EGG16

Lecture III-IV – Modal Polarity Items

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I. Modal auxiliaries

- Negative Polarity Items (NPIs) and Positive Polarity Items (PPIs) are also attested among modal elements (cf. Van der Wouden 1994, Israel 1996, Nilsen 2003, Iatridou & Zeijlstra 2013, Homer t.a.).
- In this talk I focus on modal auxiliaries that are NPIs and PPIs.

I. Modal auxiliaries

- Modal NPIs: in several languages a modal auxiliary meaning ‚need' is an NPI.

Mary need*(n't) leave

Marie braucht *(nicht) zu gehen — German
Marie need not to go

Marie hoeft *(niet) te vertrekken — Dutch
Marie need not to go

I. Modal auxiliaries

- Modal PPIs: in many languages certain modals outscope negation, whereas others scope under it.

John mustn‘t leave	Must > Neg
John shouldn‘t leave	Should > Neg
John doesn‘t have to leave	Neg > Have to
John can‘t leave	Neg > Can

I. Modal auxiliaries

- Iatridou & Zeijlstra (2013): every modal auxiliary reconstructs under negation, unless it is a PPI (if you can reconstruct, you must reconstruct).

John can‘t <can> leave

John doesn‘t have to leave

John mustn‘t <~~must~~> leave

I. Modal auxiliaries

- Evidence comes from the fact that in every case where PPIs may appear under negation, modals normally outscoping negation may also take scope under negation (cf. Homer t.a.).

- Metalinguistic/contrastive negation
- Intervention effects
- Extra-clausal negation
- Baker-Szabolcsi-effects

I. Modal auxiliaries

- Metalinguistic/contrastive negation:

If you push the red button, you will see something, but if you press the blue button you WON'T see something.

A: One student must read 5 articles on the topic.

B: NO student must read 5 articles on the topic, but one student is encouraged to do so.

I. Modal auxiliaries

- Intervention effects:

John didn’t offend someone because he was malicious (but because he was stupid).

John doesn’t always call someone.

She must not marry him because he is handsome but because he is smart.

I mustn't always take the garbage outside. Many times my son does that.

I. Modal auxiliaries

- Extra-clausal negation:

I didn’t say that John called someone.

I regret that John called someone.

I won’t say that John must leave.

I regret that John must leave.

I. Modal auxiliaries

- Baker-Szabolcsi-effects:

I am surprised that John didn't call someone.

Few boys didn't call someone.

I am surprised that he must not write a paper about the Romans.

Very few doctors must not work tonight; most of them are on duty.

I. Modal auxiliaries

- Conclusion: in the domain of modal auxiliaries, both NPIs and PPIs can be attested.

- Many languages offer a variety of PPI modals (alongside polarity-neutral ones): English (*must, should, to be to*), Spanish (*deber*); Dutch (*moeten*); German (*sollen*); Greek (*prepi*).

- NPI modals occur as well (English *need*, Dutch *hoeven*, German *brauchen*), but appear to be cross-linguistically rarer.

II. Differences with other PIs

- However, modal PIs substantially differ from other PIs in a variety of ways:

- Type of quantifier
- Distribution
- Linear-sensitivity
- Distribution of types of PIs

II. Differences with other PIs

- **Type of quantifier:** In the domain of DP quantifiers over individuals, NPIs and PPIs are only attested among existentials and not among universals.

NPIs:	anybody, anything
PPIs:	somebody, something
Neutral:	a person, everything, everybody

II. Differences with other PIs

I didn’t see / *saw any girl
Nobody/*somebody saw any girl

I didn’t see some girl (some>not; *not>some)
Nobody saw some girl (some>no; *no>some)

I didn’t see / saw a girl (not>a; a>not)
Nobody/somebody saw a girl (no>a; a>no)

I didn’t see / saw everything (not>everything)
Nobody/somebody saw every girl (nobody>every girl)

II. Differences with other PIs

However, in the domain of deontic modals (i.e. quantifiers over possible worlds), the reverse pattern emerges: all attested NPIs and PPIs are universals.

	PPIs	Neutral	NPIs
Universal	*must, should, ought* *to, to be to*	*Have to, need to*	*Need*
Existential	-	*Can, may*	-

II. Differences with other PIs

John need*(n't) leave

John mustn't leave (must>not;*not>must)

John doesn't have to leave (not>have to)

John has to leave

John may leave

John may not leave (not>may)

II. Differences with other PIs

In the domain of epistemic modals, NPIs and PPIs appear in both quantificational domains (universal and existential):

	PPIs	Neutral	NPIs
Universal	*must, should, ought* *to, to be to*	*have to, need to*	*need*
Existential	*may*	*could*	*can*

