Question Bias from Polarity Focus

Cory Bill and Todor Koev

Leibniz-Center General Linguistics (ZAS) and University of Konstanz

Biased Questions: Experimental Results and Theoretical Modelling
February 4-5, 2021

Empirical basis

- We investigate the following subset of biased polar questions in English. (CAPITALS indicate a pitch accent.)

    - Accented low negation questions

        (1) Is there NOT a vegetarian restaurant in this town?   (aLNQs)

    - High negation questions

        (2) Isn't there a vegetarian restaurant in this town?   (HNQs)

    - Verum questions (questions with a verum accent)

        (3) IS there a vegetarian restaurant in this town?   (VrmQs)

    - *Really*-questions (question with epistemic *really*)

        (4) Is there REALLY a vegetarian restaurant in this town?   (RlyQs)

Speaker bias

- We focus on one kind of question bias, i.e. **speaker bias** (aka "epistemic bias" or "original bias"). Speaker bias reflects the speaker's prior beliefs about the question prejacent.
- Other kinds of question bias (not discussed here):
  - **Contextual bias** (aka "contextual evidence"): Bias that has to do with contextual evidence about the question prejacent.
    (Büring & Gunlogson 2000; Romero & Han 2004; Sudo 2013; Northrup 2014; Domaneschi et al. 2017)
  - **Answer bias:** An expectation about which of the two polar answers the addressee is going to choose.
    (cf. Krifka 2015; Malamud & Stephenson 2015; AnderBois 2019).

Main claims

- *Empirical claim*: Speaker bias varies across three dimensions.
    - **Polarity:** positive vs. negative bias
    - **Optionality:** optional vs. obligatory bias
    - **Strength:** weak vs. strong bias
- *Theoretical claim*: The settings of these bias features are determined by a combination of two main factors: polarity focus and polar operators.
    - Polarity focus has a contrastive interpretation and triggers speaker bias (in the targeted question forms).
    - Polar operators (low negation, high negation, VERUM, epistemic *really*) are the carriers of polarity focus and their semantics may also contribute to the bias profile.
    - Specifically, polarity focus dictates the polarity and optionality settings while polar operators may manipulate the strength settings.

- Empirical evidence
  - Diagnosing bias polarity, optionality, and strength
  - Summary of findings
- Main ingredients of the account
  - Polar operators
  - Polarity focus
- Account
  - Deriving bias polarity, optionality, and strength
  - Summary of proposal
- Previous approaches
  - Epistemic approach
  - Decision-theoretic approach
  - Accounts based on projected discourse developments
- Summary and outlook (tag questions)

Empirical Evidence

- A biased question form may give rise to a positive or a negative speaker bias toward the plain proposition.

  (5) Is Kai NOT from Hawaii?
       ⤳ *The speaker believes that Kai is from Hawaii.*   (positive bias)

  (6) Is Kai REALLY from Hawaii?
       ⤳ *The speaker doubts that Kai is from Hawaii.*   (negative bias)

- *Shortcut*: Speaker bias is always of the *opposite* polarity to that of the question prejacent.

- We do not propose an independent diagnostic for polarity.
  - The direction of the speaker bias is intuitively clear.
  - Our diagnostic for bias strength (presented below) already suggests the direction of the bias.

Diagnosing bias optionality

- All polar questions (incl. positive polar questions/PPQs) can be biased in the right context, but only some of them *always* convey a bias. So we need a diagnostic for the *lack* rather than presence of speaker bias.
- **BAC test:** The neutrality marker *by any chance* is incompatible with any degree of speaker bias (Sadock 1971). It is thus ruled out in questions that obligatorily convey a bias.

  (7)   Does John drink alcohol, by any chance?   (PPQs=optional bias)

  (8)   #Does John REALLY drink alcohol, by any chance? (RlyQs=obligatory bias)

- Beyond BAC, neutral contexts constitute another natural diagnostic for the absence of bias. However, this diagnostic is not bulletproof, as assumptions of bias can be subsequently added or accommodated.

Diagnosing bias strength

- **Follow-up test:** A biased question is paired with one of two follow-up sentences which spell out the speaker bias and assign to it different levels of epistemic certainty.
  - A sentence with *suspect* signals a *weak* preference for the prejacent.
  - A sentence with *be certain* signals a *strong* preference for the prejacent.

