

# RUTGERS

THE STATE UNIVERSITY  
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## An experimental study on *nandao*-Questions in Mandarin

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RULing IX

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- Introduction
- Theoretical background
- A forced-choice experiment
- Semantics and pragmatics of *nandao*/*NANDAO*

## *Nandao/NANDAO*-Questions

(1) *Nandao/NANDAO* zhe jiushi shichang jingji (ma)?

*Nandao*                      this be market economy Q

(Rhetorical question reading) ‘This isn’t a market economy.’

(Biased question reading) ‘This isn’t a market economy, right?’

## Similar cases in English questions

- Neutral questions vs. verum focus questions in Romero & Han (2002)
  - (2) Is Jane coming?  
No epistemic implicature.
  - (3) **IS** Jane coming?  
Negative epistemic implicature: the speaker believes or expects that Jane is not coming.
- Neutral questions vs. emphatic focus questions in Asher & Reese (2007)
  - (4) Do you need that porkchop? (Neutral)
  - (5) Do you **NEED** that porkchop? (Biased)

## Stress, epistemic bias and degrees of bias

- Both Romero & Han (2002) and Asher & Reese (2007) attribute the phonological prominence, verum stress or emphatic stress, to the distinction between epistemic unbiased questions and epistemic biased questions.
- |                                   |        |                                  |
|-----------------------------------|--------|----------------------------------|
| Unbiased                          | stress | Biased                           |
| <i>(neutral degree of belief)</i> | →      | <i>(biased degree of belief)</i> |

## Stress and polarity of beliefs

- Polarity of beliefs: the speaker and the addressee share or do not share the similar belief/bias.
- Coercing effect of *NANDAO*-Qs: by emphasizing the adverb is to convince the addressee to believe the same thing by providing reasoning or evidence (cf. Yin 2006).
- On the other hand, when the speaker and the hearer both believe the same proposition  $\neg p$ , the speaker doesn't have to emphasize *nandao* to call for attention, because the answer is obvious. In this case, the speaker tends to use the unstressed version of *nandao*.

## A research question on *nandao*/NANDAO-Qs

- Which of the two factors in fact affect the use of stress on *nandao* in *nandao*-Qs?
- Stress and its association with degrees of belief?
- Stress and its association with polarity of beliefs?
- Or both?

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## Romero & Han (2002)

- (3) is a biased question expressing a high degree of certainty on the part of the speaker towards the negative polar answer, and (2) is epistemic unbiased showing no speaker's preference to either answer.
  - Stress is the source of bias of questions.
  - The stress on the auxiliary in (3) leads to a Verum focus which can trigger the existence of an epistemic implicature.
- (6) IS Jane coming?  
= {"it is for sure that Jane is coming", "it is not for sure that Jane is coming"}
- (7) Is Jane coming?  
= {"that Jane is coming", "that Jane is not coming"}

## Asher & Reese (2007)

- Bias and epistemic degrees of speaker's belief:  
“[B]iased questions... convey an expectation, or bias, on the part of the speaker toward a specific answer to the question” (3)
- The bias in questions like (3) and (5) comes from the complex speech act containing both ASSERTION and QUESTION.
- (8) *After all*, has John *by any chance* **EVER** voted for a democrat?
- Such a complex speech act is triggered by the emphatic stress in these questions which is interpreted as an L\*+H pitch accent.

## *Nandao* in previous literature

- *Nandao* as a sole rhetorical question adverb: Yu (1984), Qi & Ding (2006), Yu (2006).
  - *Nandao* is to “enhance the force of rhetorical questions” (Lü 2012).
  - *Nandao* is infelicitous in the contexts of conjecture or speculation (*Yingyong Hanyu Cidian*)
- (9) *Nandao* ni feng-le?  
nandao you crazy-LE  
‘You are not crazy.’
- *Nandao* can also be used in ordinary questions (although the cases are not common): Gong (1995), Su (2000), Sun (2007).

## An example from Su (2000)

(10) Qing Boren: Yuzhai, zanmen haidei likai Beijing!

Qing Boren Yuzhai we again.must leave Beijing

‘Qing Boren: Yuzhai, we still need to get out of Beijing!’

Lu Yuzhai: Nandao Yuan Shikai guyi zhizao bingbian?

Lu Yuzhai nandao Yuan Shikai deliberately make mutiny

‘Lu Yuzhai: Yuan Shikai didn’t lead the mutiny deliberately, right?’

Yaoshi zheyang, zanmen xiuxiang taochu Beijing qu!