II. Differences with other PIs

?He mustn't be home (must>not; *not>must)
He need*(n't) be home

He may not be home (may>not; *not>may)
He can*('t) be home

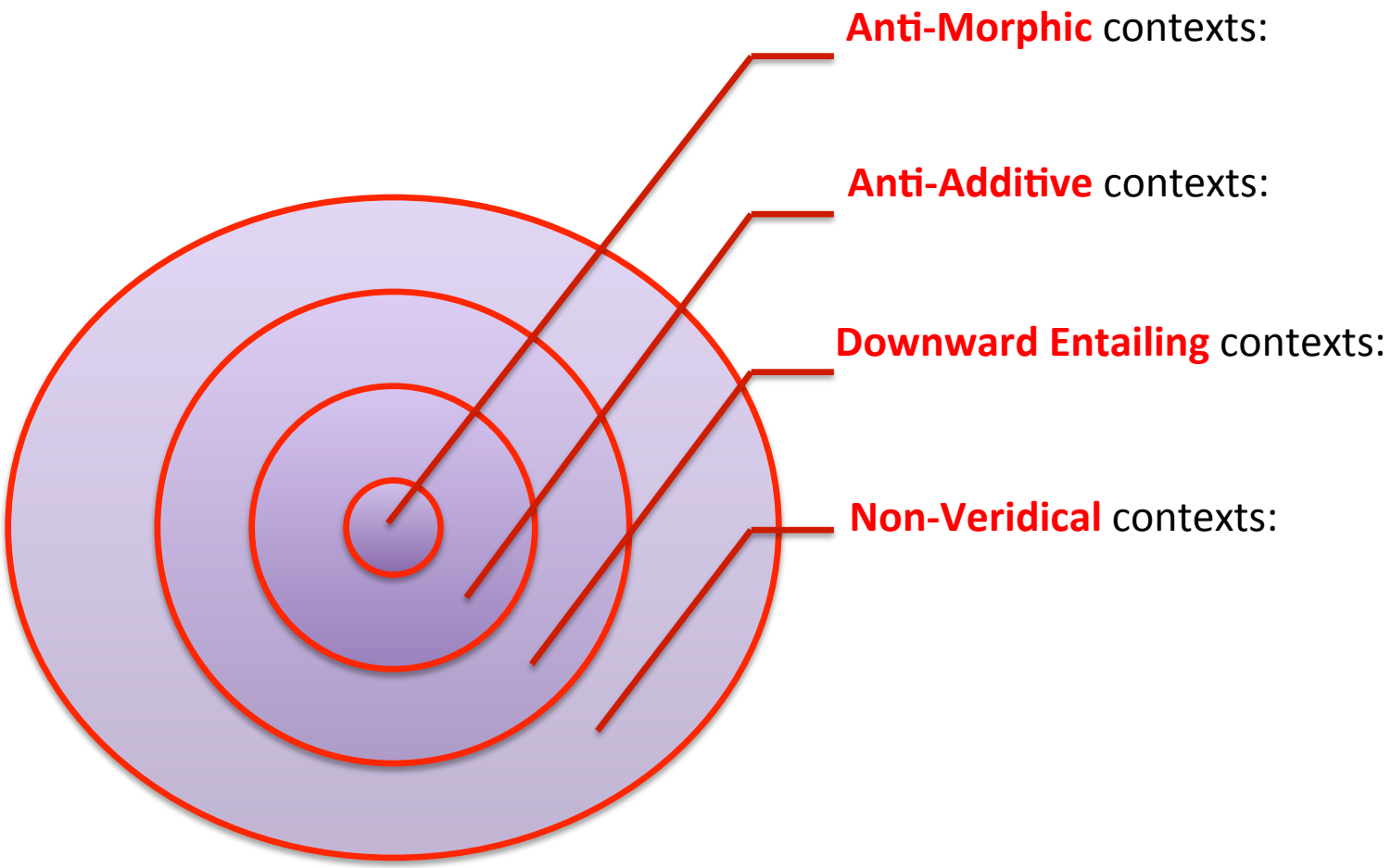
He could be home
He couldn't be home (not>could)

He has to be home
He doesn't have to be home (not>have to)

II. Differences with other PIs

- **Distribution:** NPIs themselves come about in different kinds: different NPIs impose different requirements on the logical properties of their licensers.

II. Differences with other PIs



II. Differences with other PIs

Superstrong NPIs: only in **Anti-Morphic** contexts;
Dutch *mals* ('soft')

Strong NPIs: only in **Anti-Additive** contexts;
Dutch *ook maar* ('at all')

Weak NPIs: only in **Downward Entailing** contexts;
English *ever*

Superweak NPIs: only in **Non-Veridical** contexts;
Mandarin *shenme* ('a (thing)')

II. Differences with other PIs

- Similar differences can be attested among PPIs. Dutch *nog* (‚yet') is a weak PPI (banned only from anti-morphic contexts) (cf. Van der Wouden 1994):

*De monnik is niet nog gelukkig
The monk isn't yet happy

Niemand is nog gelukkig
Nobody is yet happy

Weinig monniken zijn nog gelukkig
Few monks are yet happy

II. Differences with other PIs

- Dutch *een beetje* (‚a bit') is banned from all anti-additive contexts:

*De monnik is niet een beetje gelukkig
The monk isn't a bit happy

*Niemand is een beetje gelukkig
Nobody is a bit happy

Weinig monniken zijn een beetje gelukkig
Few monks are a bit happy

II. Differences with other PIs

- Finally, *allerminst* (not in the least) is a strong PPI, banned from all DE contexts:

