



# Evidential Restriction on Epistemic Signs: Experimental Study in Turkish Sign Language (TİD)

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# Introduction

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- ❖ Spoken languages can be grouped as the ones with dedicated evidential morphemes and the ones encoding it via other means
- ❖ Sign languages are understudied in terms of evidentiality.

# Introduction

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- ❖ Turkish Sign Language (TİD) **seems to not** have a dedicated evidential morpheme.
- ❖ One modal sign **NECESSARY** requires a strong inference context like ‘must’ in English (von Stechow & Gillies 2010; Matthewson 2015, 2020).
- ❖ What kind of evidentiality do epistemic signs require in TİD?

# Outline

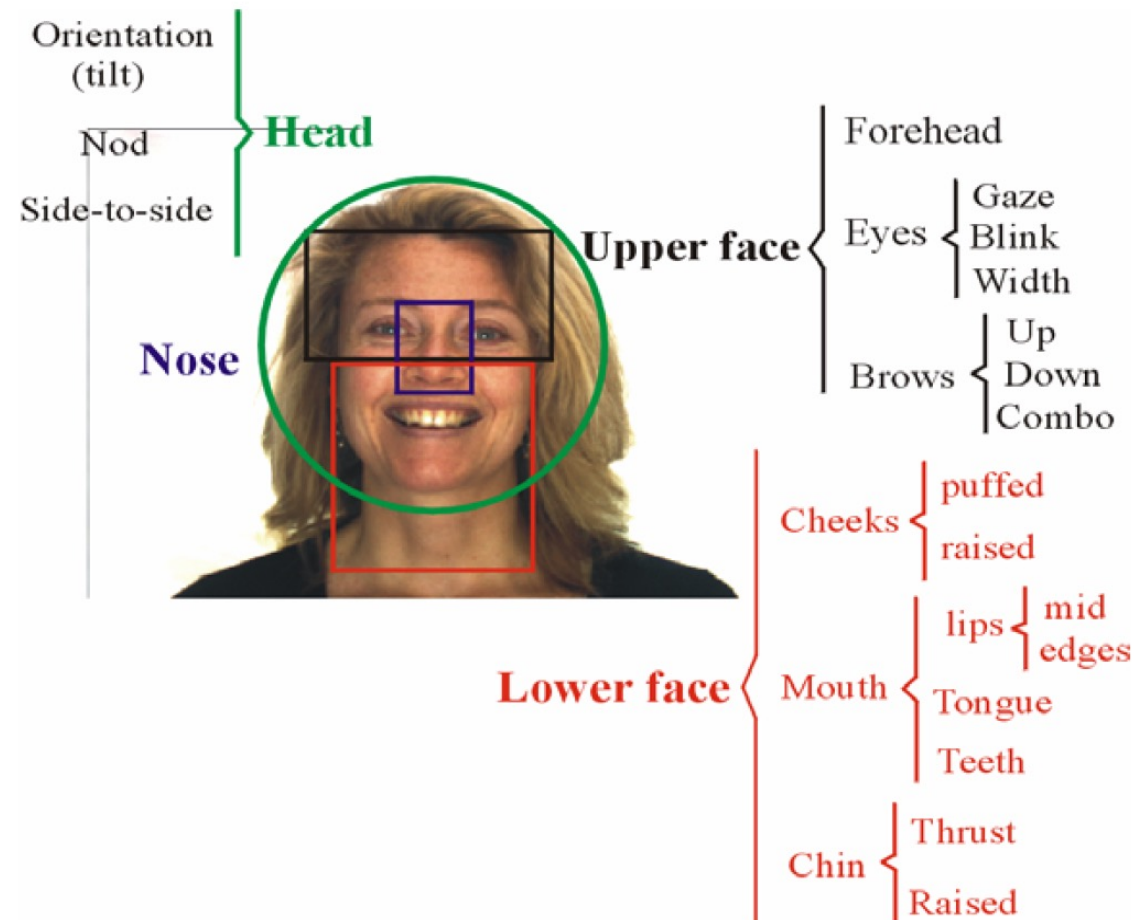
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- ❖ Brief background on sign languages' structure
- ❖ Evidentiality and Epistemic
- ❖ Epistemic Modals in T1D
- ❖ Study: Testing Evidential Restriction
  - ❖ Preparing Stimuli
  - ❖ Participants
  - ❖ Procedure
  - ❖ Results
- ❖ Further Puzzles
- ❖ Conclusion

