Variation and compositionality in polarity items:
why scalarity is not enough

Anastasia Giannakidou
University of Chicago
giannaki@uchicago.edu

1 Common paradigms of PIs and basic terminology

Hallmark property of PIs:

<table>
<thead>
<tr>
<th>Pls have limited distribution: typically, they cannot appear in positive assertions with simple past (= positive episodic sentences).</th>
</tr>
</thead>
</table>

Negative PIs (NPIs)
(Earliest reference: Klima 1964)

1. Bill didn’t buy any books.
   * 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 John
    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.

The NPI is licensed by negation, which is also characterized as the trigger of the NPI (Ladusaw 1979). Licensing normaly translates into a be-in-the-scope-of condition:

5. a. \( \neg \exists x. \text{book}(x) \land \text{bought}(b, x) \)
    b. \( \exists x. \text{book}(x) \land \neg \text{bought}(b, x) \)

…Which often translates into overt c-command:

6. a. *Anydoby I didn’t see.
    b. [Three students]_{f} I didn’t see.
NPIs belong to various syntactic categories:

(7) a Bill isn’t here yet.
    b  *Bill is here yet.

(8) a I haven’t seen Bill in years.
    b  *I saw Bill in years.

(9) a Bill doesn’t like pasta either.
    b  *Bill likes pasta either.

(7) a Je hoeft niet te komen.                       (Dutch)
    you need not to come
    You need not come.
    b  *Je hoeft te komen.

(10) Greek NPI-oute
    a Dhen theli na dhi  ou te 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  ou te idhio tou to pedi.

**Free choice items (FCIs)**

(11) 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.’

But FCIs remain bad with negation, as long as they remain in an episodic sentence!!

Spanish; Quer 1999 ; Menendez-Benito 2006
(12)  * (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.’

Catalan; Quer 1998
(13)  * (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 didn’t buy him/her any bouquet.’
French; Jayez and Tovena 2005

(14) a * Hier Marie a apprécié n’importe quel livre.
     Yesterday, Marie didn’t appreciate any book.
b * Marie n’a pas lu n’importe quel livre.
     Mary didn’t read any books.

So, FCIs are also licensed by something, but is seems to be different from what licenses the NPIs.

[Not all FCIs are polarity sensitive:

(15) a * Irgendemand hat angerufen.       (Kratzer and Shimoyama 2002: (6))
       irgend-one has called
b * Opjosdhipote telefonise.              (Greek)

(16) a Bill bought whichever book he liked.
     b *Bill bought whichever book.        (Horn 2000; Giannakidou and Cheng 2006)

Dare-demo in Japanese?                      (See Yoshimura 2007 for some ideas)

Episodicity overridden: subtrigging (LeGrand 1975)

(17) a. *Last night at the party, Bill talked to any woman.
b. Last night at the party, Bill talked to any woman who seemed interested.]

Given the contrast in terms of negation, NPIs and FCIs must be sensitive to different things.

Positive polarity items (PPIs)

PPIs seem to be the opposite of NPIs (Baker 1970 orginally; for more recent analyses see Szabolcsi 2004, Nilsen 2004, Ernst 2007):

(18) a Bill didn’t buy some books.
b ∃x. book (x) ∧ ¬ bought (b, x)

(19) a Bill would rather be in Montpellier.
b # Bill wouldn’t rather be in Montpellier.

(20) a John is here already.
b #John isn’t here already.

(21) a *John is here yet.
b John isn’t here yet.

PPIs are thought of as anti-licensed by negation (Ladusaw 1979, Progovac 1994, Giannakidou 1998), but see Szabolcsi for trying to make anti-licensing a positive condition).
2 Core questions

(A) Licensing question:

- Is there a common property shared by all environments where (N)PIs occur?
- Is the sanctioning property semantic or pragmatic?
- Is sanctioning one mechanism—licensing—or is it more refined?
- How does sanctioning translate into scope?

(B) The status question: If not purely syntactic, what is the nature of polarity ill-formedness?

| Since early on, the intuition has been that a sentence with a failed NPI, e.g. *Bill brought any presents, *Bill ever lived in Paris, is unacceptable in a sense stronger than mere lexical anomaly is, or presupposition failure. |

Recent psycholinguistic evidence supporting this conclusion: 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.

(C) Compositionality question (aka the sensitivity question)

- Goal: No composition external filters (as in Ladusaw 1979). The limited interpretation of the PI must be derived by the lexical semantics of the PI itself. Scope and syntax will follow.


3 Sanctioning question: very liberal distribution of any

Any is fine in many contexts other than negation.