If so we stop.think escape Beijing go

‘If so, we cannot leave Beijing!’

## *Nandao*-Qs and varying degrees of speaker's belief

- *Nandao-p* as a rhetorical question equals to the assertion of  $\neg p$ .
- *Nandao-p* as a non-rhetorical questions expresses the speaker's weak bias towards  $\neg p$ .
- The only difference between the claims of the two groups of scholars lies in the degrees that the speaker is committed to the negative polar answer, i.e. belief vs. bias.
- In rhetorical question reading of *nandao-p* question, the speaker is **fully committed to**, i.e. (near) 100% sure of,  $\neg p$ .
- In biased question reading of *nandao-p* question, the speaker is **less committed to**, i.e. more than 50% but less than 100% sure of,  $\neg p$ .

*Nandao-p* essentially express speaker's bias towards

$\neg p$

(11)(In a situation where the speaker has no slightest idea of whether Zhangsan will go to America or not.)

#Nandao Zhangsan yao qu Meiguo?

nandao Zhangsan will go America

(Attempted) 'Will Zhangsan go to America?'

(12)(Speaker thinks that there is someone in a house.)

#Nandao wuli you ren?

Nandao room.in exist person

(Attempted) 'There is someone in the room, right?'

## An interim summary

- *Nandao*-Qs express the speaker's bias, either strong (belief, rhetorical question reading) or weak (bias, biased question reading).
- The bias or the belief is always  $\neg p$  in *nandao*-*p*.
- The prosodic prominence, i.e. stress, may show the higher/highest degrees of speaker's belief expressed by *NANDAO*-Qs.
- The polarity of speaker's and addressee's belief/bias might be involved in the distinction of *nandao*/*NANDAO*-Qs.

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## Participants

- 15 native Mandarin speakers participated in the experiment. Participants were graduate students at Rutgers University, members of local Chinese community, or family members of students at Rutgers. They were at least 18 years of age and had no self-reported reading problems. They were each compensated \$8 for participation.

## Materials

- In each trial a short discourse context followed by a Q&A exchange between a speaker and an addressee is created.
- The short discourse context consists of series of sentences describing a scenario, such as a conversation among friends. The target sentence is included in the Q&A part.
- A native Mandarin pronouncer was instructed to pronounce the same *nandao*-Q twice after each scenario: one with stress on *nandao* and one without any stress.
- In order to make sure that all other things being equal *nandao*/*NANDAO*-Qs differed minimally in the phonological prominence on *nandao*.
- All the processed sounds were checked by two other native Mandarin speakers for naturalness.

## General acoustic features of the recorded *nandao*/*NANDAO*

	<i>nandao</i>	<i>NANDAO</i>
Average duration	0.27 s	0.41 s
Average mean intensity	61.10 dB	67.18 dB
Average pitch level	226.82 Hz	235.67 Hz
Average peak F0	264.48 Hz	333.207 Hz

- Compared to *nandao*, *NANDAO* generally had longer duration, higher intensity, higher pitch level and higher peak F0.
- These acoustic differences marked the phonological prominence of *NANDAO*.

## Manipulating the degrees of belief

- In order to show the varying degrees of belief in *nandao*-*p* questions, we designed two types of stimuli contexts: in the first type, the speaker did not fully committed to but expressed bias towards  $\neg p$ , while in the second type, the speaker fully committed to  $\neg p$ .
- In the test stimuli, we used contextual contrasting evidence to weaken the speaker's belief prior to his utterance of *nandao*-Qs.
- Usually, in order to indicate at the time of utterance of *nandao*-Qs the speaker was no longer sure of  $\neg p$ , we clearly indicated the emotional/psychological status of the speaker of such unsureness.
- On the other hand, there was no such contextual counter-evidence or expressions showing unsureness in full-commitment contexts.

## Manipulating polarity of belief

- In order to show the polarity of belief, we implicitly or clearly showed the speaker's bias or belief and the addressee's belief in the contexts before the speaker uttered the target sentence.
- In the test stimuli, all evidence of beliefs were presented prior to the speaker's utterance of *nandao*-Qs, the speaker should be aware of the addressee's status of belief when uttering *nandao*-Qs.

