



# **Presupposition filtering in disjunction – Does exclusive interpretation play a role?**

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# Presupposition: one type of inference

Two traditional diagnostics:

Context: We don't know whether John has a violin.

- (1) # John's violin is expensive. **↗ John has a violin.**
- (2) # John's violin is not expensive. **↗ John has a violin.**
- (3) # Is John's violin expensive? **↗ John has a violin.**
- (4) # If John's violin is expensive, he will be happy. **↗ John has a violin.**

► **Survived the family of sentences test: not at issue!**

- (5) John has a violin. John's violin is expensive.

► **Can be backgrounded: treated as old information!**

Background

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Predictions

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# Projection and filtering: two sides of the same coin

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- ▶ (1) John's violin is expensive.  $\leadsto$  **John has a violin.**
- ▶ Context: We don't know whether John has a violin.
- ▶ Conjunction:
  - ▶ (2) # John's violin is expensive **and** John has a violin.  $\leadsto$  **John has a violin.**
    - ▶ **Presupposition of the left conjunct projects = no right to left (R-to-L) filtering**
  - ▶ (3) John has a violin **and** John's violin is expensive.  $\leadsto$  **no presupposition**
    - ▶ **Presupposition of the right conjunct doesn't project = have left to right (L-to-R) filtering**
- ▶ Disjunction:
  - ▶ (4) Either John's violin is expensive **or** John doesn't have a violin.  $\leadsto$  **no presupposition**
    - ▶ **Presupposition of the left disjunct doesn't project = have R-to-L filtering**
  - ▶ (5) Either John doesn't have a violin **or** John's violin is expensive.  $\leadsto$  **no presupposition**
    - ▶ **Presupposition of the right disjunct doesn't project = have L-to-R filtering**



# Presupposition filtering in disjunction

- ▶ (1) Either John doesn't have a violin, or John's violin is expensive.
- ▶ (2) Either this floor has no bathroom, or the bathroom is in a weird place.
- ▶ Bathroom disjunction: Negation of one disjunct = the presupposition of the other disjunct

- ▶ Different possibilities for bathroom disjunctions:

Projection	Filtering
Presupposition in <i>either</i> disjunct projects	<b>No filtering</b>
Presupposition in the left disjunct (sometimes) projects but presupposition in the right disjunct doesn't	<b>Asymmetric filtering</b> R-to-L filtering weaker than L-to-R filtering
Presupposition in <i>neither</i> disjunct projects	<b>Uniform filtering</b> (R-to-L and L-to-R filtering both at ceiling)

- ▶ A recent experimental study by Kalomoiros & Schwarz (2024): uniform filtering

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# Does exclusive interpretation play a role in filtering?

- ▶ Kalomoiros & Schwarz (2024): “either ... or ...”
- ▶ “either or” sounds more exclusive than “or”
  - ▶ Does exclusive interpretation play a role in presupposition filtering in disjunction?
- ▶ Why exclusive interpretation of a disjunction might play a role:

p or q	q=1	q=0	q=#
p=1	1	1	1
p=0	1	0	#
p=#	1	#	#

p xor q	q=1	q=0	q=#
p=1	0	1	#
p=0	1	0	#
p=#	#	#	#

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# Does exclusive interpretation play a role in filtering?

- ▶ Kalomoiros & Schwarz (2024): “either ... or ...”
- ▶ “either or” sounds more exclusive than “or”
  - ▶ Does exclusive interpretation play a role in presupposition filtering in disjunction?
- ▶ Why exclusive interpretation of a disjunction might play a role:

p or q	q=1	q=0	q=#
p=1	●	●	1
p=0	1	0	●
p=#	●	●	●

p xor q	q=1	q=0	q=#
p=1	●	●	#
p=0	1	0	●
p=#	●	●	●

- ▶ Either p or q: (1) Either this floor has no bathroom, or the bathroom is in a weird place.

