek-type NPIs and English-type *any*/minimizers (see Beaver and Clark 2003 for some data from Dutch) shows that we must allow NPI-rescuing as an option in the grammar, but only as a secondary one: to my knowledge, there have been no NPIs

that appear to be rescued but not licensed (such NPIs would have to be fine with *only* and emotive factives, for instance, but unacceptable with negation).

Given that the option of rescuing exists, languages may exploit it to a varying degree for the various items. English seems to be more liberal than Greek in this respect. Ideally, one would like to know why a particulat type of NPI favors rescuing, or why a given language X exploits the rescuing strategy more liberally than a language Y, but I will leave this to future research.

This proposal has an important implication regarding LF and pragmatics. Contrary to Linebarger, it becomes necessary to keep the LF "clean" of implicatures: if global information were available at LF, it should be accessible to *all* PIs, thus making licensing possible, contrary to fact. The empirical difference between licensing and rescuing can thus be taken as an argument for the standard neo-Gricean view (*pace* Chierchia 2002, 2006; for a recent critique on more general grounds see Russell 2007), and also in line with Potts (2005) where conventional implicatures are computed at a level distinct from the truth conditional "at-issue" meaning.

6   Is scalarity enough for NPI licensing?

We now move on to address the question of compositionality: why do PIs appear in nonveridical environments only? Why do they further partition the nonveridical space the way they do? Why are some of them more narrow, and some more broad? Addressing this question is extremely important, as I said at the beginning, because in answering it we gain a better understanding of what NPIs mean, and how their meaning restricts their distribution. As a result, PIs will no longer be mysterious but tractable.

There have been two approaches to compositionality. The first is the logician's null hypothesis: there is only one source of ill-formedness in polarity— *scalarity*, in some form or other, is acknowledged as the culprit of polarity phenomena (Kadmon and Landman 1993, Krifka 1995, Chierchia 2006, Lee and Horn 1994, Lahiri 1998). This position has been very influential, so we need to assess very carefully what it says and how far it can go.

The second approach, which I have been advocating in Giannakidou (1998, 2001, 2006, 2007, to appear), is the *variation* position. This position acknowledges that (a) NPIs are not all licensed in the same nonveridical environments, (b) not all NPIs are scalar or containing EVEN, and (c) some NPIs are truly ungrammatical if not licensed (*any*, *either*, Greek *kanenas*, Dutch *ook maar* indefinites, NPI EVENs), but others are not (some EVEN NPIs). This diversity makes it more plausible to assume that the source of ill-formedness is not uniform, and we should expect different accounts for different classes of PIs—though all of them consistent with why NPIs require nonveridicality. In this approach, the obvious way to start is to say that PIs have a lexical deficit (implemented via polarity features in Giannakidou 1997), and that this deficit imposes restrictions on the contexts NPIs can be used. Nonveridical enviroments will have to be harmless for the NPI-deficit. There are in principle three sources of lexical deficits: scalarity (realized in lexically distinct EVEN-items; Giannakidou 2007), the presence of a dependent variable (Giannakiodu 1998), and the presence of a syntactic feature that must be checked, thus making the NPI subject to syntactic locality (as was shown to be the case of strict NPIs).

In this section, I address the scalarity approach and show why it will not be adequate. I consider first domain widening, and then Lahiri's implementation based on *EVEN*.

6.1   Domain widening: Kadmon and Landman and Chierchia

Kadmon and Landman's 1993 quite influential paper on *any* proposed a unified theory for NPI and FCI *any* by appealing to the notion of domain widening:

(83)   Meaning of *any (*Kadmon and Landman 1993)
         any CN= the corresponding indefinite NP or CN with the additional semantic/pragmatic characteristics (widening, strengthening) contributed by *any.*

(84)   *Widening* of *any (*Kadmon and Landman 1993)
         In an NP of the form *any CN, any* widens the interpretation of the common noun phrase along some contextual dimension.

The intuition behind domain widening is that *any*'s well-formedness depends on figuring out the right domain—in this sense, *any* is just like any other quantifier. *Any* requires that its domain must be extended (*widened)* along some contextual dimension. This sets *any* apart from other quantifiers where typically the domain must be narrowed down.
         Widening is coupled with *strengthening*:

(85)   Licensing condition for *any*: Strengthening
         Any is licensed only if the widening that it induces creates a stronger statement, i.e. only if the statement on the wide interpretation entails the statement on the narrow interpretation.

Strengthening says that widening must have a purpose: it must make a stronger statement, a point particularly central in Krifka 1995. Strengthening is satisfied in a negative context, but not in a positive one:

 (86)   a   I didn't see any book on the table.
         b   * I saw any book on the table.

The positive sentence is out because strengthening is not satisfied; in Chierchia's words "domain widening is pointless" (Chierchia 2006: 557) in a positive sentence. If it is true that I saw a book in the widened domain, it is not necessarily true that I saw one in a (specific) narrower domain, thus the widened statement is too weak, and for this reason not very informative. Here lies the essence of all widening based accounts (see also Krifka 1995).
         The key idea in Chierchia 2006 is the same—a unitary analysis for FCI and NPI *any* via domain widening— only implemented in a system where implicatures project in a syntactic-like manner. Chierchia excludes *any* in the positive sentence in the following way. First, the NPI introduces alternative domains, indicated by the index *i*, which refers to numbers between 1 and the maximum number (in this arbitrary case *three*) that we take our largest domain to consist of:

(87)   a. *I saw any boy.   (Chierchia's (47))
       b. Meaning
       $\exists w' \exists x \in D_{w'} [\text{boy}_{w'}(x) \land \text{saw}_w(I, x)]$
       c. Alternatives
       $\exists w' \exists x \in D_{w'} [\text{boy}_{i,w'}(x) \land \text{saw}_w(I, x)]$, where $1 \leq i \leq 3$

In a domain that consists of three boys, *any boy* makes us think of domains that contain 2 boys,

one boy, and all three boys. These alternatives are active and must be used to enrich plain meaning, according to Chierchia. The domain of individuals is not ordered, but in choosing among alternatives, speakers tend to go for the strongest one they have evidence for. In the case above, we end up saying that even the most broad choice of D makes the sentence true: "in other words, the base meaning will acquire an *even*-like flavor" (Chierchia 2006: 556).

The positive sentence also gives rise to the following implicature (Chierchia's (48)):

(48)   Implicature
$\exists w' \exists x \in D_{w'} [\text{boy}_{w'}(x) \wedge \text{saw}_w(I, x)] \subseteq_c$
$\exists w' \exists x \in D_{w'} [\text{boy}_{i,w'}(x) \wedge \text{saw}_w(I, x)]$, where $1 \leq i \leq 3$, and
$p \subseteq_c q$ means: p is stronger (hence, less likely) than q relative to the common ground c

Chierchia claims that "given the way domains are chosen, (48) is logically false: all of the alternatives are logically stronger than the statement in *b*; therefore, the latter statement cannot be less likely than its alternatives. The positive sentence enriched by implicature (48) is inconsistent, whence its deviance." (Chierchia 2006: 556).

