

## Polarity phenomena in natural language: Licensing, variation and compositionality

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### 1 Common paradigms of PIs and basic terminology

Hallmark property of PIs:

PIs have limited distribution: typically, they cannot appear in positive assertions with simple past (= positive episodic sentences).

#### ☞ Negative PIs (NPIs)

(Earliest reference: Klima 1964)

- (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.

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

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

...Which often translates into overt c-command:

- (6) a \*Anydoby I didn't see.  
b [Three students]<sub>F</sub> I didn't see.

☞ **Free choice items (FCIs)**

- (7) 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  
(8) \* (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  
(9) \* (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.'

- ☞ French; Jayez and Tovena 2005  
(10) 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.

[However, not all FCIs are polarity sensitive:

☞ *irgendein* (Kratzer and Shimoyama 2002).

- (11) a. **Irgendjemand** hat angerufen. (Kratzer and Shimoyama 2002: (6))  
irgend-one has called  
b. \* Opjosdhipote telefonise. (Greek)
- (12) a. Bill bought **whichever book** he liked.  
b. \*Bill bought whichever book. (Horn 2000; Giannakidou and Cheng 2006)

Episodicity overridden: subtriggering (LeGrand 1975)

- (13) 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 originally; for more recent analyses see Szabolcsi 2004, Nilsen 2004, Ernst 2007):

- (14) a Bill didn't buy some books.  
b  $\exists x. \text{book}(x) \wedge \neg \text{bought}(b, x)$
- (15) a Bill would rather be in Montpellier.  
b # Bill wouldn't rather be in Montpellier.
- (16) a John is here already.  
b #John isn't here already.
- (17) 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).

### 3 Core questions

PPIs raise the question of well-formedness that is not purely determined by syntax!

What is the the nature of polarity ill-formedness?

#### (A) Status question

- Are polarity failures generally the same? E.g. Can they be reduced to the same source, lexical anomaly, presupposition failure, mere oddity, semantic-syntactic failure?

No! (see especially Giannakidou 2001, 2006, Herburger and Mauck 2006). Though attempts have been made to answer positively in the pragmatic direction (Lahiri 1998, Krifka 1995, Chierchia 2006).

#### (B) Sanctioning question (aka the *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?

#### (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.

Examples: Kadmon and Landman 1993, Lee and Horn 1994, Krifka 1995, Israel 1996, Lahiri 1998, Giannakidou 1998, 2001, Kratzer and Shimoyama 2002)

### 3 Sanctioning question: very liberal distribution of *any*

Any is fine in many contexts other than negation.

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

#### 3.1 Downward entailment

(19) *Ladusaw's (1979) licensing condition*

$\alpha$  is a trigger for negative polarity items in its scope iff  $\alpha$  is downward entailing.

(20) **DEFINITION 1** (Upward entailing function).

A function  $f$  is upward entailing iff for every arbitrary element  $X, Y$  it holds that:  $X \subseteq Y \rightarrow f(X) \subseteq f(Y)$

(21) **DEFINITION 2** (Downward entailing function).

A function  $f$  is downward entailing iff for every arbitrary element  $X, Y$  it holds that:  $X \subseteq Y \rightarrow f(Y) \subseteq f(X)$

- (22) a Lucy does not like linguistics.  
[[syntax]]  $\subseteq$  [[linguistics]]

---

$\therefore$  Lucy does not like syntax.

- b Few students like linguistics.  
[[syntax]]  $\subseteq$  [[linguistics]]

---

$\therefore$  Few students like syntax.

- (23) Every [student who likes linguistics] came to the party.  
[[syntax]]  $\subseteq$  [[linguistics]]

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$\therefore$  Every student who likes syntax came to the party.

☺ (19) proved very fruitful (Hoeksema 1986, Zwarts 1986, 1993, van der Wouden 1994, Kas 1993, Dowty 1994, among many others). One also finds references to licensing environments as non-UE, as in Postal (2000) and Progovac (1994).

However, problems arose immediately:

- Problem 1: Conceptually, it remained unclear for a long time why DE is relevant for PIs. In Ladusaw, the licensing condition had the status of a filter:
- Problem 2: (19) 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:

- (24) a \*/#Each student who saw anything contacted the police.  
b \*/# Both students who saw anything contacted the police.

