

# Epistemic bias anti-licenses NPIs in polar questions

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- 1 Introduction**
- 2 NPI licensing
- 3 Intervention by E
- 4 Summary
- 5 Declarative & negated questions

# Consensus

- NPIs are restricted in statements, unrestricted in (polar) questions
  - (1)
    - a. John is reading something by Chomsky
    - b. #John is reading anything by Chomsky
  - (2)
    - a. Is John reading something by Chomsky?
    - b. Is John reading anything by Chomsky?

## Novel observation

- Epistemic bias anti-licenses NPIs in polar questions
- (3) John's email: "I am reading a very intriguing book. The author conjectures that language could be like a snowflake."
- A: Did you read John's email?
- B: (i) Yeah. Is he reading something by Chomsky?  
(i) #Yeah. Is he reading anything by Chomsky?
- (4) I am talking with my friend on the phone and hear what sounds like chewing.
- a. Are you eating something?  
b. #Are you eating anything?

## Gist of explanation

- Biased questions contain a covert modal  $E$  whose semantics is akin to that of overt epistemic *must*
  - (5) I am talking with my friend on the phone and hear what sounds like chewing.
    - a. Are you eating something?
    - b. You must be eating something. Are you?
- $E$  intervenes between *whether* and the NPI it licenses
  - (6) a. *whether* [ ... NPI ... ]
  - b. \**whether* [ $E$  [ ... NPI ... ]]

# Structure of talk

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## Subdomain alternatives

- NPIs are existential quantifiers with covert domain restriction and subdomain alternatives

$$(7) \quad \begin{array}{l} \text{a. } any_D = \lambda P. \lambda Q. \exists x \in D : P_x \wedge Q_x \\ \text{b. } Alt(any_D) = \{any_{D \cap C} \mid C \neq D\} \end{array}$$

- Alternatives of sentences containing NPIs are constructed by point-wise composition

$$(8) \quad \begin{array}{l} Alt(John \text{ read } any_D \text{ book}) \\ = \{John \text{ read } any_{D \cap C} \text{ book} \mid C \neq D\} \end{array}$$

Kadmon and Landman (1993)



## Association with *MAX*

- NPIs associate with a covert operator, *MAX*, which requires its prejacent be “maximally strong” among the alternatives (cf. Heim 1984, Lee and Horn 1994, Krifka 1995, Lahiri 1998, Crnič 2014, 2019)

(9)  $MAX(p)$  is defined only if  $\forall q \in Alt(p) : p \leq q$   
 When defined,  $MAX(p) = p$

- Relative strength is defined for both statements and questions (Roelofsen 2018, Roelofsen and Jeong 2022)

(10)  $X \leq Y$  iff either (i) or (ii) holds  
 (i)  $X \subseteq Y$   
 (ii)  $\bigcup X \subseteq \bigcup Y$

cf. also van Rooy (2003), Schwarz (2017)

## NPIs in statements

- NPIs must be in the scope of a DE function

(11)  $MAX(\text{John read any}_D \text{ book})$  is defined only if  
 $\forall C \neq D : ANY_D \subseteq ANY_{D \cap C}$  = unsatisfiable

(12)  $MAX(\text{John did not read any}_D \text{ book})$  is defined only if  
 $\forall C \neq D : \neg ANY_D \subseteq \neg ANY_{D \cap C}$

$ANY_D = \text{John read any}_D \text{ book}$

# NPIs in polar questions

- Polar questions are tautological

(13)  $MAX(\text{whether}(\text{John read any}_D \text{ book}))$  is defined only if

$$\forall C \neq D : \underbrace{\bigcup (\text{whether}(\text{ANY}_D))}_{\top} \subseteq \underbrace{\bigcup (\text{whether}(\text{ANY}_{D \cap C}))}_{\top}$$

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# Main ideas

- There is a covert epistemic modal  $E$  which is akin to epistemic *must*
- Biased questions are parsed as  $whether(E(p))$
- $E$  intervenes between *whether* and NPI
  - $MAX(whether(ANY_D))$  is defined
  - $MAX(whether(E(ANY_D)))$  is not defined

## von Fintel and Gillies' (2010) analysis of *must*

- F&G distinguish between what is **directly known** (the kernel) and what is **known** (the modal base)

(14) a. What is **directly known**,  $K$ , is a non-closed set of propositions

b. What is **known** is  $\bigcap K$

(15)  $must_K(p)$  is defined only if  $\neg\exists q \in K : q \Rightarrow p \vee q \Rightarrow \neg p$   
 When defined,  $must_K(p) = 1$  iff  $\bigcap K \Rightarrow p$

cf. also von Fintel and Gillies (2021)

## K accomodation

- $must_K(p)$  sounds odd to the extent that it is hard to accomodate  $K$

(16) I see John writing with his left hand

a. John must be left-handed

$K = \{ \dots \text{John is writing with his left hand, people who write with their left hand are left-handed} \dots \}$

b. ?John must be writing with his left hand

$K = \{ \dots \text{John is writing with his left hand, I see John writing with his left hand, I am not hallucinating} \dots \}$

c. #John must be right-handed

$K = \{ \dots \text{John is writing with his left hand, people who write with their left hand are right-handed} \dots \}$

# K and context

- Propositions in  $K$  do not have to be known from facts about the immediate context

(17) A: Did you read John's email?