6.2   Problems with domain widening

Here I will take widening theories to task and see how far they can go in explaining (at least some of) the core facts we saw in this paper, and how successful they are in being compositional.

In the widening approaches, the failure of *any* in a positive veridical sentence follows from informativity, which is basic in conversation. Sentences with unlicensed *any* are claimed to be impossible because the use of *any* renders them too weak to be informative (Kadmon and Landman, Krifka), or inconsistent (Chierchia) after implicature enrichment. The first, rather obvious, problem lies precisely here: the ill-formedness such a type of explanation predicts is weak (Giannakidou 1998, 2001): sentences with failed *any* must have the same psychological status as uninformative sentences. But this is not true. Speakers generally perceive a difference between sentences that are ungrammatical, and sentences that are just odd; and uninformative sentences—tautologies (*The morning stat is the morning star*), presupposition failures (*The king of France is my bother*), contradictions (*John is born in NY, and he is not born in NY*), lexical anomalies (*The green ideas sleep furiously*)— are never judged ungrammatical. The grammar generates them, and speakers have a clear intuition that they can produce them; they can even figure out ways to render them felicitous in certain contexts. Pragmatically odd sentences as thus perhaps non-sensical in a default context, but certainly repairable and grammatically possible.

Positive sentences with *any*, however, (and the other kinds of NPIs we saw here), are ungrammatical. The intuition has been that grammar does not generate these sentences, and context manipulation does not have an effect on the NPI: *Any boy kissed Amy* remains bad even though we can still imagine a possible meaning of it (either *some boy* or *every boy*). This difference is eagerly glossed over in the widening literature, but recent processing evidence supports it (Saddy at al. 2004, Drenhaus et al 2006, Drenhaus, Blaszczak, and Schutte 2006, see details in footnote 1), and challenges the fundamental idea of the widening approach that dooms NPI failures to the realm of pragmatic uselessness. [4]

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[4] Chierchia does acknowledge this weakness of the purely pragmatic account as the following passage shows: "So why is a sentence like (47a) (an NPI-licensing violation) ungrammatical?

Hence widening alone cannot rule out NPIs in positive episodic sentences (Giannakidou 2001). A domain widened quantifier, e.g. in *Every student that you can possibly imagine came to the party* is fine in a veridical context, though indeed some more thinking is required to figure out what exactly the truth conditions of the sentence will be. But there is nothing fatally wrong, or weak, in extending or even modalizing domains in positive veridical sentences. *Any*, unlike *every student that you can possibly imagine,* is ill-formed not because it is domain widened, but because it is subject to the composition external requirement of strengthening which works as a filter. This recycles the semantic filtering of the earlier days, and means that the widening approach is ultimately non-compositional.

A third problem lies with the very notion of widening: widening is not always present with *any*, NPIs or FCIs (as shown also in Krifka 1995):

(88)   Pick any <u>one of these 5 cards.</u>
(89)   Consider any arbitrary number.

Here *any* extends over a very specific domain of the five cards in the context supplied by the partitive. We cannot talk about domain widening in this case. Likewise, the set of numbers is infinite, so it is hard to see what domain extension would yield in *any arbitrary number.*

A related, fourth, problem has to do with the fact that not all NPIs are scalar. *Kanenas*, as mentioned earlier, is not:

(90)   Fere kanena gliko.
        Bring some cake.
         (Context: No need for something specific; it doesn't matter what you bring really).

Kanena is a non-scalar existential and does not make us think of an extended domain; in fact, the domain with *kanena* becomes somewhat irrelevant, as indicated above. Thus NPIs exist that are non-scalar, yet unacceptable in the veridical positive sentence. For these cases at least, which are in fact more common than we think (and labeled *epistemically non-specific* in Haspelmath 1997), the domain widening analysis is not a plausible starting point.

Another problem arises with the fact that not all widened NPIs improve with negation: *any* improves, but FCIs, in many languages, remain unacceptable. Recall:

(91)   a.   *Idha   **opjondhipote.**   (Greek; Giannakidou 2001)
                saw.perf.1sg FC-person
                '*I saw anybody.'
        b.   ***Dhen** idha   **opjondhipote.**
                not   saw.perf.1sg   FC-person
                Intended: 'I didn't see anybody.'

There is an impasse here between the way domain widening explains the distribution of NPIs (using Gricean principles) and the way such principles are typically taken to work…." (Chierchia 2006: 557). And later on, he posits a lexical entry for *any* (his (51)) where, in addition to widening, *any* is claimed to have an uninterpretable feature [+σ] (Chierchia 2006: 559), ensuring that *any* will be in the scope of some operator. It is checking of this feature that renders *any* grammatical, a clear withdrawal from the purely pragmatic position.

Opjondhipote and all Greek FCIs are indeed scalar (Giannakidou 2001), as is typically the case for FCIs crosslinguistically. The problem posed by these data is twofold. First, the non-improvement of FCIs with negation undermines the idea that NPIs and FCI are due to the same source (emphasized in Chierchia). Clearly, this cannot be the case, or at least it cannot *generally* be the case. Second, the informativity based account predicts improvement with negation for *all* widened items. The ill-formedness of *opjondhipote* then suggests that there is something other than widening that further reduces the distribution of FCIs (Giannakidou 2001). Domain widening falls short of deriving the correct set of facts.

The asymmetry within the class of NPIs and FCIs in terms of polarity poses a sixth problem. Take *any* and *whoever* as a contrastive pair here. Both involve domain widening (Jacobson 1995, Horn 2002, Giannakidou and Cheng 2006), but only *any* is polarity sensitive:

(92) a. **Whoever** saw a fly in his soup complained to the manager.
      b   **Irgendein** hat angerufen.
      b. ***Anyone** complained to the manager.

Likewise, *irgendein* in German patterns with *whoever* and not with *any*, despite its domain widening (Kratzer and Shimoyama 2002). This variation leads to a conclusion similar to the one we just reached regarding the variation with negation: there must be something other than widening that further reduces the distribution of some scalar items, but not others.

The final puzzle for domain widening is posed by the fact that domain widened items like *any*, as we saw in the previous subsections, are admitted in a large set of contexts not related to negation, and some of them actually quite remote from it: modal verbs, imperatives, questions, propositional attitudes, generic and habitual sentences. It is not obvious how the type of explanation in terms of strength invoked by Kadmon and Landman, Krifka and Chierchia can be extended to explain why NPIs are licit in these contexts. Consider, for example, the generic case:

(93)   Any cat hunts mice.

Here *any cat,* in the widened interpretation, does *not* entail the more narrow one, just like in the positive veridical sentence—there are exceptions to generic generalizations (Krifka et al 1995). Hence it follows that *any* should actually be unacceptable in this context. But it is not; rather, genericity is a very common context for widened items.