  (9) Isn't Diego from Peru? That is to say, I suspected / #I was certain he was.
  <div align="right">(weak bias)</div>

  (10) ISN'T Diego from Peru? That is to say, #I suspected / I was certain he was.
  <div align="right">(strong bias)</div>

- While strong certainty entails weak certainty, a strongly biased question is not felicitous with a *suspect*-type follow-up because the *certain*-alternative is a better fit.
- *Notice*: The follow-up test diagnoses not just the strength but also the polarity of the bias.

Summary of findings

Label	Example	Polarity	Optionality	Strength
aLNQs	*Is it NOT raining?*	positive	obligatory	weak
HNQs	*Isn't it raining?*	positive	obligatory	weak
VrmQs	*IS it raining?*	negative	optional	strong
RlyQs	*Is it REALLY raining?*	negative	obligatory	weak

- Speaker bias is always of the *opposite* polarity to that of the question prejacent: positive in negative questions (aLNQs, HNQs) and negative in positive questions (VrmQs, RlyQs).
- Optionality and Strength are two distinct notions, e.g. optional bias can be strong (VrmQs) and obligatory bias can be weak (HNQs, aLNQs RlyQs). Additionally, tag questions provide instances of the combinations optional-weak and obligatory-strong (see Conclusion).

Main Ingredients of the Account

- **Polar operators** are clause-level elements that entail the prejacent proposition or its negation.
- We discuss four such operators:
    - Low negation (not^{low})
    - High negation (not^{high})
    - VERUM
    - Epistemic *really* ($really_F$ or REALLY)

- We assume two different lexical entries for negation: low negation and high negation.
- Low negation is just propositional negation.
- High negation takes scope over a commitment operator. (Its semantics will be discussed below.)

- **Verum accent** (aka "verum focus") is a pitch accent on the finite auxiliary that emphasizes the truth of the prejacent (Höhle 1992).

  (11) Oliver IS from Australia.
      ⤳ It is <u>true</u> that Oliver is from Australia.

- Analyses of verum accent come in two main forms:
  - **Focus approach:** Verum accent is focus on a syntactically represented polarity head.
    (Laka 1990; Wilder 2013; Samko 2016; Goodhue 2018)
  - **Operator approach:** Verum accent is the spelling out of an otherwise covert epistemic/common ground operator called VERUM.
    (Romero & Han 2004; Gutzmann et al. 2020)
- We propose a version of the operator approach.

Semantics for VERUM

- Verum accent spells out a VERUM operator that has no truth-conditional import but which introduces a **conflicting evidence presupposition**.

  (12) $[\![\text{VERUM}]\!](p) = p$,
  provided there is conflicting evidence about p

- This semantics explains why a verum accent occurs in **contradiction** contexts and is infelicitous in a **neutral**/non-conflicted context.

  (13) A: Oliver is not from Australia.   (contradiction context)

       B: No, he IS from Australia.

  (14) *Out of the blue...*   (neutral context)

       A: Is it raining?

       B: #It IS raining.

Ambiguity of *really*

- *Really* is ambiguous between an **intensifier** use and an **epistemic** use (Partee 2004; Romero & Han 2004; cf. Barker 2002; Sauerland & Stateva 2011).

  (15) Jen is really tall. (intensifier use)
       ≈ *Jen is very tall.*

  (16) Jen REALLY is tall. (epistemic use)
       ≈ *The speaker is definitely certain Jen is tall.*

- *Notice*: In English, these two uses are distinguished both structurally (low vs. high attachment) and prosodically (optional vs. obligatory focal stress).

- This kind of meaning overlap has crosslinguistic significance (cf. German *wirklich* or Bulgarian *naistina*). It points to a single entry for *really*.

- Two prior analyses of *really*:
  - **Precisifier approach:** *Really* raises the standard of precision by stating that the subject meets all "relevant" standards.
    (cf. Barker 2002; Partee 2004; Sauerland & Stateva 2011; Krifka 2021)
  - **Epistemic approach:** (Epistemic) *really* is the overt realization of VERUM.
    (Romero & Han 2004)

Semantics for *really*

- *Really* signals negotiation about standards. It quantifies over contexts "similar" to the current one and states that in each such context the degree to which the gradable property applies lies above the standard.