- ▶ p = this floor doesn’t have a bathroom
- ▶ q = the bathroom is in a weird place
- ▶  $\neg p = Ps(q)$
- ▶  $p = 1 \Rightarrow q = \#$
- ▶  $p = 0 \Rightarrow q \neq \#$
- ▶  $p \neq \#$

Presupposition of the right disjunct is filtered

Presupposition of the right disjunct is NOT filtered

Vice versa when presupposition is in the left disjunct

Vice versa when presupposition is in the left disjunct

Uniform filtering for inclusive disjunction

NO filtering for exclusive disjunction



# Many theories would predict exclusively interpreted disjunction to have no filtering

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► **Trivalent logic:** Strong Kleene semantics (noted by Mayr & Romoli, 2016b):

No filtering

► **Local context theory** of Schlenker 2009 (noted by Mayr & Romoli, 2016a)

No filtering

► Local context for exclusive disjunction is the global context

► **Traditional dynamic semantics** of Heim 1983 (*novel observation*):  $C[\alpha \text{ xor } \beta] =$

$(a) C[\alpha][\neg\beta] \cup C[\beta][\neg\alpha]$	$(e) C - C[\alpha][\beta] - C[\neg\beta][\neg\alpha]$
$(b) C[\neg\alpha][\beta] \cup C[\neg\beta][\alpha]$	$(f) C - C[\neg\alpha][\neg\beta] - C[\beta][\alpha]$
$(c) C[\alpha][\neg\beta] \cup C[\neg\alpha][\beta]$	$(g) C - C[\alpha][\beta] - C[\neg\alpha][\neg\beta]$
$(d) C[\beta][\neg\alpha] \cup C[\neg\beta][\alpha]$	$(h) C - C[\beta][\alpha] - C[\neg\beta][\neg\alpha]$

No filtering

► **Exh** in trivalent semantics, with strong negation of alternatives (Spector & Sudo, 2017)

No filtering

►  $Exh^2(\phi \text{ or } \psi)$

❑ Since our theories predict there **is** filtering for inclusively interpreted disjunctions, we have reason to expect exclusive interpretation might have an effect





# Experiment in Mandarin

- ❖ **Goal:**
- ❖ **Test whether exclusive interpretation of disjunction affects its presupposition filtering**

Upward entailing (UE): unembedded

Downward entailing (DE):  
embedded in antecedent of conditional

- ▶ Adopt the within-subject design from K&S 2024
- ▶ Add two cross-subject manipulations: (1) form of disjunction; (2) monotonicity of environment

One particle disjunction: ...huozhe...

Two particle disjunction: yaome...yaome...

- ▶ (Intuitions about) rate of exclusive interpretation:
  - ▶ *yaome yaome* > *huozhe*
  - ▶ Disjunctions in UE environment > disjunctions in DE environment
- ▶ Why cross-subject:
  - ▶ Avoid highlighting the contrast; if difference is observed, it will be very convincing
- ▶ Why use Mandarin:
  - ▶ Sample of convenience
  - ▶ Don't expect cross-linguistic differences in this domain
    - ▶ Check whether K&S 2024's results can be replicated in the *yaome yaome* conditions using stimuli of similar structures





# Norming study: Rate of exclusive interpretation

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- ▶ Norming study on rate of exclusive interpretation for different **disjunction forms** in different **environmental monotonicity**

(1) (Translation of) A trial (from **the norming task**) of “huozhe” in a UE environment:

Li said: “I believe Zhang will come or (*huozhe*) Wang will come.”  
In fact, both Zhang and Wang came.  
Do you consider Li’s prediction correct or incorrect?

[Choosing “incorrect” will be analyzed as an “exclusive reading” of disjunction]

- ▶ UE environment: “I believe ...”
- ▶ DE environment: “I don’t believe ...”
- ▶ Results confirm our intuition about disjunction forms and environmental monotonicity:

Table 1 Percentage of exclusive reading of disjunction across participants in the norming task

	DE environment	<	UE environment
... <i>huozhe</i> ...	0%		23.3%
<i>Yaome</i> ... <sup>^</sup> <i>yaome</i> ...	36.7%		53.3%

- ▶ Similar results in terms of disjunction form was found by Nicolae et al. (2024)



# Experimental design in more details

► 4 Variables

Table 2 Variables in the experiments

Variable	Value	Value
DisjunctionType	huozhe	yaome...yaome...
MonotonicityType	UE	DE
PredicateType	Presuppositional (Ps)	Non-presuppositional (NoPs)
OrderType	First	Second

between-subject variables

within-subject variables

Table 3 The 6 within-subject conditions

Abbr.	Context	PredicateType	OrderType	Sentence form
PsFirst	EI	Presuppositional	First	$S_p \text{ or } \neg p$
PsSecond	EI	Presuppositional	Second	$\neg p \text{ or } S_p$
NoPsFirst	EI	Non-presuppositional	First	$S \text{ or } \neg p$
NoPsSecond	EI	Non-presuppositional	Second	$\neg p \text{ or } S$

EI (Explicit Ignorance): I don't know whether John has smoked.  
 S (Support): I know John has smoked.

