A bridge to Mandarin demonstratives: An experimental report

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Guest lecture for *Language and Logic*
Fudan University, May 21, 2024

Roadmap

- Theoretical background
  - English definites
  - Mandarin definites
  - Bridging
  - Definites in bridging
- Study 1: Sentence ratings task
- Study 2: Production study
- Discussion
- Conclusion

Theoretical background

English definites

(There is a dog.)

English definites

(There is a dog.)

It/**The dog**/**That dog** wants to cross the road.

Mandarin definites

Mandarin makes definite references with two forms of descriptions:

1. Bare nouns (BN)

(1) gou yao guo malu.
dog want cross road
'The dog wants to cross the road.'

2. Demonstrative descriptions with *na* (DEM)

(2) na-tiao gou yao guo malu.
na-cl dog want cross road
'That dog wants to cross the road.'

Mandarin *na*-descriptions

	Pointing	Modifier	Index	Bridging
BN	✗			
DEM	✓			

Unlike bare nouns, *na*-descriptions can be combined with a pointing gesture.

(3) a. na-tiao$_{\rightarrow}$ gou hen da. na-tiao$_{\rightarrow}$ gou hen xiao.
na-cl dog very big na-cl dog very small
'That dog is big, but that dog is small.'

b. #gou$_{\rightarrow}$ hen da. gou$_{\rightarrow}$ hen xiao.
dog very big dog very small
Intended: 'The dog is big. The dog is small.'

Mandarin *na*-descriptions

	Pointing	Modifier	Index	Bridging
BN	✗	✗/✓		
DEM	✓	✓		

Na-descriptions can be combined with a modifier: relative clauses, prepositional phrases, names, and even nouns...

(4) zai jiao de (na-tiao) gou hen da.
prog bark mod (na-cl) dog very big
'The/that dog that is barking is very big.'

(5) men hou de (na-tiao) gou hen da.
door behind mod na-cl dog very big
'The/that dog behind the door is very big.'

Mandarin *na*-descriptions

	Pointing	Modifier	Index	Bridging
BN	✗	✗/✓		
DEM	✓	✓		

Na-descriptions can be combined with a modifier: relative clauses, prepositional phrases, names, and even nouns...

(6) Wangcai *(na-tiao) gou hen da.
Wangcai na-cl dog very big
'That dog, Wangcai, is very big.'

(7) kafei dian *(na-tiao) gou hen da.
coffee shop na-cl dog very big
'That dog at/associated with the coffee place is very big.'

Mandarin *na*-descriptions

	Pointing	Modifier	Index	Bridging
BN	✗	✗/✓	✓	
DEM	✓	✓	✓	

Na-descriptions can be used anaphorically.

(8) wo mai-le yi-tiao gou[1]. (na-tiao) gou$_1$ hen da.
I buy-past one-cl dog. na-cl dog very big
'I bought a dog. The/that dog is very big.'

*more complex anaphora show preference for DEM

(see discussion in Dayal & Jiang 2021; Jenks 2018)

Mandarin *na*-descriptions

Across languages, DEM is assumed to require more than just the NP description (Wolter 2006).

We have seen *na*-descriptions used with different linkers:

- **Direct linker**: a pointing gesture →
- **Linguistic linker**: RC, PP, name, noun...
- **Contextual linker**: an index *i*

Mandarin *na*-descriptions

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- **Direct linker**: a pointing gesture →
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- **Contextual linker**: an index *i*

Can *na*-descriptions be used without any linkers?

Mandarin *na*-descriptions

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- **Direct linker**: a pointing gesture →
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Can *na*-descriptions be used without any linkers?

Diagnostics: part-whole bridging!

Bridging

Two types of bridging (Clark 1975; Hawkins 1978; Schwarz 2009):

1. Part-whole bridging relies on situational uniqueness

   (9) Yesterday Jane was driving. **The steering wheel** was cold.

2. Producer-product bridging relies on relational anaphora

   (10) Jake bought a book today. **The author** is French.

Definites in bridging

Two types of bridging (Clark 1975; Hawkins 1978; Schwarz 2009):

1. Part-whole bridging relies on situational uniqueness
2. Producer-product bridging relies on relational anaphora

Some languages make morpho-syntactic distinctions between ...

→ uniqueness-denoting definiteness in part-whole bridging, and

→ anaphoricity-denoting definiteness in producer-product bridging.