*De monnik is niet allerminst gelukkig
The monk is not not.in.the.least happy

*Niemand is allerminst gelukkig
Nobody is not.in.the.least happy

*Weinig monniken zijn allerminst gelukkig
Few monks are not.in.the.least happy

II. Differences with other PIs

- Modal PPIs show the same distribution.
  Should is a strong PPI:

Mary shouldn‘t leave	Should>Neg
Nobody should leave	Should>Nobody
Few students should leave	Should>Few

II. Differences with other PIs

- *Must*, however, is fine in DE contexts that are not AA:

Few students must leave

Few>Must

Must>Few

- Speakers differ with respect to *must* in anti-additive contexts (generally, US English *must* is weaker than UK English *must*, but this distinction is not watershed):

Nobody must leave

Must>Nobody

%Nobody>Must

II. Differences with other PIs

- Modal NPIs, however, show a more unusual distribution.
- Hoeksema (2008), Iatridou & Zeijlstra (2013): Dutch *hoeven* is much more restricted in terms of its licensing conditions than other NPIs.
- *Hoeven* can appear in anti-additive contexts:

Niemand hoeft te werken
Nobody needs to work

Hij hoeft niets te doen
He needs nothing to do

II. Differences with other PIs

- But *hoeven* can appear in some downward entailing contexts only (*negated universals, few, only*):

Niet iedereen hoeft te werken
Not everybody needs to work

Weinig studenten hoeven te werken
Few students need to work

Alleen Hans hoeft te werken
Only Hans needs to work

II. Differences with other PIs

- In other downward entailing contexts *hoeven* may not appear (restrictive clauses of universals, *if*-clauses):

*Iedereen die hoeft te werken wordt om 7:00 verwacht

Everybody who needs to work is at 7:00 expected

*Als je hoeft te werken, word je om 7:00 verwacht

If you need to work, are you at 7:00 expected

II. Differences with other PIs

- This does not only apply to Dutch hoeven, but also to German *brauchen* and English *need*.

Nicht jeder braucht zu arbeiten

Not everybody needs to work

Nur Hans braucht zu arbeiten

Only Hans need work

II. Differences with other PIs

* Jeder der zu arbeiten braucht, wird um 7:00 erwartet

  Everybody who to work needs is at 7:00 expected

* Wenn du zu arbeiten brauchst, wirdst du um 7:00 erwartet

  If you to work need, are you at 7:00 expected

II. Differences with other PIs

Not everybody need go to work

Only John need go to work

*Everybody who need go, should be informed

*If you need go, you'll be informed

II. Differences with other PIs

- **Linear-sensitivity**: Certain modal PPIs show linearity-effects. Dutch *moeten* only behaves a PPI when it precedes negation:

Hij moet niet vertrekken
He must not leave
Must>Neg;*Neg>Must

… dat hij niet moet vertrekken
… that he not must leave
Must>Neg;Neg>Must

II. Differences with other PIs

- ‚US English' *must* outscopes the negative marker *not*/*n't*, but does not necessarily outscope negative quantifier subjects:

John mustn't leave	Must>Neg; *Neg>Must
Nobody must leave	Must>Nobody; %Nobody>Must

II. Differences with other PIs

- However, a negative quantifier object is always outscoped by *must*:

Mary must read nothing Must>Nothing;
*Nothing>Must

- I pretend no awareness of similar facts among non-modal PIs at this stage of the talk.

II. Differences with other PIs

- **Distribution of type of PIs**: Among most domains where PIs can be found, NPIs are more widely attested than PPIs (cf. Van der Wouden 1994, Israel 1996). In the domain of modal auxiliaries PPIs seem to appear more often than NPIs. Many languages have multiple PPI modals, whereas many languages lack NPI modals. (No hard numbers available, though.)

III. Questions

What explains the difference in distribution and behavior between modal and non-modal polarity items?

- Distribution of type of PIs
- Type of quantifier
- Linear-sensitivity
- Distribution

IV. Hypotheses

- A prima facie one would expect to reduce the differences between modal and non-modal PIs to the differences between the semantics of modals (quantification over possible worlds, cf. Kratzer 1981, 1991) and non-modals (quantifiers over individuals, degrees, ...).

IV. Hypotheses

- However, nothing in the current existing analyses of NPI-/PPI-hood hinges the type of variables that are quantified over.

- In this talk, I argue that these differences follow as a result of the syntactic differences between modal auxilaries and other types of PIs.

V. Roadmap

- Show that what underlies non-modal NPIs is the same as what underlies modal PPIs.
- Show how most attested differences between modal and non-modal PIs follow as a result of this analysis.
- Show how modal NPIs are a different type of NPI, but not necessarily specific to modals.
- Discuss some open questions.

