1 Introduction

Goal of the project

• Negative polarity items (NPIs) like any and ever owe their name to the fact that they are fine in negative statements but not in positive ones.

(1) a. Bill didn’t steal any eggs.
   b. Nobody ever listens to Sue.
   c. Mary passed the exam without doing any exercises.

(2) a. *Bill stole any eggs.
   b. *Fred ever listens to Sue.
   c. *Mary passed the exam after doing any exercises.

• However, besides negative statements, questions often license NPIs as well.

(3) a. Did Bill steal any eggs?  
    b. Who ever listens to Sue?  

• The goal of the project that this talk is part of is to understand exactly when NPIs are licensed in questions, and why that would be.

Motivation: why now?

• I should say upfront that this project is at a very early stage of development, and there will be many open issues along the way.

• In fact, over the last couple of weeks I have asked myself many times whether I should not rather present some other work that is at a more mature stage.

• But then, about a week ago, there was a moment of divine intervention, and I realised that I was meant to talk about NPIs in questions here today.

*This work is at a very early stage of development. There will be many open questions along the way, and much work remains to be done. I am grateful to Ivano Ciardelli, Danny Fox, Nadine Theiler, and audiences in Munich, Santa Cruz, and Amsterdam for very helpful discussion, and to the European Research Council (ERC, grant agreement number 680220) for financial support.
• The divine entity was AirBnB, and the form of intervention was the following message:

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**Pack your bags!**

It's almost time for your trip to New York.

Great Location in the heart of NYC!

Private room hosted by Ever

Your host is here to help
Reach out to Ever with any questions
you may have about your stay.

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• Besides this, I think it is a particularly interesting time to look at NPIs in questions for the following reasons.

• Most existing theories of NPI licensing are formulated in terms of **truth-conditional** semantic notions, such as truth-conditional entailment.

• Therefore their domain of application is restricted to declarative statements.

• Reformulating these theories in terms of more general semantic notions, as have recently been developed in **inquisitive semantics** (Ciardelli *et al.*, 2018), would extend their domain of application to questions.

• Such a generalisation would allow us to test our theories against a **wider range of data**, which will hopefully lead to new insights.

• **Barker (2018)** has suggested exactly this kind of ‘inquisitive generalisation’ of his scope licensing theory of NPI licensing, and offers an initial exploration of the predictions that this generalised theory makes.

• I will explore this direction further today, but as we will see, many open issues remain.

• What I want to convince you of, above all, is that these issues are worth addressing.
Reductive versus uniform approaches

- There are, very generally speaking, two strategies in the literature to deal with NPIs in questions:¹,²

1. **Reductive approaches**: These reduce the problem of NPIs in questions to the problem of NPIs in statements, by arguing that questions involve certain operators (e.g., negation) which are known to license NPIs in statements. Any explanation for why the operator licenses NPIs in statements then carries over to questions as well.
   
   Examples: Nicolae (2013); Guerzoni and Sharvit (2014)

2. **Uniform approaches**: These are formulated in terms that are sufficiently general so as to apply to both statements and questions in a uniform way.
   
   Examples: van Rooij (2003); Barker (2018)

- I will focus on uniform approaches, but let me first briefly consider the reductive ones.

**Reductive approaches**

- Nicolae (2013) and Guerzoni and Sharvit (2014) account for NPIs like *any* and *ever* in questions by assuming that questions licensing NPIs always involve some **covert operator** which also licenses NPIs in declaratives:
  
  - only in the case of Nicolae 2013;
  
  - negation in the case of Guerzoni and Sharvit 2014.

- So they assume the following kinds of logical forms:

  (4) Did Bill steal some eggs or did he not steal any eggs? (Guerzoni and Sharvit)

  (5) Who¹ only t₁ ever listens to Sue? (Nicolae)

  Interpretation: ‘Which plurality x is such that only x ever listens to Sue?’

- These theories are **reductive** in nature because they reduce the problem of accounting for NPIs in questions to the better understood problem of accounting for NPIs in statements under negation or in the scope of *only*.

- However, these theories have a number of **prima facie** disadvantages:

  - Limited explanatory value since they need to assume a fair amount of covert syntax.
  
  - Some problematic empirical predictions. For instance (some other predictions are discussed in the appendix), both Nicolae 2013 and Guerzoni and Sharvit 2014 predict that **polar alternative questions** like (6) are unacceptable:

    (6) Have you ever been to Australia or not?

¹The discussion here will be limited to **semantic** approaches. In future stages of the project I intend to consider approaches that emphasise **syntactic** aspects as well (e.g., Szabolcsi, 2004; Collins and Postal, 2014).

²The same split between reductive and uniform theories exists in the analysis of another class of expressions interacting with both declaratives and interrogatives, namely responsive clause-embedding predicates like **know**. For recent arguments in favour of the uniform approach in this domain, see Uegaki (2018); Theiler et al. (2018); Uegaki and Roelofsen (2018). It would be interesting to consider whether any of these arguments carries over to the domain of NPIs.
They claim that this is a good prediction. However, Schwarz (2017a) reports that sentences like (6) are fine according to his informants, and I have indeed found quite a few instances in the COCA corpus. Below is a random sample:

(7)  
  a. ...whether you have any actual aptitude for it or not.  
  b. ...if any of it was true or not.  
  c. ...whether there will be any toilet seats in heaven or not.  
  d. ...whether this guy has violated any kind of HR rules or not.  
  e. ...whether Brown ever got mad at it or not.  
  f. ...whether government ever has a role to play or not.  
  g. ...if you ever were involved in criminal law or not.  
  h. ...if you ever heard that term before or not.  
  i. ...whether this company will ever come back or not.

