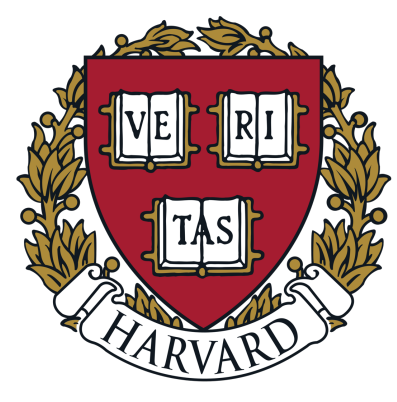


# Crosslinguistic interpretation of logical connectives

## Negation, conjunction, and disjunction in English, Hungarian, Mandarin Chinese, and Spanish

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## One-sentence take-away

**Adult speakers of English, Hungarian, Mandarin Chinese and Spanish did not show considerable variation in their interpretations of the logical constructions (disjunction, negative disjunction, and negative conjunction), against findings in previous literature.**

## Background

## Logical connectives

With multiple possible interpretations for a single logical construction, there claims to be crosslinguistic differences regarding which interpretation is the dominant one.

- **Disjunction**

(1) Abe bought tea or coffee ... not both (XOR) / or both (IOR).

- **Negative disjunction**

(2) Abe didn't buy tea or coffee ... he bought neither (NOR) / he didn't buy one or the other (NAND).

- **Negative conjunction**

(3) Abe didn't buy tea and coffee ... he didn't buy neither (NOR) / he didn't buy both (NAND)

## Previous findings about the dominant reading

Disjunction	XOR: exclusive	English (upward entailing environment)
	IOR: inclusive	English (downward entailing environment)
Negative disjunction	NOR	(English, Spanish, Romanian, Korean) (Dutch, French-c, Hungarian-c) (French, Italian, Romanian, English)
	NAND	(Hungarian, Mandarin, Japanese, French) (Hungarian, French, Italian) (French, Italian, Romanian, English)
Negative conjunction	NOR	(Hungarian, Mandarin, Japanese, French)
	NAND	(English, Spanish, Romanian, Korean)

## Research question

- Use a controlled and unbiased experimental context to test adult interpretation of a collection of these logical connectives.

## Methods

## Card selection task


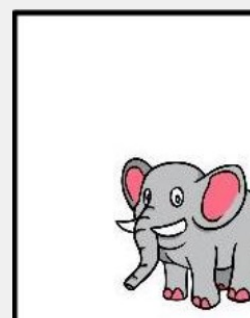
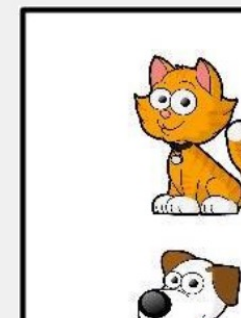

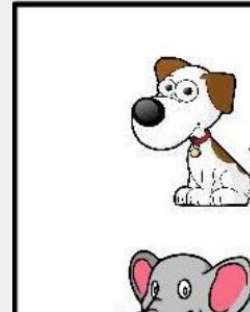
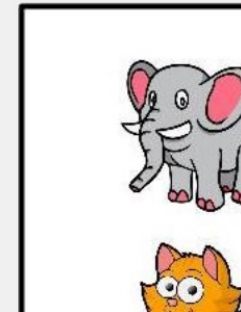
- Each trial contained a question prompt with a logical construction
- Participants chose the cards that best answered the question

## Languages

- English (N=50), Hungarian (50), Mandarin (50), Spanish (51)