VI. Existential NPIs

- Following Chierchia (2006, 2013), basing himself on Kadmon & Landman (1993) and Krifka (1995), the ungrammaticality of unlicensed NPIs can be understood, once it is assumed that:
  - NPIs introduce domain-alternatives;
  - NPIs come along with some (syntactic) feature that triggers the presence of a covert exhaustification operator;
  - Inherent contradictions give rise to ungrammaticality judgments;

VI. Existential NPIs

*I have any potato

[I have any potato$_{[u\sigma]}$] no contradiction, unchecked feature

[EXH$_{[i\sigma]}$ I have any potato$_{[u\sigma]}$] contradiction, checked feature

I don't have any potato

[EXH$_{[i\sigma]}$ I don't have any potato$_{[u\sigma]}$]

VI. Existential NPIs

*I have any potato:

$\exists p[p \in \{p1, p2, p3\} \& Have(I, p)] <$
$\exists p[p \in \{p1, p3\} \& Have(I, p)]$
$\exists p[p \in \{p2, p3\} \& Have(I, p)]$
$\exists p[p \in \{p1, p3\} \& Have(I, p)]$
$\exists p[p \in \{p1\} \& Have(I, p)]$
$\exists p[p \in \{p2\} \& Have(I, p)]$
$\exists p[p \in \{p3\} \& Have(I, p)]$

All domain alternatives are stronger. Therefore:

VI. Existential NPIs

EXH(∃p[p∈{p1, p2, p3} & Have(I, p)) =

∃p[p∈{p1, p2, p3} & Have(I, p)] &
¬∃p[p∈{p1, p3} & Have(I, p]) &
¬∃p[p∈{p2, p3} & Have(I, p)] &
¬∃p[p∈{p1, p3} & Have(I, p)] &
¬∃p[p∈{p1} & Have(I, p)] &
¬∃p[p∈{p2} & Have(I, p)] &
¬∃p[p∈{p3} & Have(I, p)]

- A clear contradiction

VI. Existential NPIs

I don't have any potato

$\neg\exists p[p\in\{p1, p2, p3\} \& Have(I, p)] >$
$\neg\exists p[p\in\{p1, p2\} \& Have(I, p)]$
$\neg\exists p[p\in\{p2, p3\} \& Have(I, p)]$
$\neg\exists p[p\in\{p1, p3\} \& Have(I, p)]$
$\neg\exists p[p\in\{p1\} \& Have(I, p)$, etc.

- All domain alternatives are weaker, so no contradiction can arise.

$EXH(\neg\exists p[p\in\{p1, p2, p3\} \& Have(I, p)]) =$
$\neg\exists p[p\in\{p1, p2, p3\} \& Have(I, p)]$

VII. Universal PPIs

- In principle, Chierchia's approach should also be applicable to universals, as nothing would rule out the introduction of domain alternatives in the restrictive clause of a universal quantifier.
- However, since universals are at the other end of the scale, the reasoning in terms of arising contradictions is reverse: such universal quantifiers that are obligatorily exhaustified are expected to be PPIs.

VII. Universal PPIs

- To see this, take the imaginary word *pevery*, which would be the universal counterpart of *any*: a universal quantifier that obligatorily introduces domain alternatives, which must be exhaustified.

VII. Universal PPIs

- I didn’t see pevery girl

¬ ∀g[g∈{g1, g2, g3} → See(I, g)] <

¬ ∀g[g∈ {g1, g2} → See(I, g)]

¬ ∀g[g∈ {g2, g3} → See(I, g)]

¬ ∀g[g∈ {g1, g3} → See(I, g)]

¬ ∀g[g∈ {g1} & See(I, g)], etc.

VII. Universal PPIs

- Consequently, EXH(I didn't see pevery girl) yields a contradiction:

$$\text{EXH}(\neg \forall g[g \in \{g1, g2, g3\} \rightarrow \text{See}(I, g)]) =$$

$$\neg \forall g[g \in \{g1, g2, g3\} \rightarrow \text{See}(I, g)] \;\&$$
$$\forall g[g \in \{g1, g2\} \rightarrow \text{See}(I, g)] \;\&$$
$$\forall g[g \in \{g2, g3\} \rightarrow \text{See}(I, g)] \;\&$$
$$\forall g[g \in \{g1, g3\} \rightarrow \text{See}(I, g)] \;\&$$
$$\forall g[g \in \{g1\} \rightarrow \text{See}(I, g)], \text{ etc.}$$

VII. Universal PPIs

- Outside DE contexts, the assertion is not weaker than any of its alternatives, so exhaustification is semantically vacuous.

I saw pevery girl

$\forall g[g \in \{g1, g2, g3\} \rightarrow See(I, g)] >$
$\forall g[g \in \{g1, g2\} \rightarrow See (I, g)]$
$\forall g[g \in \{g2, g3\} \rightarrow See (I, g)]$
$\forall g[g \in \{g1, g3\} \rightarrow See(I, g)]$
$\forall g[g \in \{g1\} \rightarrow See(I, g)]$, etc.

VII. Universal PPIs

- Chierchia's approach predicts there to be universal quantifier PPIs.
- However, no language in the world seems to exhibit such universal quantifier PPIs, at least within the domain of quantifiers over individuals.

VII. Universal PPIs

- Most modals that are PIs are universal PPIs. No language investigated so far seems lacks them, just as there is no language that seems to lack existential NPIs that quantify over individuals.
- The PPI-hood of these modals follows directly, once they are assumed to be universal quantifiers that obligatorily introduce domain alternatives that must be exhaustified.