## Experimental design and test stimuli

- **2\*2** design

		Addressee (B)	
		believes $\neg p$	believes $p$
Speaker (A)	biases towards $\neg p$	Type 1	Type 2
	believes that $\neg p$	Type 3	Type 4

- **8** test items: 2 of each type
- **16** fillers: Q-A congruence, contrastive focus, illocutionary force, and irrelevant answer
- Stimuli : Fillers = **1:2**

## A sample procedure of Test Stimulus 3.2

Zhangsan and Lisi are discussing each other's financial situation.  
Lisi tells Zhangsan he is running out of money and is thinking of asking Wangwu for help.

## A sample procedure of a Test Stimulus

Lisi: Considering my current situation, do you think Wangwu will help me out?



## A sample procedure of a Test Stimulus



Zhangsan: <<Nandao taiyang hui da xibian chulai?>> Bie wangxiangle.

“The sun doesn’t rise from the west, right? Stop day-dreaming.”

## A sample procedure of a Test Stimulus

Lisi: I guess I'll get help from someone else.

## A sample procedure of a Test Stimulus

 A	 B
<i>nandao</i>	<i>NANDAO</i>

Nandao taiyang hui da xibian chulai?  
“The sun doesn’t rise from the west, right?”

## Predictions

- **H1:** If there is an association of stress on *NANDAO* with varying degrees of belief, then we expect to see stressed *NANDAO* associated with highest degree of belief, and unstressed *nandao* associated with lower degree of belief.
- **H2:** If there is an association of stress on *NANDAO* with polarity of belief, then we expect that stressed *NANDAO* is connected to the opposing polarity of belief and the unstressed *nandao* to the same polarity of belief.

## Combined hypotheses

- Combining the two hypotheses, we have three Association of Stress Hypotheses.
  - a. Twin Association Hypothesis: both H1 and H2 are supported
  - b. Single Association Hypothesis: only H1 or H2 is supported
  - c. Null Association Hypothesis: neither H1 nor H2 is supported

## General results

		Addressee				Average	
		$\neg p$ belief (similar belief)		p (belief) (opposite belief)			
Speaker	$\neg p$ bias	T1	83.3%	T2	56.7%	70%	nandao
			17.7%		43.3%	30%	NANDAO
	$\neg p$ belief	T3	66.7%	T4	53.3%	60%	nandao
			33.3%		46.7%	40%	NANDAO
Average		75%	25%	55%	45%	nandao	NANDAO

## Binomial tests

- Binomial tests compare performance of binary choices to chance.
- The null hypothesis is that the choice of *nandao* and *NANDAO* is by chance ( $p=.5$ ); The alternative hypothesis is that there is a preference of one choice over the other.
- The results showed that there were genuine distinctions between *nandao*-Qs and *NANDAO*-Qs in Mandarin, and in contexts where the interlocutors had different polarities of belief, there were no preferences between *nandao* and *NANDAO*.

Binomial probabilities (n=30, k= # unstressed, p=.5; exact)			
	k	z ratio	p
T1	25	3.47	<.001
T2	17	0.55	0.11
T3	20	1.64	<.05
T4	16	0.18	0.13

## Wilcoxon Signed-Rank tests

- Wilcoxon Signed-Rank tests were run to compare choices of unstressed *nandao* across different types of contexts.
- Participants were more likely to choose *nandao* in T1 than in T2 and T4 (T1 vs. T2,  $W=22.5$ ,  $p<0.05$ ; T1 vs. T4,  $W=14$ ,  $p<0.05$ ).
- An average results on the speaker and the addressee had the similar belief/bias showed that unstressed *nandao* is more likely when speaker and addressee shared bias towards or belief of  $\neg p$  (T1+3 vs. T2+T4,  $W=94.5$ ,  $p<0.05$ ).
- However, there was no significant difference in contexts where speaker's bias toward  $\neg p$  and belief of  $\neg p$  (T1+2 vs. T3+4,  $W=135$ ,  $p=0.15>0.05$ ).



## Discussion

- Not both of the factors, degrees of belief and polarity of belief, were significantly influential in distinguishing *nandao*-Qs from *NANDAO*-Qs.
- Only the polarity of belief significantly contributed to this distinction.
- Null Association Hypothesis: not supported
- Twin Association Hypothesis: not supported
- Single Association Hypothesis: **supported**

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## Romero & Han (2002)

- Verum focus necessarily triggers the epistemic implicature.
- If *NANDAO* in *NANDAO-p* carries the verum focus, it should be predicted that there is always the strongest bias, i.e. *it is for sure that*  $\neg p$ , implied by *NANDAO-p*.
- That is to say the stressed *NANDAO*-Qs cannot appear in contexts where the speaker is less sure about  $\neg p$ , e.g. Type 1 and Type 2 contexts in our experiment, because the implicature associated with the stress on *NANDAO* contradicts with the contexts.
- However, the experimental results showed that *NANDAO*-Qs can appear in Type 1 and Type 2 contexts.