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

3.1 Downward entailment

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

(24) DEFINITION 1 (Upward entailing function).
A function f is upward entailing iff for every arbitrary element X,Y it holds that:
X⊆Y → f(X) ⊆ f(Y)

(25) DEFINITION 2 (Downward entailing function).
A function f is downward entailing iff for every arbitrary element X,Y it holds that:
X⊆Y → f(Y) ⊆ f(X)
Lucy does not like linguistics.

$$[[\text{syntax}]] \subseteq [[\text{linguistics}]]$$

∴ Lucy does not like syntax.

Few students like linguistics.

$$[[\text{syntax}]] \subseteq [[\text{linguistics}]]$$

∴ Few students like syntax.

Every [student who likes linguistics] came to the party.

$$[[\text{syntax}]] \subseteq [[\text{linguistics}]]$$

∴ Every student who likes syntax came to the party.

Problems arose immediately:

- **Problem 1**: Conceptually, it remained unclear for a long time why DE is relevant for PIIs. In Ladusaw, the licensing condition had the status of a filter.
- **Problem 2**: (23) cannot capture the variation in PI distribution, e.g. the contrast we just saw in NPIs-FCIs. Or the contrast between every and each/both below:

$$\star \# \text{Each student who saw anything contacted the police.}$$

$$\star \# \text{Both students who saw anything contacted the police.}$$

It seems that, with determiners, it is not so much monotonicity that matters but existence, i.e. whether the domain of the determiner is non-empty or not (Giannakidou 1997, 1998, 1999; see also Horn 1997).

In Giannakidou 1998 I suggested that presuppositional determiners are veridical:

**DEFINITION 3** — (Non)veridicality of determiners and quantifiers

A determiner/quantifier $\delta$ is veridical iff it holds that:

$$[[\delta \ NP \ VP]]_{c} = 1 \rightarrow \exists x \ NP \ (x); \ otherwise, \ \delta \ is \ nonveridical.$$  

“$\rightarrow$” stands for “presupposes”

- **Problem 3**: (23) is empirically inadequate. NPIs appear non-monotone environments such as: questions, in imperatives, with modal verbs, and subjunctive/infinival propositional attitudes, or disjunctions (Giannakidou 1998, 1999, 2006).

If you talk to any students, just let me know.

Did you see anybody?

Press any key.

John may talk to anybody.

John is willing to talk to anybody.
• Problem 4: NPIs in questions:

(31)  

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**. Crucially, these NPIs are *not* licensed by counterparts of *few* or *at most five* (Zwarts 1981, Giannakidou 1998):

(32)  

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 5 people saw anything.’

The non-occurrence of **ook maar iets** and **tipota** with a DE quantifier, and their improvement with non-DE questions, are problematic for the assumption that these items are sensitive to DE (or varieties thereof, Zwarts 1993, van der Wouden 1997).

3.2 Nonveridicality

Proposal: The *semantic property that unifies NPI-licensing environments as a natural class is nonveridical.*


(33)  

**DEFINITION 4.** (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 $\neg p$ in some individual’s epistemic model: $Fp \rightarrow \neg p$ in some $M_E(x)$.

See also: Montague 1969, defined as existence. Part of the motivation was the occurrence of NPIs with propositional attitudes:

(34)  

a  John would like to invite any student.

b  John asked us to invite any student.

c  John is willing to invite any student.

d  I insist that you allow anyone in.
Zwarts 1995: DE ⊂ Nonveridical. Hence nonveridicality is proposed as an extension of DE, to unify PI licensers semantically as a natural class, and strengthen the semantic approach to NPI-licensing.

Protasis of conditionals

(35) 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.’

Directive intensional verbs (selecting subjunctive): notice the use of subjunctive, and see also Borschev et al. 2007 and earlier literature):

(36) I Ariadne epemine na afisoume \{opjondhipote/kanenan\} na perasi mesa.
    the Ariadne insisted.3sg subj let.1pl FCI-person/ NPI-person subj come.3sg in
    ‘Ariadne insisted that we allow anyone in.’
    With kanenan: ‘Ariadne insisted that we allow some person or other to come in.’

Modal verbs: notice again the use of subjunctive!

(37) Boris na anapse \{opjodhipote/kanenas\} to fos.
    can.3sg subj lit.3sg FCI-person/NPI-person the light
    ‘Anyone may have turned on the light.’
    With kanenas: ‘It is possible that somebody or other turned on the light.’