Language	Uniqueness	Anaphoricity
English (Schwarz 2009)	the	the
Fering (Ebert 1971a)	a	di
German (Schwarz 2009)	zum	zu dem

Mandarin *na* in bridging

Two theories on Mandarin demonstratives:

1. ***na*-descriptions require anaphoricity** (Jenks 2018):
   → Mandarin *na* is disallowed in uniqueness-based part-whole bridging.
2. ***na*-descriptions require anti-uniqueness** (Dayal & Jiang 2021)
   → As English *that* constructions cannot be used as anaphora in bridging, Mandarin *na* is ruled out for the same reason.

Language	Uniqueness	Anaphoricity
Mandarin (Jenks 2018)	BN	DEM
Mandarin (Dayal & Jiang 2021)	BN	BN

Mandarin *na* in bridging

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Language	Uniqueness	Anaphoricity
Mandarin (Jenks 2018)	BN	DEM
Mandarin (Dayal & Jiang 2021)	BN	BN

Study 1: Sentence ratings task

Study 1

Motivations:

→ It is still debated whether *na* can be used in bridging.

→ The limited data allow for only categorical predictions.

This study:

→ *Na*-descriptions are felicitous as both uniqueness- and anaphoricity-denoting definites (c.f. Jenks 2018).

→ The anti-uniqueness presupposition makes too strong a prediction for Mandarin *na* (c.f. Dayal & Jiang 2021).

Stimuli

96 bridging sentences evenly distributed in ...

- bridging type (part-whole, producer-product)
- anaphor noun type (BN, DEM)
- antecedent noun type (BN, DEM, INDEF)
- animacy of the antecedent noun (animate, inanimate)

Ex: an inanimate, part-whole bridging item with BN antecedent & BN anaphor

(11) qunian wo mai le **che**, wo zong wangji jiancha shache.
last.year I buy ASP car I always forget check brake
'I bought **the car** last year. I always forget to check **the brake**.'

Ex: an animate, producer-product bridging item with BN antecedent & DEM anaphor

(12) zuotian wo mai le **shu**. wo hen xiang jianjian na wei zuozhe.
yesterday I buy asp book I very want meet na cl author
'Yesterday I bought **the book**. I really want to meet **that author**.'

Stimuli

Part-whole relations (antecedent, anaphor):

- **Inanimate**: (car, brake), (house, roof), (bike, seat), (laptop, screen)
- **Animate**: (horse, forehead), (dog, nose), (shark, mouth), (cat, tail)

Producer-product relations (antecedent, anaphor):

- **Inanimate**: (lock, key), (account, password), (TV, remote), (phone, charger)
- **Animate**: (book, author), (painting, painter), (film, director), (presentation, speaker)

Stimuli

Each participant sees ...

- 8 **part-whole bridging**
  I bought the car last year. I always forget to check the brake.
- 8 **producer-product bridging**
  Yesterday I bought the book. I really want to meet the author.
- 8 semantically odd (contradiction; thematic mismatch)
  Jake is a married bachelor.
- 8 pragmatically odd (redundant information)
  Yuki arrived. Yuki sat down. Yuki turned on her laptop.
- 8 neutral
  Mason thinks it's raining outside.

and rates the naturalness of these sentences on a 7-point Likert scale.

(More on the choice of instructions and control items in Zhu & Ahn (2023)!)

