

Expecting and Asking: A Study of Bias in *Nandao*-Questions

Beibei Xu (billyxu@rutgers.edu)
MACSIM 4, New Brunswick



Introduction to Bias

Bias is a phenomenon that is found in questions

> Different views of bias

- Bias as epistemic belief: Romero & Han (2004)
- Bias as contextual evidence: Buring & Gunlogson (2000)
- Bias = Epistemic Bias + Evidential Bias: Sudo (2013)

> Consensus view on question bias

A particular answer is expected to be correct while the others are not.

> Current views on modeling bias

- Bias from compelling evidence: (B&G 2000)
 - Contextual evidence for ans $p \Rightarrow$ bias towards p
 - Contextual evidence against $p \Rightarrow$ bias towards $\neg p$
- (1) [Context: My officemate enters the windowless computer room wearing a dripping wet raincoat.]
What's the weather like out there?
Is it raining?/#Is it sunny?
 - Bias from semantic presupposition: (Guerzoni 2003)
 - Presupposition of ans p is met \Rightarrow bias towards p
 - Presupposition of p is not met \Rightarrow bias isn't p
- (2) Did Sam *lift a finger* to help? (Minimizer Question)
 - Bias from unbalanced epistemic partition of answers:
 - Balanced partition of ans \Rightarrow no bias (R&H 2004)
 - Unbalanced partition of ans \Rightarrow there is a bias
- (3) Does John really like Mary? (Verum Question)
 - Bias from common knowledge in CG: (Caponigro & Sprouse 2007)
 - CG \models a complete ans $p \Rightarrow$ bias towards p
 - CG $\not\models$ a complete ans $p \Rightarrow$ bias isn't p
- (4) Is the Pope Catholic? (Rhetorical Question)
 - Two essential conditions for introducing bias
 - The selection of a particular answer as privileged in some way.
 - Strict partial-ordered preference ranking of all possible answers.

Nandao-Q: A case study in Bias

> Contextual conditions of *nandao*-Q: negative epistemic bias

In Mandarin, *nandao*-Q necessarily express bias.

<i>Nandao</i> -p?	Speaker's bias towards p	Neutral	Speaker's bias against p
Contextual evidence for p	✗	✗	✓
Neutral	✗	✗	✓
Contextual evidence against p	✗	✗	✓

Table. Contextual conditions for *nandao*-p?

- Nandao*-p? is not sensitive to contextual evidence. It is always biased towards *not-p*.

* *Nandao* is not Outer Negation like *n't* in English

- ONPQ: [-positive evidential bias] & [positive epistemic bias]
- Nandao*-Q: [negative epistemic bias]

Syntactic properties of *nandao*-Q

✓ *Nandao* + Yes/No Questions (Y/N-Q) * *Nandao* + WH-Q

- (5) *Nandao* xiayu-le ma? (6) **Nandao* shui bang-guo ni ne?
Nandao rain.PERF Y/N-Q *Nandao* who help-EXP you WH-Q
 'It is not raining, right?' (Intended) 'No one helped you, right?'

* *Nandao* + declaratives * *Nandao* + A-not-A-Q

- (7) **Nandao* Lisi hui lai. (8) **Nandao* Zhangsan chi-mei-chi fan?
Nandao Lisi will come *Nandao* Zhangsan eat-not-eat rice
 (Intended) 'Lisi will not come.' (Intended) 'Zhangsan didn't have a meal, right?'

> *Nandao* > Foc

- (9) (*Nandao*) zhiyou (**nandao*) [Zhangsan]_F (**nandao*) zou-le ma?
Nandao only *nandao* Zhangsan *nandao* walk-PERF Y/N-Q
 'It is not the case that only [Zhangsan]_F left, right?'

> *Nandao* > Question

- (10) [_{CP} Zhangsan qu-le Meiguo ma]_{Top}, *nandao* [_{CP} Zhangsan go-PERF America Y/N-Q] *nandao*
 'Zhangsan didn't go to America, right?'

* *Nandao* is not Minimizer

- Minimizers: all kinds of sentences
Nandao: Y/N-Q
- MQs: only rhetorical reading
nandao-Q: RQ and non-RQ.

* *Nandao* is not Verum focus

- VERUM: declaratives, Y/N-Q, WH-Q.
- Nandao*: Y/N-Q.

What is *nandao*?

> *Nandao* is a gradable epistemic modal

- Nandao* \Rightarrow negative epistemic bias:
nandao-p? [negative epistemic bias] vs p? [no epistemic bias]
- In (5), the speaker believes that the correct answer is more likely to be *It is not raining* than *It is raining*.
- \therefore *Nandao* is a gradable epistemic modal which provides a probability ranking of the speaker's degree of belief, i.e. *nandao*-Q satisfies the 2nd essential condition for bias.