(38) Boris na dhanistis \{opjodhipote/kanena\} vivlio.
    can. 2sg subj borrow.2sg FCI / NPI book
    ‘You may borrow any book.’
    With kanena vivlio: ‘You may borrow some book or other.’

Imperatives

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

(40) Disjunction
    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.

Two facts to remember:

- *Any and its Greek counterpart are sanctioned in nonveridical contexts. Still there are differences in the interpretation that we must account for.
- Not all NPIs are scalar: kanenas is not.
3.3. Propositional attitudes, NPIs, mood choice, and nonveridicality

Main empirical contrast (Giannakidou 1995, 1998, 1999):

NPIs appear in the complements of subjunctive selecting attitudes, but not in the complements of indicative ones.

(41) I Ariaðni epemine na afiso {opjon dipote/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.’

(42) I Ariaðni θa iθele na milisi me {opjon dipote/kanenan} fititi.
the Ariadne would like.3sg subj talk.1sg with FC /NPI -
student
‘Ariadne would like to talk to any student.’

(43) a * O Pavlos pistevi oti akuse {kanenan/opjon dipote} θorivo.
the Paul believe.3sg that heard.3sg NPI / FCI noise
* Paul believes that he heard any noise.

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

Mood choice in Greek in regulated by nonveridicality (Giannakidou 1995, 1998, 1999). Likewise in Russian (Borschev et al. 2007)

<table>
<thead>
<tr>
<th>(44) Indicative verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>assertives: leo ‘say’, dhiavazo ‘read’, isxirizome ‘to claim’</td>
</tr>
<tr>
<td>fiction verbs: onirevome ‘to dream’, fandazome ‘imagine’</td>
</tr>
<tr>
<td>epistemics: pistevo ‘believe’, nomizo ‘think’</td>
</tr>
<tr>
<td>factive verbs: xerome ‘be glad’, gnorizo ‘know’, metaniono ‘regret’</td>
</tr>
<tr>
<td>semifactives: anakalipto ‘discover’, thimame ‘remember’</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(45) Directive na- verbs (equivalent to to-infinitivals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>volitionals: thelo ‘want’, elpizo ‘hope’, skopevo ‘plan’</td>
</tr>
<tr>
<td>directives: dhiatazo ‘order’, simvulevo ‘advise’, protino ‘suggest’</td>
</tr>
<tr>
<td>modals: (invariant) prepi ‘must’, bori ‘may’</td>
</tr>
<tr>
<td>permissives: epitrepo ‘allow’; apagorevo ‘forbid’ (negative permissive)</td>
</tr>
<tr>
<td>verbs of fear: (verba timendi) fovame ‘to be afraid’</td>
</tr>
</tbody>
</table>

© Indicative-selecting verbs are veridical.

(46) [[ Jacob believes that Ariadne loves Paul ]] \(\varepsilon = 1 \) if
\( \forall w [ w \in \text{Dox}_\alpha (w) \rightarrow w \in \lambda \omega ]. \) Ariadne loves Paul in \(\omega \).
where \( \text{Dox}_\text{Jacob} (w) \) is Jacob’s epistemic model \( M_\text{E}(\text{Jacob}) \)
Directive verbs are nonveridical

[[Jacob wants that Ariadne leave]] = 1 if
\[ \exists w \in \text{Dox}_\alpha(w) \land w \in \lambda w'. \text{Ariadne leave in } w' \]
where Dox_{Jacob}(w) is Jacob's epistemic model M_e(Jacob)

4. At the same time: true NPIs!

4.1 Strict dependency

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>John didn't come either.</td>
</tr>
<tr>
<td>b</td>
<td>*Did John come either?</td>
</tr>
<tr>
<td>c</td>
<td>*I want John to come either.</td>
</tr>
<tr>
<td>d</td>
<td>*Pick this up either!</td>
</tr>
<tr>
<td></td>
<td>(OK: Pick this up too)</td>
</tr>
</tbody>
</table>

Minimizers in Greek: Only allowed with negation (Giannakidou 1998, 1999):

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!

Minimizers in Spanish?

(51) (from Giannakidou 2006, due to Quer)
*María se arrepintió de haber movido (ni) un dedo.
(Mary regrets that she lifted a finger.)

mo+ONE in Japanese (Nakanishi 2007, Yoshimura 2007)

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.’

   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).