Which doesn't have a cat or an elephant?			
Experimental			
1. Which has a [cat]?		?	
2. Which doesn't have a [cat]?		?	
3. Which has a [cat] <b>or</b> a [dog]?		?	
4. Which has <b>either</b> a [cat] <b>or</b> a [dog]?		?	
5. Which doesn't have a [cat] <b>or</b> a [dog]?		?	
6. Which doesn't have <b>either</b> a [cat] <b>or</b> a [dog]?		?	
7. Which doesn't have a [cat] <b>and</b> a [dog]?		?	
Control			
1. Which has <b>only</b> a [cat]?		EXH	
2. Which doesn't have <b>only</b> a [cat]?		NEXH	
3. Which has a [cat] <b>or</b> a [dog], <b>or both</b> ?		IOR	
4. Which has a [cat] <b>or</b> a [dog], <b>not both</b> ?		XOR	
5. Which has <b>neither</b> a [cat] <b>nor</b> a [dog]?		NOR	
6. Which has a [cat] <b>and</b> a [dog]?		AND	
7. Which doesn't have <b>both</b> a [cat] <b>and</b> a [dog]?		NAND	

Which doesn't have a cat or an elephant?			
			
			

Positive Disjunction			
Which has (either) a cat or a dog?			English
Melyik-en van (vagy) macska vagy kutya?			Hungarian
¿Cuál/es tiene/n (o) un gato o un perro?			Spanish
哪张/些卡片有猫或狗(要有猫要有狗)?			Mandarin
Negative Conjunction			
Which doesn't have a cat and a dog?			English
Melyik-en nincs macska és kutya?			Hungarian
¿Cuál/es no tiene/n un gato y un perro?			Spanish
哪张/些卡片没有猫和狗?			Mandarin

## Result interpretation

## Simple disjunction

- No significant effect of language in interpreting IOR/XOR of simple disjunctions; IOR is the dominant across the four.

## Negative disjunction

- NOR dominates, with no significant difference across the four.

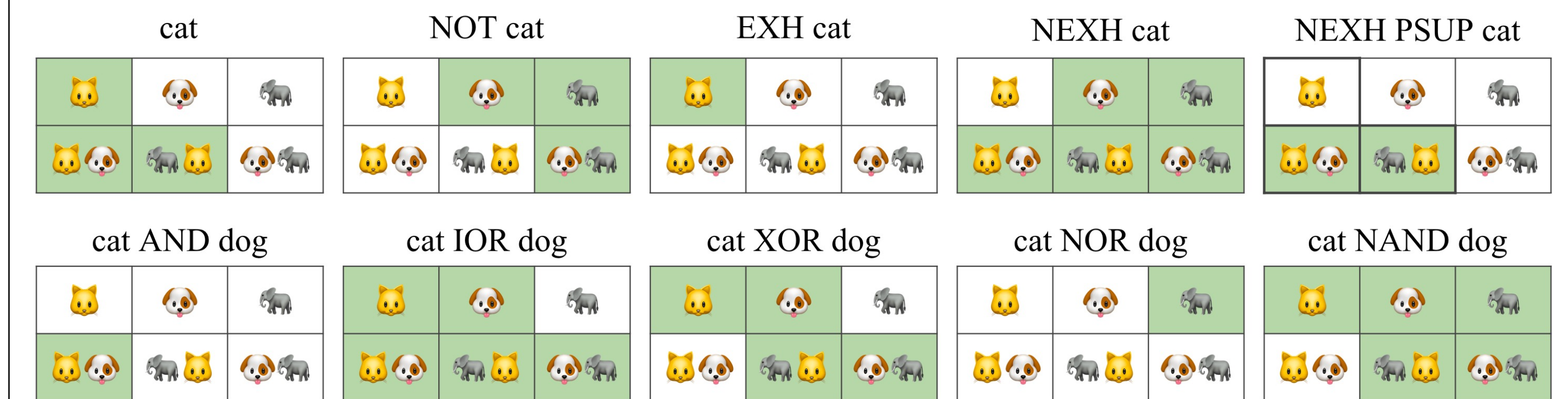
## Negative conjunction

- No significant difference among English, Hungarian and Spanish; Mandarin slightly prefers NOR. In general, ambiguous.