## Asher & Reese (2007)

- If we assume that emphatic stress on *NANDAO* triggers a complex speech act for *NANDAO*-Qs which leads to a biased question reading, we shall see a distinction between neutral question and biased question as the case in (4) and (5).
- However, as *nandao* necessarily expresses the speaker's bias, no neutral question reading is available for *nandao*-Qs.
- As emphatic stress and the adverb *nandao* both triggers a bias reading, we shall see little difference between *nandao*-Qs and *NANDAO*-Qs.
- If there is additive force of the above, i.e. *NANDAO*-Qs express higher degree of belief than *nandao*-Qs, then we should have seen that there was significant difference in contexts where speaker's bias toward  $\neg p$  and fully committed to  $\neg p$ , which is contrary to our experimental results.

## Bias as the semantics of *nandao*

(13) Zhangsan chi-le fan (me)?

Zhangsan eat-PERF rice Q

‘Did Zhangsan have a meal?’

(14) **Nandao/NANDAO** Zhangsan chi-le fan (me)?

Nandao Zhangsan eat-PERF rice Q

(RQ reading) ‘Zhangsan didn’t have a meal.’

(Biased reading) ‘Zhangsan didn’t have a meal, right?’

- the epistemic bias, no matter strong (belief) or weaker (bias), towards the negative polar answer is the part of semantic meaning of *nandao/NANDAO*.

## Belief domains in Caponigro & Sprouse (2007) and in Chafe (1976)

- $SB = \{p: p \text{ is a belief of or assumed by the } \mathbf{speaker} \text{ for discourse purpose}\}$
- $AB = \{p: p \text{ is a belief of or assumed by the } \mathbf{addressee} \text{ for discourse purpose}\}$
- “What a speaker shares with his addressee must be part of what is in the speaker’s consciousness at the time” (Chafe 1976: 111).
- In this sense, when a speaker utters a *nandao/NANDAO-p?*, both the question semantics of  $\{p, \neg p\}$  denoted by *p?* and the bias towards  $\neg p$  carried by *nandao/NANDAO* should be in SB.

## My proposal to the distinction between *nandao*/*NANDAO*

- Basing on the experimental results, I regard the difference between *nandao* and *NANDAO* to be the presence or absence of ***information focus*** in Mandarin.
- In this sense, *nandao* is the default form and *NANDAO* encompasses an extra layer of meaning from information focus.
- I propose that the difference between *nandao* and *NANDAO* depends on whether the speaker chooses to convey the information of the speaker's bias to the addressee.
- If the answer is yes, then *NANDAO* will be used to indicate new information. If not, then the unstressed *nandao* may be used. In this case, the information of the speaker's bias is assumed by the speaker as the old information in the discourse.