Consider also NPIs in questions. I noted earlier that questions are not DE, and in the informativity based theories that we are discussing this fact has been recognized (see especially van Rooy 2003). The strategy within widening is to assume that NPIs are allowed in (non-rhetorical) questions either because they make the question more *general* than the corresponding one without the NPI (Krifka), or because it turns a settled issue into an unsettled one (Kadmon & Landman). But why should it a general question be preferred to a more specific one? And how, or why, should this notion of generality be seen as a special case of strength in questions?

Van Rooy (2003) proposes that strength in questions must be reduced to *entropy*. Entropy is the measure of the informativity value of a question. The informative value of question Q is maximal just in case the answers to Q are all equally likely to be true. The value becomes less than maximal when an NPI occurs (resulting in biased readings). In van Rooy's words: "The NPI weakens the satisfaction conditions for the positive answer, q, and strengthens the satisfaction

conditions for the negative answer ¬q." (van Rooy 2003:xx). It is further proposed that entropy can replace strength also in assertions, so it provides the unifying notion of strength.

However, this type of explanation is problematic. First of all, the general use of an NPI in questions does not yield bias in polar questions—only the use of a certain type of NPIs does (and is due to a particular kind of EVEN akin to *at least*; Giannakidou 2007*)*. Second, the explanation is analytically too weak: as I mentioned already, less informative sentences do not become less grammatical. Van Rooy takes it for granted that informativity impacts grammaticality— whether we want such a model may be a possible research question, and most likely to be answered negatively; assuming a *bona fide* positive answer to it is not justified.

The pragmatic route in this direction produces, ultimately, liberal theories that predict more fluid judgment than we have. Even *any*, an NPI of the more liberal kind as we noted, cannot occur just as freely as van Rooy's reasoning predicts. In fact, in questions, widened FC *any*, along with FCI items crosslinguistically is systematically bad. The diagnostic is the ability to modify *any* by *almost* (only FCI-*any* accepts this modification, Davison 1981):

(94) a   * Did you see almost anybody?
      b   * Idhes sxedhon opjondhipote?   (Greek)

FCIs are prototypical domain wideners, but they fail to be licensed in questions (see also Quer 1998 for Spanish, Catalan data). This robust empirical fact is a surprise for van Rooy's account. Recall also that FCIs are generally bad with negation. This may support van Rooy's attempt to make negation and questions a natural class in terms of entropy/strength, but then the predicted pattern is the opposite: items that involve domain widening are *not* admitted in negation and questions. This suggests either that widening does not necessarily correlate with strength, or that widening and strengthening (in whatever version) do not predict the right kind of polarity sensitivity, a dooming conclusion in either case.

Notice also that if we unify negation and questions *via* strength, we can no longer distinguish empirically between NPIs that are licensed by negation and questions (*any*) and those that are licensed only by negation (*either*, Greek and Japanese minimizers, NPI *even*). By identifying one culprit in both assertions and questions, we predict no contrast, but the contrast is quite systematic across languages. It must be admitted, then, that we still need other factors (syntactic or semantic) besides informativity for accurately restricting NPI distribution.

Finally, regarding other nonveridical NPI environments, it is unclear how informativity as entropy would apply, e.g. in propositional attitudes, or with modal verbs, generic sentences. One can of course stretch the notion, but then it runs the risk of becoming itself not very informative.

To summarize, I have shown in this section that domain widening, by appealing exclusively to conversational principles such as informativity and strength, does not predict either the correct distribution of various kinds of NPIs, or the correct effect of illicit NPIs. It also misses the fact that not all NPIs are scalar, and is unable to account for variation with respect to negation (negation does not save all widened items), or within widened items as regards their polarity status or not (some FCIs are polarity sensitive, and some others aren't). Finally, the account was shown to be non-compositional, since strengthening is *external* to widening which is the posited lexically property of *any*. In the end, it becomes obvious that even though widening *is* indeed a lexical property of some NPIs (the scalar ones), when it comes to working out the

details of the explanation, it becomes impossible to make the argument that it is widening alone that restricts the distribution of scalar NPIs.

6.3   Lahiri's generalization

Lahiri 1998 formulates a widening account based on the idea that NPIs contain a low scalar EVEN plus *one*. The empirical motivation came from Hindi NPIs (also used for FCIs), which contain an EVEN—*bhii*—just like the Dutch *ook maar*, or the Japanese NPIs containing *mo*. Lahiri 1998 argues that the low-likelihood presupposition of *bhii* creates a conflict when combined with ONE in a positive sentence. The conflict, he argues, is resolved in negative and DE contexts, thus NPIs will be admitted in these contexts.
     The low-scalar property of English *even* is manifested in positive sentences, typically:

(95)   The Dean invited **even** Bill.
(96)   i. $\exists$x [x ≠ Bill ∧ invited (Dean, x)], and
        ii. $\forall$x[x ≠Bill →likelihood (Dean inviting x) > likelihood (Dean inviting Bill)]

(95) asserts that the Dean invited Bill, and *even* contributes the presupposition (or *conventional implicature* in Kartunnen and Peters 1977) in (96), i.e., that there is a set of alternatives to x, the *even* phrase, that the context makes salient, and that these alternatives are ranked on a scale of likelihood. The existence of alternatives is due to focus (Rooth 1985), observed with other focus additive particles (*too, also*); low scalarity is a contribution of *even* (Horn 1989, Kay 1991). The *even* phrase picks out the least likely individual(s) from the given set of alternatives. Likelihood is understood as a possibility scale in the sense of Horn (1972, 1989). Low likelihood, when combined with *one* in a positive sentence, yields oddity:

(97)   # Even ONE student arrived.

Notice that here we don't talk about ungrammaticality. *Even* is odd because it is *more likely* that one student came, not less likely. This is so because *one* is entailed by every other cardinality:

(98)   # $\exists$n [n ≠ **one** ∧ n students arrived] ∧ $\forall$n [n ≠ **one** →
        likelihood (n students arriving) > likelihood (one student arriving)]

As a result, construals of *EVEN one* in positive sentences will always be problematic. With negation, on the other hand, *EVEN one* will be OK, because, according to Lahiri, *even* scopes out of negation and this yields the correct presupposition.
     The appeal of Lahiri's account is obvious: it remains faithful to the morphological facts of Hindi and other languages that employ EVEN in some NPI formations. However, the link between a low scalar EVEN and polarity is not as simple; nor does such link predict immediately the appearance of NPIs in non negative nonveridical contexts, a fact that we also want to explain. Lahiri predicts improvement of low scalar *even* with negation, assumes a straightforward extension to DE, and overlooks all other contexts.
     In Giannakidou (2007), I launched a detailed critique of the uniform low-scalar *even* theories that need not be repeated here (see also Rullmann 1997, Hoeksema and Rullmann 2001, for more critical points). The two main objections regarding Lahiri's implementation are the

following. First, the improvement of *even one* and *even* NPIs with negation can have an alternative analysis that does not raise *even* above negation. This analysis assigns to *even* a presupposition of *highest,* not lowest likelihood, and was originally proposed by Rooth 1985.