# Building blocks of sign languages

Briefly, sign languages (SLs) have three main components in their grammar:

1. **Hands – manual signs**
2. Space
3. Everything body does other than hands – nonmanuals (NMMs)



# Evidentiality and Epistemic

- In this talk,
  - epistemic - conveying the possibility of a proposition
  - evidential as conveying the speaker's source of information (Faller, 2002; Krifka, 2021)
- Evidentiality is
  - another type of epistemics (Matthewson et al. 2007)
  - different category than epistemics (Aikhenvald 2004)

# Epistemic Modals in TİD

- TİD has manual signs mostly lexicalized for modal base (Karabüklü, 2022).
- Modal base duality is only attested with NECESSARY.

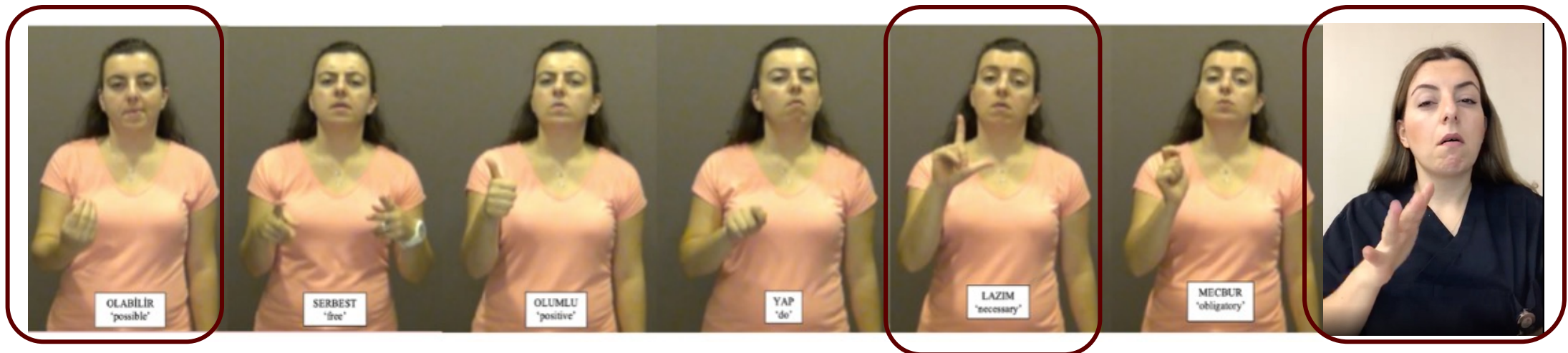


Figure 1. Manual modal signs in TİD

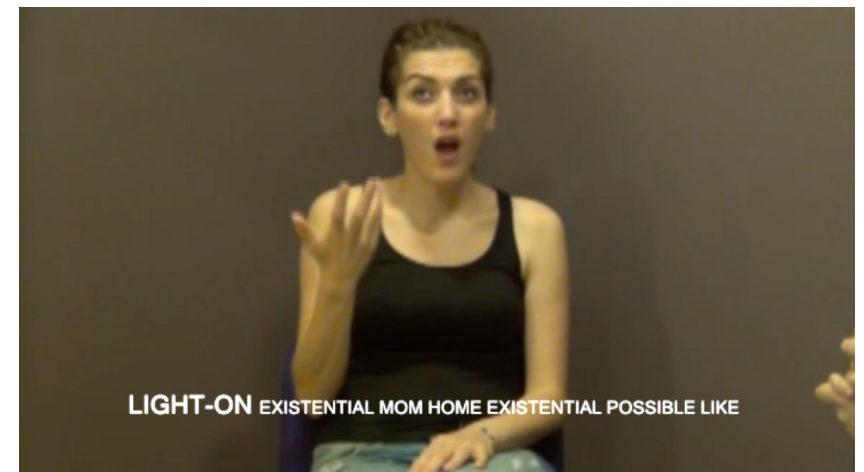
# TiD modals

- ❖ POSSIBLE and MAYBE **only** have **epistemic flavor**.
- ❖ They can co-occur.