Giannakidou (1997: p.137: (181)): with “anaphoric definites” no FCIs, even with *every*:

- (25) Context: Yesterday, some students came to my office. Many of them had information about the murder of Athanasiadis.  
 S: # {Every/Each} student who know anything about the murder proved very useful.

It seems that, with determiners, it is not so much monotonicity that matters but existence (Lin 1996), i.e. whether the domain of the determiner is non-empty or not (Giannakidou 1997, 1998, 1999; see also Horn 1997).

- Problem 3: (19) is empirically inadequate. NPIs appear non-monotone environments such as: questions, in imperatives, with modal verbs, and subjunctive/infinitival propositional attitudes, or disjunctions (Giannakidou 1998, 1999, 2006).

- (26) a If you talk to any students, just let me know.  
 b Did you see anybody?  
 c Press any key.  
 d John may talk to anybody.  
 e John is willing to talk to anybody.

### 3.2 Nonveridicality

☞ Proposal: The semantic property that unifies NPI-licensing environments as a natural class is nonveridicality.  
 (Giannakidou 1998, 1999, 2006, Zwarts 1995, Bernardi 2002; for the related notion of non-existence and that it is relative to NPI licensing see Lin 1996).

- (27) **DEFINITION 3.** (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 *antiveridical* iff  $Fp$  entails that *not*  $p$  in some individual's epistemic model:  $Fp \rightarrow \neg p$  in some  $M_E(x)$ .

For nonveridicality see also: Montague 1969, defined as existence. For a recent attempt to unify non-existence and absence of truth entailment (or presupposition), as proposed in Def. 3 see Borschev et al 2007.

Zwarts 1995:  $DE \subset$  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*

- (28) 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):

- (29) 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!

- (30) Bori na anapse {**opjosdhipote/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.’

- (31) 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

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

- (33) Disjunction
- |   |   |           |                         |               |
|---|---|-----------|-------------------------|---------------|
| a | I bike mesa kanenas                                   | <b>i</b>  | 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                                    | <b>ke</b> | 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.

#### 4. At the same time: true NPIs!

##### 4.1 Strict dependency

There is a class of items that are strictly licensed by negation and antiveridical expressions only.

- ☞ *Either* (Nathan 1999, Rullman 2003, Giannakidou 2006)
- (34) a John didn't come either.  
 b \*Did John come either?  
 c \*If John comes either, they'll give us a table.

d \* Pick this up either! (OK: Pick this up *too*)

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

(35) Dhen dhino djekara 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!

(36) #/\*An dhinis dhekara, tha me akousis.  
(If you dive a damn, you'll listen).

☞ Minimizers in Spanish?

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

☞ mo-items in Japanese (Nakanishi 2007, Yoshimura 2007)

- (38) 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.'

{dare-mo / hito-ri-mo} seem to be admitted with negation only.

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

- (39) 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.  
c. \*Idhe **oute** to idio tou to pedi?  
d. ...**xoris** na dhi **oute** to idhio tou to pedi.  
without seeing even his own child.

All these are fine with antiveridical *without*. Finally:

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

(40) \***To poli pende fitites** dhiavasan **oute ena** arthro.  
'At most 5 students read even one article.'  
(Greek; Giannakidou 2007)

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

Notice the problem with EVEN + indefinite. This runs counter to Lahiri's generalization! We come back.

## 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.

- (42) 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 fine with directive propositional attitudes:

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

- (43) 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](http://www.xanga.com/betweenIDs)

- (44) "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](http://...www.deadmule.com/content/word.of.mule.php?content_id=952)

- (45) 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](http://everything2.com/index.pl?node_id=1166781)

☞ Minimizers and *any* are fine also with *only*, and factive verbs (positive and negative):

- (46) 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}.
- (47) 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.

⊗ But *only* and factives are veridical, and they are also not DE!