(99)   Bill didn't invite even one student.
(100)   ∃n [n ≠ **one** ∧ Bill didn't invite n students] ∧ ∀n [n ≠ **one** →
        likelihood (one student being invited) > likelihood (n students being invited)]

Even under negation can thus itself be an NPI, and it is very common crosslinguistically to find designated lexical items EVEN with negation that carry a high-scalar presupposition (NPI-EVENs, as I mentioned earlier). We must simply concede that English *even* and Hindi *bhii,* can flexibly associate with low scalar and high scalar values, and that with negation only association with high value is allowed, for reasons that we must explain (see Giannakidou 2007).

    The second main objection, which I elaborate on next, is that empirically, it is not desirable to assume either a continuum between negation and DE in terms of polarity *even*, or that an EVEN meaning will necessarily improve with negation.

6.3. 1 With negation, low scalars do *not* always improve

In Giannakidou (2007) I discussed three items meaning *even* in Greek. In a positive sentence, as shown below, only the low scalar *akomi ke* is used:

(101)   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
(102)   Presupposition of *akomi ke*
        ∃x [x ≠ **ice-cream** ∧ ate(Maria, x)], and
        ∀x [x ≠ **ice-cream** → likelihood (Maria eating x) > likelihood (Maria eating **ice-cream**)]

Akomi ke is just like *even* and Hindi *bhii*: it associates with the lowest end of a likelihood scale in a positive sentence. And just like *even* and *bhii*, *akomi ke* is odd with *one:*

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

However, unlike *even* and *bhii*, *akomi ke* with *one* remains odd with negation, even if *akomi ke* appears overtly above it (for more discussion see Giannakidou 2007):

(104)   a   ?#Akomi ke ENAS fititis   dhen irthe.
             even one student   didn't arrive.
        b   ?#Akomi ke enan fititi   dhen idha.
              even one   student   I didn't see.

The non-improvement of low scalar *akomi ke* with *one* is quite surprising for Lahiri who predicts general improvement. But consider that *one* remains the highest likelihood also with negation:

(105)   # ∃n [n ≠ **one** ∧ it is not the case that n students arrived] ∧ ∀n [n ≠ **one** →
          likelihood (n students not arriving) > likelihood (one student not arriving)]

One is the *most likely*, not *the least likely*, cardinality and what we see here is a lexical mismatch: a high scalar numeral like *one* cannot combine with an expression that must associate with low scalar values like *akomi ke*. The contrast between Greek *akomi ke*, and *even/bhii* then confirms that only the former is low scalar. For improvement of *even/bhii* with negation something more needs to be said.
          NPI-*oute* requires high likelihood; and *one* is fine with it:

(106)   [[**NOT oute** (x) (P)]] = 1 iff ¬ P (x) = 1;   (assertion)
          ∃y [y ≠ x ∧ C(y) ∧ ¬ P(y)] ∧
          ∀y [y ≠ x → likelihood (P(x)) > likelihood (P(y))]   (presupposition)
(107)   Oute ENAS fititis dhen irthe.
          Not even one student arrived.

Hence *even/bhii* can also associate with high values, and this is why they are fine with *one*.
          Consider finally a third item, *esto,* also scalar, also odd with negation:

(108)   ?# O Janis   dhen milise   **esto (ke)** me tin Maria.
          the John   not talked.3sg even with the Maria
          John didn't talk to even Maria.
(109)   O Janis   dhen milise   **oute** me tin Maria.
          the John   not talked.3sg even with the Maria
          John didn't talk even to Maria.

Esto associates not with likelihood (though marginally it may be) but relies on the context to provide a scale for it. I call it flexible scale *even* (see also Hoeksema and Rullmann for similar facts in Dutch):

(110)   [[**esto (ke)** (x) (P)]] = 1 iff P(x)= 1;   (assertion)
          ∃y [y ≠ x ∧ C(y) ∧ ¬P(y)] ∧
          ∃Q_{scalar} [C(**Q**) ∧ ∀y [y ≠ x → **Q**(y) > **Q** (x)]]   (presupposition)

Esto is very close in meaning to *at least*—and it is the negative existential presupposition (absent in *at least*, or at most an implicature) that renders it polarity sensitive. The non-improvement with negation is due to the fact that the produced statement with *esto* is too weak: it merely says that John didn't talk to the least expected person— and this contradicts the choice to employ a focus particle in the first place (Krirka 1995; for more details see Giannakidou 2007).
          The main lesson here is that whether or not an NPI containing EVEN improves with negation is a matter of lexical choice for that NPI, and is not generally predictable by low-likelihood alone.

6.3.2 Even-NPIs are out with non-negative DE quantifiers

NPI *oute* and flexible scale *esto* do not improve with DE quantifiers (Giannakidou 2007):

(111) ***To poli pende fitites** dhiavasan **oute ena** arthro.   Greek
           'At most 5 students read even one article.'
(112) */??**To poli pende** pedhia efagan   **esto**   ena pagoto.
           (?)At most five children ate   even   one ice-cream

In fact, the positive low likelihood *akomi ke* is also odd:

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

Recall also the non-improvement with DE of the Dutch NPI *ook maar ites*, and Japanese *dare-mo* and *hitori-mo* that we saw earlier:

(114) ***Weinigen**   zullen **ook maar iets**   bereiken.   Dutch
           few   will   even   something   achieve
           Few will achieve anything.   (Zwarts 1981).

The non-improvement indicates that DE, at least in some languages, is not a sufficient condition for the occurrence of EVEN ONE and EVEN. This challenges the continuum between negation, DE and NPIs containing EVEN posited by Lahiri. NPI *even* itself is not licensed in contexts other than negation and antiveridical *without*, as we saw ealrier, and this holds not just for Greek *oute,* but NPI-even crosslinguistically. In Lahiri's system there is no way to capture this fact (for a similar point see Herburger and Mauck 2006 for data from Hebrew).

Finally, it is important to remember the difference in status between low likelihood EVENs and NPI-EVEN. When illicit, the NPI *oute* is plainly ungrammatical; the other EVENs, however, give rise to weaker effects— indicated by the use of #. Occasionally, these EVENs can improve in a context if it is made consistent with their presuppositions somehow, a behavior expected if what goes wrong is a presupposition clash, as I am arguing. The greater flexibility of these items is due to the fact that their occurrence depends on a felicity condition (the satisfaction of their presupposition). The rigidity of NPI-EVEN, on the other hand, is suggestive of a more systematic "grammatical" sensitivity. It becomes necessary to distinguish between these two different patterns, and I do not see a way to do this in the type of explanation proposed by Lahiri.

To sum up, we saw in section 6 that the accounts of NPIs based on sclalarity alone (widening, EVEN-based) fail to predict the variable distribution, interpretation, and status of NPIs. They posit a continuum between negation and DE which creates a handicap: it cannot capture the contrast between strict NPIs with very narrow distribution in antiveridical contexts only, and broader NPIs whose distribution is across nonveridical environments. We also saw that DE in itself is actually a very marginal licenser. We must conclude then, that scalarity alone cannot provide the basis for a general, and truly explanative theory of NPIs.