PsFirst: Either John stopped smoking, or John has never smoked.  
 PsSecond: Either John has never smoked, or John stopped smoking.  
 NoPsFirst: Either John frowned upon smoking, or John has never smoked.  
 NoPsSecond: Either John has never smoked, or John frowned upon smoking.  
 SimplePs: If John stopped smoking, then the cigarettes in the dustbin are not his.

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variable	value	value
<b>DisjunctionType</b>	huozhe	yaome...yaome...
<b>MonotonicityType</b>	UE	DE
<b>PredicateType</b>	Presuppositional (Ps)	Non-presuppositional (NoPs)
<b>OrderType</b>	First	Second

between-subject variables

within-subject variables

► 6 within-subject conditions (4 + 2)

Table 3 The 6 within-subject conditions

Abbr.	Context	PredicateType	OrderType	Sentence form
PsFirst	EI	Presuppositional	First	$S_p \text{ or } \neg p$
PsSecond	EI	Presuppositional	Second	$\neg p \text{ or } S_p$
NoPsFirst	EI	Non-presuppositional	First	$S \text{ or } \neg p$
NoPsSecond	EI	Non-presuppositional	Second	$\neg p \text{ or } S$
EISimplePs	EI	Presuppositional	Not applicable	$\text{If } S_p, \text{ then.}$
SSimplePs	S	Presuppositional	Not applicable	$\text{If } S_p, \text{ then.}$

Latin square design

Prevent global accommodation

Their difference: Reduction in rating with no filtering

Condition labels are adopted from K&S 2024



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		Exclusive interpretation	
		semantics	pragmatics
Presupposition projection	semantics	H1?	H2
	pragmatics	H1	?

- ▶ Question: Does exclusive interpretation affect presupposition filtering?
- ▶ Assumption:
  - ▶ the exclusive interpretations caused by both disjunction form and environmental monotonicity are implicatures
- ▶ Hypothesis 1 (H1): Exclusive interpretation **does** affect presupposition filtering
  - ▶ Mayr & Romoli (2016b), Spector & Sudo (2017), our observation
  - ▶ Prediction: disjunction form and environmental monotonicity should have the same effect on presupposition filtering
    - ▶ **Significant** two-way interactions among PredicateType \* DisjunctionType and among PredicateType \* MonotonicityType in the same direction
- ▶ Hypothesis 2 (H2): Exclusive interpretation **doesn't** affect presupposition filtering
  - ▶ Prediction: environmental monotonicity **will not** affect presupposition filtering
    - ▶ **No** significant two-way or three-way interactions involving PredicateType \* MonotonicityType
    - ▶ disjunction form **may or may not** affect presupposition filtering





# Triggers and items

► 2 triggers, 2 items each trigger → 4 items

Table 4 Ps triggers, their NoPs counterparts, and items

Ps Trigger (presuppositional predicate)	Item	Presupposition	Non- presuppositional predicate
戒 “jie” quit	戒酒 quit drinking 戒烟 quit smoking	曾经喝过酒 have drunk 曾经抽过烟 have smoked	不喜欢 “buxihuan” dislike
知道 “zhidao” know	不知道某人泄密 don’t know sb. has leaked secrets 不知道某人挪用公款 don’t know sb. has embezzled funds	某人确实泄密了 sb. has indeed leaked secrets 某人确实挪用公款了 sb. has indeed embezzled funds	觉得 “juede” think

- Each participant completes 15 trials:
- 8 critical trials (2 conditions per item, Latin square design)
  - + 2 catch trials + 2 good conditionals + 2 bad conditionals + 1 inference task

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# An example trial

- ▶ Ps trigger: **jie** (“quit”)
- ▶ Within-subject condition: **PsFirst**
- ▶ Cross-subject condition: **huozhe-in-DE**

我之前完全不认识小李，不知道他有没有喝过酒。在今晚的饭局上，大多数人都喝酒了，但小李滴酒不沾，于是我想：

如果小李已经戒酒了或者从来不喝酒，那么他今晚的行为很合理。

请给划线句子在语境中的自然程度打分：

I didn't know Li at all before, and I didn't know if he ever drank. At tonight's dinner party, most people drank, but Li didn't drink a drop, so I thought:

If Li has quit drinking or (huozhe) never drank, then his behaviour tonight makes sense.