  (17) $[\![\text{really}]\!]^c = \lambda P \lambda x . \exists d\, [P(d)(x) \wedge \forall c' \approx c\, [\mathbf{std}_{c'}(P) < d]]$

- Intensifier *really* composes with a (gradable, vague) individual property.

  (18) $[\![\text{tall}]\!]^c = \lambda d \lambda x . d \leq \mathbf{tall}(x)$

  (19) $[\![\text{really tall}]\!]^c = \lambda x . \exists d\, [d \leq \mathbf{tall}(x) \wedge \forall c' \approx c\, [\mathbf{std}_{c'}([\![\text{tall}]\!]) < d]]$
        $= \lambda x . \forall c' \approx c\, [\mathbf{std}_{c'}([\![\text{tall}]\!]) < \mathbf{tall}(x)]$

- Epistemic *really* composes with a property of degrees of commitment.

  (20) $[\![\text{COM } \phi]\!]^c = \lambda d \lambda x . d \leq \mathbf{com}_x([\![\phi]\!]^c)$

  (21) $[\![\text{really}_F\,[\text{COM } \phi]]\!]^c$
        $= \lambda x . \exists d\, [d \leq \mathbf{com}_x([\![\phi]\!]^c) \wedge \forall c' \approx c\, [\mathbf{std}_{c'}([\![\text{COM } \phi]\!]^c) < d]]$
        $= \lambda x . \forall c' \approx c\, [\mathbf{std}_{c'}([\![\text{COM } \phi]\!]^c) < \mathbf{com}_x([\![\phi]\!]^c)]$

- *Notice*: We treat the contribution of epistemic *really* as at-issue content (in line with Romero & Han 2004 and pace Romero 2015). It seems to readily embed.

  (22) Jill thinks/doubts that Oswald REALLY is the murderer.
        $\not\rightsquigarrow$ *The speaker is definitely certain Oswald is the murderer.*

- High negation takes scope over COM and negates the proposition downstairs.

(23) $\llbracket \text{not}_F^{high} \rrbracket^c = \lambda P \lambda x . \forall d [P(d)(x) \to d = 0]$

(24) $\llbracket \text{COM } \phi \rrbracket^c = \lambda d \lambda x . d \leq \textbf{com}_x(\llbracket \phi \rrbracket^c)$

(25) $\llbracket \text{not}_F^{high} [\text{COM } \phi] \rrbracket^c = \lambda x . \forall d [d \leq \textbf{com}_x(\llbracket \phi \rrbracket^c) \to d = 0]$
$= \lambda x . \textbf{com}_x(\llbracket \phi \rrbracket^c) = 0$

- We assume that focus on high negation is manifested by a high structural position (not prosodically).

- Since COM is upward-entailing wrt its propositional argument, we correctly predict that positive but not negative polarity items freely occur in HNQs.

- We adopt Rooth's alternative semantics for focus (Rooth 1985; 1992).
  - Focus is marked by a feature F.
  - Every linguistic expression α has two semantic values: ordinary $[\![\alpha]\!]^o$ and focus $[\![\alpha]\!]^f$.
  - A focus domain ϕ is linked via a squiggle operator $\sim$ to an appropriate antecedent C.
- We view **polarity focus** as regular focus marking on a polar operator. Specifically, we assume the following focus semantic values for focused polar operators.

  (26) $[\![\text{VERUM}_F]\!]^f = [\![\text{not}_F^{low}]\!]^f = \{\lambda p.p, \lambda p.\neg p\}$

  (27) $[\![\text{really}_F]\!]^f = [\![\text{not}_F^{high}]\!]^f = \{[\![\text{really}_F]\!]^o, [\![\text{not}_F^{high}]\!]^o\}$

  That is, positive and negative polar operators come in pairs and compete with each other.
- Two additional assumptions (Wilder 2013; Samko 2016; Goodhue 2018):
  - The focus domain of polarity focus is the minimal clause that contains the focused polar operator.
  - Polarity focus always receives a contrastive interpretation.