Sample stimuli

一辆自行车在后院里，我准备去擦一下那个车座。

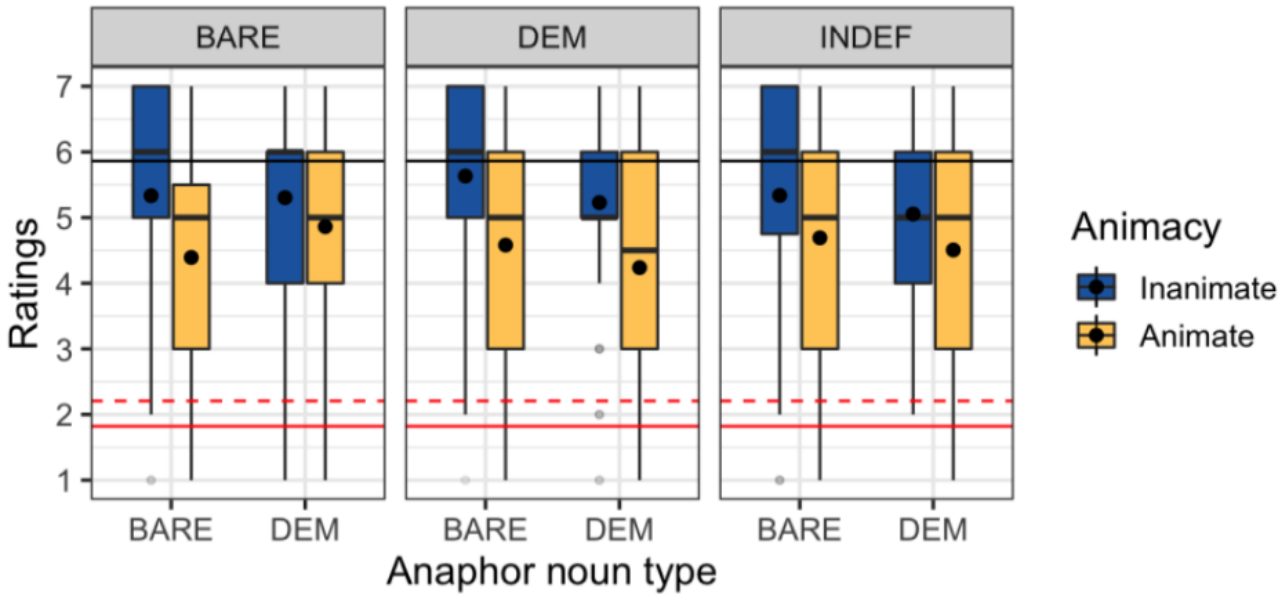
请给句子的自然程度打分，1分为最不自然，7分为最自然。

最不自然 ○ ○ ○ ○ ○ ○ ○ 最自然
1 2 3 4 5 6 7

Try this experiment at https://farm.pcibex.net/r/GEULTQ/!

Results [n: 120; 18–64; gender-balanced]

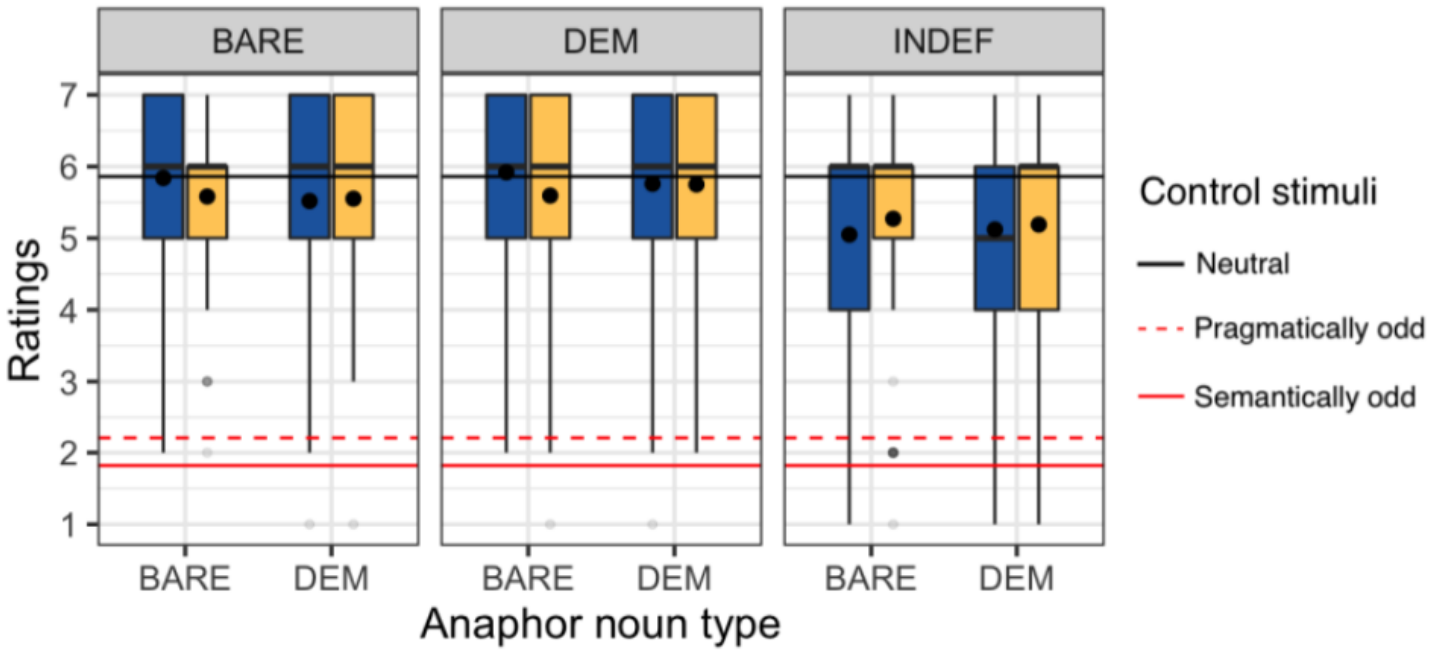
Figure 1: Part-whole bridging: Average ratings by antecedent noun type (top), anaphor noun type (bottom), and animacy (color)



- No significant main effect was found for either **antecedent noun type** or **anaphor noun type** ($p > 0.1$).