Please rate how natural the underlined sentence is in the context:

[7-point scale; ends of scale: completely unnatural 1 – completely natural 7]

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# Overall results

## Does exclusivity of disjunction affect its presupposition filtering?

- ❑ We analyzed 197 responses after exclusions based on catch trials.
- ▶ **Significant** three-way interaction among:
  - ▶ Predicate.Type\***Disjunction.Type**\*Order.Type ( $\beta=1.20$ , SE=0.59,  $p=0.043$ )
    - ❑ This shows disjunction form does affect presupposition filtering
- ▶ **No** significant three-way or two-way interaction including **Monotonicity.Type**\*Predicate.Type
  - ▶ **No** significant three-way interaction among: Predicate.Type\***Monotonicity.Type**\*Order.Type
  - ▶ **No** significant two-way interaction among: Predicate.Type\***Monotonicity.Type**
    - ❑ This shows environmental monotonicity doesn't affect presupposition filtering at all
- ▶ It is **NOT** the case that disjunction form and environmental monotonicity affect presupposition filtering in the same way → **incompatible with H1**
- ▶ Environmental monotonicity has no effect + disjunction form has an effect → **compatible with H2**

Treatment coding  
ref level: NoPs, huozhe, Second

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# Unpack the three-way interaction

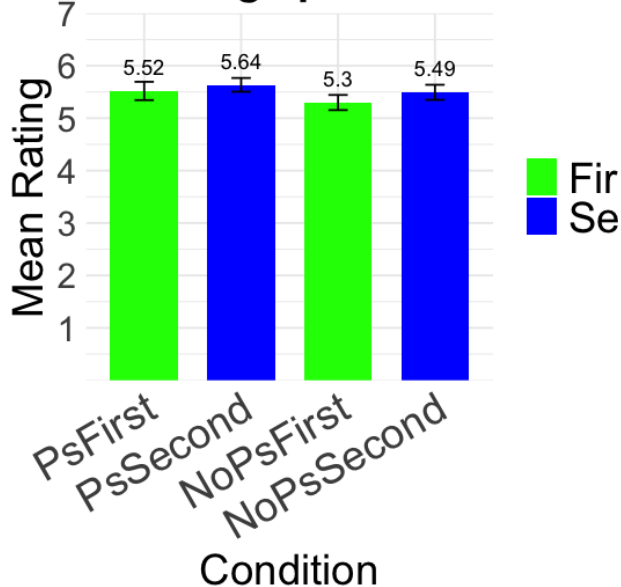
Treatment coding  
ref level: NoPs, huozhe, Second

- ▶ **Significant** three-way interactions among:
  - ▶ **Predicate.Type\*Disjunction.Type\*Order.Type**  
( $\beta=1.20$ ,  $SE=0.59$ ,  $p=0.043$ )

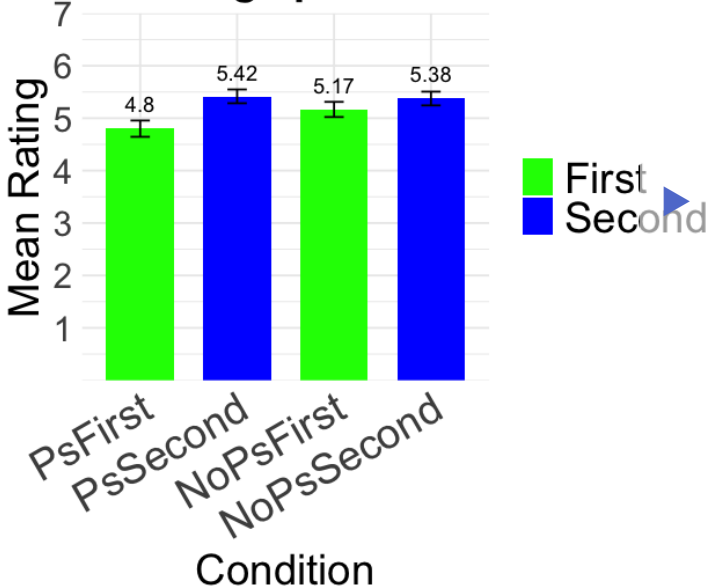
- ▶ Bonferroni corrected simple-interaction tests (Predicate.Type  $\times$  Order.Type | Disjunction.Type):
  - ▶ “yaome yaome”: not significant
  - ▶ “huozhe”: significant
    - ▶  $\beta = -0.82$ ,  $p=0.046$
    - ▶ R-to-L filtering weaker