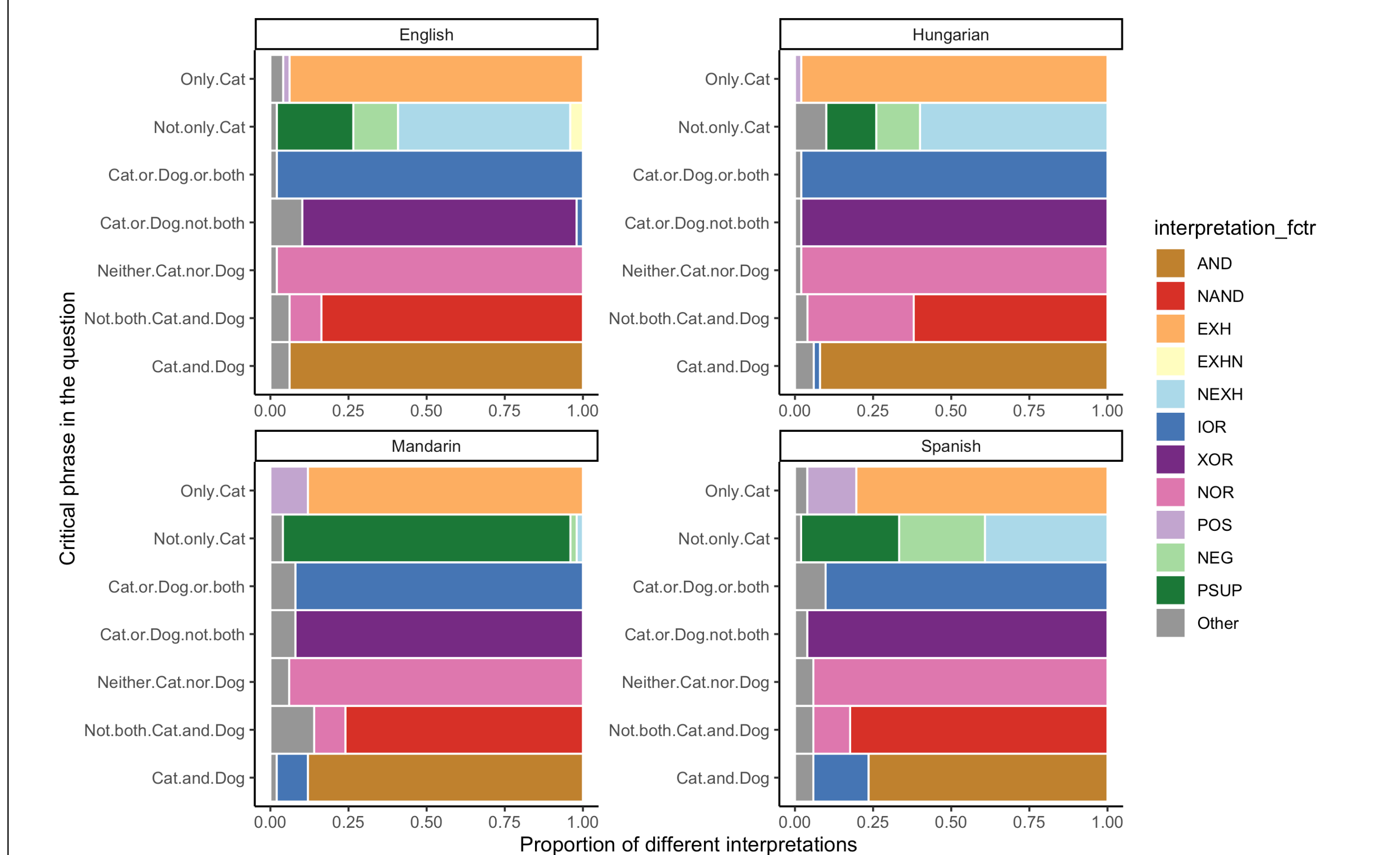
## Discussion & Future work

- The controlled and unbiased experimental context bring all four languages within the same comparison frame;
- Previously found inconsistency may result from different research paradigms;