Results [n: 120; 18–64; gender-balanced]

Figure 2: Producer-product bridging: Average ratings by antecedent noun type (top), anaphor noun type (bottom), and animacy (color)



- No significant main effect was found for either **antecedent noun type** or **anaphor noun type** ($p > 0.1$).

Results

Our sentence ratings task shows that ...

- Anaphor noun type is not significant in both bridging types ($p > 0.1$).
- All bridging items are rated significantly higher than pragmatically/semantically odd controls ($p < 0.001$).
- ***Na* allows both part-whole and producer-product bridging uses**.

Study 2: Production study

Study 2

Motivations:

→ To assess the bridging use of Mandarin definites through a production task.

→ To study the competition between bare nouns and demonstratives across linguistic contexts.

This study:

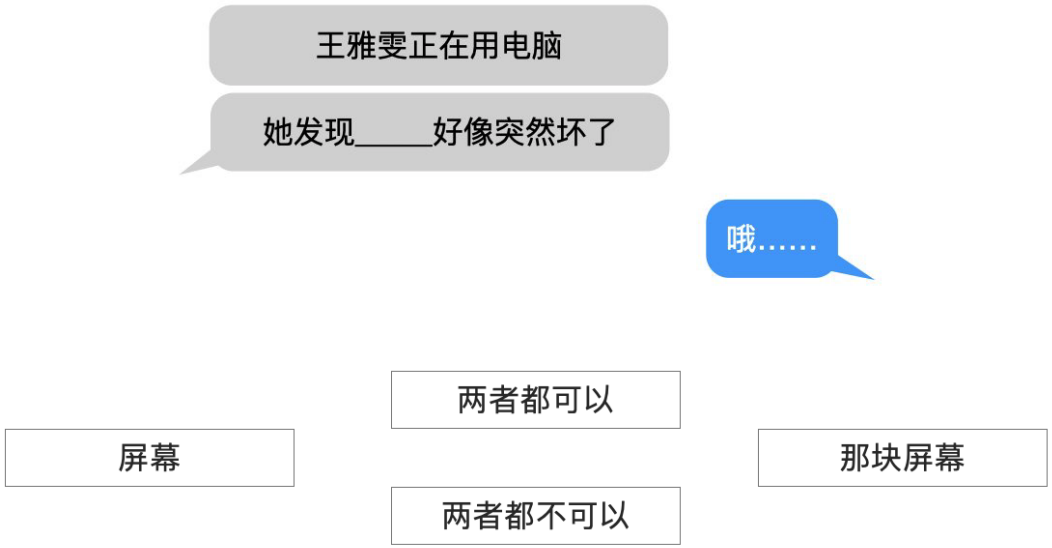
→ Mandarin speakers accept demonstratives as bridging anaphora similarly in both part-whole and producer-product bridging (c.f. Jenks 2018).

→ Sanity check: demonstratives are degraded without linguistic antecedents or with plural antecedents, while they are more acceptable with a singular antecedent.

Stimuli

55 message exchanges each consisting of ...

- a background sentence providing the linguistic context
- a test sentence containing a blank to be filled with a nominal
- a placeholder reply suggesting the naturalness of the previous messages



Try this experiment at https://farm.pcibex.net/r/ZnCkqT/!

Stimuli

Each participant sees ...