- Not all gradable modals can express bias in questions.

(11) [Context: A has no idea of whether Zhangsan will win tonight's game.]

- A: Will Zhangsan possibly win tonight? Coach: It's possible.
 A: Henkeneng ma? Coach: Henkeneng./Kenengxing bu da.
 Probably Y/N-Q Probably probability not big
 'Is it probable?' 'Probably./It's not probable.'

□ *Henkeneng*-Q has two possible answers {Probably p , not-probably p }, but there is no preference ranking between the two answers.

□ What *henkeneng* provides is two probability rankings between p and $\neg p$:

$$p >_{\text{PROB}} \neg p, p \leq_{\text{PROB}} \neg p.$$

▲ It does not conform to the second condition of question bias.

\therefore *Henkeneng*-Q has no bias.

> *Nandao* is a subjective epistemic modal

The syntactic position of *nandao* and its nature of expressing speaker's epistemic bias resembles what Lyons (1977) categorizes as subjective epistemic modals which only qualify (i.e. modify) illocutionary force. I propose that *nandao* is a subjective epistemic modal with the following syntax for *nandao*-p? (cf. Lyons 1977, Rizzi 2004)

$$(12) [\text{FORCEP } [\text{nandao QUEST }]]_{\text{INTP}} \text{ Y/N-op } [\text{INT } [\text{INT } [+\text{WH }]]]_{\text{IP } P }]]]$$

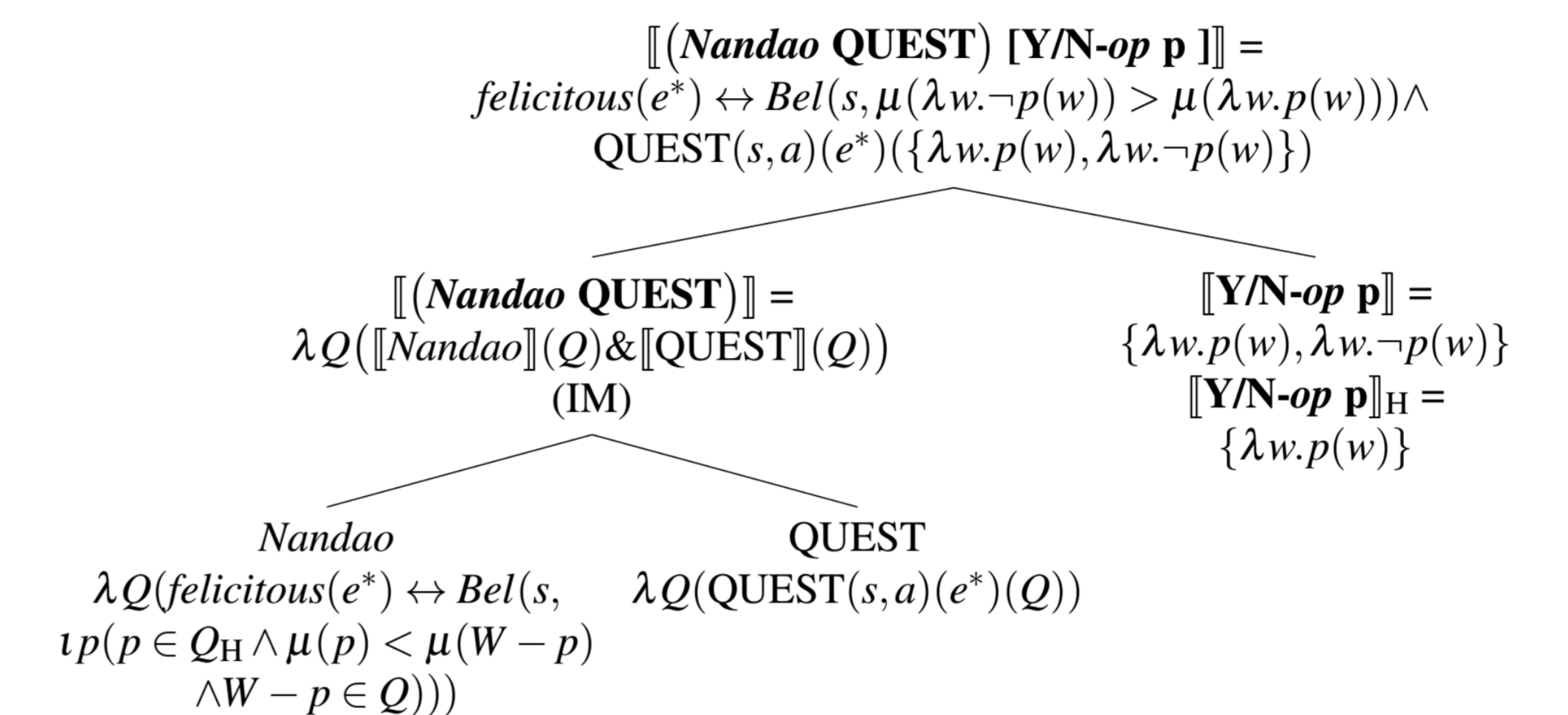
A Gradable Subjective Epistemic Modal Solution to *nandao*-Q