VII. Universal PPIs

She mustn't leave (*NEG>MUST)

EXH(NOT(Must(leave(she))) =

EXH[$\neg \forall w[w \in \{w1, w2, w3\} \rightarrow leave_w(she)]$] =

$\neg \forall w[w \in \{w1, w2, w3\} \rightarrow leave_w(she)]$ &
$\forall w[w \in \{w1, w2\} \rightarrow leave_w(she)]$ &
$\forall w[w \in \{w2, w3\} \rightarrow leave_w(she)]$ &
$\forall w[w \in \{w1, w3\} \rightarrow leave_w(she)]$ & …

Contradiction!

VII. Universal PPIs

- Hence, if existential non-modals NPIs are PIs for the same reason as universal modal PPIs, it follows that both represent a more canonical type of PI.
- But why are the mirror images absent then? Why are there hardly any modal existential NPIs? And why are there hardly any non-modal universal PPIs?

VIII. Existential modal NPIs

- For the absence of existential modal NPIs, there might be a functional reason: every modal that is not a PPI reconstructs under negation anyways, so modal existential NPIs would functionally be poorly motivated.
- Such an analysis would predict that existential modal NPIs are not impossible, but should be very rare.

VIII. Existential modal NPIs

- Middle Dutch *dorven* (may) might be an example of such a (shortlived) NPI (cf. Meijer 2014), though its quantificational force is unclear:

Ganse ne darftu niit vermiden
Health neg may.you neg avoid
‚You may not forget about your health‘

Maar dat ne darf hi clagen niet
But that neg may he complain neg
‚But he doesn‘t have to / may not complain‘

IX. Universal non-modal PPIs

- But why would PPI-universal quantifiers over individuals not exist? Or, to be more precise: why would universal quantifiers over individuals that obligatorily introduce domain alternatives that have to be exhaustified not exist?

- Answer, they do exist!

IX. Universal non-modal PPIs

- Note: EXH>NEG>$\forall_{[u\sigma]}$ yields a contradiction. But NEG>EXH>$\forall_{[u\sigma]}$ does not!

- So, it al depends on where EXH is present in the structure.

- Assumption: Covert EXH is always higher than the PPI at surface structure, since it must appear in a position c-commanding its syntactic feature checker (cf. Zeijlstra 2004, 2012).

IX. Universal non-modal PPIs

[<EXH> [NEG [<EXH> [$\forall_{[u\sigma]}$ [<*EXH>]]]]]

[EXH [$\forall_{[u\sigma]}$ [<*EXH> [NEG [<*EXH>]]]]]

- Universal Quantifier PPIs can scope under negation (or any other DE operator), as long as EXH is able to intervene between the negation (or another DE operator) and the PPI.

IX. Universal non-modal PPIs

- Prediction 1: Universal Quantifier PPIs may scope under negation(/DE operators) as long as their surface position is lower;
- Prediction 2: Universal Quantifier PPIs surfacing above negation(/DE operators) may not reconstruct.

IX. Universal non-modal PPIs

She must not leave

- EXH must be higher than must

  EXH(MUST(NOT)) OK
  EXH(NOT(MUST)) Contradiction

- EXH must appear before *must*; since *must* introduces domain alternatives, *must* cannot reconstruct; hence, *must* is a PPI.

IX. Universal non-modal PPIs

- In those languages that exhibit PPI modals these modals surface either adjacent to or higher than the negation (cf. Iatridou & Zeijlstra 2012): they form either a morphological complex with negation or they precede negation.

- Those modals may not reconstruct and therefore exhibit all PPI-like properties.

IX. Universal non-modal PPIs

He mustn't leave	English
Hij moet niet vertrekken He must not leave	Dutch
Dhen-prepi na to kanume afto Not must PRT it do this	Greek
Juan no-debe ir Juan must must go	Spanish

- All: MUST > NEG

IX. Universal non-modal PPIs

- But, in languages with V2 in main clauses, only modals in main clauses are PPI-like:

Hij moet niet vertrekken — Dutch
He must neg leave
Must>Neg;*Neg>Must

… dat hij niet moet vertrekken — Dutch
… that he neg must leave
Must>Neg;Neg>Must

IX. Universal non-modal PPIs

- The PPI-like behavior of those modals that outscope negation follows from:

  - the assumption that universal quantifiers may be equipped with the same properties that Chierchia assumes English *any* has;

  - the fact that these modals do not surface in a lower position than their anti-licenser.

IX. Universal non-modal PPIs

- But things are different for universal quantifier DP 'PPIs' if they appear below negation

John didn't see pevery girl:

EXH(NOT(pevery))	contradiction
NOT(EXH(pevery))	OK

- Universal PPIs can scope under negation (or any other DE operator), as long as EXH is able to intervene between the negation (or another DE operator) and the PPI.

IX. Universal non-modal PPIs

- It cannot be determined whether a universal quantifier that surfaces below negation and that takes scope below negation is a PPI or not.
- But how to determine whether DP universals are PPIs?
- To investigate their behavior when they surface above negation.

IX. Universal non-modal PPIs

- Universal quantifier PPIs that are DPs that surface above negation should have EXH take scope over them:

EXH>$\forall_{[u\sigma]}$>NEG

- Prediction: PPI universals are not expected to reconstruct under negation; polarity-insensitive universals are.

IX. Universal non-modal PPIs

- Languages are known to vary cross-linguistically with respect to inverse reading of universal quantifiers preceding negation.

