Dedicated Bias Particles: A Case Study of Mandarin *Nandao*-Qs

Beibei Xu (billyxu@rutgers.edu), Rutgers University

Nandao-Q: A case study in Bias

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

In Mandarin, *nandao*-Qs can have rhetorical (RQ) or Information-seeking reading (IQ). Both of the readings **necessarily** express bias.

Nandao-p?	Speaker's bias towards *p*	Neutral	Speaker's bias against *p*
Contextual evidence for *p*	✗	✗	✓ (IQ)
Neutral	✗	✗	✓ (RQ)
Contextual evidence against *p*	✗	✗	✓ (RQ)

Table 1. Contextual conditions for *nandao-p*?

- *Nandao-p*? is sensitive to **speaker's epistemic attitude** to *p* but not sensitive to contextual evidence. It is always biased towards **not-p**.
- The negative epistemic bias is brought by *nandao*: without *nandao*, *p*? doesn't necessarily express the negative epistemic bias.

Discourse properties of *nandao*-Q

➤ **Question Formation Test (Koev 2013)**

1. A: Nandao Yuehan shi ge yisheng ma?
   nandao John   be CL doctor Y/N-Q
   'John is not a doctor, right?'
   B₁: # Shia, ni   juede ta bushi yige   yisheng.
       yes you think he is.not one-CL doctor
   (Intended) 'Yes, you think John is not a doctor.'
   B₂: # Bu, ni bu renwei ta shi ge yisheng.
       no you not believe he is CL doctor
   (Intended) 'No, you don't think he is a doctor.'

➤ **"Hey, wait a minute" Test (von Fintel 2004)**

2. A: Nandao Zhangsan bu xihuan shuiguo ma?
   nandao Zhangsan not like   fruit   Y/N-Q
   'Zhangsan likes fruits, right?'
   B₁: Wei, dengdeng. Ni renwei Zhangsan bu xihuan chi shuoguo de ba.
       hey wait.wait you believe Zhangsna not like eat fruits DE BA
       'Hey, wait a minute. You think Zhangsan doesn't like fruits at first.'
   B₂: # Wei, dengdeng. Zhangsan bu xihuan chi shuiguo.
        hey wait.wait Zhangsan not like   eat   fruits
   (Intended) 'Hey, wait a minute. Zhangsan doesn't like fruits.'

➤ **Nandao-Qs convey the bias as new information**

3. Context: (A is a poor guy who never thinks about investing in stocks to earn money. On the other hand, C has been invested in stock market for many years. A and C are not familiar with each other, but B is a friend of both A's and C's. B knows A and C quite well. One day, A approaches B and asks B,)
   A: Can you help me ask C how to open an account in stock market?
   B: Why do you want to open an account?
   A: Nandao wo buneng ye chaogu   ma?
      nandao I   cannot too invest.in.stock Y/N-Q
      'I can make some investment in stocks too, right?'
   B: A... Yuanlai ni ye xiang chaogu   a!
      ah so   you too want invest.in.stock ah
      'Ah… So, you want to make investment in stocks too!'

Syntactic properties of *nandao*-Q

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

4. Nandao xiayu-le   ma?
   nandao rain.ASP Y/N-Q
   'It is not raining, right?'

5. * Nandao shui bang-guo   ni   ne?
     nandao who help-EXP you WH-Q
   (Intended) 'No one helped you, right?'

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

6. *Nandao Lisi hui lai.
    nandao Lisi will come
   (Intended) 'Lisi will not come.'

7. ✶Nandao Zhangsan chi-mei-chi fan?
    nandao Zhangsan eat-not-eat rice
   (Intended) 'Zhangsan didn't have a meal, right?'

➤ ***Nandao* > Foc**

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

➤ ***Nandao* > Question**

9. [_CP Zhangsan qu-le   Meiguo ma]_Top, nandao t_{CP} .
   Zhangsan go-ASP America Y/N-Q   nandao
   'Zhangsan didn't go to America, right?'