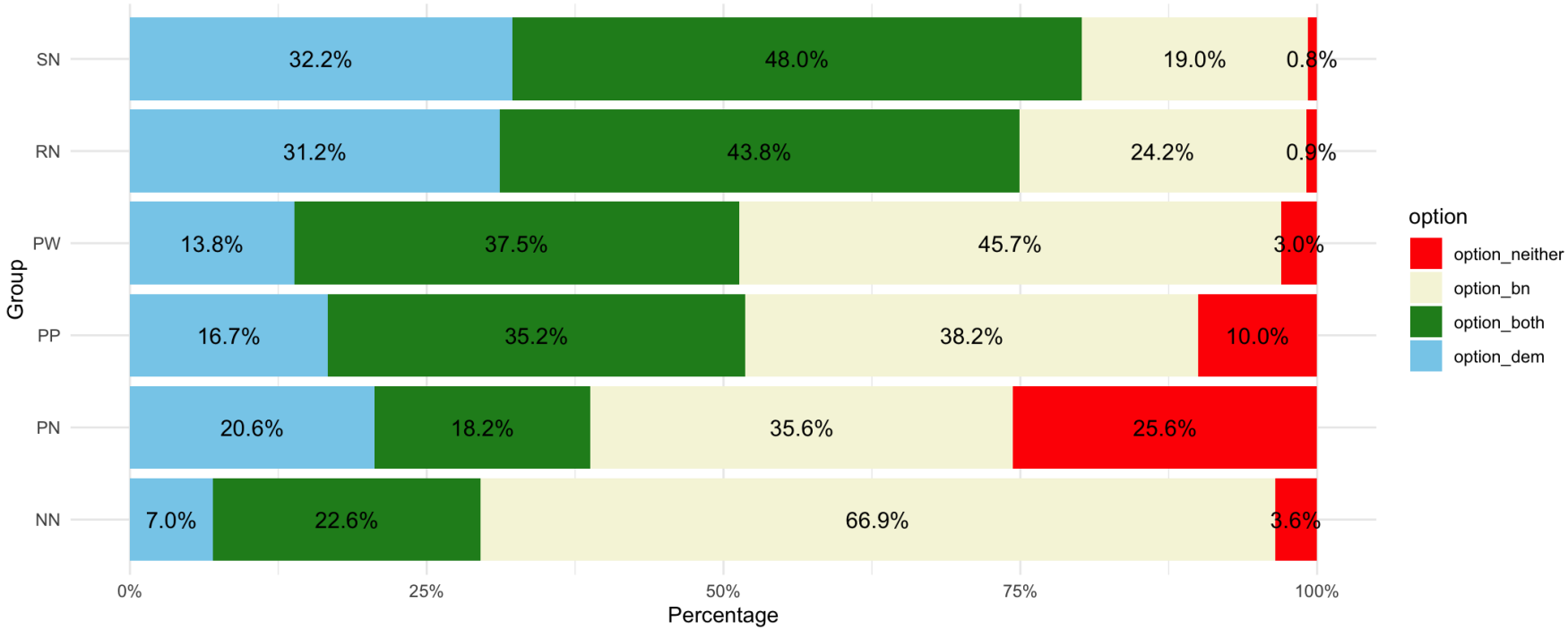
- 6 **part-whole bridging**
  W was using *COMPUTER*. She found that (*THAT-CL*) *SCREEN* ...
- 6 **producer-product bridging**
  W was using *COMPUTER*. She found that (*THAT-CL*) *CHARGER* ...
- 5 singular indefinite noun antecedent (SN) controls
  W was using *ONE-CL COMPUTER*. She found that (*THAT-CL*) *COMPUTER* ...
- 5 plural indefinite noun antecedent (PN) controls
  W was using *TWO-CL COMPUTER*. She found that (*THAT-CL*) *COMPUTER* ...
- 12 repeated bare noun antecedent (RN) controls
  W was using *COMPUTER*. She found that (*THAT-CL*) *COMPUTER* ...
- 10 no nominal antecedent (NN) controls
  W was just working. She found that (*THAT-CL*) *COMPUTER* ...

and selects one option out of BN, DEM, BOTH, and NEITHER.

Predictions

- **Target conditions** (PW and PP): If demonstratives support bridging uses, then they should be similarly accepted in these conditions.
- **Baseline conditions** (NN and PN): No singular referent can be identified in these conditions, therefore blocking the use of demonstratives.
- **Anaphoric conditions** (SN and RN): A singular referent can be identified in these conditions. If demonstratives support anaphoric uses, then they should be accepted in these conditions.