• It may be possible, of course, to adapt the theories in such a way that the problematic predictions are avoided.

• However, the need to postulate a fair amount of covert syntax is part and parcel of the general approach. It seems preferable to do without.

Uniform approaches

• Existing uniform approaches include the entropy-based approach of van Rooij (2003) and the scope licensing approach of Barker (2018).

• In the project that this talk is part of:
  – I explore the predictions that these approaches make about NPIs in various kinds of questions;
  – but I also consider other theories of NPI licensing which are, as originally formulated, only targeted at declaratives—let’s call these declarative baseline theories—and see how these can be generalized so as to apply to questions as well.

• The declarative baseline theories that I have focused on so far are so-called alternative-based theories (Krifka, 1995; Chierchia, 2006, 2013; Crnič, 2014b, among others).

Outline of the talk

• §2 discusses the main data to be accounted for
• §3 considers a generalised alternative-based approach
• §4 considers the scope licensing approach
• §5 concludes

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3See https://corpus.byu.edu/coca. In the corpus, the examples given here are all clearly cases of embedded polar questions rather than adjuncts in unconditionals.
2 Basic data to be accounted for

2.1 Which NPIs are we interested in here?

- Several classes of NPIs have been distinguished in the literature, including:
  - Strong NPIs like until June and in years
  - Weak NPIs like any and ever
  - Minimizer NPIs like lift a finger and give a damn
- Strong NPIs are not licensed in questions.
- Weak NPIs and minimizer NPIs are (at least sometimes; see below).
- Minimizer NPIs induce a negative bias in questions; (unstressed) weak NPIs usually don’t.
- We will focus here on weak NPIs.

2.2 Matrix questions

- Weak NPIs are licensed in polar questions:
  
  (8) Did you eat anything?

- They are also licensed in wh-questions, both in the nucleus and in the restrictor:

  (9) Whom of you has ever been to Australia? [nucleus]
  (10) Which students who you have ever taught are you still in touch with? [restrictor]

- However, they are not licensed in alternative questions like (11):

  (11) *Did you say anything to Mary↑ or to Sue↓?

- There is disagreement in the literature as to whether they are licensed in alternative questions like (12), where, unlike in (11), the disjunction c-commands the NPI:

  (12) ?Did Mary↑ or Sue↓ say anything?

- Nicolae (2013) reports that such sentences are fine, but Schwarz (2017a) reports that they are bad according to his informants. More systematic empirical work is needed to settle this issue.

- It is striking that, while NPIs are not licensed in alternative questions like (11), they do seem to be licensed in structurally parallel open disjunctive questions:\(^4\)

  (13) Did you say anything to Mary↑ or to Sue↑?

- As mentioned above, whether NPIs are licensed in polar alternative questions such as (14) is controversial:

\(^4\)I have not seen this discussed in the literature before; I’d be very happy with any pointers.
Did Mary say anything today or not?

Guerzoni and Sharvit (2014) report that such sentences are bad, and Nicolae (2013) endorses this judgment. On the other hand, Schwarz (2017a) reports that his informants find such sentences perfectly fine, which is supported by the examples from the COCA corpus listed above.\(^5\)

- In contrast to (14), it seems uncontroversial that NPIs in polar alternative questions like (15) are fine:

(15) Did you or didn’t you see anyone?

- Moreover, cases that are structurally similar to (14) but have an explicit second disjunct rather than ‘or not’ seem to license NPIs as well.\(^6\)

(16) Would you like anything else\(^\uparrow\) or are you all set\(^\downarrow\)?

(17a) [Context: Mary just told Bill a secret about something she did 20 years ago.]

Bill: Did you tell anyone\(^\uparrow\) or did you keep this to yourself all those years\(^\downarrow\)?

### 2.3 Embedded questions

- Guerzoni and Sharvit (2007) report that NPIs are licensed in \(\text{wh}\)-complements under \textit{wonder} but not under emotive factives like \textit{surprise}, \textit{regret}, \textit{disappoint}, \textit{be glad}, etc.

(18) Bill wonders who ever climbed Mount Everest.

(19) *Bill is surprised at who ever climbed Mount Everest.

- This contrast between \textit{wonder} and \textit{surprise} has been tested experimentally by Tieu (2013). On a 1 – 5 scale, the mean rating of \textit{wonder} sentences was 4.61 and that of \textit{surprise} sentences 2.51. So the contrast seems to be quite substantial, although the mean rating for NPIs in \(\text{wh}\)-questions under \textit{surprise} was still much higher than that for NPIs in plain positive sentences (1.07).

- Guerzoni and Sharvit (2007) also report that the acceptability of NPIs in \(\text{wh}\)-complements under \textit{know} varies across speakers.

(20) Bill knows who ever climbed Mount Everest.

- Examples like (20), with \textit{know}, are rare in the COCA corpus, and almost all instances that I found were embedded under negation or another NPI licensing operator. More empirical work is needed to settle their exact status.\(^7\)

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\(^5\)Thanks to Erin McCloskey for first pointing out to me that the judgment reported by Guerzoni and Sharvit may not be shared by all speakers.

\(^6\)I have not seen this discussed in the literature before; I’d be very happy with any pointers.