(1) Context: Light is on, you guess:

MOM HOME EXISTENTIAL POSSIBLE/MAYBE

‘Mom might/must be home.’





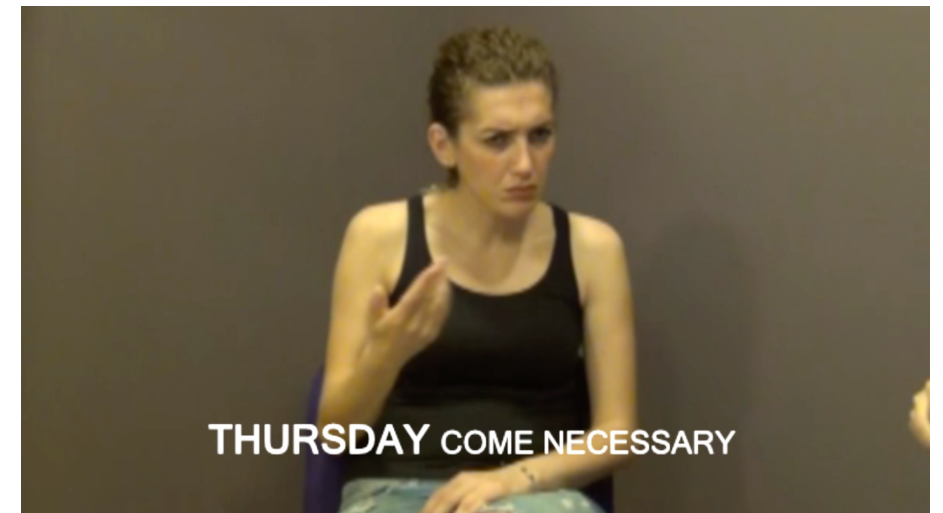
# TiD modals

❖ NECESSARY has deontic flavor.

(2) Context: Ali's time-off is ending on Wednesday. He will be back to work on Thursday:

(ALI) THURSDAY COME NECESSARY/\*POSSIBLE/\*MAYBE

'Ali must come (to the work) on Thursday.'



# TiD modals

- NECESSARY can be epistemic but **not in any epistemic context.**

(1) Context: Light is on, you guess:

MOM HOME EXISTENTIAL POSSIBLE /MAYBE / **#NECESSARY**

‘Mom might be home.’

- No, you can't sign it; (NOT the right context).

# TiD modals

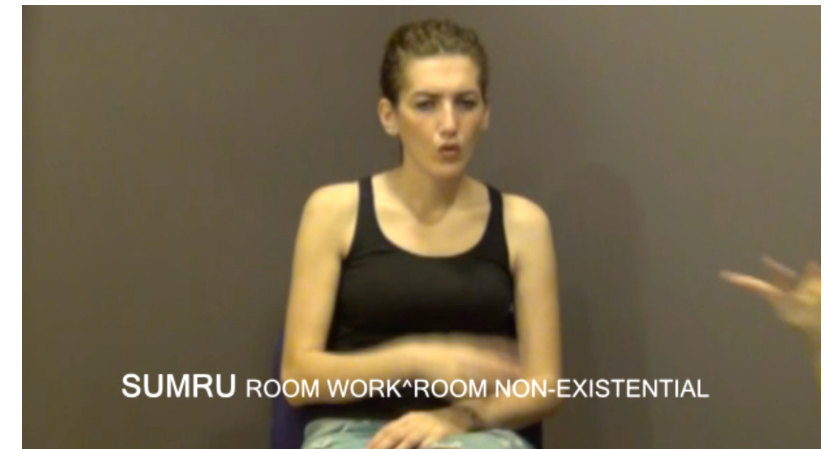
❖ NECESSARY can be epistemic but **not in any epistemic context.**

(3) Context: It's Sumru's office hour. She has to be in her office but isn't there. You guess:

SUMRU SECRETARY OFFICE GO **BE NECESSARY / #NECESSARY**

'Sumru must/might have gone to the secretary's office.'