- (48) Atlas (1991, 1993): *only a P* asserts:  
 $\exists x \forall y [(x=y \leftrightarrow Py) \ \& \ (Py \rightarrow y=a)]$   
= Exactly one individual, and no one other than a, has the property P.  
Which *entails* the positive proposition:  $P(a)$



- (49) Atlas (1993, 1996) inspired LF:  
 $\text{ate.a.vegetable}(\text{Larry}) \wedge \neg \exists x[x \neq \text{Larry} \wedge \text{ate.a.vegetable}(x)]$
- (50) Only Larry ate a vegetable  $\not\rightarrow$  Only Larry ate broccoli.  
 Larry may have eaten spinach, for instance.
- (51) 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:

- (52) Weak DE (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
- (53) Strawson DE (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:  $f(y) \rightarrow f(x)$ .
- (54) Strawson validity (von Fintel 1999: (19))  
 An inference  $p_1, \dots, p_n \therefore q$  is Strawson-valid iff the inference  $p_1, \dots, p_n, S \therefore q$   
 is classically valid; where  $S$  is a premise stating that the presuppositions of all the statements  
 involved are satisfied.

Thus:

- (55) a. Broccoli is a vegetable. ( $C \subseteq B$ ;  $x \rightarrow y$ )  
 b. John ate broccoli. (a is  $C$ ;  $f(x)$  defined)  
 c. **Only John ate a vegetable.**  
 d.  $\therefore$  Only John ate broccoli.
- (56) a. Honda is a car. ( $C \subseteq B$ ;  $x \rightarrow y$ )  
 b. John bought a Honda. (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:

Strawson and weak DE overgenerate: they allow any context inference to influence the reasoning pattern (Atlas 1993, Giannakidou 2006).

- (57) Only John ate a vegetable.

*Presupposes: Someone ate a vegetable.* (Horn 1996)  
*Asserts: Nobody other than John ate a vegetable.*

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

(58) a. Broccoli is a vegetable.  
 b. John ate broccoli. (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.

(59) a. Broccoli is a vegetable.  
 b. John ate broccoli. (f(x) defined;  $j \in C$ )  
 c. [John]<sub>F</sub> ate a vegetable.  $\rightarrow_{\text{Strawson DE-entails}}$  [John]<sub>F</sub> ate broccoli.

(60) a \* It was John who talked to anybody.  
 b \* [John]<sub>F</sub> talked to anybody.

(61) \* Even John ate any broccoli. (Horn 1989)

(62) Presupposition of *even* (Karttunen and Peters 1979)  
 Existential presupposition of *even*:  
 $\exists x [x \neq \text{John} \wedge C(x) \wedge \text{ate}(x, \text{broccoli})]$ , 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:

(63) a. Broccoli is a vegetable.  
 b. John ate broccoli. (f(x) defined;  $j \in C$ )  
 c. John ate a vegetable  $\rightarrow_{\text{Strawson DE-entails}}$  John ate broccoli.

(64) \* John ate any vegetable.

⊗ This is too liberal!

### 5.1.3 No way to distinguish between positive and negative factives

(65) a. Honda is a car. ( $C \subseteq B$ ;  $x \rightarrow y$ )  
 b. John bought a Honda. (a is C; f(x) defined)  
 c. Larry {is glad/regrets} that John bought a car.  
 d.  $\therefore$  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 licensers for NPIs:

☞ Giannakidou 1998, 2006:

(66) \* **Monon** o Janis **δini δekara.** (Greek )  
 only the John give.3sg damn

- (Only John gives a damn.)
- (67) \* I Maria **metanjose** pou **kunise** to **daxtilaki tis**.  
 the Maria regret.3sg that moved.3sg the little.finger hers  
 (Mary regrets that **she lifted a finger**.)
- (68) a \* **Ekplisome** pu exi {**opjondipote/kanenan**} filo.  
 be-surprised.1sg that has FC / NPI friend  
 (I'm surprised she has any friend.)
- b \* **Monon** o Janis exi {**opjondipote/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.

### (69) *Rescuing by nonveridicality*

A PI  $\alpha$  can be rescued in the scope of a veridical expression  $\beta$  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 are NPIs banned from veridical contexts?

And: Why are the various kinds of NPIs and FCIS permitted in exactly the contexts they are?