NPI even (Giannakidou 2007; for Spanish ni siquiera see Herburger 2003; likewise for German einmal, Zwarts 2005)
Finally:

The strict NPIs are out with DE (but not negative) quantifiers:

(53)  
\[ \text{a} \quad \text{Dhen theli na dhi} \quad \text{oute} \quad \text{to idhio tou to pedi.} \]  
\[ \text{not want3sg to see.3sg even.NPI the self his the child} \]  
He doesn’t want to see even his own child.

\[ \text{b} \quad *\text{Theli na dhi} \quad \text{oute} \quad \text{to idhio tou to pedi.} \]  
\[ \text{c} \quad *\text{Idhe} \quad \text{oute} \quad \text{to idio tou to pedi?} \]  
\[ \text{d} \quad \ldots \text{xoris na dhi} \quad \text{oute} \quad \text{to idhio tou to pedi.} \]  
without seeing even his own child.

Notice the problem with EVEN + indefinite. This runs counter to Lahiri’s generalization!

4.2 English minimizers?

Minimizers in English (Fauconnier 1975, Horn 1972, etc.)

English minimizers as a class behave more liberally than the strict NPIs we just identified.

(54)  
\[ \text{*To poli pende fitites dhiavasan} \quad \text{oute} \quad \text{ena} \quad \text{arthro.} \]  
\[ \text{‘At most 5 students read even one article.’} \]  
(Greek; Giannakidou 2007)

(55)  
\[ *\text{Weinigen} \quad \text{zullen} \quad \text{ook maar iets} \quad \text{bereiken.} \]  
\[ \text{Few will even something achieve} \]  
Few will achieve anything.  
(Zwarts 1981).

Minimizers are fine with directive propositional attitudes:

[Retrieved with Google, 10/17/2006; gratia Jason Merchant]

(57)  
\[ \text{She’s still funny and cute and smart and} \quad \text{I wish she gave a damn} \quad \text{that we aren’t friends} \]  
\[ \text{anymore. I miss Candice.} \quad \text{www.xanga.com/betweenIDs} \]  
(58)  
\[ \text{‘I just wish you gave a damn about something besides your television set.’} \]  
\[ \text{Mr. Smith’ threw the remote control across the room stomped out of the room} \]  
...www.deadmule.com/content/word.of.mule.php?content_id=952

(59)  
\[ \text{till the pianist finished, we left, and I dropped off tom and went home.} \]  
\[ \text{Now I wish I had said a word. It would have come out lame though, I just know it.} \]  
\[ \text{everything2.com/index.pl?node_id=1166781} \]  
Minimizers and any are fine also with only, and factive verbs (positive and negative):
(60) 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}.

Contrast with Greek:

(61) 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 daktiaki tis.
    Only literal interpretation: Mary regrets that she lifted her finger.

Only and factives are veridical, and they are also not DE!

    \[ \exists x \forall y[(x=y \leftrightarrow Py) \& (Py \rightarrow y=a)] \]
    = Exactly one individual, and no one other than a, has the property P.
    Which entails the positive proposition: \( P(a) \)

(63) Atlas (1993, 1996) inspired LF:
    ate.a.vegetable (Larry) \& \neg \exists x[x \neq Larry \& ate.a.vegetable(x)]
    Only Larry ate a vegetable \( \not\rightarrow \) Only Larry ate broccoli.
    Larry may have eaten spinach, for instance.

(64) Only Larry ate a vegetable \( \not\rightarrow \) Only Larry ate broccoli.
    Larry may have eaten spinach, for instance.

(65) Larry regrets that I bought a car. \( \not\rightarrow \) Larry regrets that I bought a Honda.
    Because, in fact, I bought a Ferrari, and Larry might not regret this at all.

Is this fatal for the semantic approach, as Linebarger argued (1980)?

5 Only and emotive factives: weakening DE, or refining sanctioning?

5.1 The limits of weakening DE
Defensive strategy: we try to render only and negative factives DE somehow, by weakening DE:

(66) Weak DE \hspace{1cm} (Hoeksema 1986)
    If a \( \in \) C and C \( \subseteq \) B, then only a is B \( \rightarrow \) only a is C.
    where C is a property given by the context

(67) Strawson DE \hspace{1cm} (von Fintel 1999: 14)
    A (partial) function f of type \( \langle \sigma, \tau \rangle \) is Strawson-DE iff
    for all x, y of type \( \sigma \) such that x \( \rightarrow \) y, and \( f(x) \) is defined: \( f(y) \rightarrow f(x) \).
(68) **Strawson validity** (von Fintel 1999: (19))

An inference $p_1, \ldots, p_n \therefore q$ is **Strawson-valid** iff the inference $p_1, \ldots, p_n, S \therefore q$ is **classically valid**, where $S$ is a premise stating that the presuppositions of all the statements involved are satisfied.