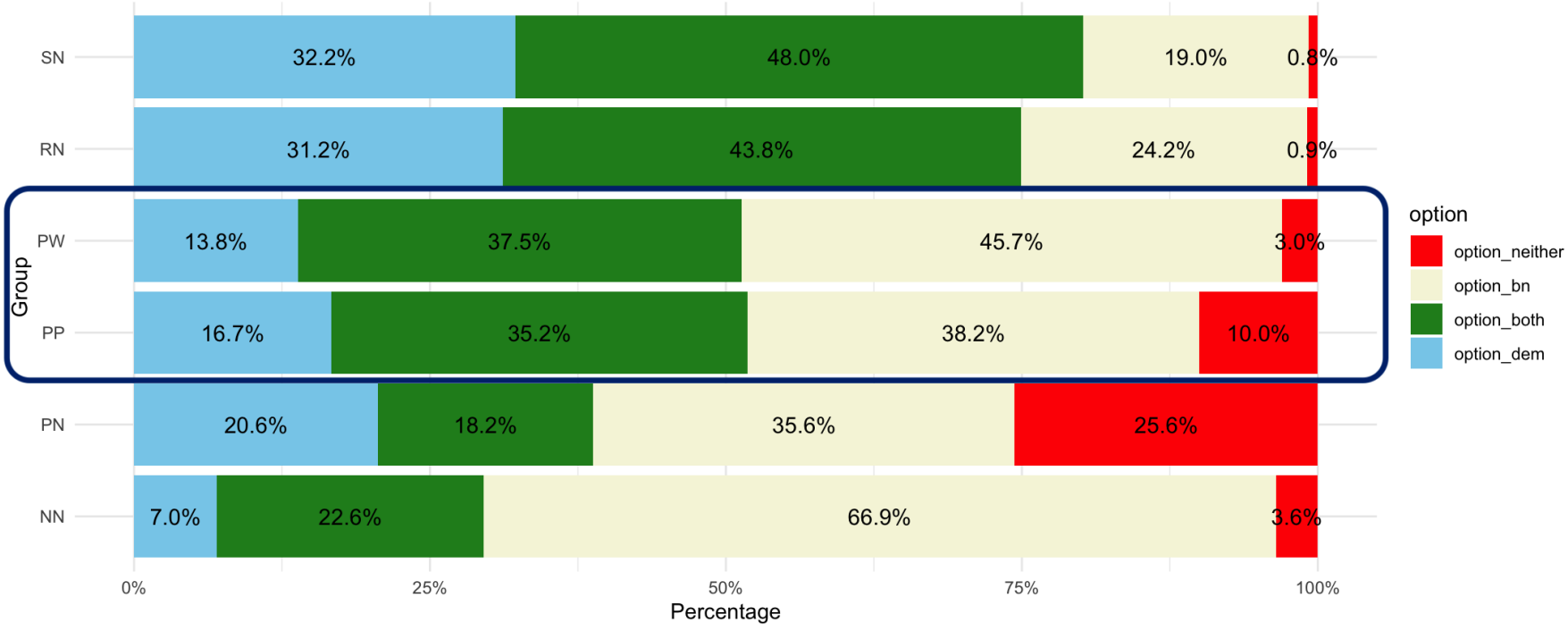
Results [n: 100; age- and gender-balanced]



Percentages of accepted demonstratives across conditions:

- Target conditions: 51.3% (PW); 51.9% (PP)
- Baseline conditions: 29.6% (NN); 38.8% (PN)
- Anaphoric conditions: 80.2% (SN); 75% (RN)

Results [n: 100; age- and gender-balanced]



A chi-square test confirmed that ...

- There is **no** association between the bridging type (PW vs. PP) and participants' acceptance of **demonstratives** ($p > 0.05$).
- There **is** an association between the bridging type (PW vs. PP) and participants' acceptance of **bare nouns** ($p < 0.05$).

Discussion

Discussion I: theoretical implications on bridging

Our empirical observations

Both bare nouns and demonstrative descriptions containing *na* readily allow uniqueness-based bridging.

Himmelmann's (1996) observation

Demonstratives disallow bridging uses.

Jenks's (2018) prediction

Na descriptions require anaphoricity.

DEM should be rated lower than BN in part-whole bridging.

Dayal & Jiang's (2021) prediction

Na descriptions, like English demonstratives, require anti-uniqueness.

Similar to *that*, they should be rated very low in both types of bridging.