○ No, you can't sign it; (NOT the right morphology).

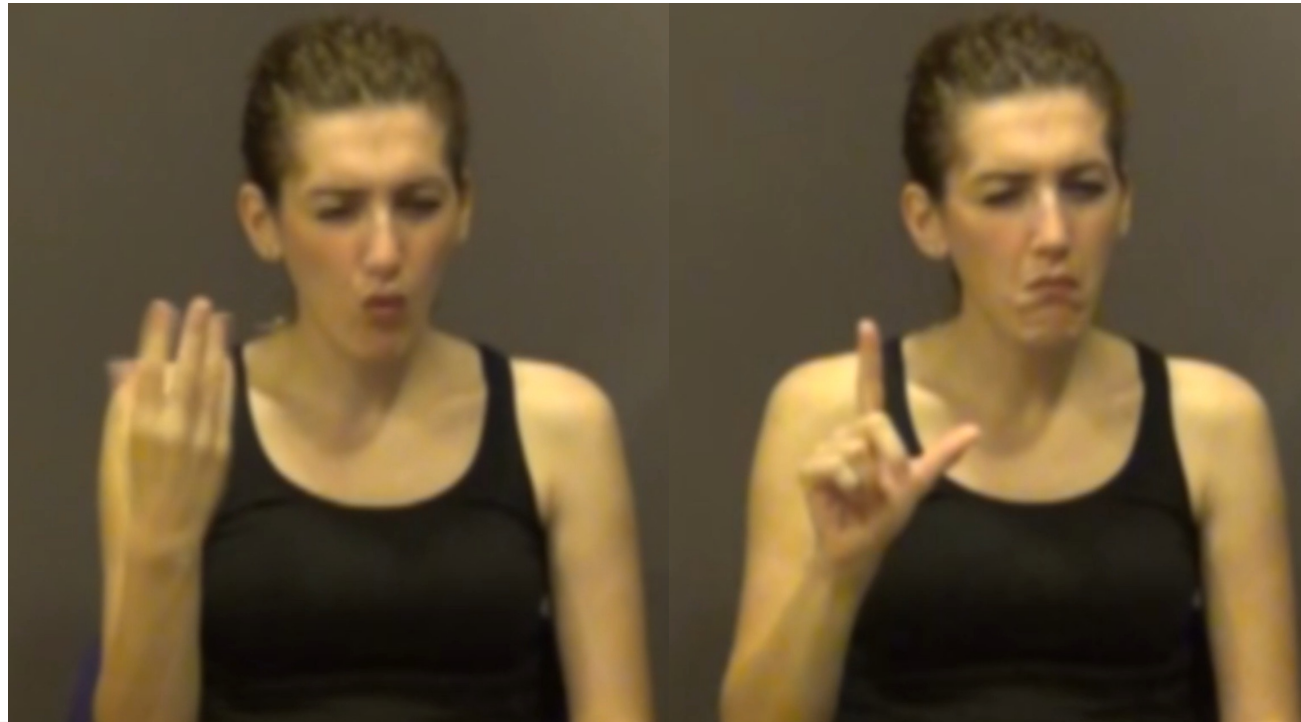


# TiD modals

(3) Context: It's Sumru's office hour. She has to be in her office but isn't there. You guess:

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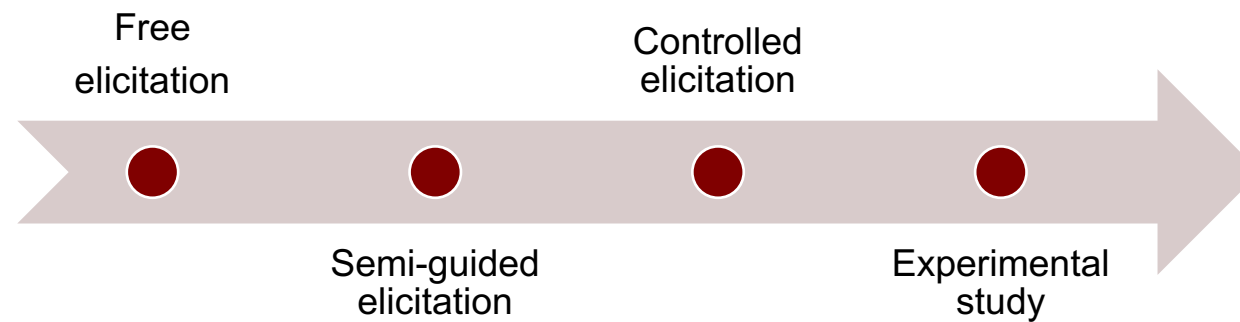