\(^7\)Nadine Theiler (p.c.) pointed out that if NPIs are degraded in \(\text{wh}\)-questions under \textit{know} in positive sentences as well as under \textit{surprise}, but licensed in \(\text{wh}\)-questions under negated \textit{know} as well as under \textit{wonder}, it might be that NPI licensing in \(\text{wh}\)-questions is a root phenomenon, which only occurs in embedded environments in cases of pseudo-subordination (cf., McCloskey, 2006). This would be an interesting possibility to consider, but I haven’t had a chance to carefully look into it yet.
2.4 Summary

<table>
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<tr>
<th>polar question</th>
<th>wh-question nucleus</th>
<th>alternative question restrictor</th>
<th>open disjunctive question</th>
<th>polar altq ‘or not’</th>
<th>polar altq ‘did or didn’t’</th>
<th>polar altq ‘or all set’</th>
<th>under wonder</th>
<th>under surprise</th>
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3 Alternative-based approaches

- Alternative-based approaches to NPI licensing are so-called because they assume that NPIs give rise to a set of alternatives, which serve as input for a certain semantic operator.
- NPIs are predicted to be anti-licensed in case this operator yields a contradiction or a presupposition that cannot be satisfied or accommodated.
- Alternative-based theories differ as to what kind of operator they invoke. Two general types of approaches can be distinguished, both with two subtypes (see Fig. 1 below):
  - The exhaustification approach:
    The operator strengthens the original sentence \( \varphi \) by negating some of its alternatives. There are two prominent ways of implementing this:
    * Exhaustification negates all alternatives entailing \( \varphi \) (Krifka, 1995)
    * Exhaustification negates all alternatives not entailed by \( \varphi \) (Chierchia, 2013)
  - The checking approach:
    The operator does not strengthen the original sentence, but just checks that none of its alternatives are stronger, and otherwise yields a presupposition failure. Again there are two prominent options:
    * Strength is measured in terms of entailment (Chierchia, 2006)
    * Strength is measured in terms of likelihood (Heim, 1984; Crnič, 2014b)

- One can try to generalise each of these approaches and see what kind of predictions they make in the domain of questions.

![Figure 1: Alternative-based approaches to NPI licensing in statements.](image-url)
Overview of main findings

- The **exhaustification approach**:
  - There is a natural way to generalize the approach to questions. This essentially consists in replacing the truth-conditional notion of entailment by the more general notion of entailment provided by inquisitive semantics (Ciardelli et al., 2018), which works uniformly for statements and questions.
  - Exhaustification as negating alternatives entailing $\varphi$ (Krifka, 1995) yields promising results for questions, but has some (already known) shortcomings w.r.t. NPIs in statements.
  - Exhaustification as negating alternatives not entailed by $\varphi$ (Chierchia, 2013) arguably overcomes some of these shortcomings w.r.t. statements, but is still not completely satisfactory (especially w.r.t. non-monotonic environments), and does not deal well with questions.

- The **checking approach**:
  - There is a natural way to generalize the implementation in terms of entailment (Chierchia, 2006), which again consists in replacing the truth-conditional notion of entailment by its inquisitive counterpart. This makes promising predictions for questions, but has the same shortcomings as the exhaustification approach concerning NPIs in statements (especially w.r.t. non-monotonic environments).
  - There are **two** natural ways to generalize the implementation in terms of likelihood:
    * One amounts to the theory of NPIs in questions of van Rooij (2003) and Schwarz (2017a,b), defined in terms of entropy.
    * But there is another natural option as well, which I will call the cumulative likelihood approach.
  - These theories are better equipped to deal with NPIs in non-monotonic environments in statements than the entailment based theories are.
Both also make promising, though somewhat different predictions for questions.

One salient difference is that on the entropy account, NPIs are only licensed in polar questions in the presence of a negative bias. This is not required on the cumulative likelihood approach, which seems to be an advantage.

For instance, suppose John goes to a little village store where they usually though not always have fresh eggs. Then it seems natural for him to ask the storekeeper:\footnote{Perhaps this can be explained in terms of politeness. Another example: Bill is making a shopping list and wants to buy a cake later that day for which he needs flower. He usually has flower on stock, but he’s not sure whether there is currently any left. His wife Sue is in the kitchen next to the cupboard where the flower is stored. Bill asks Sue: “Is there any flower left?” This seems fine, and politeness doesn’t seem to play a role.}

\begin{equation}
\text{Do you have any fresh eggs today?}
\end{equation}

\begin{itemize}
\item So, overall, the cumulative likelihood approach seems to be most satisfactory.
\item In the remainder of this section I will consider this account in some detail.
\end{itemize}

3.1 The minimal likelihood account for statements

On this approach the operator that ‘evaluates’ the alternatives introduced by an NPI checks that its prejacent is less likely than any of the alternatives.

Likelihood is seen as a measure of strength: the less likely the stronger.

The operator associated with NPIs may be seen as a covert counterpart, at least roughly, of even.

\begin{equation}
\text{Even Bill left.} \quad \text{\sim \ ‘Bill left’ was the least likely among a set of alternatives}
\end{equation}

We will therefore denote the operator as even.

Interestingly, in certain languages there are NPIs which actually consist of the word for even plus the word for one or for someone (Lahiri, 1998). Although it should be noted that these seem to behave more like minimizers in English than like weak NPIs such as any. For instance, they always induce a negative bias when used in polar questions.