B: Yes. He must be under stress.

(i) John's email: "... I started smoking again..."

(ii) #John's email: "... I am under stress..."



# Introducing E

- $E$  presupposes what *must* asserts

(18)  $must_K(p)$  is defined only if  $\neg\exists q \in K : q \Rightarrow p \vee q \Rightarrow \neg p$   
 When defined,  $must_K(p) = 1$  iff  $\bigcap K \Rightarrow p$

(19)  $E_K(p)$  is defined only if  $\bigcap K \Rightarrow p$   
 When defined,  $E_K(p) = p$

cf. Bassi et al. (2021, 2023) for similar relationship between **EXH** and **only**

## E and indirectness

- $E$  does not require indirectness

(20) I see John writing with his left hand

- $E_K$  John is left-handed.
- $E_K$  John is writing with his left hand.

## E and biased questions

- Questions epistemically biased towards  $p$  are parsed as *whether*( $E_K(p)$ )

(21) a.  $whether(p) = \{p, \neg p\}$   
 b.  $\neg p = 1$  iff  $p = 0$   
 c.  $whether(E_K(p)) = \{E_K(p), \neg E_K(p)\}$   
 presupposition:  $\bigcap K \Rightarrow p$

- A question is epistemically biased towards  $p$  if it gives rise to the inference  $\bigcap K \Rightarrow p$

cf. Trinh (2014)

# Parallels

- $K$  accomodation works similarly for  $must_K(p)$  and  $whether(E_K(p))$

(22) I see John writing with his left hand

- a. (i) Is John left handed?
- (ii) John must be left-handed.
- b. (i) #Is John right-handed?
- (ii) #John must be right-handed.

(23) A: Did you read John's email?

- B: (i) Yes. He must be under stress.
- (ii) Yes. Is he under stress?

→  $whether(E_K(p))$  also does not require  $p$  be known from facts in the immediate context!

# Differences

- The difference between  $must_K(p)$  and  $whether(E_K(p))$  emerges in cases where some  $p$  is settled by some proposition in  $K$

(24) I see John smoking

$K = \{ \text{John is smoking, ...} \}$

- #John must be smoking again.
- Is John smoking again?

$must_K(p)$

$whether(E_K(p))$

# Intervention by $E$

- $E$  makes the polar question non-tautological

$$(25) \quad \text{MAX}(\text{whether}(\text{John read any}_D \text{ book})) \text{ is defined only if}$$

$$\forall C \neq D : \underbrace{\bigcup (\text{whether}(\text{ANY}_D))}_{\top} \subseteq \underbrace{\bigcup (\text{whether}(\text{ANY}_{D \cap C}))}_{\top}$$

$$(26) \quad \text{MAX}(\text{whether}(E_K(\text{John read any}_D \text{ book}))) \text{ is defined only if}$$

$$\forall C \neq D : \underbrace{\bigcup (\text{whether}(E_K(\text{ANY}_D)))}_{\cap K \Rightarrow \text{ANY}_D} \subseteq \underbrace{\bigcup (\text{whether}(E_K(\text{ANY}_{D \cap C})))}_{\cap K \Rightarrow \text{ANY}_{D \cap C}}$$

$$\forall C \neq D : \cap K \Rightarrow \text{ANY}_D \subseteq \cap K \Rightarrow \text{ANY}_{D \cap C} \quad = \text{unsatisfiable}$$

# Prediction

- We predict that biased negative questions can license NPIs
- (27) A: I read a lot of books in linguistics and have never found a good argument for UG
- B: Did you not read any book by Chomsky?

$MAX(whether(E_K(\neg ANY_D)))$  is defined only if  
 $\forall C \neq D : \bigcap K \Rightarrow \neg ANY_D \subseteq \bigcap K \Rightarrow \neg ANY_{D \cap C}$

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# Summary

- Biased questions do not license NPIs
  - Biased questions are parsed as  $\text{whether}(E_K(p))$
  - $\text{ANY}_D$  requires  $\text{MAX}$
  - $\text{MAX}(\text{whether}(E_K(\text{ANY}_D)))$  has an unsatisfiable presupposition
- $E$  is the covert counterpart of *must*
  - $\text{must}_K(p)$ 
    - asserts  $\bigcap K \Rightarrow p$
    - presupposes  $\neg \exists q \in K : q$  settles  $p$
  - $E_K(p)$ 
    - presupposes  $\bigcap K \Rightarrow p$

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## Default bias and NPI anti-licensing

- Declarative questions are biased by default (Gunlogson 2002, Safarova 2005, Trinh 2014, Goodhue 2022)

(28) I have no evidence regarding John's handedness

- a. Is John left-handed?
- b. #John is left-handed?