Thus:

(69) a. Broccoli is a vegetable. \hspace{1cm} (C \subseteq B; x \rightarrow y)
b. John ate broccoli. \hspace{1cm} (a is C; f(x) defined)
c. **Only John ate a vegetable.**
d. \therefore Only John ate broccoli.

(70) a. Honda is a car. \hspace{1cm} (C \subseteq B; x \rightarrow y)
b. John bought a Honda. \hspace{1cm} (a is C; f(x) defined)
c. **Larry {regrets/is surprised} that John bought a car.**
d. \therefore Larry {regrets/is surprised} that John bought a Honda.

However:


(71) Only John ate a vegetable.

*Presupposes:* Someone ate a vegetable. \hspace{1cm} (Horn 1996)

*Asserts:* Nobody other than John ate a vegetable.

5.1.1 **NPIs are wrongly predicted to be OK with other focus structures:**

(72) a. Broccoli is a vegetable.
b. John ate broccoli. \hspace{1cm} (f(x) defined; j \in C)
c. It was John who ate a vegetable. \rightarrow_{\text{Strawson DE-entails}} It was John who ate broccoli.

(73) a. Broccoli is a vegetable.
b. John ate broccoli. \hspace{1cm} (f(x) defined; j \in C)
c. [John]$_F$ ate a vegetable. \rightarrow_{\text{Strawson DE-entails}} [John]$_F$ ate broccoli.

(74) a * It was John who talked to anybody.
b * [John]$_F$ talked to anybody.

(75) * Even John ate any broccoli. \hspace{1cm} (Horn 1989)

(76) Presupposition of *even* \hspace{1cm} (Karttunen and Peters 1979)

Existential presupposition of *even*:

\[ \exists x \ [x \neq \text{John} \land C(x) \land \text{ate}(x, \text{broccoli})] \], and
5.1.2 NPIs are wrongly predicted to be OK even in positive sentences…
…If inference to the subset is given in the context:

(77) a. Broccoli is a vegetable.
  b. John ate broccoli. (f(x) defined; j ∈ C)
  c. John ate a vegetable → Strawson DE-entails John ate broccoli.

(78) * John ate any vegetable.

.substr This is too liberal!

5.1.3 No way to distinguish between positive and negative factives

(79) a. Honda is a car. (C ⊆ B; x → y)
  b. John bought a Honda. (a is C; f(x) defined)
  c. Larry {is glad/regrets} that John bought a car.
  d. ∴ Larry {is glad/regrets} that John bought a Honda.

Giannakidou 2006: this runs counter to the attempt to only render negative factives Strawson DE.

5.1.4 Only and factives are not general licensors for NPIs:

Giannakidou 1998, 2006:

(80) * Monon o Janis δini δekara. (Greek )
        only the John give.3sg damn
        (Only John gives a damn.)

(81) * I Maria metanjose pou kunise to δaxtilaki tis.
        the Maria regret.3sg that moved.3sg the little.finger hers
        (Mary regrets that she lifted a finger.)

(82) a * Ekplisome pu exi {opjonδipote/kanena} filo.
        be-surprised.1sg that has FC / NPI friend
        (I’m surprised she has any friend.)
        b * Monon o Janis exi {opjonδipote/kanena} filo.
        (Only John has any friend.)

And notice that the opjondhipote, kanenas NPIs are of the more liberal variety, hence we cannot invoke a “stronger” status to rule them out.

5.2 Alternative: any is not licensed but rescued with only and factives!

Giannakidou 2006:

Any and minimizers are not always licensed; sometimes they can be tolerated in a context because that context gives rise globally to a nonveridical inference.

(83) Rescuing by nonveridity
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 $\beta$; and (b) $\alpha$ can be associated with $\beta$ in $S'$. Where “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’s work).

This clause builds on what I called indirect licensing in earlier work (Giannakidou 1998, 1999), and:

**Rescuing happens in violation of scope at LF!**

(see also the related notion of assertoric inertia, Horn 2002).

Some clarifications

- 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 stricter PI classes will only be licensed via scope at LF.
- In the case of only, the nonveridical proposition is an entailment (the non-cancelable exclusive conjunct); in the case of emotive factives it is possibly a conventional implicature.

Implications

- Necessary to keep the syntax (LF) "clean" of implicatures: if global information were available at LF, it should be accessible to licensed PIs too, 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 Compositionality: Why scalarity is not enough

Why are the various kinds of NPIs and FCIs permitted in exactly the contexts they are?