- Most languages (including English) allow inverse readings, but some (Dutch, Northern German, Lebanese Arabic, Japanese) do not do so (cf. Abels & Marti 2010).

IX. Universal non-modal PPIs

Every boy didn't walk — English

OK: "No boy walked"

OK: "Not every boy walked"

Iedere jongen liep niet — Dutch

OK: "No boy walked"

*: "Not every boy walked"

IX. Universal non-modal PPIs

Every doctor has no car — English

OK: “No doctor has a car”

OK: “Not every doctor has a car”

Iedere arts heeft geen auto — Dutch

OK: “No doctor has a car”

*: “Not every doctor has a car”

IX. Universal non-modal PPIs

- These facts are well-known but have not received a proper explanation.
- Once we assume that Dutch *ieder* is a PPI, these facts follow even though *ieder* may take scope below negation (e.g. when it is in object position):

Hij heeft niet iedere vrouw gezien

He has not every woman seen

‚He didn‘t see every woman‘

IX. Universal non-modal PPIs

- But how do we know whether *ieder* is a PPI indeed?

- Again, apply the four diagnostics for PPI-hood: Meta-linguistic negation, extra-clausal negation, intervention effects and Baker-Szabolcsi-effects.

IX. Universal non-modal PPIs

- *Ieder* may reconstruct under meta-linguistic negation:

Speaker A: Iedereen moet de kamer uit

Everybody must the room out

'Everybody must leave the room'

Speaker B: Nee, onzin. Iedereen moet niet de kamer uit; alleen Jan en Piet

No, nonsense. Everybody must neg the room out; only Jan and Piet

'No, nonsense. Everybody mustn't leave the room, only John and Piet must'

IX. Universal non-modal PPIs

- *Ieder* may appear under extra-clausal negation:

Ik zeg niet dat iedereen moet vertrekken; alleen dat Jan moet vertrekken

I say neg that everybody must leave; only that Jan must leave

'I'm not saying that everybody must leave; only that John must leave'

IX. Universal non-modal PPIs

- *Ieder* may reconstruct under negation if there is a proper intervener

(?)Iedereen gaat niet de kamer uit, omdat het wordt gevraagd

Everybody goes neg always the room out, because it is asked

‚It is not because it is asked for that everybody leaves the room'

IX. Universal non-modal PPIs

- *Ieder* may reconstruct under negation if that negation is embedded under another NPI-licensing context:

Het verbaast me dat iedereen niet blijft

It surprises me that everybody neg stays

'It surprises me that not everybody stays'

Het verblijdt me dat iedereen niet blijft

It makes me happy that everybody neg stays

'It makes me happy that nobody stays'

IX. Universal non-modal PPIs

- The evidence shows that Dutch *ieder* is indeed a PPI.
- The fact that *ieder* does not behave like a PPI when it surfaces below negation actually follows from the application of Chierchia's (2005, 2013) approach in accordance with certain syntactic assumptions.

IX. Universal non-modal PPIs

- Chierchia's (2005, 2013) approach predicts that universal quantifiers can become PPIs for the same reason that existential quantifiers can become NPIs.
- Universal quantifier PPIs can be attested, both among quantifiers over possible worlds and among quantifiers over individuals.
- Universal quantifier PPIs may scope under negation once the EXH-operator they induce acts as an intervener between the PPI and its anti-licenser.

X. Strength & linear-sensitivity

- However, not all differences between modal and non-modal PIs are explained. For instance, the strength difference between *should* and *must*:

Few students should leave	*Few>should; Should>few
Few students must leave	Few>,must; must>few

X. Strength & linear-sensitivity

- Also the fact that in certain varieties of English *must* may appear in anti-additive contexts has not been explained yet:

Nobody must leave	Must>Nobody; %Nobody>Must

X. Strength & linear-sensitivity

- These facts correspond to the linear-sensitivity effects observed earlier:

Mary must read nothing	Must>Nothing; *Nothing>Must

- Also, the Dutch and German *should*-verbs (both strong PPIs), don‘t show the linear-sensitivity effect atteseted for weak moeten/müssen (‚must‘):

X. Strength & linear-sensitivity

… dat Jan niet zou moeten vertrekken
… that Jan neg would must leave
'… that Jan shouldn't leave'
Should >neg;*neg> should

… dass Hans nicht abfahren soll
…that Hans neg leave should
'… that Hans shouldn't leave'
Should >neg;*neg> should

X. Strength & linear-sensitivity

- Linear-sensitivity applies only to weak PPIs; not to strong PPIs.

- However, nothing in the approach so far explains this: linear-sensitivity emerges as the result of EXH intervening between the anti-licensers and the PPI

X. Strength & linear-sensitivity

… dat Jan <EXH> niet <EXH> moet vertrekken

… that Jan neg must leave

'… that Jan doesn't have to leave'

<EXH> Nobody <%EXH> must leave

Must>Nobody;
%Nobody>Must

XI. Strong vs. weak PIs

- Gajewski (2011), Chierchia (2013): The strong-weak distinction for NPIs (and thus also for universal PPIs) is the result of the exhaustifier taking the implicatures of the (anti-)licensing context into account.