(29) John's email: "I injured my left hand so I couldn't hand-write ... "

- A: Did you read John's email?  
B: I did. He's left-handed?

- Declarative questions do not license NPIs (Hirst 1983, Huddleston 1994, Gunlogson 2002)

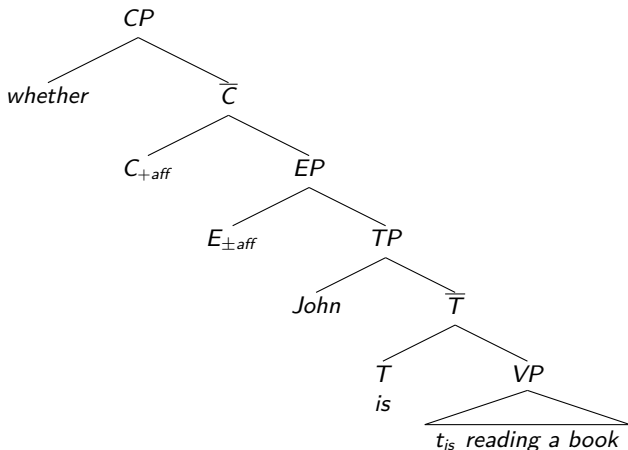
(30) a. Is John reading any book by Chomsky?  
b. #John is reading any book by Chomsky?

# Morphology of $C$ and $E$

- $C$  must attract,  $E$  may attract

⇒ a declarative question has to be parsed as  $whether(E_K(p))$

(31)



# Maxim of Manner

- We predict that negation forces a question to become biased

(32) I know nothing about John's marital status

a. Is John married?

b. Is John single?

c. #Is John not married?

→ I see him browsing Tinder

d. #Is John not single?

→ I see him wearing a ring

- Maxim of Manner  $\Rightarrow$  do not use negation for no reason!

(33) a. *whether*( $p$ ) = *whether*( $\neg p$ )

b. *whether*( $E_K(p)$ )  $\neq$  *whether*( $E_K(\neg p)$ )

cf. Trinh (2014) for details

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- Bassi, Itai, Guillermo Del Pinal, and Uli Sauerland. 2021. Presuppositional exhaustification. Semantics and Pragmatics 14:1–48.
- Bassi, Itai, Guillermo Del Pinal, and Uli Sauerland. 2023. Free choice and presuppositional exhaustification. Accepted for publication in Semantics and Pragmatics .
- Crnič, Luka. 2014. Against a dogma on NPI licensing. MIT Working Papers in Linguistics 71:117–145.
- Crnič, Luka. 2019. Any: Logic, likelihood, and context. Language and Linguistic Compass 13:1–20.
- von Stechow, Kai, and Anthony Gillies. 2021. Still going strong. Natural Language Semantics 29:91–113.
- von Stechow, Kai, and Anthony S. Gillies. 2010. Must ... stay ... strong! Natural Language Semantics 18:351–383.
- Goodhue, Daniel. 2022. Isn't there more than one way to bias a polar question. Natural Language Semantics 30:379–413.
- Gunlogson, Christine. 2002. Declarative questions. Proceedings of SALT 12:144–163.

- Heim, Irene. 1984. A note on negative polarity and downward entailingness. Proceedings of NELS 14:98–107.
- Hirst, Daniel. 1983. Interpreting intonation: A modular approach. Journal of Semantics 2:171–182.
- Huddleston, Rodney. 1994. The contrast between interrogatives and questions. Journal of Linguistics 30:411–439.
- Kadmon, Nirit, and Fred Landman. 1993. *Any*. Linguistics and Philosophy 16:353–422.
- Krifka, Manfred. 1995. The semantics and pragmatics of polarity items. Linguistic Analysis 25:209–257.
- Lahiri, Utpal. 1998. Focus and negative polarity in Hindi. Natural Language Semantics 6:57–123.
- Lee, Young-Suk, and Laurence R. Horn. 1994. *Any* as indefinite + *even*. Manuscript, Yale University.
- Roelofsen, Floris. 2018. NPIs in questions. Talk given at NYU Linguistics Colloquium.
- Roelofsen, Floris, and Sunwoo Jeong. 2022. Focused NPIs in statements and questions. To appear in Journal of Semantics.



- van Rooy, Robert. 2003. Negative polarity items in questions: Strength as relevance. Journal of Semantics 20:239–274.
- Safarova, Marie. 2005. The semantics of rising intonation in interrogatives and declaratives. Proceedings of Sinn und Bedeutung 9:355–369.
- Schwarz, Bernhard. 2017. On question exhaustivity and NPI licensing. Proceedings of Amsterdam Colloquium 21:405–414.
- Trinh, Tue. 2014. How to ask the obvious - A presuppositional account of evidential bias in English yes/no questions. MIT Working Papers in Linguistics 71:227–249.