7   The variation approach to polarity: non-deictic variables

In Giannakidou 1998, 2001, 2007 I address the compositionality question from the perspective of variation. In this perspective, polarity items are "created" because of distinctive lexical properties they have. Some NPIs are scalar, but not all of them are. For scalar NPIs, I suggested a pragmatic typology of four possible EVEN meanings, from which different analyses can be derived to account for the variable patterns observed with EVEN-containing NPIs (Giannakidou 2007). I will now turn to non-scalar NPI indefinites of the *kanenas* type. Such NPI indefinites exist in many languages, and we saw that they are licensed broadly. Why are *kanenas* NPIs bad in veridical sentences, and why do they improve in non-nonveridical sentences?

Let me start with what I said in Giannakidou (1998: 70-71, 139-40). I suggested there that *kanenas* denotes a 'dependent' indefinite. A dependent existential is one that does not introduce a discourse referent in the actual world (or in some individual's epistemic model):

(115) An existential quantifier $\exists x_d$ is dependent iff the variable x_d it contributes does not introduce a discourse referent in the main context.   (based on: Giannakidou 1998: 70)

A dependent existential is this peculiar "existential' that cannot assert existence in a default context. The intuition that some quantifiers cannot assert existence is also found in Matthewson's (1998) claim that some determiners (*ku…a* and *kwelh…a* in St'at'imcets Salish) "represent the notion of 'non-assertion of existence'" (Matthewson 1998: 179). (The Salish determiners appear to be a bit broader in their distribution than the Greek *kanenas*—but it is important to note the parallel). Matthewson further argues that such determiners do not entail non-existence of an entity, rather they "merely fail to positively assert the existence of an entity" (Matthewson 1998: 179). In my system this intuition is formalized by using a designated variable: "x_d" is a new kind of variable—one that cannot introduce a discourse referent in a main context. Such variables will not be able to be used in unembedded veridical sentences because they would be forced to do exactly that. Under negation, there will be no problem:

(116)   [[kanenas]] = **person** (x_d)
(117)   a   *Idha kanenan.
               not saw.1sg anybody
         b   Dhen idha kanenan.
               not saw.1sg anybody

(118)   a   [[$\exists x_d$ **person** (x_d) ∧ **saw** (I, x_d)]] $_g$ = undefined
         b   [[¬ $\exists x_d$ [**person** (x_d) ∧ **saw** (I, x_d))]] $_g$ = 1 iff no value *a* assigned to x_d by *g* is such that *a* is a person in *c* and I saw *a*.

Under negation, $\exists$-closure of x_d will be fine because x_d will not introduce a discourse referent. Generally, then, dependent variables of this kind will be fine in the scope of nonveridical operators, because the nonveridical operator is an embedding operator, and ensures that x_d will not be forced to introduce a discourse referent in the main context. den Dikken and Giannakidou 2002 extend this idea to *wh-the-hell* phrases and treat them as dependent indefinites of this kind.

In Giannakidou 1998, I emphasized also that dependent reference does not imply lack of reference:

(119)   An dhis kanenan₁,   pes tu₁   na me perimeni.

If you see anybody,   tell him   to wait for me.

Here *kanenan* does introduce a discourse referent, which is subsequently modally subordinated to the pronoun *tu*. Yet the introduction of the referent is done not in the default context but in an embedded one (the protasis of the conditional). Dependent existentials thus receive values only in embedded domains; their 'deficiency' is that the assignment function *g* cannot give them a value in a main context. Two important assumptions here are that multiple domains are available in a sentence when there is embedding (Giannakidou 1998, Tancredi 2007), just like there are multiple models; recall our discussion of propositional attitudes. In fact, we can define (following Tancredi) a conversion function that would assign a distinct domain to each model. The second assumption is that the *kanenas* indefinite cannot receive a value in the main domain. We can view this as inability to be interpreted in type *e*.

Dependent reference understood broadly says that some variables cannot be interpreted referentially or deictically. These variables cannot be interpreted as free variables, and in order to be well-formed, they must either be bound, refer back to antecedents, or be used in an embedded domain. [5] *Kanenas* NPIs are referentially deficient in this way, and end up with limited distribution in nonveridical contexts. In Giannakidou to appear, I analyze the Greek subjunctive as containing a dependent temporal variable that cannot introduce a time in a main context; temporal dependency is also limited to nonveridical contexts. In this program, polarity phenomena are seen as a form of anaphoric like dependency; and if we look at the raw data, it turns out that many NPIs are amenable to such an analysis.

The link between polarity and anaphora is not new. Progovac (1994) was the first to exploit it, but her approach was purely syntactic: the goal was to transfer the binding principles for pronouns to the locality conditions on NPIs. Another attempt with similar typological concerns as mine is Schlenker 2003, 2004. In his system, there are two types of indexicals: the *unshiftable* ones, i.e. those that can only be interpreted with respect to the context of the actual speech act, and the *shiftable* ones, i.e. those that can be evaluated in this context as well as in the context of the reported speech act. The driving premise in my program is exactly the same— that not all *variables* are interpreted by the same procedures; then I argue that there is a natural class of variables that are not deictic.

I will generalize, then, and propose the definition below for dependent variables:

(120)   *Dependent variables*
         An variable x_d is dependent iff x_d cannot be interpreted as a free variable.

From this it follows that a dependent variable cannot be linked to a discourse referent. In order to become licit, such variable has three options: (a) binding by a higher quantifier; (b) embedding under negation and noveridical operators; (c) co-reference (a strategy exploited largely by the subjunctive in embedded contexts).

In Giannakidou 2001, I argued that FCIs contain a dependent world variable w_d. This variable can only become licit via binding. In an episodic context (positive *and* negative) there is no operator to bind it, the variable remains unbound, thus ill-formed:

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[5] Farkas 2002 uses the term 'dependent' in a narrower sense: to refer to variables that are well-formed only if be bound by higher quantifiers (e.g. Hungarian indefinites *egy-egy* which only occur as bound existentials). I envision the class of dependent variables broadly, as a label for the whole range of narrow scope variables— including the ones studied by Farkas.

(121)　〚opjosdhipote〛= **person**(x)(w$_d$)

(122)　*Idha opjondipote
　　　　not saw.1sg anybody
(123)　*Dhen idha opjondipote
　　　　not saw.1sg anybody

(124)　〚∃x [**person** (x, w$_d$) ∧ **saw** (I, x)] 〛= undefined in *c*　because　w$_d$ can't get a value in c
(125)　〚¬∃x [**person** (x, w$_d$) ∧ **saw** (I, x)] 〛= undefined in *c*　because　w$_d$ can't get a value c

The variable w$_d$ is non-deictic, and can never receive a default value to refer to the actual world. This derives the non-improvement of FCIs with episodic negation—without a binder, w$_d$ remains illicit in both positive and negative sentences—and predicts the correct distribution of FCIs in non-episodic contexts where will be abinder for w$_d$. (The universal effect is further derived by a presupposition, not pertinent to our discussion here). An illicit (unbound) variable, in this reasoning leads to ungrammaticality, just like **The Pope saw herself* is ungrammatical.