- *Few* is semantically DE. But once it‘s implicatures are taken into consideration not anymore.

XI. Strong vs. weak PIs

Few student lefts ≈> Some student left

If few students pass the exam, the department is faced with budget cuts; this year no student passed the exam, so the department will face budget cuts.

- ‚Few but some' is not DE.
- Consequently EXH(Few but some (NPI)) would yield a contradiction.
- Only anti-additive licensers do not trigger positive (scalar) implicatures.

XI. Strong vs. weak PIs

- Problems:

- How is it encoded in the NPI (or PPI) that its exhaustifier should take the pragmatic properties of its licenser into consideration?
- Linear-sensitivity effects remain unexplained.

XI. Strong vs. weak PIs

- Collins & Postal (2014): strong NPIs are (generally) strict NPIs; weak NPIs are generally non-strict NPIs.

  - Strict NPIs must be licensed in a (syntactically) local domain.
  - Non-strict NPIs do not have to be licensed in a (syntactically) local domain.

XI. Strong vs. weak PIs

- *Ever*: weak and non-strict:

Few people ever saw him

At most five students ever saw him

I don't travel in order to ever see him

I didn't say that I ever saw him

XI. Strong vs. weak PIs

At all: strong and strict:

*Few people saw him at all

*At most five students saw him at all

*I don't travel in order to see him at all

*I didn't say that I saw him at all

XI. Strong vs. weak PIs

- Note that weak/non-strict NPIs form another problem for Chierchia's approach:

[EXH$_{[\sigma]}$ I don't travel [in order to ever$_{[\sigma]}$ see him]]
[EXH$_{[\sigma]}$ I didn't say [that I ever$_{[\sigma]}$ saw him]]

- Since EXH must Agree with the NPI's [σ]-feature, EXH should stand in a local relation with it, predicting every NPI to be a strict NPI.

XI. Strong vs. weak PIs

- **Proposal**: two ways to trigger the presence of an exhaustifier:

– one way is by syntactic agreement;

– another one would be the result of a pragmatic mechanism that states that if there have been introduced some alternatives in the sentence and they have not been applied to by any operator that applies to alternatives, as a last resort, the entire clause is exhaustified.

XI. Strong vs. weak PIs

- Syntactic exhaustification:
- is triggered by agreement;
- is subject to syntactic locality constraints;
- may apply at any position in the clause, provided its complement is of the right semantic type;

- Pragmatic exhaustification:
- takes place as a last resort operation;
- is not subject to syntactic locality constraints;
- may apply at the CP level only (given that it is a last resort operation applying at propositional level);

XI. Strong vs. weak PIs

- **Pragmatic exhaustification** involves regular EXH.
- **Syntactic exhaustification** involves EXH+$_{[\sigma]}$, which also considers the implicatures generated in its entire complement.

- *Ever, should*: introduce domain alternatives
- *At all, must*: introduce domain alternatives and carry [uσ].

XI. Strong vs. weak NPIs

- Weak NPIs:
  - are pragmatically exhaustified;
  - licensed in all DE contexts;
  - subject to locality constraints;
  - do not show linear-sensitivity effects, as EXH is always in CP.

- Strong NPIs:
  - are syntactically exhaustified;
  - licensed in all AA contexts
  - subject to locality constraints;
  - show linear-sensitivity effects, as EXH is always in CP.

XI. Strong vs. weak PPIs

- Strong PPIs:
  - are pragmatically exhaustified;
  - anti-licensed in all DE contexts;
  - subject to locality constraints;
  - do not show linear-sensitivity effects, as EXH is always in CP.

- Weak PPIs:
  - are syntactically exhaustified;
  - anti-licensed in all AA contexts
  - subject to locality constraints;
  - show linear-sensitivity effects, as EXH is always in CP.

XII. Interim summary

The approach pursued so far explains:

- the uneven distribution of existential non-modal NPIs and modal NPIs, and the uneven distribution of universal non-modal PPIs and modal PPIs.
- the existence of linear-sensitivity effects and their relation with PPI-strength.
- But not yet the distributional differences of universal NPIs.

XIII. Universal NPIs

- As for the latter, it should be noted that the current approach to NPI/PPI-hood cannot account for the existence of universal quantifier NPIs in the first place.

- However, another type of approach may actually account for such NPIs.

XIII. Universal NPIs

- **The syntactic aproach to NPI-hood**: NPIs come along with a syntactic requirement that they be licensed by a (semi-)negative element (Klima 1964, Laka 1990, Progovac 1992, 1993, 1994, Postal 2000, Den Dikken 2006, Herburger & Mauck 2007):

  - any: $[_D$ NEG [A(N)]] (Postal)
  - $any_{[uNEG]}$ (Den Dikken/H&M)

XIII. Universal NPIs

- Postal: the negation that is incorporated in *any* must be spelled out elsewhere:

I saw nobody

I did-[n't]$_i$ see t$_i$-anybody

- Den Dikken/Herburger & Mauck: [uNEG] on *any* must be checked by a higher element carrying [iNEG]:

I didn't$_{[iNEG]}$ see anybody$_{[uNEG]}$

XIII. Universal NPIs

- But this approach faces several problems:

  - No principled restriction to what kind of elements can be NPIs.
  - Unclear how the set of potential licensers can be extended to all downward entailing contexts (including restrictive clauses of universal quantifiers and *if*-clauses).