# Interim summary and questions

- NECESSARY – only acceptable in strong inference contexts
  - RQ1: Is it acceptable in other contexts denoting different evidence types?
- NECESSARY – require another sign BE to be interpreted as epistemic
  - RQ2: Are NECESSARY and BE NECESSARY interpreted as deontic and epistemic respectively?
- POSSIBLE and MAYBE – only epistemic, can cooccur
  - RQ3: Are they also sensitive to any evidence types?

# Methodology

- Translation task
- Signers are NOT bilingual Turkish and TİD users (Göksel et al. 2021; İlkbaşaran 2015).
- ~~Translation task~~ (Van Herreweghe & Vermeerbergen 2012)
- Acceptability ratings – everything recorded in TİD – 3/4<sup>th</sup> phase in the field



# Stimuli Preparation & Design

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- 8 different contexts denoting evidentiality (Matthewson 2015, 2020)
  1. Evidence type: whether the evidence is visual, sensory, reported, etc.
  2. Evidence location: whether the speaker witnessed the event itself or merely some of its results
  3. Evidence strength: the trustworthiness/ reliability of the evidence

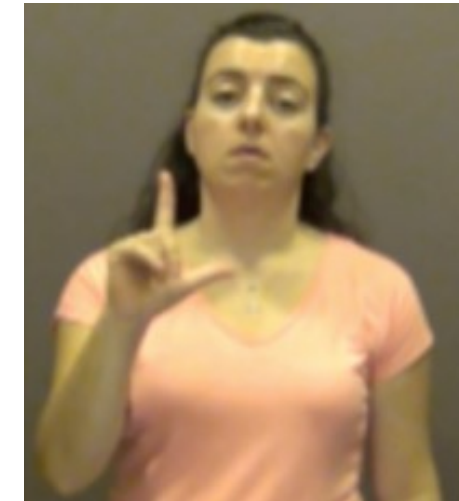
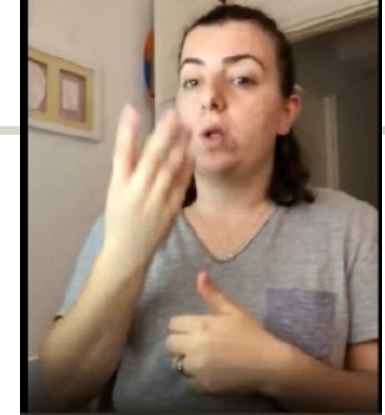
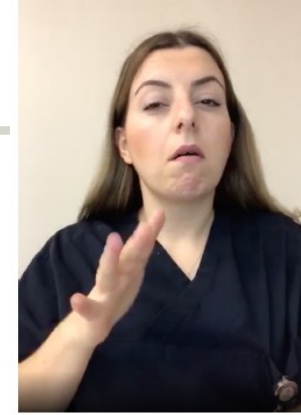
# Stimuli Preparation & Design

Contexts	Type	Location	Strength
Pure Possibility (PP)			✓
Rumors (R)	✓		✓
Hearsay & Trusting Source (T)	✓		✓
Hearsay & Not Trusting Source (NT)	✓		✓
Smelling (S)	✓	✓	✓
Seeing Whole Event (SW)	✓	✓	✓
Seeing Part of an Event (SP)	✓	✓	✓
Seeing End/Endresult of an Event (SE)	✓	✓	✓



# Design

- ❖ **Design:** 5x8 factorial design
    - ❖ Based on the Deaf consultant's comments, target sentences included one of five modals
- (4) ALI LOTTERY WIN POSSIBLE
- (5) ALI LOTTERY WIN MAYBE
- (6) ALI LOTTERY WIN POSSIBLE MAYBE
- (7) ALI LOTTERY WIN NECESSARY
- (8) ALI LOTTERY WIN BE NECESSARY



# Stimuli Preparation

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- ❖ All stimuli were recorded with a Deaf consultant and checked for their naturalness.
- ❖ Two sets were prepared for all tasks and participants were randomly assigned to one set.