　　　The notion of dependent reference, as conceived of here, allows us to unify the class of indefinites that are always interpreted with narrow scope. Dependent reference, naturally, is not limited to polarity, but extends to other expressions that we didn't think of NPIs before— bare plurals in their existential use, bare singulars in English, Romance and Greek, and incorporated object nouns in languages that allow them. These items are unusable if forced to refer to a particular object in the highest domain. Hence, the notion of dependent reference embeds polarity into the larger class of non-specificity phenomena, a quite welcome result, as it explains the polarity status as a manifestation of something more familiar.

　　　Before closing, let me raise some questions for further research within this program. The first is how to refine and formalize further the property of dependence. I have done this here following Giannakidou 1998 by using designated variables (subscripted by *d)*, and treated the dependency as a condition on the variable assignment function (Giannakidou 2001, Giannakidou and Cheng 2006): that *g* cannot assign a value to x$_d$ in an unembedded context. The difference, in particular, between NPIs and FCIs vis a vis negation suggests that we need to further distinguish between dependent variables that can only become licit through binding (FCIs), and those who just cannot refer to individuals in the domain D$_M$ of the main context (*kanenas*). The former will not improve with negation because negation is not a binder, but the latter will, because they will be existentially closed under negation, and will not refer to an individual in D$_M$.

　　　The inability to receive a value at D$_M$ deserves some more thought. If D$_M$ contains the actual individuals in the context, does this mean that non-deictic indefinites with this deficiency cannot refer to actual individuals at all? I don't think so. As I mentioned briefly earlier, the various domains can be overlapping, and clearly, under negation, x$_d$ can indeed receive values from D$_M$. This shows that what is troublesome for x$_d$ is that x$_d$ cannot be linked by default to a value in D$_M$, and this is what I tried to capture by calling this variable non-deictic. More work is need in order to establish how exactly sortal differences of the kind I am talking about are encoded in the grammar, but the main message is that we need such differences.

　　　Another question is: how does my notion of non-deictic variable relate to Partee's 1986 theory of flexible NP-interpretation? Given that dependent indefinites are always non-specific and narrow scope, and given that such indefinites are recently thought as denoting properties (*et*) (McNally and others), can the difference between "regular' indefinites, which are freer in the referential and scope properties, and dependent ones, be reduced to a type difference? Is it plausible

to say that dependent indefinites are property-type only? I am not sure that a positive answer can be given to this question, since dependent indefinites can indeed refer to individuals in embedded contexts (Giannakidou 1998, 2001). However, it is worth exploring whether the sortal difference I propose here can be reduced to a more familiar type difference.

Finally, if what underlies polarity indefinites is an inability to refer to individuals in a default context, the relevance of notions such as non-existence (Lin 1996) is not accidental. (Non)existence and (non)veridicality are tightly connected: in a veridical context you are forced to refer, thus exist; in a nonveridical one, you are not.

8   Positive polarity items

Positive polarity items (PPIs) are thought to have "the boring property that they cannot scope below negation" (Szabolcsi 2004: 409). In this section, we consider two representative members of the class—the indefinite *some,* and speaker oriented adverbs (Nilsen 2003, Ernst 2008). Our starting point, as with NPIs, will be that PPIs do not form a homogeneous class. We follow Szabolcsi's conclusion that "the *someone/something*-type PPIs share properties with NPIs" (Szaboclsi 2004: 409), but we show this to hold not because *some* with negation is an NPI, as argued by Szabolcsi, but because *some* indefinites have nothing special, and they can generally scope below any operator, regardless of negation. What *is* special, is the fact that *some*-indefinites are accented under clausemate negation, and it is only in this use that they are PPIs. The accent signals scoping above negation, a pattern that we find in other languages (Greek, Giannakidou 1998, 2000; Japanese, Yoshimura 2007) when quantifiers scope above negation.

Following Ernst, on the other hand, the distribution of speaker oriented adverbs will be argued to be sensitive to speaker commitment: strong evaluative adverbs like *unfortunately* are factive, and express full speaker commitment to the truth of *p.* In Ernst's terms, this makes them subjective, and therefore felicitous only in veridical contexts, which guarantee truth of *p* in all worlds in the speaker's belief model (as we saw). This explains the inability of speaker oriented adverbs to occur in nonveridical contexts such as questions, conditionals, etc. As we move to less subjective adjectives, e.g. *possibly* and *obviously,* the truth condition is weakened, (*p* need not be true in all worlds in the speaker's model), and this results in compatibility in some nonveridical contexts. Both Szabolcsi and Ernst show that scalarity plays no role in PPI distribution.

8. 1 Two types of *some* indefinites: emphatic and non-emphatic *some*
Ever since Jespersen, *some* has been thought of as an PPI in that it must scope above negation:

(126)   You didn't see something.

This sentence cannot mean that you *didn't see anything*, where an existential quantifier scopes below negation. Scoping above negation is the defining property of PPI-hood, and it is indeed observed with equivalent items across many languages, e.g. Serbocroatian (Progovac 1994, 2000), Dutch (van der Wouden 1994), Greek (Giannakidou 1997, 1998), Hungarian (Toth 1996, Szabolsci 2004), among others. It has gone unnoticed, however, that this scoping has a particular intonation: *some* is accented (uppercase henceforth), and negation is de-accented:

(127)   You didn't see SOMETHING.

The reverse pattern, when *some* is de-accented, allows, and perhaps even prefers, a narrow scope reading under negation. In this case, negation is accented (*emphatic denial*). PPIs like *some* are thought to be "allergic" to negation, and this allergy translated as being anti-licensed by negation (Progovac, Giannakidou, Ladusaw) in the sense that *some* must raise structurally in a position above negation (the exact nature of which is immaterial here). PPIs in this context are the reverse of NPIs, and scholars thought of them as contrasting pairs. [6]

The need to escape the scope of negation has been lexically motivated by assuming that *some* indefinites are specific (Progovac) referential—they always assert existence in some model, as I suggested in Giannnakidou (1997, 1998). In either case, they get existentially closed above negation only. Apart from clausemate negation, *some* is excluded from the immediate scope of a negative quantifier and other anti veridical operators (*without*):

(128)   a   John didn' t call SOMEONE.   # not > some
              b   Nobody called SOMEONE.   # no one > some
              c   John came to the party without SOMEONE.   # without > some

(The non-emphatic versions above are fine with narrow scope *some,* a point to which we return). So we can generalize that emphatic SOME must scope above antiveridical elements. However, *some*-PPIs have been notorious for allegedly scoping below *non-local* negation:

(129)   Bill didn't say that you saw something.   not > say> some

This narrow scoping wrt negation is peculiar for items that must escape the scope of negation in the first place. To make things worse, narrow scoping of *some* is observed even with local negation, if *negation + some* is found under an NPI-trigger—a fact noted in Jespersen, Baker and Postal, and emphasized by Szabolsci. I give below data from Szabolcsi (2004: (33)-(40)):