XIII. Universal NPIs

- However, these problems may not necessarily apply to *hoeven/brauchen/need* if they are treated as an NPIs in these terms.
- *Hoeven* can appear in anti-additive contexts:

Niemand hoeft te werken

Nobody needs to work

Hij hoeft niets te doen

He needs nothing to do

XIII. Universal NPIs

- *Hoeven* can appear in some downward entailing contexts only (*negated universals, few, only*):

Niet iedereen hoeft te werken
Not everybody needs to work

Weinig studenten hoeven te werken
Few students need to work

Alleen Hans hoeft te werken
Only Hans needs to work

XIII. Universal NPIs

- But in other downward entailing contexts *hoeven* may not appear (restrictive clauses of universals, *if*-clauses):

*Iedereen die hoeft te werken wordt om 7:00 verwacht

Everybody who needs to work is at 7:00 expected

*Als je hoeft te werken, word je om 7:00 verwacht

If you need to work, are you at 7:00 expected

XIII. Universal NPIs

- This does not only apply to Dutch *hoeven*, but also to German *brauchen* and English *need*.

- **Observation**: All contexts that license *hoeven/ brauchen/need* are either plain negations or give rise to split-scope readings that contain a negation:

XIII. Universal NPIs

- Split-scope readings (cf. Penka 2010):

You need to wear no tie:

i. *There is no tie that you need to wear (NEG>∃>NEED)

ii. It is not obligatory that you wear a tie (NEG>NEED>∃)

iii. ?It is obligatory that you wear no tie (NEED>NEG>∃)

XIII. Universal NPIs

- Two approaches:

  - **Negative quantifier approach**: Negative indefinites are plain negative quantifiers and split-scope readings are derived as an entailment of quantification over kinds (Geurts 1996), properties (De Swart 2000) or choice-functions (Abels & Martí 2011).

XIII. Universal NPIs

- **Decomposition approach**: split-scope effects result from lexical decomposition by means of some process of amalgamation (Jacobs 1980), incorporation (Rullmann 1995), syntactic agreement (Penka 2007, 2010) or of a post-syntactic spell-out rule (Zeijlstra 2011) .

XIII. Universal NPIs

- If the decomposition approach is correct, all licensers of universal NPI modals are licencers that in their lexical decomposition contain a negation.
- This is completely in line with the syntactic approach to NPI-hood, the only approach that is able to predict universal NPIs in the first place.

XIII. Universal NPIs

- The only question that remains open, then, is the question as to why *hoeven/need/brauchen* got assigned a negation, whereas other elements did not.

- The answer: learnability constraints make that only specific elements can be lexically combined with a negation. Concretely, only elements that primarily occur almost always together with an (almost) adjacent negative marker.

XIII. Universal NPIs

- If NPIs, such as *hoeven/need/brauchen* contain a negation as well (under Postal's version of the syntactic approach to NPI-hood), this should be learnable and therefore be directly tracable in their acquisitional pathway.

[HOEVEN + NIET]	First stage
[HOEVEN + NEG]	Second stage

XIII. Universal NPIs

- Van der Wal (1996), Lin et al. (2015): this is indeed what is attested:

  - Dutch children age 2-3: *hoeven* only combined with *niet*.
  - Dutch children age 4-5: *hoeven* in all anti-additive contexts.

- Note: known acquisitional pathways of other NPIs (English *any*, Chinese *shen-me*) do not show this pattern (cf. Lin 2011, Tieu 2011).

XIII. Universal NPIs

- One of the reasons why children take *hoeven* + *niet* to be a lexical chunk in the initial phase of the acquisition of *hoeven*, is that:

- most instances of *hoeven* in the child-directed speech are licensed by a negative marker (85%);
- When licensed by the negative marker, they very robustly occur adjacently in the child-directed language input (90% within three syllables);

XIII. Universal NPIs

- Again, this reduces the presence of universal NPIs to very specific syntactic properties that only apply in some languages to some modal verbs (and other NPIs that often appear adjacently to the negative marker).
- The limited distribution of universal NPIs and their specific acquisitional developments provide evidence for there being universal NPIs that are syntactically encoded for NPI-hood outside the domain of DP quantifiers over individuals.

XIII. Universal NPIs

- An open question is of course is whether such NPIs are restricted to modal auxiliaries only.
- In principle not: any construction that satisfies the proper learnability requirements for such NPI can become one.
- Hence, a prediction is that such NPIs should exist outside the domain of modals, albeit in a much more restricted way (one candidate might be French *ne*, cf. Zeijlstra 2010; other candidates may be Arabic/Hindi NPIs with the same distribution).

XIV. Open questions

- What are other Postal-type of NPIs outside the domain of modals?
- What needs to be said about existential PPIs (both for modals and non-modals)?
- How do the differences between epistemic vs. deontic modals follow?
- You tell me ☺

XV. Conclusion

- All differences between modal and non-modal NPIs and PPIs in terms of their PI-behaviour follow as a result of the syntactic differences between the two types of categories, and not as a result of their semantic differences.

Thank you!