This three-way interaction is driven by uniform filtering for “yaome yaome” as opposed to asymmetric filtering for “huozhe”

**Figure 1: 'yaome yaome'**  
Mean ratings per condition



**Figure 2: 'huozhe'**  
Mean ratings per condition





# Comparison with Kalomoiros & Schwarz (2024)

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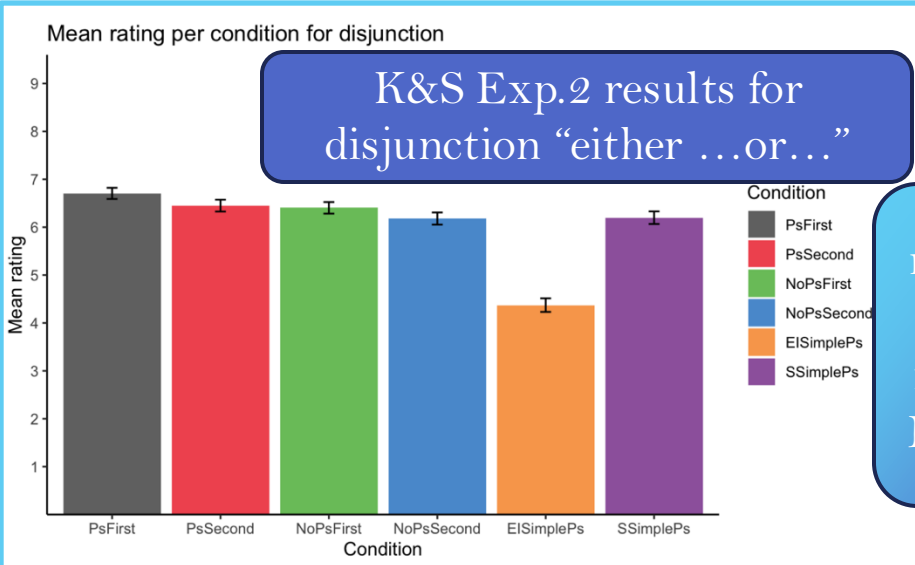
Predictions