Discussion I: English *that* in bridging

Ex: an animate producer-product item with DEM antecedent and DEF anaphor

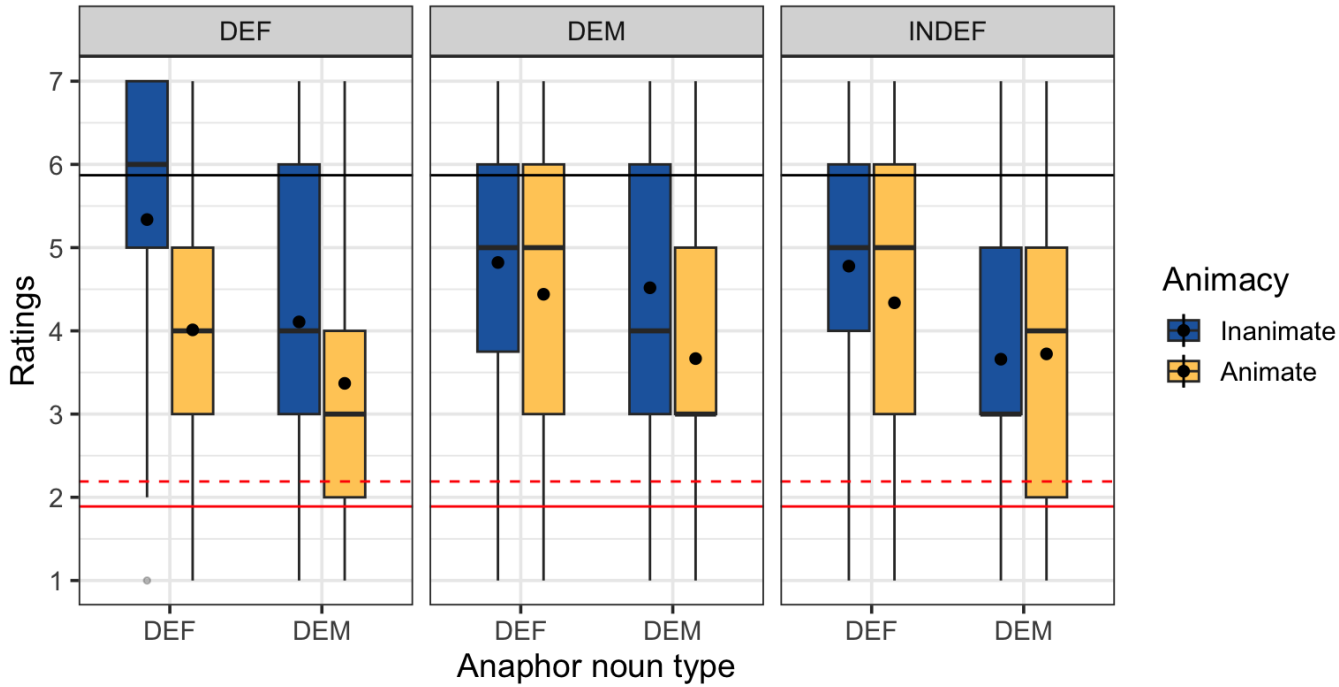
Yesterday I bought that book. I really want to meet the author.

Please rate the naturalness of the sentence (1 = least natural, 7 = most natural).

Least natural ○ ○ ○ ○ ○ ○ ○ Most natural
1 2 3 4 5 6 7

Discussion I: English *that* in bridging [n: 120; 18–64; gender-balanced]

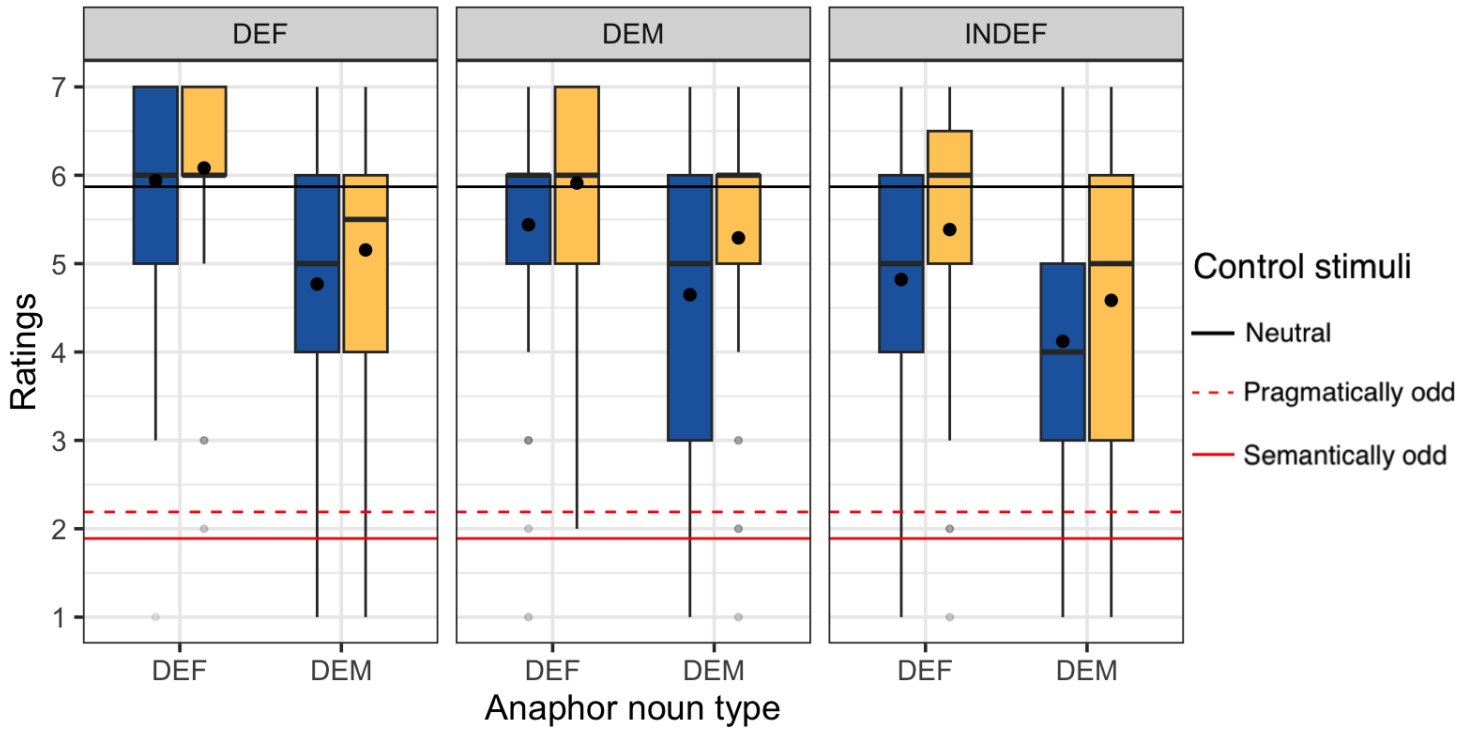
Figure 3: Part-whole bridging: ratings as function of anaphor type (bottom), grouped by antecedent type (top)