An account of weak NPIs in terms of minimal likelihood has been developed most explicitly in the work of Heim (1984), Lee and Horn (1994), and Crnič (2014a,b, 2017).\footnote{See also Krifka (1995); Lahiri (1998); Chierchia (2013), where the same approach is adopted for minimizers and what Krifka calls strong NPIs, though not for weak NPIs.}

We will build here most directly on Crnič (2014a,b, 2017), with one small but crucial change. We define:

\begin{equation}
\left[\text{even}(\varphi)\right]^c = \begin{cases} 
\left[\varphi\right]^c & \text{if no } \psi \in \text{alt}(\varphi) \text{ is such that } \psi <_c \varphi \\
\text{undefined} & \text{otherwise}
\end{cases}
\end{equation}

In words, the semantic value of even(\varphi) is the same as that of \varphi itself given that no alternative \psi is less likely than \varphi in the context of evaluation c. Otherwise, the semantic value of even(\varphi) is undefined.
• This is not exactly Crnič’s definition: he requires that $\varphi$ is strictly less likely than every alternative $\psi$. We allow for the possibility that some alternatives are equally likely as $\varphi$. This does not seem to affect the predictions for NPIs in statements, but will be crucial for questions.

• Two things need to be further specified: $\text{alt}(\varphi)$ and $<_c$.

What are the relevant alternatives?

• Consider the following example:

(24) Bill stole any$_D$ eggs.

• The relevant alternatives for this sentence are of the form:

(25) Bill stole any$_{D'}$ eggs. where $D' \subseteq D$

• These are called subdomain alternatives.

What does $\psi <_c \varphi$ mean exactly?

• For Crnič it means that $P^c(\psi) < P^c(\varphi)$ where $P^c$ is the contextually given probability distribution.

• This works well as long as $\varphi$ and $\psi$ are statements, but for questions it will have to be generalized. We will do this below, for now let’s stick with statements.

Main predictions

• Note that if $\psi \models \varphi$ then we must have that $\psi \leq_c \varphi$ as well, for any $c$.

• This means that NPIs are licensed in DE environments, and not in UE environments, as desired.

• The greatest selling point of the approach, however, are its predictions in non-monotonic environments.

• NPIs are sometimes licensed in NM environments:

(26) Exactly four people in the whole world have ever read my dissertation. (Linebarger, 1987, p.373)

(27) Exactly three students said anything in my seminar today. (Gajewski, 2008, p.73)

(28) Most men with any revolutionary commitments were executed. (Rothschild, 2006, p.229)

(29) He forgot that he had eaten anything. (Linebarger, 1980, p.206)

(30) No one but John has ever read that dissertation.

• However, there are also cases of unlicensed NPIs in NM environments:
3.2 Generalization to questions

• Now what if \( \varphi \) and its alternatives are questions?

• How should \( \psi <_c \varphi \) be defined in this case?

• As mentioned above, I see at least two natural options:
  
  - One is to simply say that \( \psi <_c \varphi \) if the likelihood of \( \bigcup [\psi] \) is lower than that of \( \bigcup [\varphi] \).

\[
P^c(\bigcup [\psi]) < P^c(\bigcup [\varphi])
\]

Let’s call this the cumulative likelihood approach.

10Though see Horn (2016) for a possible refinement of such approaches in terms of the at-issue/inert content distinction.
Another option is to say that $\psi <_c \varphi$ if the entropy of $\psi$ is greater than that of $\varphi$, where the entropy of $\psi$ is defined as in information theory (see van Rooij, 2003; Schwarz, 2017a,b):

$$\sum_{\alpha \in \max[\psi]} P^c(\alpha) \times -\log_2 P^c(\alpha)$$

Let’s call this the entropy approach.

- We will focus on the cumulative likelihood approach here.
- Note that on this approach the predictions for statements are the same as for the baseline minimal likelihood approach, provided that $\bigcup [\varphi]$ just contains one (maximal) element in case $\varphi$ is a statement, consisting of all worlds in which $\varphi$ is true (Hamblin, 1973; Ciardelli et al., 2018).
- What are the predictions for questions?

3.2.1 Polar and wh-questions

- Consider:

(35) Did anyone$_D$ leave?

- The cumulative likelihood of the two ‘basic answers’ to this question is 1, and the same goes for all subdomain alternatives.\textsuperscript{11}

- So it is predicted that the NPI is licensed.

- Next consider a wh-question with an NPI in its nucleus:

(36) Who saw anyone$_D$?

- The domain alternatives for this question are:

(37) Who saw anyone$_{D'}$? where $D' \subseteq D$.

- The literature is divided as to whether wh-questions like (36) have an existential presupposition (someone saw someone) or not. It is also possible that the sentence has both a presuppositional and a non-presuppositional reading.

- We will not try to settle this debate but will just consider both presuppositional and non-presuppositional readings.

- Moreover, we will also consider both exhaustive and non-exhaustive (mention-some) readings, again staying neutral as to whether these readings both exist for questions like (36).

- On a non-presuppositional reading, either exhaustive or non-exhaustive, the cumulative likelihood of all the basic answers is again 1, and the same goes for all the subdomain alternatives. So the NPI is predicted to be licensed under such a reading.

\textsuperscript{11}What I mean here by ‘basic answers’ are propositions that resolve the issue expressed by the question and do not provide any more information than is necessarily to do so. In inquisitive semantics, these are the maximal elements of $[\varphi]$. See Ciardelli et al. (2018) for discussion.
• On a presuppositional reading, the cumulative likelihood will be < 1, namely the likelihood that the presupposition of the question is satisfied, i.e., the presupposition that someone saw someone in D.

  - The cumulative likelihood for the subdomain alternatives will be the likelihood that someone saw someone in \( D' \), where \( D' \subset D \).
  - Assuming that there is at least one individual in \( D \) with non-zero likelihood of having been seen, this means that the cumulative likelihood of at least one of the subdomain alternatives will be strictly lower than the cumulative likelihood of the original sentence.
  - So the NPI is not licensed in this case, no matter whether the question is interpreted exhaustively or non-exhaustively.

• We predict in particular that NPIs are bad in singular which-questions such as (38), under the assumption that these carry an existential presupposition.