Two approaches:

- **The unitary source position** (UCP; Kadmon and Landman 1993, Krifka 1995, Chierchia 2006, Lee and Horn 1994, Lahiri 1998): Underlying unifying idea: there must be one source of ill-formedness and this source is scalarity: NPIs and FCIs are scalar, and it is this scalarity that makes them somehow polarity sensitive.

- **The variation position**: Giannakidou 1998, 2001, 2006: the source of ill-formedness is not uniform, in fact we shouldn’t expect it to be, given the different judgements we get! There are at least two sources of polarity: scalarity, and restrictions on how variables can be interpreted.
6.1 Scalarity, domain widening, even: Kadmon and Landman

(84) 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.

(85) 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.

(86) 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.

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

6.2 Problems with widening:

② Widening alone cannot rule out NPIs in positive episodic sentences (Giannakidou 2001). It is the composition external requirement of strengthening that works as a filter to rule NPIs out.

So, the widening approach is ultimately non-compositional]

② Widening is not always present with FCIs (Krifka 1995, and others later):

(88) Pick any one of these 5 cards. (partitive, specific set of cards)
(89) Consider any arbitrary number.

② Not all NPIs are scalar: kanenas

② Not all scalar PIs improve with negation: any (good) and FCIs (bad) with negation. Recall:

(90) 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.’

② Asymmetry within the class of NPIs and FCIs: all are scalar, but not all are polarity sensitive.

(91) a. Whoever saw a fly in his soup complained to the manager.
b Irgendein hat angerufen.
b *Anyone complained to the manager.
6.3 **Chierchia 2006**

The NPI introduces alternatives:

(92) 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

\[ \exists w' \exists x \in D_{w'} [ \text{boy}_{i,w'}(x) \land \text{saw}_{w}(I, x)], \text{where } 1 \leq i \leq 3 \]

Key assumptions:

- Active alternatives must be used to enrich plain meaning.
- In choosing among alternatives, speakers do tend to go for the strongest one they have evidence for. In the case above, we end up saying that even the most liberal (i.e., broad) choice of D makes the sentence true: “in other words, the base meaning will acquire an even-like flavor” (Chierchia 2006: 556).

(48) Implicature

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

“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. Sentence (47a) enriched by implicature (48) is inconsistent, whence its deviance.” (Chierchia 2006: 556).

© But this is too weak: **logically false statements are not ungrammatical** (Giannakidou 2001, 2007)!

Hence, domain widening does not provide the correct foundation for capturing the correct distribution and interpretation of NPIs.

6.4 **Lahiri’s generalization**

**Underlying idea:** NPIs (and FCIs) contain EVEN.

- Lahiri 1998: the low-likelihood presupposition of EVEN creates a conflict when combined with ONE in a positive sentence. The conflict is resolved in negative and DE contexts in general, thus NPIs will be admitted only in these contexts. This is a general claim about NPIs (and FCIs).

Fact: Though attractive, Lahiri’s generalization is empirically unsustainable.
6.4. 1 With negation, low scalars do NOT always improve

Greek *evens* and *even*-NPIs (Giannakidou 2007)

(93) 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  estim to pagoto. (flexible scale EVEN)
the Maria ate even the ice cream

(94) Presupposition of akomi ke (PPI-even)
\[\exists x [x \neq \text{ice-cream} \land \text{ate(Maria, } x))]\], and
\[\forall x [x \neq \text{ice-cream} \rightarrow \text{likelihood (Maria eating } x) > \text{likelihood (Maria eating ice-cream)}]\]

*Akomi ke* associates with the lowest end of a likelihood scale (just like Kartunnen and Peters suggested)

(95) [[akomi ke (x) (P)]] = 1 iff P(x)= 1; (assertion)
\[\exists y [y \neq x \land P(y)] \land\]
\[\forall y[y \neq x \rightarrow \text{likelihood (P(y)) > likelihood (P (x))]}\] (presupposition)

With one:

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

The incompatibility with *one* persists with negation, even if *akomi ke* appears overtly above it:

(97) a ?#Akomi ke ENAS fititis dhen irthe.
even one student didn’t arrive.
b Oute ENAS fititis dhen irthe.
Not even one student arrived.

(98) ?#Akomi ke enan fititi dhen idha.
even one student I didn’t see.

(99) a # \[\exists n [n \neq \text{one} \land n \text{ students arrived}] \land \forall n [n \neq \text{one} \rightarrow \text{likelihood (n students arriving) > likelihood (one student arriving)}]\]
b # \[\exists n [n \neq \text{one} \land \text{it is not the case that n students arrived}] \land \forall n [n \neq \text{one} \rightarrow \text{likelihood (n students not arriving) > likelihood (one student not arriving)}]\]

Giannakidou 2007: one is the *most likely*, not the *least likely*, cardinality; hence there will always be a problem when combining it with an EVEN that lexically requires a low-likelihood item!
Low-scalar flexible *even* also does not improve with negation (Giannakidou 2007)

(100) ?# 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.