> Modeling degrees of belief: probability function μ

- Halpern's (1990) type 2 probability structure can represent degrees of belief: μ is the discrete probability function from a set of possible worlds to the real number between [0, 1]. In this way, $\mu(p)$ represents the probability of p being true (cf. Yalcin 2010, Lassiter 2010).
- The bias meaning of *nandao*-p?, i.e. the answer *not-p* is more likely to be than p , can be represented as a probability ranking $\mu(p) < \mu(W-p)$.

> How to satisfy the first condition: the highlighted answer as the target

- Standard question semantics cannot help: all answers are created equal after composition in standard question semantics, i.e. *nandao* cannot retrieve a specific answer after composition of Y/N-Q.



- Highlighting** can help: The idea of highlighting from Inquisitive Semantics can differentiate answers to a question (R&G 2010).

(13) $Q_H = \llbracket [Y/N-op(p)]_H \rrbracket := \llbracket p \rrbracket_H$ (p is the question nucleus). If p is an atomic proposition, $\llbracket p \rrbracket_H = \{p\}$; if p is composed of a disjunction a or b , $\llbracket p \rrbracket_H = \{a, b\}$.

- Nandao* can target the unique highlighted answer.

$$(14) \llbracket [nandao] \rrbracket := \lambda Q_{\langle (s,t), t \rangle} (\text{felicitous}(e^*) \leftrightarrow \text{Bel}(s, \varphi_{\langle (s,t), t \rangle}(p \in Q_H \wedge \mu(p) < \mu(W-p) \wedge W-p \in Q)))$$

> Composing *nandao*-Q

For compositional derivations of (12), I adapt Hacquard's (2007) and Krifka's (2012) semantics for speech act (15) and propose the Illocutionary Modification Rule (16).

(15) $\llbracket \text{QUEST} \rrbracket := \lambda Q_{\langle (s,t), t \rangle} (\text{QUEST}(s,a)(e^*)(Q))$ (s is the speaker, a is the addressee, e^* is the speech act event)

(16) Illocutionary Modification (IM):

If α is a branching node, $\{\beta, \gamma\}$ is the set of α 's daughters, and $\llbracket \beta \rrbracket$ and $\llbracket \gamma \rrbracket$ are both in $D_{\langle \pi, t \rangle}$, then $\llbracket \alpha \rrbracket := \lambda R \in D_{\pi} . \llbracket \beta \rrbracket(R) \wedge \llbracket \gamma \rrbracket(R)$.

Explanation of the Mandarin Data

* *Nandao* + declaratives

As *nandao* provides a probability ranking for the anchor answer and its alternative answer, it cannot be used in declaratives which do not have alternatives in their denotations.

* *Nandao* + WH-Q

- The status of highlighted answer(s) is unclear in WH-Q: it may not have highlighted answers.
- WH-Q does not have both positive and negative forms of an answer in its denotation.

* *Nandao* + A-not-A-Q

- $\llbracket (8) \rrbracket = \{\lambda w. \text{eat.rice}(zhangsan)(w), \lambda w. \neg \text{eat.rice}(zhangsan)(w)\} = \llbracket (8) \rrbracket_H$
- The uniqueness presupposition in (14) is violated: *... $\varphi_{\langle (s,t), t \rangle}(p \in Q_H)$...

Acknowledgement

I would like to express my sincere gratitude to Veneeta Dayal for her constant guidance and support. Also, I want to extend my thanks to Kirsten Syrett, Simon Charlow, Mingming Liu, Eason Chen, and audience at SURGE for their valuable comments, suggestions, and judgments of the data.

References

- Buring & Gunlogson. 2000. Aren't positive and negative polar questions the same? Ms. Caponigro & Sprouse. 2007. Rhetorical questions as questions. SuB11. Guerzoni. 2003. Why even ask: On the pragmatics of questions and the semantics of answers. PhD Diss. Hacquard. 2006. Speaker-oriented vs. Subject-oriented modals: A split in implicative behavior. SuB 11. Halpern. 1990. An analysis of first-order logics of probability. AI 46. Krifka. 2012. Embedding speech acts. Ms. Lyons. 1977. Semantics, Vol 2. CUP. Roelofsen & van Gool. 2010. Disjunctive questions, intonation, and highlighting. LLM. Romero & Han. 2004. On negative yes/no questions. L&P 27.