(38) *Which Dutch mountaineer has ever climbed Mount Everest?

• Schwarz (2017b) reports that some of his informants indeed find (38) unacceptable, but others don’t.

• He further proposes, based on his informants’ reports, that the existence presupposition of questions like (38) can in fact be suspended, and that it is exactly in these cases that the NPI is acceptable. This hypothesis is very much in line with the present account.

• We add some further observations that seem to support the hypothesis that the acceptability of NPIs in the nucleus of wh-questions depends on the possibility of the ‘noone’ answer.

  - First, as predicted, NPIs are perfectly acceptable in plural wh-questions which explicitly lack an existential presupposition.

(39) Which Dutch mountaineers, if any, have ever climbed Mount Everest?

  - Second, if the ‘noone’ answer is explicitly ruled out in the preceding context, NPIs seem to be bad even in plural which-questions.

(40) Some Dutch mountaineers climbed Mount Everest.
    Which of them (*ever) did?

  - Third, in rhetorical singular which-questions, whose existential presupposition is obviously lifted, NPIs are perfectly acceptable again:

(41) Which sane person would ever do such a thing?

• Having seen these contrasts in the nucleus of wh-questions, let us now briefly return to polar questions.

• We saw above that NPIs are licensed in plain polar questions. But what if we add something akin to an existential presupposition, which seems to anti-license NPIs in wh-questions?

• A case in point is (42):
(42) *Was it Bill$_F$ who saw anyone$_D$?

- Indeed, the NPI seems unacceptable here.

- This is predicted because the question itself presupposes that someone saw someone in $D$, while its subdomain alternatives presuppose that someone saw someone in $D' \subset D$, which is a stronger presupposition.

- Assuming that there is at least one individual in $D$ with non-zero probability of having been seen, there will be at least one subdomain alternative whose cumulative likelihood is strictly lower than that of (42) itself.

- Finally, let us consider the case of NPIs in the restrictor of a $wh$-question:

(43) Which students who you have ever$_D$ taught are you still in touch with?

- On a non-presuppositional reading, be it exhaustive or non-exhaustive, the NPI is licensed, as before.

- On a presuppositional reading, the cumulative likelihood of (43) is the likelihood that you are still in touch with at least one student that you taught during some time-interval in $D$. The cumulative likelihood of the subdomain alternatives is the likelihood that you are still in touch with at least one student that you taught during some time-interval in $D'$, where $D' \subseteq D$. Assuming that there is at least one time-interval in $D$ with non-zero probability of you having taught someone in that interval, the latter is lower than the former. So the NPI is not licensed on this reading.

3.2.2 Alternative questions and open disjunctive questions

- Consider:

(44) *Did you see any$_{D_1}$ man↑ or any$_{D_2}$ woman↓?

- Alternative questions generally presuppose that one of their disjuncts is true.

- So this question presupposes that the addressee saw either a man in $D_1$ or a woman in $D_2$.

- The cumulative likelihood of the question is the likelihood that this presupposition is satisfied.

- For reasons similar to those discussed above in connection to presuppositional $wh$-questions, there will be at least one subdomain alternative whose cumulative likelihood is strictly lower than that of the sentence itself, provided that $D_1$ contains at least two men with non-zero likelihood of having been seen by the addressee, or similarly for $D_2$.

- So the NPI is not licensed.

- Next, consider an open disjunctive question:

(45) Did you see any man↑ or any woman↑?

- In this case, the reasoning is similar to that for polar questions and non-presuppositional $wh$-questions: the cumulative likelihood of the question is 1 and the same goes for all its alternatives. So the NPI is predicted to be licensed.
3.2.3 Polar alternative questions

- Consider (46) and (47):

(46) Did you see anyone or not?
(47) Did you or didn’t you see anyone?

- Recall that the empirical status of (46) is controversial: Guerzoni and Sharvit (2014) report that it is bad, while Schwarz (2017a) reports that it’s fine.

- The predictions for (46) depend on whether or not we make the following assumption about ellipsis:
  - **Parallel subdomains assumption**: for each subdomain alternative of (46), the subdomain that is selected for the NPI in the elided second disjunct must be the same as the subdomain that is selected for the NPI in the first disjunct.

- If we don’t make this assumption, (46) is predicted to behave like an **alternative question**.
  - In this case, the NPI is predicted to be **anti-licensed**, in line with the judgment reported by Guerzoni and Sharvit (2014).

- If we do make the assumption, (46) is predicted to behave like a **polar question**.
  - In this case, the NPI in (46) is predicted to be **licensed**, in line with the judgment reported by Schwarz (2017a).  
  
  - As for (47), it is predicted that the NPI is licensed here, assuming that there is an elided VP in the first disjunct (*see someone*), and that the *even* operator targeting the domain alternatives of *anyone* takes scope over the negation in the second disjunct but not over the question as a whole.

- Note that there is independent evidence that the identity condition on VP ellipsis does not care about the distinction between NPIs and plain indefinites:

(48) A: Sue didn’t see anyone.
    B: Yes, she did see someone.

- Is there any independent evidence against or in favour of the parallel subdomains assumption?

- Our third type of polar alternative question is repeated in (49):

(49) [Context: Mary just told Bill a secret about something she did 20 years ago.]
    Bill: Did you tell anyone↑ or did you keep this to yourself all those years↓?

- This question is predicted to behave like an alternative question, so the NPI is predicted to be **anti-licensed**. This seems to be a **problematic** prediction.