What is *nandao*? What is not *nandao*?

✓ ***Nandao* is a not-at-issue content encoder**

- *Nandao* takes a global scope: $nandao > \neg, \forall, \Diamond$
- *Nandao*-Qs pass "*Hey, wait a minute*" Test but not Question Formation Test.

✶ ***Nandao* is not a presupposition trigger** ✶ ***Nandao* is not Verum focus**

- Presupposition: old, back-grounded information, and not speaker-oriented
- The epistemic bias conveyed by *nandao*: new information and speaker-oriented

- VERUM: compatible with declaratives, Y/N-Q, WH-Q; not necessarily convey epistemic bias
- *Nandao*: Y/N-Q; necessarily convey epistemic bias

✶ ***Nandao* is not a CI encoder**

- CI: its truth value is independent from that of the at-issue content; shows *anti-backgrounding effect*
- The bias conveyed by *nandao*: the bias meaning has to be true; Although it is new information, it does not show *anti-backgrounding effect*

✶ ***Nandao* is not a High Negation**

- Questions with High Negation: positive epistemic bias, not compatible with contexts with positive evidence
- *Nandao*-Qs: negative epistemic bias, compatible with contexts with positive evidence or negative evidence

✓ ***Nandao* is an Illocutionary Modifier**

	P	CI	IM	*nandao*
Convey new information	✗	✓	✓	✓
Backgrounding effect	✓	✗	✗	✗
Antibackgrounding effect	✗	✓	✗	✗
Participant-oriented	✗	✓	✓	✓

Table 2. Comparison among *nandao*, P, CI, and IM
(P=Presupposition; CI=Conventional Implicature; IM=Illocutionary Modifier)

➤ ***Nandao* is a subjective epistemic modal adverb**

- The syntactic position of *nandao* (> FocP, Q), the discourse status as Illocutionary Modifier, and its nature of expressing speaker's epistemic bias resembles what Lyons (1977) categorizes as subjective epistemic modals. Thus, I propose that *nandao* is a subjective epistemic modal adverb with the following syntax for *nandao-p*? (cf. Lyons 1977, Rizzi 2004)

10. [_ForceP *nandao* [_ForceP [_Force QUEST] [_IntP Y/N-*op* [_Int' [_Int [+WH]] [_IP p]]]]]

A compositional analysis of *nandao*-Qs

➤ **The basic meaning of *nandao***

- *Nandao* takes the denotations of $\{p, \neg p\}$ as an argument and creates an epistemic preorder of the two on the part of the speaker by conveying that $\neg p$ is more likely to be the true answer than p.
- Three things are needed to fully decode the meaning of *nandao*: 1. how to select a specific answer out of the question denotation; 2. how to model the epistemic preorder; 3. how to hook the epistemic preorder to the speaker.

➤ **The selectional problem: 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.

11. $\llbracket Q \rrbracket_H := \llbracket p \rrbracket_H$ (*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*, $\llbracket p \rrbracket_H = \{a, b\}$. (adapted from R&G 2010).

➤ ***Nandao* under Kratzerizan Modality Theory**

- The core meaning of *nandao* in *nandao-p*? is the epistemic bias, i.e. the speaker believes that the correct answer is more likely to be $\neg p$ than p. Such an epistemic modal meaning can be represented in Kratzerian framework for modality using the notation of *Better Possibility* (Lassiter 2011) as the speaker believes that $\neg p \succ^s_{g(w)} p$.

➤ ***Nandao*-Q as Discourse Commitment update**

- Whenever the addressee hears *nandao-p*?, he becomes aware of the speaker's **private** attitude toward all possible answers, i.e. the speaker's bias. In effect, by uttering *nandao-p*?, the speaker makes **public** of this biased attitude. In Gunlogson's (2001) term, $\neg p \succ^s_{g(w)} p \in DC_s$ (*s*=speaker). As the bias brought by *nandao* is new information, we may from a dynamic view regard the meaning of *nandao-p*? as its Context).