Proposal

Deriving bias polarity

- Schematic derivation (O=polar operator, ϕ=focus domain, C=focus antecedent):

  (28) $[Q \; [[O_F \; ...]_\phi \sim C]]$

    - The focus domain ϕ and the focus antecedent C must meet Rooth's (1992) constraint on contrasting phrases: $C \in [\![\phi]\!]^f \land C \neq [\![\phi]\!]^o$.
    - Due to its polar nature, $[\![\phi]\!]^f$ is always binary, so the antecedent C is just the alternative to $[\![\phi]\!]^o$.
    - The speaker is questioning the focus domain while pointing to its polar alternative, so she must have a preference for said alternative.
    - The speaker bias is always of the *opposite* polarity to that of the focus domain!

- LFs for the targeted biased questions forms.

  (29) $[Q \; [[\text{VERUM}_F \; S]_\phi \sim C]]$ $\hfill$ (VrmQs)
        $[\![\phi]\!]^f = \{p, \neg p\}$, $[\![\phi]\!]^o = p$, so $C = \neg p$ (where $p = [\![S]\!]^o$)

  (30) $[Q \; [[\text{not}_F^{low} \; S]_\phi \sim C]]$ $\hfill$ (aLNQs)
        $[\![\phi]\!]^f = \{p, \neg p\}$, $[\![\phi]\!]^o = \neg p$, so $C = p$

  (31) $[Q \; [[\text{really}_F \; [\text{COM} \; S]]_\phi \sim C]]$ $\hfill$ (RlyQs)
        $[\![\phi]\!]^f = \{Rp, \neg p\}$, $[\![\phi]\!]^o = Rp$, so $C = \neg p$ (where $Rp = [\![\text{really}_F \; [\text{COM} \; S]]\!]^o$)

  (32) $[Q \; [[\text{not}_F^{high} \; [\text{COM} \; S]]_\phi \sim C]]$ $\hfill$ (HNQs)
        $[\![\phi]\!]^f = \{Rp, \neg p\}$, $[\![\phi]\!]^o = \neg p$, so $C = Rp$

Aside: Polar responses to RlyQs and HNQs

- *A potential issue*: RlyQs and HNQs refer to commitments (they embed COM), thus introducing epistemicity into the question partition. But polar responses to such questions seem to pick out plain propositions (Romero & Han 2004; Romero 2015).
- Our story about that:
  - RlyQs/HNQs are associated with two pairs of alternatives: the question ordinary meaning and the domain focus value.
  - These two pairs correspond to the immediate QUD (the ordinary question meaning) and a superordinate QUD (the domain focus value), respectively.
  - A polar response may target either pair, although the *stronger* option is preferred.

  (33) Q: Did he REALLY apologize?   (RlyQ)
            $\{Rp, \neg p\}$ (domain focus value = superordinate QUD)
            $\{Rp, \neg Rp\}$ (ordinary question meaning = immediate QUD)

        A: Yes. $\rightsquigarrow Rp$
            No. $\rightsquigarrow \neg Rp$ or $\neg p$ (Preference: $\neg p > \neg Rp$)

  (34) Q: Didn't he apologize?   (HNQ)
            $\{Rp, \neg p\}$ (domain focus value = superordinate QUD)
            $\{\Diamond p, \neg p\}$ (ordinary question meaning = immediate QUD)

        A: Yes. $\rightsquigarrow \Diamond p$ or Rp (Preference: $Rp > \Diamond p$)
            No. $\rightsquigarrow \neg p$

- Questions with a focused polar operator (aLNQs, HNQs, RlyQs) are obligatorily biased. This is because polarity focus presupposes a (contrasting) alternative and thus generates an obligatory bias.
- However, VrmQs are optionally biased (Goodhue 2019; Gutzmann et al. 2020). This suggests that a VERUM operator may but need not be focused.

  (35) By any chance, DID Kim join the team? (Because some say she did, others say she didn't.)

- We propose that a VrmQ may be associated with the two homophonous LFs. While both LFs require conflicting evidence about the prejacent (due to the presupposition of VERUM), only the variant with polarity focus conveys a bias.

  (36) DID Kim join the team?
       a. [Q [VERUM [Kim join the team]]]   (unbiased)
       b. [Q [VERUM$_F$ [Kim join the team]]$_\phi \sim C$]   (biased)

Deriving bias strength

- Polarity focus in questions points to a contrasting alternative and conveys just a *preference*. This is why, by default, the speaker bias in most of the targeted question forms (aLNQs, HNQs, RlyQs) is weak.