(101) O Janis dhen milise **oute** me tin Maria.
the John not talked.3sg even with the Maria
John didn’t talk even to Maria.

\[
[\text{esto (ke)}(x)(P)] = 1 \text{ iff } P(x) = 1; \\
\exists y [y \neq x \land C(y) \land \neg P(y)] \land \\
\exists Q_{\text{scalar}} [C(Q) \land \forall y [y \neq x \implies Q(y) > Q(x)]]
\]

(102) (assertion)

\[
[\text{NOT oute} (x)(P)] = 1 \text{ iff } \neg P(x) = 1; \\
\exists y [y \neq x \land C(y) \land \neg P(y)] \land \\
\forall y [y \neq x \implies \text{likelihood}(P(x)) > \text{likelihood}(P(y))]
\]

(103) (presupposition)

Hence:

Whether or not an NPI containing **EVEN** improves with negation may be a matter of lexical choice for that NPI, and is not generally predictable by low-likelihood.

**6.4.2 Even-NPIs are out with simple DE, but not negative, quantifiers**

Giannakidou 2007:

(104) *To poli pende fitites* dhiavasan **oute ena** arthro. Greek

‘At most 5 students read even one article.’

(105) */??To poli pende* pedhia efagan **esto** ena pagoto. (?!At most five children ate even one ice-cream

(106) * To poli pende fitites aghorasan **akomi ke ena vivlio**.

? At most five students bought even one book.

(107) *Weinigen zullen ook maar iets* bereiken. Dutch

few will even something achieve


Japanese

(108) 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 student.’

student-ACC {who-MO / one-CL-MO} see-if inform-IMP
‘If you see any student, inform me.’
The non-improvement indicates that DE, at least in some languages, is not a sufficient condition for the occurrence of EVEN ONE and even.

6.4.3 Improvement in non-veridical contexts does not follow

…Not from Lahiri’s reasoning. Also, the differences in meaning between FCIs and NPIs do not follow.

7 Alternative: dependent variables

Giannakidou 1998, 2001: enrich the ontology of variables and include dependent ones.

Basic observation: some variables cannot be interpreted deictically (as free variables). NPIs and FCIs that are polarity sensitive contain such variables.

Thus the difference between polarity sensitive and non-polarity sensitive elements is sortal.

7.1 Dependent individual variables

Variables can be interpreted in three ways:

(a) As free variables: deictic use

(109) a He left = left (x)
       b [left (x)] is true in a context with respect to an assignment g iff g assigns a value to x in the context, and the value assigned to x by g belongs to the extension of left in the context.

(b) As bound variables

(110) a Every student thinks he is going to win.
       b [∀x. student (x) → x thinks x will win]] is true in a context with respect to an assignment g iff all values assigned to x by g verify the formula in the context.

(c) With coreference

(111) [[Bill said that he left]] is true in a context if he and Bill refer to the same individual in the context, and Bill said that Bill left in that context.

Deictic uses: independent reference: g assigns a value to x in the context. The pronoun is used as a referential expression (see also Heim and Kratzer 1998 for a particular implementation).

Coreference, binding: dependent reference: g depends on an antecedent (coreference), or a quantifier to bind it.

Giannakidou 1998, 2001, in preparation: Some variables cannot be interpreted deictically. Expressions that contain such variables will end up being dependent in their distribution for an antecedent or a binder. This renders them polarity sensitive.
(112) **DEFINITION 5** — Dependent Indefinites (cf. Giannakidou 1998: 140)

An indefinite is dependent iff the variable \( x_d \) it contributes cannot introduce a discourse referent in the actual world.

| An indefinite with a dependent \( x_d \) variable is inherently non-referential, it will thus always take narrow scope, and cannot be used as a topic. |

| Hence \( x_d \) cannot get a value in a veridical context. \( \exists \)-closure will generally be fine in the scope of a nonveridical operator, because the nonveridical operator ensures that \( x_d \) will not be forced to introduce a discourse referent in the actual world. The variable \( x_d \) can also be bound by the nonveridical operator. |

| Questions to be explored: |
| • How does the notion of dependent indefinite relate to Partee’s 1986 theory of NP-interpretation and shifts? |
| • Can it be reduced to a type difference, e.g. are dependent indefinites property-type \( \langle e,t \rangle \)? |

| Since the property of dependence is a manifestation of the general constraints of variable interpretation, NPIs of this type are not special in any mysterious way. Good result! |

### 7.2 FCIs: dependent world variables

Giannakidou 2001, Giannakidou and Cheng 2006: FCIs are intensional indefinites. They contain a dependent variable \( w_d \) that must be bound by an operator that can bind such a variable—a Q, modal, or intensional operator. In an episodic context (veridical or not) there is no such operator, the variable remains unbound, and the FCI is uninterpretable.