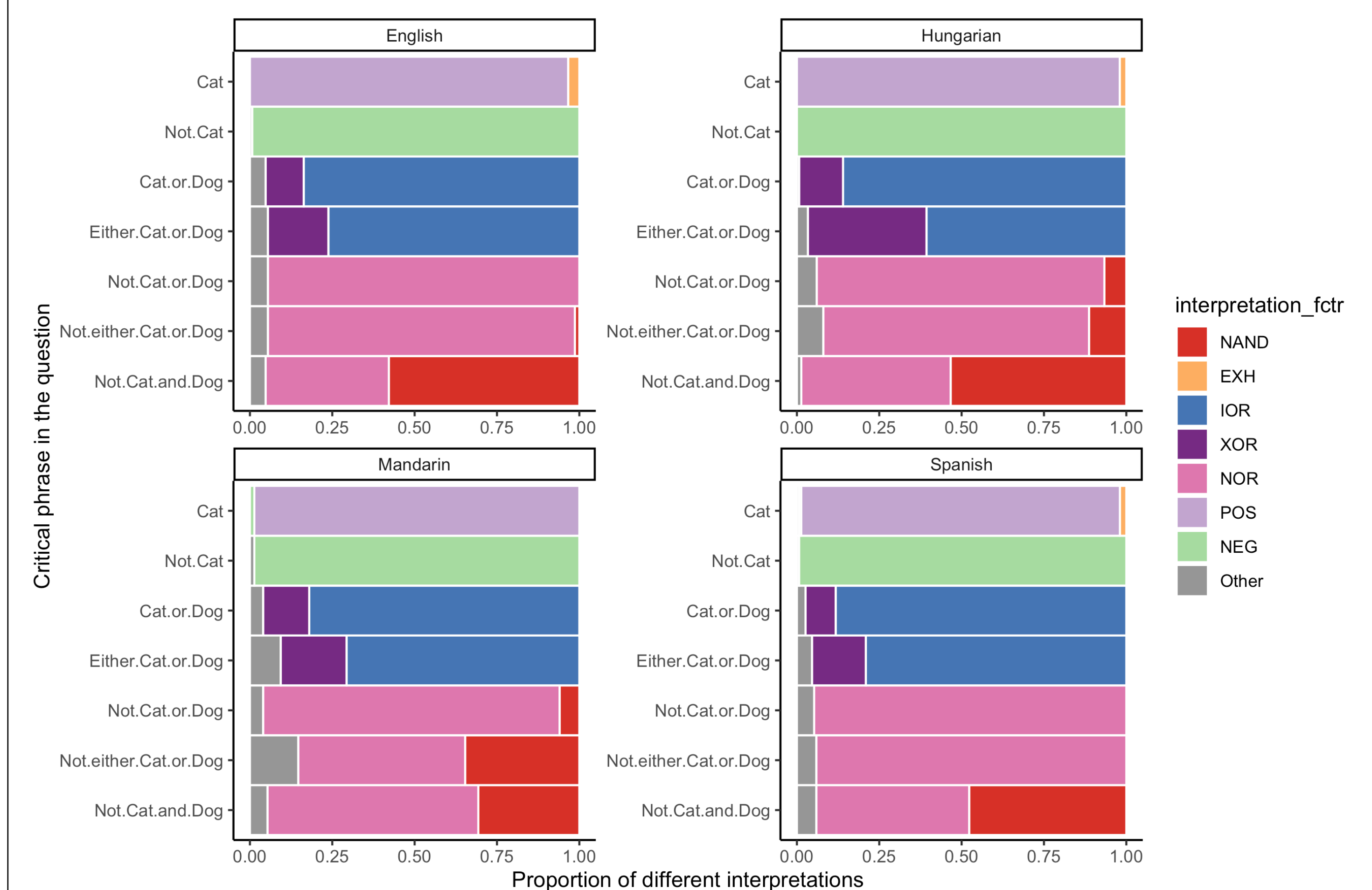
## Results



## Control trials



## Experimental trials



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Questions & comments?