- VrmQs are the only form that (when biased) conveys a *strong* bias.

    (37)   IS Mary coming to the party? That is to say, I was certain / #I suspected she wouldn't.

- We attribute the strong bias associated with VrmQs to the conflicting evidence presupposition of VERUM. That is, since the context is already conflicted, whenever the speaker is biased they are strongly biased.

- More generally, the lexical semantics of a polar operator may provide a boost to the weak bias triggered by the polarity focus marking.

Summary of proposal

Label	Example	Polarity	Optionality	Strength	Analysis
aLNQs	*Is it NOT raining?*	positive	obligatory	weak	not^{low} + polarity focus
HNQs	*Isn't it raining?*	positive	obligatory	weak	not^{high} + polarity focus
RlyQs	*Is it REALLY raining?*	negative	obligatory	weak	*really* + polarity focus
VrmQs	*IS it raining?*	negative	optional	strong	VERUM (+ polarity focus)

Previous Approaches

Epistemic approach

- All of the targeted question forms contain a metaconversational/epistemic VERUM operator (Romero & Han 2004; Repp 2013; Goodhue 2019; Silk 2019).
- VERUM(p) states that the speaker is certain that p should be added to the common ground.
- Since the speaker questions their certainty in the prejacent, she must be biased *against* said prejacent.
- This approach does well in predicting the direction of the bias (as opposite to the prejacent). But it misses the fact that speaker bias in VrmQs is optional. Not clear how to derive the weak vs. strong distinction either.

Decision-theoretic approach

- The speaker chooses a question form that accords with her beliefs and desires (van Rooy & Safarova 2003; also Krifka 1995; van Rooy 2003; AnderBois 2019; Goodhue 2019).
- Uttering a question form is felicitous if the utility value of the pronounced alternative exceeds the utility value of any unpronounced alternative. (If all alternatives are pronounced, as in alternative questions, these utility values are the same.)
- This approach correctly predicts the direction of the bias (but see PPQs). However, speaker bias is predicted to be cancelable, as only some of the strategies to optimizing the utility value entail a bias. When biased, only a mild preference is required. In order to draw the weak/strong distinction, we would need to impose specific conditions on differrent question forms.

- Question bias is centered not on the speaker beliefs directly but on the speaker expectations about how the discourse is going to develop (Krifka 2015; Malamud & Stephenson 2015; AnderBois 2019).
- We tried to evaluate Malamud & Stephenson's (2015) scoreboard effects of regular assertions, PPQs, pnNTQs and extend it to our four major question forms.
- The model correctly predicts the general direction of the bias (at least for the discussed structures). Since the account distinguishes between *current* and *projected* discourse commitments, it also has the tools to contrast strong vs. weak bias (respectively). However, since the bias computation is based on reasoning about expressed commitments, the bias should be cancelable throughout.
- Apples and oranges? The notion of bias modeled here is not based on beliefs about the world but on expectations about the answer. Not sure what is at issue is speaker bias (rather than "answer bias").

Conclusion and Outlook

- Speaker bias varies in polarity, optionality, and strength.
- Any particular feature combination arises through two kinds of elements: polar operators and polarity focus. Specifically, the focus determines the polarity and optionality settings while the semantics of a polar operator may additionally strengthen the bias.

Outlook (Tag questions)

- We have also investigated the bias profile of (reverse-polarity rising) tag questions (TQs).
- We divided such TQs into those with **nuclear** (n) vs. **postnuclear** (pn) intonation pattern and those with **positive** (P) vs. **negative** (N) tag.
- We found that, generally, the shape of the tag (an elliptical polar question) determines the bias profile of the tag question as a whole. This lends further support to our account.

Label	Example	Polarity	Strength	Optionality	Analysis
pnPTQs	*It isn't raining = is it?*	negative	weak	optional	−
pnNTQs	*It is raining = isn't it?*	positive	weak	obligatory	not^{high} + polarity focus
nPTQs	*It isn't raining* || *IS it?*	negative	strong	obligatory	VERUM + polarity focus
nNTQs	*It is raining* || *ISN'T it?*	positive	strong	obligatory	VERUM + not^{high} + pf

Thank you!