- Anaphor noun type is **significant** for part-whole bridging ($p < 0.05$).
- *That* is dispreferred in part-whole bridging.
- **Cross-linguistic differences are attested.**

Discussion I: English *that* in bridging [n: 120; 18–64; gender-balanced]

Figure 4: Producer-product bridging: ratings as function of anaphor type (bottom), grouped by antecedent type (top)



- Anaphor noun type is **significant** for producer-product bridging ($p < 0.01$).
- *That* is dispreferred in producer-product bridging.
- **Cross-linguistic differences are attested.**

Discussion II: another form of bridging

Mandarin *na* allows bridging without explicit linguistic antecedents.

(13) wo jiehun le. na-ge ren you san-tao fang.
I marry le na-cl person have three-cl house
'I got married. That person (= the person I'm married to) has three houses.'

- The context (= the marrying event) uniquely identifies the referent.
- In contrast, English and German demonstratives disallow such use and require explicit linguistic antecedents.

Discussion III: a uniqueness-denoting *na*

	Pointing	Modifier	Index	Bridging
BN	✗	✗/✓	✓	✓
DEM	✓	✓	✓	✓

Lack of contrast between BN and DEM in bridging

- *na* covers more uniqueness-based definite space than BN
- a reanalysis of *na* as an overt counterpart of ι?

Mandarin *na* as uniqueness-denoting definite marker

- definite articles derive from demonstratives diachronically (Diessel 1999; Himmelmann 1996)
- strong definite analyzed as an intermediate stage between a deictic demonstrative and a definite article proper (Simonenko 2022)

Conclusion

Conclusion

1. **We provided systematic empirical observations**
   - → Mandarin *na*-descriptions are felicitous in part-whole bridging
   - → also felicitous in bridging without explicit linguistic antecedents
2. **We provided a novel theoretical option**
   - → The predictions of existing theories are too strong
   - → Mandarin *na* as a uniqueness-denoting definite marker

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Study 1 Stimuli

Bridging type	Animacy	Syntactic position	Nominal pair
PW	Inanimate	subj+subj	(laptop, screen)
PW	Inanimate	subj+obj	(bike, seat)
PW	Inanimate	obj+subj	(house, roof)
PW	Inanimate	obj+obj	(car, brake)
PW	Animate	subj+subj	(cat, tail)
PW	Animate	subj+obj	(shark, mouth)
PW	Animate	obj+subj	(dog, nose)
PW	Animate	obj+obj	(horse, back)
PP	Inanimate	subj+subj	(phone, charging cable)
PP	Inanimate	subj+obj	(television, remote)
PP	Inanimate	obj+subj	(account, password)
PP	Inanimate	obj+obj	(lock, key)
PP	Animate	subj+subj	(presentation, speaker)
PP	Animate	subj+obj	(film, director)
PP	Animate	obj+subj	(painting, painter)
PP	Animate	obj+obj	(book, author)

Table 1: Stimuli of Study 1