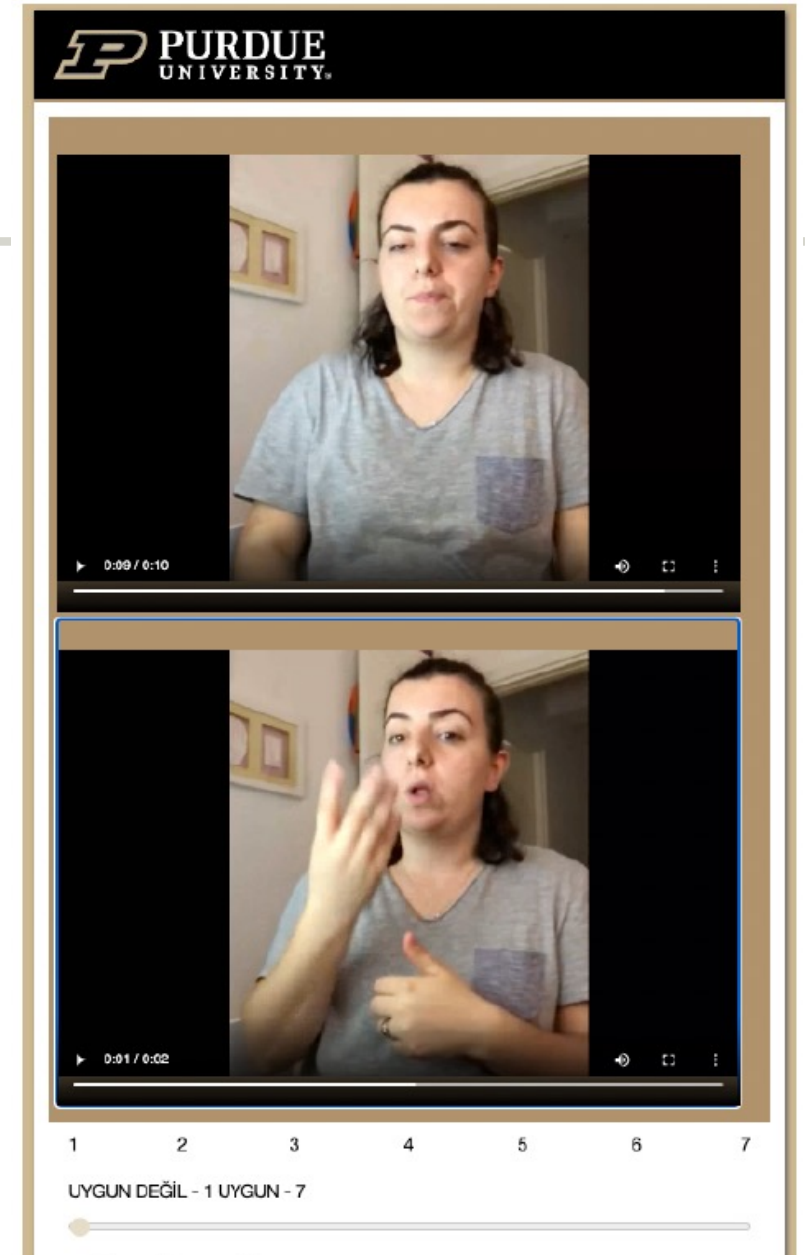
# Participants

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- 16 (9 f, 9 DoD, 15 İstanbul residents) took all the tasks.
- All tasks were presented in Qualtrics; items were randomized.
- Rating tasks had attention checks as ‘Please choose number 4’.

# Procedure

- Task I: Participants were also asked to rate if sentences were interpreted as order or guess.
- Task II: After the trial session, they were asked to rate the acceptability of sentences in the given context.