(113) \([\text{opjosdhipote fititis}] = \text{student}(x)(w_d)\)

(114) *Idha opjondipote ston kipo. 

*not saw.1sg anybody in-the garden

(115) *Dhen idha opjondipote ston kipo. 

*not saw.1sg anybody in-the garden

(116) \# \exists !e \exists x [\text{person} (x, w_d) \land \text{saw} (I, x, e) \land \text{in-the-garden} (e)]

(117) \# \neg \exists !e \exists x [\text{person} (x, w_d) \land \text{saw} (I, x, e) \land \text{in-the-garden} (e)]

The world variable \( w_d \) cannot be assigned the default value of the actual world, and since there is no world-binder in episodic sentences, FCIs are uninterpretable and the structures are ruled out.

Hence, in this account:

| It is the presence of an unbound \( w_d \) variable that renders FCIs unusable in episodic sentences. |

20
How to derive the universal effect?

FCIs presuppose exhaustive variation.

(118) i-alternatives (= epistemic alternatives: Dayal 1997, Giannakidou 2001)
A world \( w_1 \) is an i-alternative wrt \( \alpha \) iff there exists some \( w_2 \) such that \( \llbracket \alpha \rrbracket^{w_1} \not\equiv \llbracket \alpha \rrbracket^{w_2} \)
and for all \( \beta \not\equiv \alpha \): \( \llbracket \beta \rrbracket^{w_1} = \llbracket \beta \rrbracket^{w_2} \)

(119) Free choice item (= FCI nominal in Giannakidou and Cheng 2006)
Let \( W_i \) be a non-empty, non-singleton set of possible worlds. A sentence with a free choice item \( \llbracket \text{OP DET FC} (P, Q) \rrbracket \) is true in \( W_0 \) with respect to \( W_i \) iff:
(a) Presupposition: \( \forall w_1, w_2 \in W_i: \llbracket \alpha \rrbracket^{w_1} \not\equiv \llbracket \alpha \rrbracket^{w_2} \), where \( \alpha \) is the free choice phrase.
(b) Assertion: \( \llbracket \text{OP} w, x [P (x, w); Q (x, w)] \rrbracket = 1 \) where \( x, w \) are the variables contributed by the FCI.

The \( \forall \)-effect and the PI status of FCIs are dissociated, while still succeeding in deriving the PI status of FCIs from their meaning.

8 Conclusions

1. The unitary source approaches (widening plus some sort of EVEN-scalarity) to NPI licensing are not sufficient to capture the variation in both meaning (scalar and not scalar) and distribution attested in (negative) polarity.

2. Scalarity and widening alone cannot describe correctly the status of ill-formed FCIs: they predict weaker effects (contradictions, presupposition failures) than is actually the case.

3. The variation approach within nonveridicality seems to be more consistent with the empirical and interpretational diversity of PIs, thus giving a more secure foundation for addressing compositionality and predicting the correct status of PIs.

4. At least some polarity phenomena have their source not in scalarity, but in dependent reference in the sense of NPIs containing variables that cannot be interpreted referentially. More work needs to be done in order to capture precisely how sortal differences in variables are encoded in grammar.
References


Beaver, David, and Brady Clark. 2003. Always and only: why not all focus sensitive operators are alike. Natural Language Semantics 11.323-362.


Ernst, Thomas. 2007. Speaker oriented adverbs. (Submitted) manuscript, Dartmouth College/UMass Amherst.

Farkas, Donka F. 2006. Free choice items in Romanian. In Festschrift for Larry Horn, ed. by Gregory Ward and Maria Birner, John Benjamins.


Herburger, E. and S. Mauck. 2006. NPIs are low scalar items +F. Ms. Georgetown University.
Horn, Laurence R. (1997), All John’s Children are as Bald as the King of France: existential import and the geometry of opposition. Chicago Linguistics Society 33:155-179.
Quer, Josep (1999), The quantificational force of free choice items. Unpublished MS. University of Amsterdam.