(33)   I don't think that John *didn't call someone.*   √ not > not > some
(34)   No one thinks that John *didn't call someone.*   √ no one > not > some
(35)   I am surprised that John *didn't call someone.*   √ surprise > not > some
(36)   I regret that John *didn't call someone.*   √ regret > not > some
(37)   If we *don't call someone*, we are doomed.   √ if (not > some)
(38)   Every boy who *didn't call someone* . . .   √ every (not > some)
(39)   Only John *didn't call someone*.   √ only > not > some
(40)   Few boys didn't call someone.   √ few > not > some

Why would a PPI under negation become legitimate in NPI contexts? Szabolsci suggests that this is so because PPI plus negation is an NPI itself. PPIs are claimed to "have two NPI-features. One is a strong-NPI feature like that of *yet* and *squat*: it requires a clausemate antiadditive licensor, without intervention. The other is a weak-NPI feature like that of *ever*: it requires a Strawson-decreasing licensor (not necessarily clausemate but without intervention).… I propose that these

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[6] van der Wouden (1994) also identifies a class of bipolar items: these are claimed to require a decreasing licensor (an NPI-property) but cannot occur under a local antimorphic item (he calls this a PPI-property). Van der Wouden argues that NPI-hood and PPI-hood are two primitive properties and may therefore coexist in one item.

two features are normally 'dormant'. A context that can license the strong-NPI feature 'activates' and, in the same breath, licenses that feature. What we have seen indicates, however, that the other, weak-NPI feature also gets activated at the same time – activated, but not licensed. Therefore, the emergent constellation is illegitimate, unless a licensor for the weak-NPI feature is provided. In other words, PPIs do not detest antiadditives; they have a latent craving for antiadditives. That they appear to detest them is due to the fact that the satisfaction of this craving activates another, which needs to be satisfied independently." (Szabolcsi 2004: 429).

In such an account, a negative condition (anti-licensing) is reduced to a positive one (licensing), and an underlying NPI source is posited in both NPIs and PPIs. The exact nature of the commonallity needs to be refined, but the appeal of the reasoning here cannot go unnoticed. However, there are reasons to be skeptical about going that route. One obvious obstacle is that this account envisions NPI and PPI licensing in terms of syntactic features purely—negations, in particular— and gives us little insight into the lexical semantics of *some* itself.

Szabolcsi is correct to point out that *some* is not scalar, or strictly referential: clearly, in the cases above it takes narrow scope. Szabolcsi is also right to point out that we cannot extend the referentiality approach as to all PPIs— e.g. *would rather, already,* and speaker oriented adverbs are obviously not amenable to a referential analysis. (Given the variable sources of NPI sensitivity that we must allow for, there is no reason to *a priori* expect the PPI domain to lack a comparable variation). However, Szabolcsi treats *some* as $\neg\neg\exists$, with the two negations canceling each other out, and it is difficult to see this as more than mere stipulation. What is the evidence for the two negations? And why do we never see overt realizations of them in *some* crosslinguistically? This is typologically quite surprising, because negation in languages is never "forgotten" to be marked, if there. Ultimately, why items like $\neg\neg\exists$ exist? Why would a language bother to implement two negations on an expression just to cancel them out?

In assessing Szabolci's data, it is important to note two things. First, the narrow scope *some* in (33-41) is non-emphatic; reproducing the examples with emphatic SOME is either odd, or allows a wide scope reading:

(130)   a   # I don't think that John didn't call SOMEONE.
         b   # No one thinks that John didn't call SOMEONE.
         c   # I am surprised that John didn't call SOMEONE.
         d   # Every boy who didn't call SOMEONE . . .
         e   # Only John didn't call SOMEONE
         f   # Few boys didn't call SOMEONE.

The judgments here must be checked carefully, and a large scale inquiry is needed to establish the conditions on the availability of the two intonational patters for *some*. What is crucial, however, is that the narrow scope correlates with non-emphatic intonation, and that nonemphatic intonation is *not* the intonation observed with clausemate negation. Based on this contrast, it becomes plausible to argue that the narrow scope *some* is a different species from the PPI emphatic *SOME* under negation, and by different species, I mean lexically distinct. Intonation functions as a morphological feature, something not at all peculiar, but familiar from emphatic non-emphatic pairs generally observed with negation (Giannakidou 1998, 2000, 2006, and works cited there; Yoshimura 2007). In the observed cases, the emphatic member of the pair is the one that outscopes negation. Emphatic *some,* then, is simply part of this general picture.

A second observation, missed by Szabolcsi, is that lower negation is in fact *not* necessary: narrow scope non-emphatic *some* is "licensed" without it:

(131)   a   I don't think that John called someone.
         b   No one thinks that John called someone.
         c   I am surprised that John called someone.
         d   I regret that I called someone.
         e   If we call someone, we'll get help.
         f   Every boy who called someone . . .
         g   Only John called someone.
         h   Few boys called someone.

Non-clausemate negation *some* is part of this pattern too: **John didn't see that he talked to SOMEONE* is very odd. Nonemphatic *some* thus appears in polarity contexts generally, and does not dependent on the presence of negation; in fact, it appears freely in any context, regardless of veridicality or monotonicity, as indicated below.

(132)   a   Billed talked to someone (but I don't know who).
         b   Bill want to talk to someone (but I don't know who).
         c   Every student visited some museum (but I don't know which ones).

Hence Szabolcsi's narrow scope *some* is nothing more than the "regular" indefinite *some*, which can be specific or non-specific depending on the context. There seems be nothing more to explain in these cases. I think this is indeed the right way of looking at this problem: there are two varieties of *some* indefinites, an emphatic and a non-emphatic *some*, and only emphatic SOME is polarity sensitive. Non-emphatic *some* is a regular indefinite with no restrictions in its distribution. One would expect the intonation strategy to be systematically available across languages—an issue to investigate further in the future.

So, why does emphatic SOME need to scope above negation? The most profitable avenue will be to think of SOME as an indefinite that can only be interpreted referentially. In this sense, SOME is the opposite of dependent indefinites that we identified earlier, and which can never be interpreted referentially. SOME can be seen as an indefinite that is always specific—say, a variant of *a certain*, or *a particular*. Notice their parallel wide scope with negation:

(133)   a   Sue didn't talk to a certain Norwegian—his name is Otto.
         b   Sue didn't talk to a particular Norwegian—his name is Otto.
         c   Sue didn't talk to SOME Norwegian—his name is Otto.

A certain, a particular, and *SOME* all want to escape negation. We can argue that intonation provides an abstract morphological feature, e.g. equivalent to *certain,* or *specific,* that turns *some* specific and forces it to move to a scope position above negation. For reasons of space, I will not develop this suggestion further—and the first step is to examine whether SOME in contexts outside negation behaves on a par with *a certain* and *a particular.* This would be the hope, and the typical case of scope interaction with a universal quantifier below allows us to be optimistic:

(134)   Every student visited SOME museum.   (a specific museum)

The advantage of viewing the wide scope property of PPI-SOME as an instance of

specificity is obvious: SOME is no longer mysterious, but a member of the class of wide scope indefinites that is fairly well identified (though perhaps not as well understood; see Farkas 2002 for an overview). Szabolcsi's account, by contrast, fails to capture this link. Instead, PPI-*some* comes out as a very strange expression, a indefinite with two negations attached to it, for which there is no obvious motivation. In that account, the uniform pattern between *a certain, a particular,* and SOME remains accidental.