Two approaches:

- The unitary source position (Kadmon and Landman 1993, Krifka 1995, Chierchia 2006, Lee and Horn 1994, Lahiri 1998): Underlying unifying idea: there must be one source of illformedness and this source is scalarity: NPIs and FCIs are scalar, and it is this scalarity that makes them somehow polarity sensitive.
- The diversity position: Giannakidou 1998, 2001, 2006: the source of ill-formedness is not uniform, in fact we shouldn't expect it to be!

### 6.1 Scalarity, domain widening, *even*: Kadmon and Landman

(70) 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*.

(71) *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.

(72) Licensing condition for *any*: Strengthening

*Any CN* 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.

(73) a I didn't see any book on the table.

b \* I saw any book on the table.

### 6.2 Problems with widening:

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

- (74) Pick any one of these 5 cards. (partitive, specific set of cards)
- (75) Consider any arbitrary number.
- ⊗ Not all NPIs are scalar: *kanenas*
- ⊗ Not all scalar PIs improve with negation: *any* (good) and FCIs (bad) with negation. Recall:
- (76) 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.’
- ⊗ Asymmetry within the class of NPIs and FCIs: all are scalar, but not all are polarity sensitive.
- (77) a. **Whoever** saw a fly in his soup complained to the manager.  
 b. **Irgendein** hat angerufen.  
 b. \***Anyone** complained to the manager.
- ⊗ 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!

### 6.3 Chierchia 2006

The NPI introduces alternatives:

- (78) a. \*I saw any boy. (Chierchia’s (47))  
 b. Meaning  
 $\exists w' \exists x \in D_{w'} [\text{boy}_{w'}(x) \wedge \text{saw}_w(I, x)]$   
 c. Alternatives  
 $\exists w' \exists x \in D_{w'} [\text{boy}_{i,w'}(x) \wedge \text{saw}_w(I, x)]$ , 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  
 $\exists w' \exists x \in D_{w'} [\text{boy}_{w'}(x) \wedge \text{saw}_w(I, x)] \subseteq_c$   
 $\exists w' \exists x \in D_{w'} [\text{boy}_{i,w'}(x) \wedge \text{saw}_w(I, x)]$ , where  $1 \leq i \leq 3$  and  $p \subseteq_c q = p$  is stronger  
 (hence, less likely) than q 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)

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

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

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

(81)  $\llbracket \text{akomi ke } (x) (P) \rrbracket = 1$  iff  $P(x) = 1$ ; (assertion)  
 $\exists y [y \neq x \wedge P(y)] \wedge$   
 $\forall y [y \neq x \rightarrow \text{likelihood}(P(y)) > \text{likelihood}(P(x))]$  (presupposition)

☞ With one:

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

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

- (83) a ?#Akomi ke ENAS fititis dhen irthe.  
 even one student didn't arrive.  
 b Oute ENAS fititis dhen irthe.  
 Not even one student arrived.
- (84) ?#Akomi ke enan fititi dhen idha.  
 even one student I didn't see.
- (85) a #  $\exists n [n \neq \text{one} \wedge n \text{ students arrived}] \wedge \forall n [n \neq \text{one} \rightarrow$   
 likelihood (n students arriving) > likelihood (one student arriving)]  
 b #  $\exists n [n \neq \text{one} \wedge \text{it is not the case that } n \text{ students arrived}] \wedge \forall n [n \neq \text{one} \rightarrow$   
 likelihood (n students not arriving) > likelihood (one student not arriving)]

Giannakidou 2007: one is the *most likely*, and 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)

- (86) ?# 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.
- (87) O Janis dhen milise **oute** me tin Maria.  
 the John not talked.3sg even with the Maria  
 John didn't talk even to Maria.
- (88)  $[[\text{esto (ke)} (x) (P)]] = 1$  iff  $P(x) = 1$ ; (assertion)  
 $\exists y [y \neq x \wedge C(y) \wedge \neg P(y)] \wedge$   
 $\exists Q_{\text{scalar}} [C(Q) \wedge \forall y [y \neq x \rightarrow Q(y) > Q(x)]]$  (presupposition)
- (89)  $[[\text{NOT oute} (x) (P)]] = 1$  iff  $\neg P(x) = 1$ ; (assertion)  
 $\exists y [y \neq x \wedge C(y) \wedge \neg P(y)] \wedge$   
 $\forall y [y \neq x \rightarrow \text{likelihood}(P(x)) > \text{likelihood}(P(y))]$  (presupposition)

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:

- (90) \***To poli pende fitites** dhiavasan **oute ena** arthro. Greek  
 'At most 5 students read even one article.'