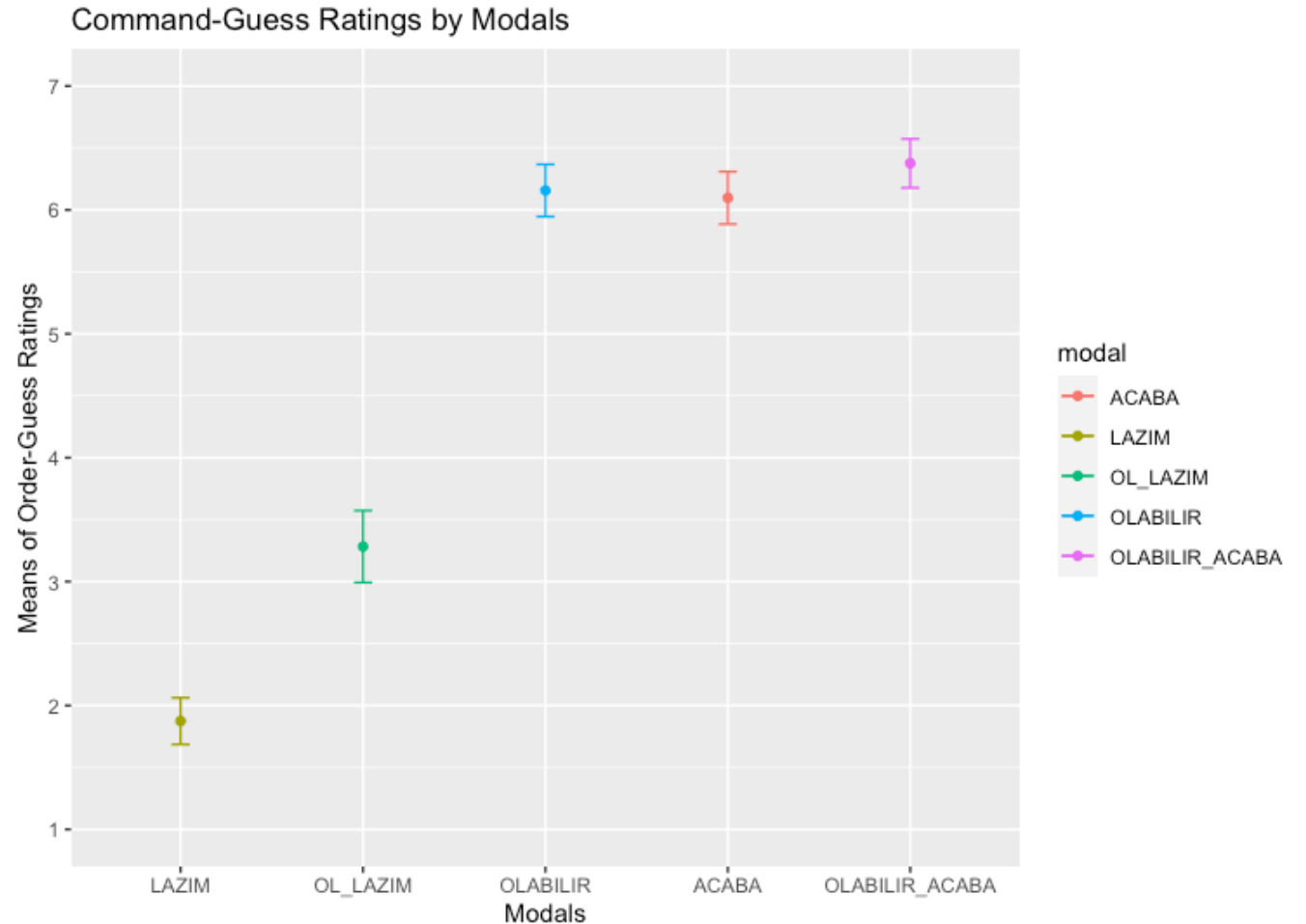
# Analysis

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- All data were analyzed with linear mixed effects models in R.
  - modals, context, age of acquisition – fixed effects
  - participant, item – random effects