8.2 Speaker oriented adverbs as PPIs

Speaker oriented (*unfortunately*) and modal (*possibly*) adverbs have been analyzed recently as polarity items by Nilsen (2003) and Ernst (2008). The main observation here too is that these adverbs are incompatible with the scope of local negation:

(135)   a   John unfortunately disappeared.
         b   #John didn't unfortunately disappear.

The positive sentence says that John disappeared and that this is unfortunate for the speaker. The negation of this sentence ought to express truth reversal: John did not disappear and this is not unfortunate. Rather than saying this, however, the negative sentence comes out odd.

   Unfortunately is a PPI, Ernst argues, because it expresses strong subjectivity. Strong subjectivity means that the adverb is factive-like: upon uttering (135a), the speaker is committed to the truth of John disappearing, and further asserts that this is unfortunate. This means that *unfortunately* is veridical:

(136)   [[John has unfortunately disappeared]]$_c$=1 iff
        $\forall$w [w $\in$ M$_E$ (speaker) $\rightarrow$ w $\in$ λw'.John disappeared in w']

Every world in the speaker's epistemic model is a world where John disappeared. From this, incompatibility with negation follows: negation would require that the proposition be false in all the worlds, and this leads to a contradiction. This type of reasoning predicts oddity and not ungrammaticality, and this is precisely the status that (135b) with illicit *unfortunately*.

   Other nonveridical sentences— questions, conditionals are also odd with *unfortunately:*

(137)   a   #Has he unfortunately disappeared?
         B   #If he has unfortunately disappeared…

Nonveridical contexts allow some worlds in M$_E$ (speaker) to not be *p*-worlds, and this again would lead to a contradiction, given the truth condition (136) of *unfortunately*. Factive adverbs like *unfortunately*, then, are veridical and will only be usable in veridical contexts.

   Ernst further shows that there is variation within the adverb PPI class—*unfortunately* is excluded from all nonveridical contexts, but modals (*possibly)*, and what he calls *weak evaluatives* (*mysteriously*) can appear in questions and the antecedent of conditionals given certain conditions. Below, I give Ernst's chartwhich summarizes the variation, and some examples from his paper to illustrate:

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(138) Variation in PPI adverbs   (Ernst 2008: Table 1)

Adverb type	*Regular negation*	*Questions/ conditionals*	*Negative questions*	*Negative counterfactuals*	*Low-tone denial MN*	*Other metalinguistic negation (MN)*
a. Strong evaluatives (*unfortunately, luckily*)	*	*	*	*	*	OK
b. Weak evaluatives (*mysteriously, conveniently*)	*	*/OK	OK	OK	OK	OK
c. Modals (*probably, possibly*)	*	*/OK	?/OK	*/OK	OK	OK
d. Evidentials (*clearly, obviously*)	OK	OK	OK	OK	OK	OK

(139) a. Are they probably going to be invited to the meeting?
  b. Where have they probably put the loot?
  c #Are they unbelievably going to be invited to the meeting?

(140) a. If, as you say, they're probably in line for an award, maybe we should get tickets for the ceremony as soon as we can.
  b. If they have conveniently decided to withdraw, the competition will go better for us.
  c. # If they have luckily decided to withdraw, the competition will go better for us.

Notice that strong evaluatives remain consistently odd in questions, conditionals. This contrast and variation, unnoticed in Nilsen (2003), suggests that not all speaker oriented adverbs express full speaker commitment; *mysteriously*, *probably* express partial commitment, hence the truth of p does not hold in all worlds in M_E (speaker), but in a subset of this model. This predicts incompatibility with negation, but greater flexibility with respect to nonveridical operators. Evidentials, on the other hand, are objective: they rely on evidence for the truth of p outside the speaker's beliefs. If speaker commitment is the source of PPI-status, we thus capture nicely the fact that evidential adverbs are *not* PPIs (and are fine with negation):

(141)   John didn't clearly express his desires.

Space prevents me from elaborating more on these very interesting ideas (see Ernst's paper for more details). The two important things to emphasize is the variation in the PPI domain—a welcome result, given the variation we attest in the NPI domain—and that speaker commitment is the key to understanding the incompatibility of speaker oriented adverbial PPIs with negation.
       One final point worth highlighting is that scalarity is not relevant for speaker oriented adverbs either. I am not going to repeat Ernst's arguments against Nilsen's scalar analysis of *possibly (*which stipulates the reverse of widening: domain s*hrinking*). Ernst's main objections are that there is no evidence for shrinking, that this property is stipulated as a lexical feature for theory internal reasons only, and that it misses the central connection to speaker commitment.

The nonveridicality approach captures precisely this link, and uses it to account for the PPI nature of speaker oriented adverbs, and the variation attested in this class.

9   Conclusion

The main conclusions to be drawn from our discussion of NPIs and PPIs in this paper are the following. First, polarity patterns crosslinguistically reveal two main kinds of sensitivity: (a) more local sensitivity to anti-veridicality (negation, antiadditivity, and antimorphicity included), and (b) a broader sensitivity to nonveridicality. The former characterizes a class of NPIs that have a very strict distribution, and is often realized also as a syntactic dependency (agreement or QR). Anti-veridicality also explains the incompatibility of referential PPIs (emphatic *SOME*) with negation. Importantly, we have seen that mere downward entailment is only a very weak NPI licenser, and often, not a licenser at all (Greek NPIs of various types, Dutch *ook maar,* and similar items; recall also that *at most*, and even *few*, often give variable judgments in English too). For PPIs, mere DE plays no role (Szabolcsi 2004, Ernst 2008).

We also found that scalar approaches to NPIs cannot provide a conceptually or analytically secure foundation for explaining why NPIs appear in nonveridical contexts. Such approaches predict the wrong status of illicit NPIs (merely uninformative or contradictory, when NPIs are in fact ungrammatical), and they are unable to capture the variation in the distribution of scalar PIs: e.g. why some of them are good with negation (NPIs), but some others are not (FCIs). Finally, the scalar approach does not seem a plausible theory for NPIs that are not scalar, or for PPIs, which as a class seems to be non-scalar.

I suggested that it is empirically and analytically more attractive to think of polarity phenomena as diverse in specific ways. Polarity items are created because of distinctive lexical properties they have, and we can identify three sources of polarity sensitivity: (a) EVEN-based scalarity (with four possible meanings of EVEN; Giannakidou 2007), (b) a referential deficiency that creates non-deictic variables that cannot be interpreted as free variables, and (c) degrees of speaker commitment (for speaker oriented PPI adverbs; Ernst 2008). Such an approach is more consistent with the empirical and interpretational diversity of PIs, and offers a flexible enough framework to address compositionally the individual sensitivities of the various NPI and PPI classes, and predict their correct grammatical status.

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