- (91) \*/??**To poli pende** pedhia efagan **esto** ena pagoto.  
 (?)At most five children ate even one ice-cream
- (92) \* To poli pende fitites aghorasan *akomi ke ena* vivlio.  
 ? At most five students bought even one book.
- (93) \***Weinigen** zullen **ook maar iets** bereiken. Dutch  
 few will even something achieve  
 Few will achieve anything. (Zwarts 1981).

Japanese

- (94) 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.’
- 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.’

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 existentially closed in the ordinary way. 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 NPIs: dependent individual variables

- (95) Idha enan fititi.  
 saw.1sg a student  
 ‘I saw a student.’

- (96) a [[ a student ]] = student(x)  
 b  $\exists x$  [ student(x)  $\wedge$  saw (I, x) ] Existential closure (Heim 1982)

☞ Giannakidou 1998, 2001: certain PIs are indefinites introducing variables which cannot undergo these standard procedures.



(97) DEFINITION 4 — 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.

☺ This means that  $x_d$  cannot be  $\exists$ -closed by the default existential quantifier (either text-level or in the nuclear scope) 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.

☞ den Dikken and Giannakidou: treat *wh-the-hell* phrases as dependent indefinites of this kind.

Questions to be explored:

- How does the notion of dependent definite relate to Partee's 1986 theory of NP-interpretation and shifts?

☞ Genitive of negation in Russian (Partee and Borschev 2004, Borschev et al. 2007): property-type hypothesis for Russian genitives:

(98) Russian gen is “preferentially” interpreted as property-type  $\langle e, t \rangle$ .

Given that dependent indefinites are all non-referential and narrow scope.

- Is being interpreted in *et* co-extensive with being dependent?
- Does the type-driven approach allow us to formalize the appropriate distinctions? Perhaps a hierarchy of non-referential NPs?

If indeed the property of dependence is a manifestation of the general constraints of NP-interpretation, as we would hope, then 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.

(99)  $\llbracket \text{opjosdhipote fititis} \rrbracket = \text{student}(x)(w_d)$

(100) \*Idha opjondipote ston kipo.  
*not saw. 1sg anybody in-the garden*

(101) \*Dhen idha opjondipote ston kipo.  
*not saw. 1sg anybody in-the garden*

- (102) #  $\exists!e \exists x [\text{person}(x, w_d) \wedge \text{saw}(I, x, e) \wedge \text{in-the-garden}(e)]$   
 (103) #  $\neg \exists!e \exists x [\text{person}(x, w_d) \wedge \text{saw}(I, x, e) \wedge \text{in-the-garden}(e)]$

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  $w$  variable that renders items containing it unusable in episodic sentences.

☞ How to derive the universal effect?

FCIs presuppose exhaustive variation.

- (104) *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  $\llbracket \alpha \rrbracket^{w_1} \neq \llbracket \alpha \rrbracket^{w_2}$   
 and for all  $\beta \neq \alpha$ :  $\llbracket \beta \rrbracket^{w_1} = \llbracket \beta \rrbracket^{w_2}$

- (105) *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  $\llbracket \text{OP DET}_{\text{FC}}(P, Q) \rrbracket$  is true in  $W_0$  with respect to  $W_i$  iff:

(where OP is a nonveridical operator; P is the descriptive content of the FC-phrase; Q is the nucleus of the tripartite structure;  $W_0$  is the actual world):

a. Presupposition:  $\forall w_1, w_2 \in W_i: \llbracket \alpha \rrbracket^{w_1} \neq \llbracket \alpha \rrbracket^{w_2}$ , 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 appearance of NPIs with *only* and emotive factives is not a problem for the semantic approach to NPIs, if we refine our view of what sanctioning is: i.e. if we give up the idea that NPI-sanctioning is always licensing-in-the-scope (as suggested in Giannakidou 2006).
2. 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.
3. 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.
4. The diversity 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.
5. More work needs to be done in order to capture precisely how sortal differences in variables are encoded in grammar.

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