Stimuli

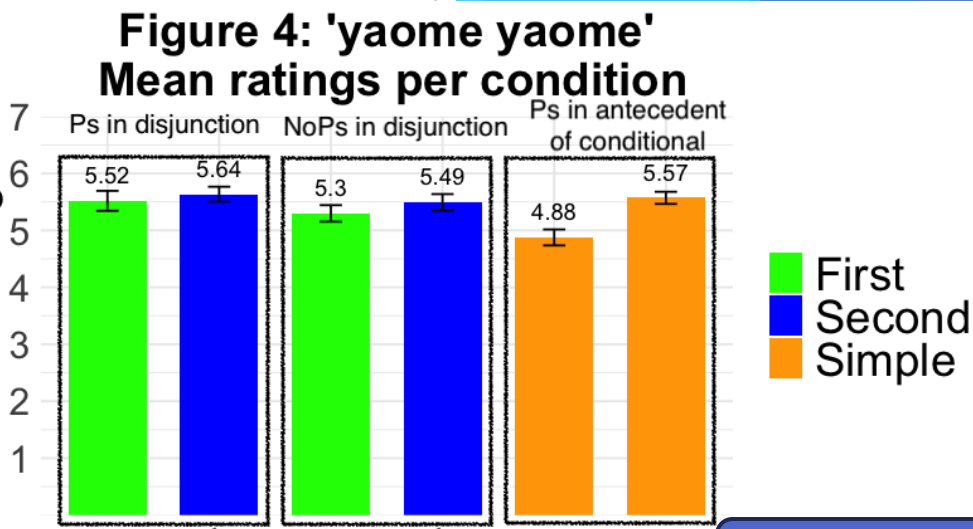
Results

Discussions

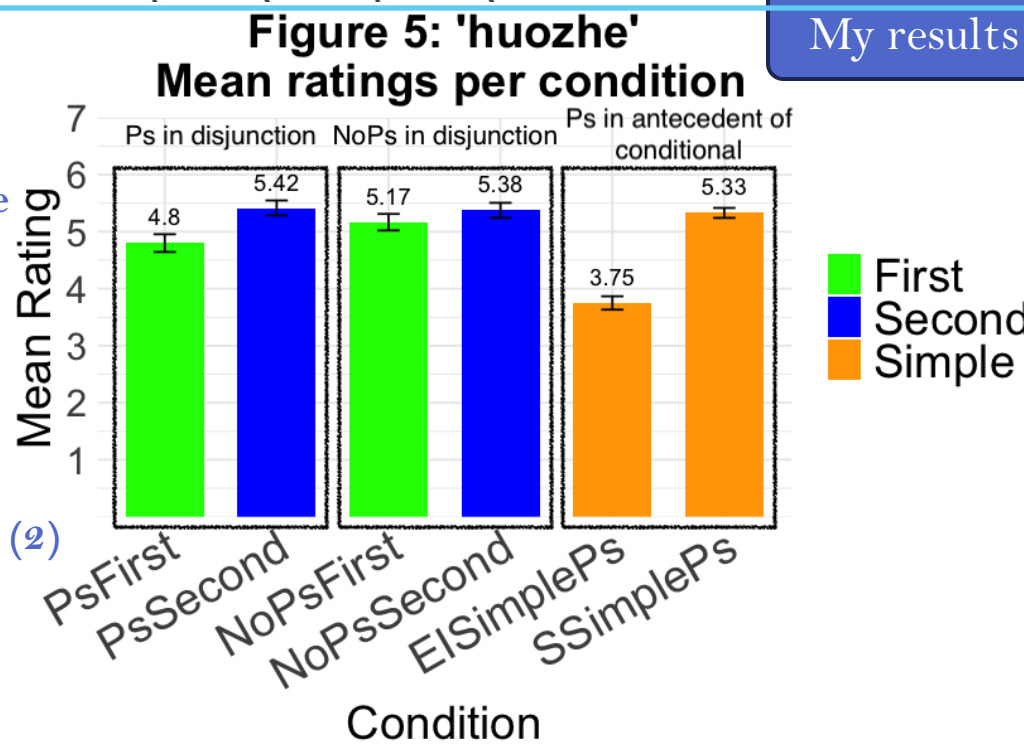
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replicated  
K&S's  
results in  
Mandarin



- ▶ Mandarin “yaome yaome” replicated English “either or”
  - ▶ Uniform filtering
  - ▶ Two-particle disjunction (iterated or not) signals the sentence is a disjunction at the beginning
- ▶ Mandarin “huozhe”
  - ▶ (slightly) Asymmetric filtering
  - ▶  $PsFirst < NoPsFirst$  (1)
  - ▶  $NoPsFirst - PsFirst < SSimplePs - EISimplePs$
  - ▶ R-to-L filtering available but a bit weaker for one-particle disjunction, possibly due to the lack of such signal at the beginning



My results



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# Conclusions

- ▶ Question: Does exclusive interpretation affect presupposition filtering?
  - ▶ Results:
    - ▶ Disjunction form does affect presupposition filtering
    - ▶ Environmental monotonicity doesn't affect presupposition filtering
  - ▶ Implication:
    - ▶ Assuming exclusive interpretation caused by both disjunction form and environmental monotonicity are implicatures
    - ▶ **Exclusive interpretation doesn't affect presupposition filtering**
- ▶ Speculative: How does disjunction form affect presupposition filtering?
  - ▶ Results:
    - ▶ Two particle disjunction: Uniform filtering (Evidence from Mandarin and English)
    - ▶ One particle disjunction: (slightly) Asymmetric filtering (Evidence from Mandarin)
  - ▶ One explanation: one-particle disjunction lacks a preview of the disjunction, leading to slightly weaker R-to-L filtering
- ▶ Future direction: a step forward from the theoretical & experimental tradition of inspecting bathroom disjunctions → use disjunctions with asymmetric entailment ( $\neg p \not\subseteq Ps(q)$ )

**Presupposition  
projection**

semantics

pragmatics

**Exclusive  
interpretation**

semantics

pragmatics



H1?

H2



H1

?



# Thank you!

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## ▶ Selected references

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- ▶ **Mayr, C., & Romoli, J. (2016b).** Satisfied or exhausted: An ambiguity account of the Proviso Problem. Proceedings of *SALT* 26, 892-912.
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- ▶ **Spector, B., & Sudo, Y. (2017).** Presupposed ignorance and exhaustification: how scalar implicatures and presuppositions interact. *Linguistics and Philosophy*, 40(5), 473-517.