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12I think that Schwarz (2017a) actually makes the parallel subdomains assumption implicitly himself. The predictions of his theory will probably change if this assumption is dropped. I still need to look at this more carefully.
3.2.4 Embedded questions

- Recall the observation of Guerzoni and Sharvit (2007) that NPIs are licensed in *wh*-questions under *wonder* but **not under emotive factives** like *surprise*:

\[(50) \quad \text{Bill wonders who ever climbed Mount Everest.}\]
\[(51) \quad \text{*Bill is surprised at who ever climbed Mount Everest.}\]

- In order to explain this we have to understand what is special about emotive factives.

- It has been noted in the literature (d’Avis, 2002; Roelofsen et al., 2016; Roelofsen, 2017) that emotive factive predicates can only embed *wh*-questions that carry an **existential presupposition**.

\[(52) \quad \text{Bill is surprised at which Dutch mountaineers climbed Mount Everest this year.}\]
\[(53) \quad \text{*Bill is surprised at which Dutch mountaineers, **if any**, climbed Mount Everest this year.}\]

- Note that this sets *surprise* apart from *know* and *wonder*:

\[(54) \quad \text{Bill knows which Dutch mountaineers, if any, climbed Mount Everest this year.}\]
\[(55) \quad \text{Bill wonders which Dutch mountaineers, if any, climbed Mount Everest this year.}\]

- We have seen above that on the present account, NPIs are only licensed in a *wh*-question under a **non-presuppositional** reading.

- So it is indeed predicted that NPIs are not licensed in *wh*-questions under emotive factives.\(^{13}\)

- As noted above, more empirical work is needed to determine the status of NPIs in interrogative complements under *know* (and other predicates besides *wonder* and emotive factives).

\(^{13}\)We only discuss *wh*-questions here because polar and alternative questions are not licensed at all under emotive factives:

\[(i) \quad \text{*Bill is surprised at whether Mary passed the exam.}\]
\[(ii) \quad \text{*Bill is surprised at whether Mary or Sue passed the exam.}\]

For accounts of this fact, see Guerzoni (2007); Sæbø (2007); Romero (2015); Roelofsen et al. (2016); Roelofsen (2017).
3.3 Summary

<table>
<thead>
<tr>
<th>Question Type</th>
<th>Polar Question</th>
<th>Wh-Question Nucleus</th>
<th>Wh-Question Restrictor</th>
<th>When</th>
<th>No Answer is Ruled Out</th>
<th>Alternative Question</th>
<th>Open Disjunctive Question</th>
<th>Polar Altq ‘or not’</th>
<th>Polar Altq ‘did or didn’t’</th>
<th>Polar Altq ‘or all set’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judgments</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
</tr>
<tr>
<td>Cumulative likelihood</td>
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<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

4 The scope-licensing approach

- Barker (2018) proposes an account of NPI licensing that is conceptually very different in nature from the alternative-based approaches.

- He proposes that an important function of using an NPI rather than an ordinary indefinite is to mark narrow scope.

- For instance, the indefinite in (56) can take wide scope, but the NPI in (57) cannot:

  (56) If a relative of mine dies, I will inherit a house.

  (57) If any relative of mine dies, I will inherit a house.

- He further suggests that forcing a narrow scope interpretation is only useful if it is not entailed by the corresponding wide scope interpretation.14

- Based on these considerations, Barker formulates the following licensing condition:

  “An NPI is scope licensed in a context only if a wide scope existential binding a variable in the position of the NPI does not entail a narrow scope existential binding that position.”

- Note that this constraint is formulated in terms of scope and entailment.

- When discussing the predictions of the account concerning NPIs in statements, Barker assumes a truth-conditional notion of entailment.

- But he also notes that, when we replace this by the inquisitive notion of entailment, the account applies to both questions and statements in a uniform way.

- He briefly discusses some of the basic predictions of the account for questions. Namely, he shows that:

  - NPIs are scope licensed in matrix polar questions;
  - NPIs are also scope licensed in polar questions embedded under know.

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14I have to say that I do not quite see this (yet): why would it not be useful to force a narrow scope interpretation even if that interpretation is entailed by the wide scope one? This could be a way for a speaker to make sure that the addressee only takes her to commit to the weaker (narrow scope) claim and not to the stronger (wide scope) one, something that would seem useful in certain situations.
Below we will explore the predictions of the account in more depth:

– Besides polar questions, what about wh-questions, alternative questions, open disjunctive questions, and the various kinds of polar alternative questions we have seen above?

– Besides embedding under know, what about embedding under other predicates, in particular emotive factives?

4.1 Polar and wh-questions

• Consider first a plain polar question:

(58) Did anyone leave?

• As Barker notes, the NPI is scope licensed here because the wide scope construal, \( \exists x?！Lx \), does not entail the narrow scope construal, \( ?！\exists xLx \).

• For instance, the proposition that Alice left resolves the issue expressed by \( \exists x?！Lx \) but not the one expressed by \( ?！\exists xLx \).

• Next consider an NPI in the nucleus of a wh-question:

(59) Who saw anyone?

• As before, we will consider presuppositional and non-presuppositional readings, as well as exhaustive and non-exhaustive readings.

– On a non-presuppositional reading, either exhaustive or non-exhaustive, the wide scope construal of (59) does not entail its narrow scope construal, because, for instance, the proposition that nobody saw Bill resolves the issue expressed by the wide scope construal but not the one expressed by the narrow scope construal.

  * So the NPI is scope licensed under such a reading.

– On a presuppositional exhaustive reading, the wide scope construal of (59) does not entail its narrow scope construal either, because, for instance, the proposition that Susan was the only person who saw Bill resolves the issue expressed by the wide scope construal but not the one expressed by the narrow scope construal.