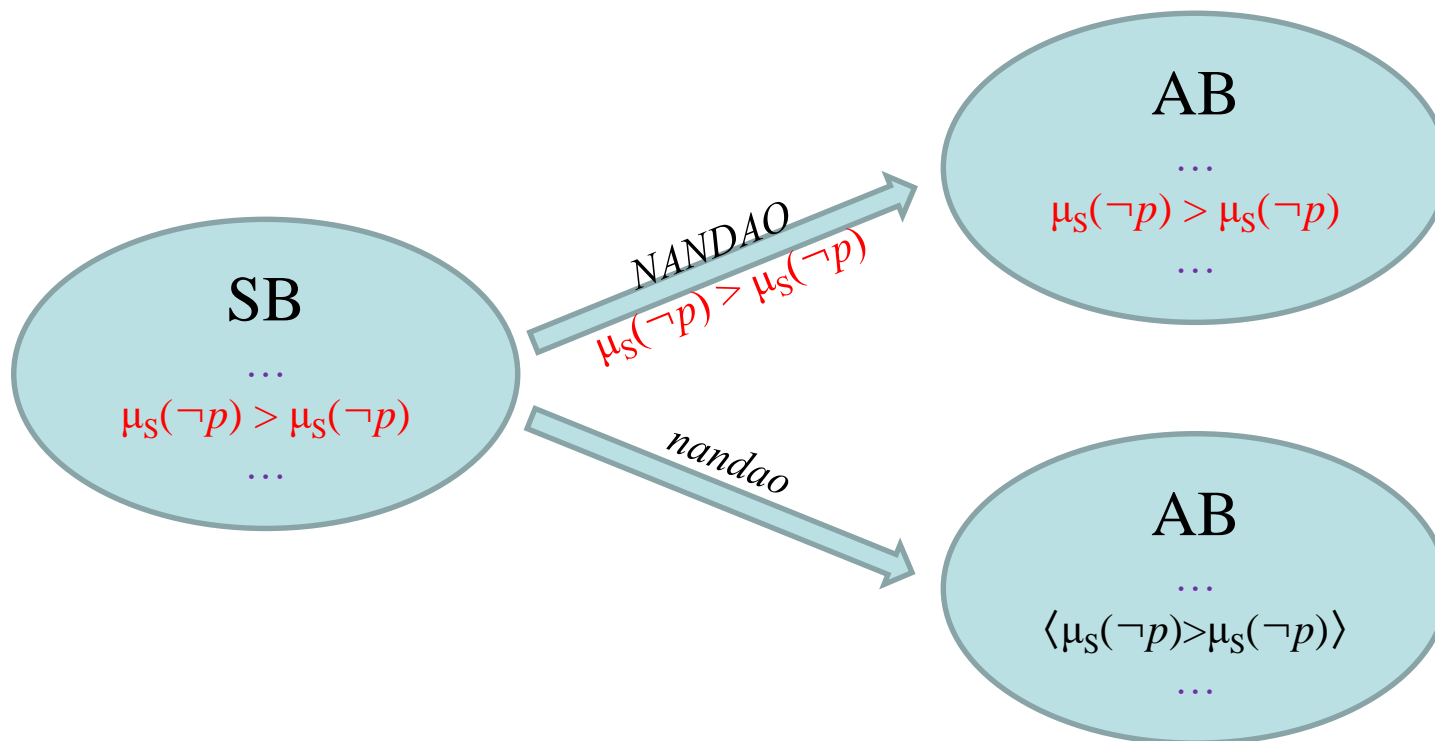
## Information focus and new information

- **Information focus**: the constituent(s) containing the information which the speaker assumes that the hearer does not share with him. (Jackendoff 1972)
- $\approx$  **New information**: what the speaker assumes he is introducing into the addressee's consciousness by what he says. (Chafe 1976)
- “If a sentence part conveys **new**, nonpresupposed information mark by one or more pitch accents... it is... a[n]... **information focus**.” (Kiss 1998: 246)
- In summary, information focus, represented by the phonological prominence of stress, introduces new information into the discourse and updates the belief domain of the hearer, i.e. AB.



## *NANDAO* = *nandao* + information focus

- In *nandao-p?*, *nandao* can host the information focus.
- This adverb introduces speaker's degree of belief of  $\neg p$  into the discourse.



## *Nandao/NANDAO* in Type 1 and Type 3 contexts

- In the contexts where the speaker and the addressee share similar bias or belief of the negative polar answer being true, it is unnecessary to convey the speaker's degree of belief towards the negative polar answer to the addressee, as the addressee already has similar if not the same belief
- Stressing *NANDAO* to convey a piece of information that is already assumed by the addressee will be redundant.
- The percentage of stressed *NANDAO* is low in these contexts when the speaker and the addressee have the same polarity of belief.

## *Nandao/NANDAO* in Type 2 and Type 4 contexts

- When the answer that is biased or believed by the speaker opposes the one by the addressee, the speaker may stress *NANDAO* to update the speaker's addressee's belief set.
- Or the speaker may choose not to stress it, if he deems such information is already known to the addressee or inferable from the context.
- Thus, choices between *nandao* and *NANDAO* are by chance.
- This is supported by our experimental results: in these contexts in the experiment, participants exhibited no preference toward *nandao* or *NANDAO*.

## Extension to *nandao*-Qs as self-addressing question

*(15) Liu Bei was chased by enemies to a turbulent river. The river was more than 30 inches wide and unfordable. He saw his pursuers in his back not far away. He was so desperate that he rode his horse into the river. Suddenly, with one tremendous leap, the horse miraculously jumped out of the water and landed safely on the other side of the river. Later, his follower General Zhao Yun traced his horse's footprints to the river with the escort. When he noticed a wet track on the farther side,*

Yun antao yue: “Nandao/#NANDAO lian ma tiaoguo-le xi qu?”

“Zhao Yun thought to himself: ‘(My lord) didn’t jumped across the river with the horse, did he?’”

(Romance of Three Kingdoms, Ch. 35)

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