12. $\llbracket nandao\text{-}p? \rrbracket (DC_{s,i}) = DC_{s,o} = DC_{s,i} \cup \{\neg p \succ^s_{g(w)} p \}$ (*i*=input, *o*=output)

➤ **Wrapping them all up in a compositional way**

- Extending F&B's (2009) update semantics of speech acts, I define *nandao,* an Illocutionary Modifier, as a function that takes the output context state (K_o) of ForceP as an argument and outputs an updated context state (K'_o).

13. $\llbracket \textit{Nandao} \rrbracket (\llbracket ForceP \rrbracket) = K'_o$ such that: (*T/T'* stack of ordered pairs containing unresolved at-issue contents)
   a) $\llbracket ForceP \rrbracket = QUEST(Q, s, K_i) = K_o$ such that: (*ps* projected set of possible at-issue contents to update CG)
      i) $T_o = push(\langle \llbracket Q \rrbracket_H, \llbracket Q \rrbracket \rangle, T_i)$; ii) $ps_o = ps_i \uplus \llbracket Q \rrbracket$ (*push(e, T)* creates a new stack with *e* added to *T*)
   b) $T'_o = T'_i = T_o$; $top(T_o) = \langle \llbracket Q \rrbracket_H, \llbracket Q \rrbracket \rangle$ (*top(T)* retrieves the top item of the stack *T*)
   c) $DC'_{s,o} = DC'_{s,i} = \{(\lambda \langle A, B \rangle : \exists_1 p[p \in A \wedge \neg p \in B]. \neg tp \in A \succ^s_{g(w)} tp \in A)(top(T'_i))\}$

Nandao picks out the **unique** *highlighted answer* in $\llbracket Q \rrbracket_H$ (defined in green and referred in purple) and updates into the speaker's Discourse Commitment that the complement answer has better possibility than the unique highlighted answer.

RQ vs. IQ

➤ **RQ (mutual belief)**

- An extreme case of $\neg p \succ^s_{g(w)} p$: $\neg p$ is a **mutual belief**

➤ **RQ (evidence strengthening)**

- When the speaker's negative bias is further supported by contextual evidence against *p* to the extent that $\neg p$ becomes **human necessity**.

➤ **IQ (evidence weakening)**

- When there is counter-evidence against the speaker's belief, the degree of the speaker's belief of $\neg p$ **decreases**.

† **Epistemic bias + Contextual evidence → RQ/IQ**

- Both RQ and IQ uses are within the spectrum of the semantics of *nandao*-Q.
- RQ/IQ readings depend on how the context affects the speaker's epistemic states.

Distribution explained

✶ ***Nandao* + declarative**

- As *nandao* provides an epistemic preorder between the highlighted answer and its complement answer, it cannot be used in declaratives which do not have complement propositions in their denotations.

✶ ***Nandao* + WH-Q**

- WH-Q does not have highlighted answers (F&R 2012)
- WH-Q does not have both positive and negative forms of an answer in its denotation.

✶ ***Nandao* + Alt-Q (e.g. A-not-A-Q)**

- Alt-Q has more than one highlighted answers
- The **uniqueness** requirement in (13) is violated

Acknowledgement

Sincere gratitude to Veneeta Dayal for her constant guidance and support. Many thanks to Kirsten Syrett, Mark Baker, Simon Charlow, Mingming Liu, Eason Chen, among others.

Selected References

F&B. 2009. On reacting to assertions and questions. *JoS 27*. **Gunlogson**. 2001. *True to form: Rising and falling declaratives as questions in English*. PhD Diss. **Lyons**.1977. *Semantics*, Vol 2. CUP. **Rett**. 2016. *The semantics of attitude markers and other illocutionary content*. Ms. **R&G**. 2010. Disjunctive questions, intonation, and highlighting. LLM. **R&H**. 2004. On negative yes/no questions. *L&P 27*. **Xu**. 2012. *Nandao*-Questions as a special kind of Rhetorical Questions. *SALT 22*.