  * So the NPI is scope licensed under this reading as well.

– Finally, on a presuppositional non-exhaustive reading, the wide scope construal of (59) does entail its narrow scope construal, because any proposition that resolves the issue expressed by the wide scope construal must establish for some \( x \) and \( y \) that \( x \) saw \( y \), and this is sufficient to resolve the issue expressed by the narrow scope construal as well.

  * So the NPI is not scope licensed under this reading.

• Note that this is different from the predictions of the cumulative likelihood account, under which NPIs are never licensed under a presuppositional reading, be it exhaustive...
or non-exhaustive.\textsuperscript{15,16}

- In fact, under the cumulative likelihood account it NPIs are anti-licensed in a wh-question as soon as the ‘noone answer’ is ruled out, either contextually or by the presupposition of the question.

- This predicts, for instance, that the NPI in (60) is bad:

  \begin{align*}
  (60) \quad \text{Some Dutch mountaineers climbed Mount Everest.} \\
  *\text{Which of them ever did?}
  \end{align*}

- On the other hand, the NPI is scope licensed here, on an exhaustive reading of the question.

- Returning to polar questions, we saw above that adding something akin to an existential presupposition anti-licenses NPIs, as in (61):

  \begin{align*}
  (61) \quad *\text{Was it Bill}_F \text{ who saw anyone?}
  \end{align*}

- This is predicted under the cumulative likelihood approach.

- Whether the NPI is scope licensed here depends on assumptions about clefts and presupposition projection, which I will not explore in detail here.

- Finally, let us consider the case of NPIs in the restrictor of a \textit{wh}-question:

  \begin{align*}
  (62) \quad \text{Which students who you have ever taught are you still in touch with?}
  \end{align*}

- On a \textit{non-presuppositional} reading, exhaustive or non-exhaustive, the wide scope construal does not entail the narrow scope construal, so the NPI is \textit{scope licensed}.

- On a \textit{presuppositional exhaustive} reading, the NPI is also \textit{scope licensed}.

- However, on a \textit{presuppositional non-exhaustive} reading, the NPI is \textit{not scope licensed}.

\subsection{Alternative questions and open disjunctive questions}

- Consider an \textit{alternative question}:

  \begin{align*}
  (63) \quad *\text{Did anyone talk to Sue}^\uparrow \text{ or Mary}^\downarrow ?
  \end{align*}

- In this case, the wide scope construal \textit{entails} the narrow scope construal.

\textsuperscript{15}The predictions for singular \textit{which}-questions are the same, since in that case the exhaustive and the non-exhaustive readings collapse.

\textsuperscript{16}Another subtle difference is that in polar questions and non-presuppositional \textit{wh}-questions, the cumulative likelihood approach really predicts that NPIs are licensed, while the scope licensing account actually predicts something weaker, namely that NPIs are \textit{scope licensed}, i.e., that the use of NPIs to mark narrow scope is not useless in these environments. As Barker emphasises, if an NPI is scope licensed in a certain environment, it may still be anti-licensed in that environment for independent reasons. It would be good to consider this difference in more depth, especially in comparison with the predictions concerning non-monotonic environments.
• After all, to resolve the issue expressed by the wide scope construal, a proposition must establish of some person $x$ that they talked to Sue, or that they talked to Mary. Without loss of generality, suppose it establishes that $x$ talked to Sue. Then it also resolves the issue expressed by the narrow scope construal, because it establishes that someone talked to Sue.

• So the NPI in (63) is not scope licensed.

• Next, consider an open disjunctive question:

\[(64) \quad \text{Did anyone talk to Sue or to Mary?}\]

• In this case, the wide scope construal does not entail the narrow scope construal.

• For instance, the proposition that Peter did not talk to either Sue or Mary resolves the issue expressed by the wide scope construal but not the one expressed by the narrow scope construal.

• So the NPI in (64) is scope licensed.

• The predictions of the scope licensing account for alternative questions and open disjunctive questions thus align with those of the cumulative likelihood account.

4.3 Polar alternative questions

• Consider (65) and (66):

\[(65) \quad \text{Did you see anyone or not?}\]
\[(66) \quad \text{Did you or didn’t you see anyone?}\]

• Recall that the empirical status of (65) is controversial: Guerzoni and Sharvit (2014) report that it is bad, while Schwarz (2017a) reports that it’s fine.

• The predictions of the cumulative likelihood account for (65) depend on whether or not we make the parallel subdomains assumption about ellipsis.

• The predictions of the scope licensing account are more clearcut. Namely, both (65) and (66) behave just like plain polar questions as far as scope licensing is concerned, so the NPI is scope licensed in both cases.

• Finally, consider the polar alternative question in (67), which we saw was problematic for the cumulative likelihood approach:

\[(67) \quad \text{[Context: Mary just told Bill a secret about something she did 20 years ago.]}\]
\[\text{Bill: Did you tell anyone or did you keep this to yourself all those years?}\]

• Here, the wide scope construal entails the narrow scope construal, so the NPI is not scope licensed. So, just like the cumulative likelihood approach, the scope licensing account seems to run into a problem here.
4.4 Embedded questions

- Recall the observation of Guerzoni and Sharvit (2007) that NPIs are licensed in \textit{wh}-questions under \textit{wonder} but \textbf{not} under \textit{emotive} \textit{factives} like \textit{surprise}:

\begin{itemize}
  \item Bill wonders which Dutch mountaineers ever climbed Mount Everest.
  \item *Bill is surprised at which Dutch mountaineers ever climbed Mount Everest.
\end{itemize}

- On the cumulative likelihood approach this is accounted for, because NPIs are only licensed in \textit{wh}-questions under a non-presuppositional reading, and emotive factives only accept presuppositional \textit{wh}-questions as their complement.

- On the scope licensing approach, the NPI in (69) is \textbf{scope licensed} because the wide scope construal does not entail the narrow scope construal.

- After all, it is possible that there is some time-interval \( t_1 \) such that Bill is surprised at which Dutch mountaineers climbed Mount Everest in \( t_1 \), while Bill is not surprised at which Dutch mountaineers climbed Mount Everest throughout the entire history.

- Thus, the scope licensing theory does \textbf{not account} for the unacceptability of (69), although it is compatible with the possibility that the NPI is anti-licensed here for reasons independent of scope marking.

4.5 Summary

\begin{tabular}{lcccccccc}
  & polar question & wh-question nucleus & when no answer is ruled out & alternative question & open disjunctive question & polar altq 'or not' & polar altq 'did or didn't' & polar altq 'or all set' \\
Judgments & ✓ & ✓ & ✓ & x & x & ✓ & ✓ & ✓ & ✓
  & Cumulative likelihood & ✓ & ✓ & ✓ & x & x & ✓ & ✓ & ✓ & ✓
  & Scope licensing & ✓ & ✓ & ✓ & x & ✓ & ✓ & ✓ & ✓ & ✓
\end{tabular}

5 Conclusion

- Both the cumulative likelihood account and the scope licensing account make promising predictions about NPI licensing in questions.

- There are some diverging predictions, but the crucial datapoints need to be investigated more systematically before drawing any firm conclusions.

- A comparison between the two approaches (as well as others) should also take into account their predictions for declarative statements, especially in non-monotonic environments.

- Much work remains to be done:
  - Detailed comparison with:
* The reductive account of Guerzoni and Sharvit (2014) (see the appendix for some initial remarks)
* The reductive account of Nicolae (2013, 2015)
* The uniform entropy-based account of van Rooij (2003) and Schwarz (2017a,b)
* Other possible uniform approaches.

- NPI licensing in the restrictor of \textit{wh}-questions.
  * See Guerzoni and Sharvit (2007) but also Hoeksema (2008) for interesting data.

- Minimizer NPIs.
  * The cumulative likelihood approach could perhaps account for the bias-effect of minimizers in questions by assuming that, unlike weak NPIs, minimizers associate with an \textit{even} operator that has an \textit{additive} component, presupposing that some relevant alternative is already settled in the context (similar to van Rooij, 2003). See also Guerzoni (2004) for a different approach.

- Strong NPIs. These seem to be unacceptable in any type of question (unless the question contains an operator that independently licenses strong NPIs). For instance:

\begin{equation}
(70) \quad \text{*Is Mary leaving until June?}
\end{equation}

- Intervention effects. For instance:

\begin{equation}
(71) \quad \text{*Did everyone eat anything?}
\end{equation}

- The c-command requirement of Han and Siegel (1997).
  * It seems that the cumulative likelihood approach (as well as the other generalised alternative-based approaches) could account for sensitivity to c-command between the \textit{wh}-trace and the NPI in terms of crossover, just like Nicolae (2013, 2015). See also Tieu (2013) and Guerzoni and Sharvit (2014) for relevant empirical observations.

A Comparison with Guerzoni and Sharvit

A.1 Guerzoni and Sharvit (2007)

* Guerzoni and Sharvit (2007) focus on:
  - NPIs in the restrictor of \textit{wh}-questions.
  - NPIs in embedded \textit{wh}-questions.

* We have left the former out of consideration here.

* As for the latter, Guerzoni and Sharvit (2007) propose that:
  1. Emotive factive verbs like \textit{surprise} cannot take \textit{wh}-question complements with a \textbf{strongly exhaustive} interpretation.
  2. NPIs are only licensed in embedded \textit{wh}-questions if such questions receive a strongly exhaustive interpretation.

* The first assumption is problematic in view of recent experimental results of Cremers and Chemla (2017) which show that strongly exhaustive readings under \textit{surprise} are in fact possible (see also Klinedinst and Rothschild, 2011; Theiler, 2013).
– It may still be that strongly exhaustive readings are difficult to get under surprise.
– The prediction would then be that NPIs are not ruled out completely in wh-questions under surprise, but less acceptable than under wonder.
– This is in principle compatible with the experimental results of Tieu (2013).

- The second assumption above adds a novel component to the theory of NPI licensing which Guerzoni and Sharvit do not provide independent motivation for (though see Nicolae, 2013).
- The cumulative likelihood account doesn’t need to make such an assumption.

A.2 Guerzoni and Sharvit (2014)

- Guerzoni and Sharvit (2014) also assume that wh-questions under surprise cannot have strongly exhaustive readings. The same comments apply here as above.

- For Guerzoni and Sharvit (2014) it is crucial to assume that questions which at face value look like simple polar questions are syntactically always polar alternative questions, involving or not. This makes it very difficult, if not impossible, to account for well-known differences between (face value) simple polar questions and polar alternative questions (see, e.g. Bolinger, 1978; Biezma, 2009; Roelofsen and Farkas, 2015). For instance:

(72) Do you want to marry me?
(73) Do you want to marry me or not?

- The syntactic assumptions that Guerzoni and Sharvit (2014) need to make about wh-questions are also problematic. Namely, they assume that the logical form of a wh-question always involves whether and or. As they acknowledge themselves, it is surprising under this assumption that these elements are never explicitly spelled out in English.

- The present account covers the case of open disjunctive questions. Guerzoni and Sharvit (2014) don’t mention these. It seems difficult to extend their theory to account for such questions.

References