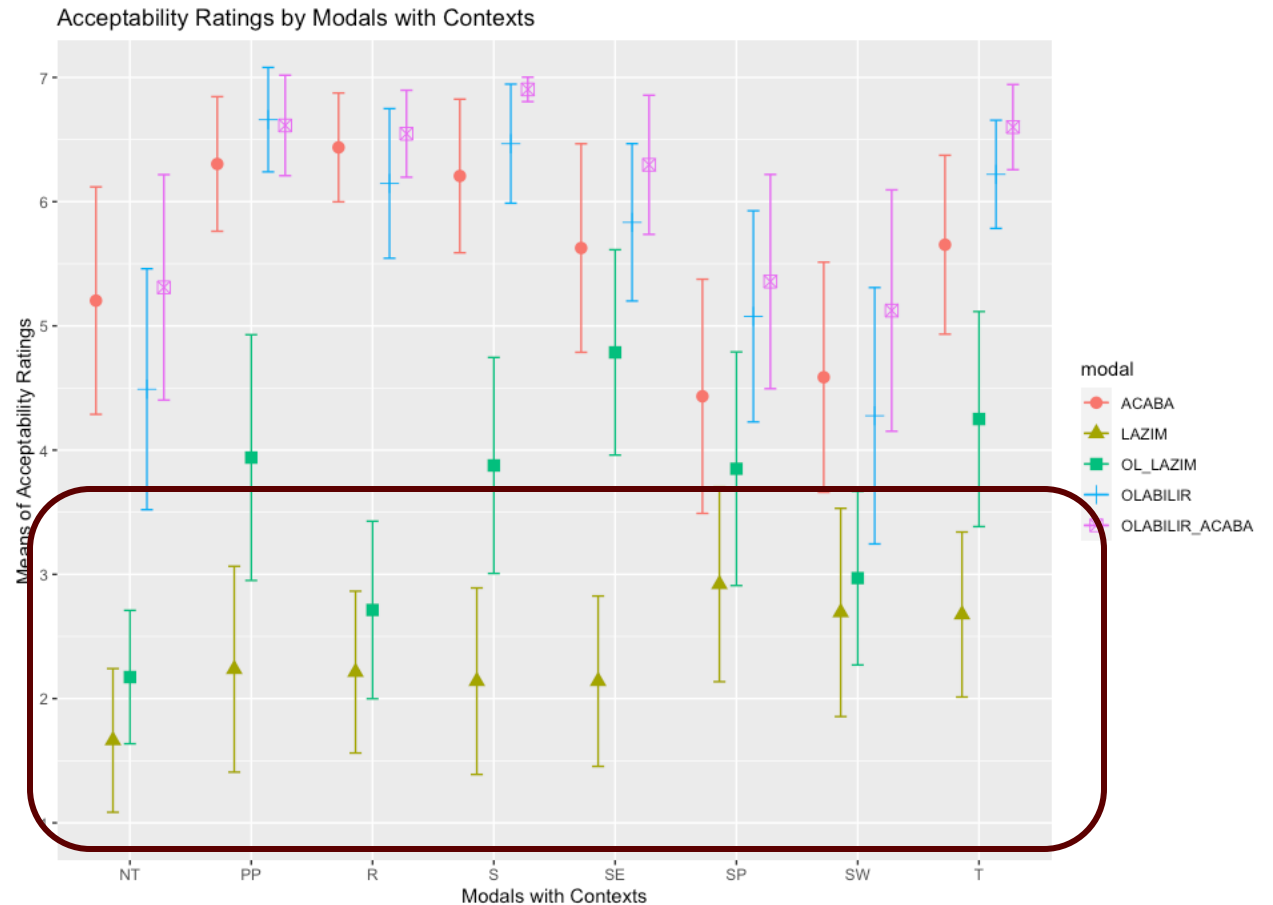
# Task I – Order vs Guess Ratings

- Significant effects of modals ( $\chi^2(4) = 317.49, p < .001$ )
- Significant effects of age of acquisition ( $\chi^2(1) = 4.285, p = .01$ )
- No effect of context
- NECESSARY (M = 1.88, SD = 1.48,  $\beta = -4.21, SE = 0.18, t = -23.581, p < .001$ )
- BE NECESSARY (M = 3.28, SD = 2.28,  $\beta = -2.80, SE = 0.18, t = -15.662, p < .001$ )



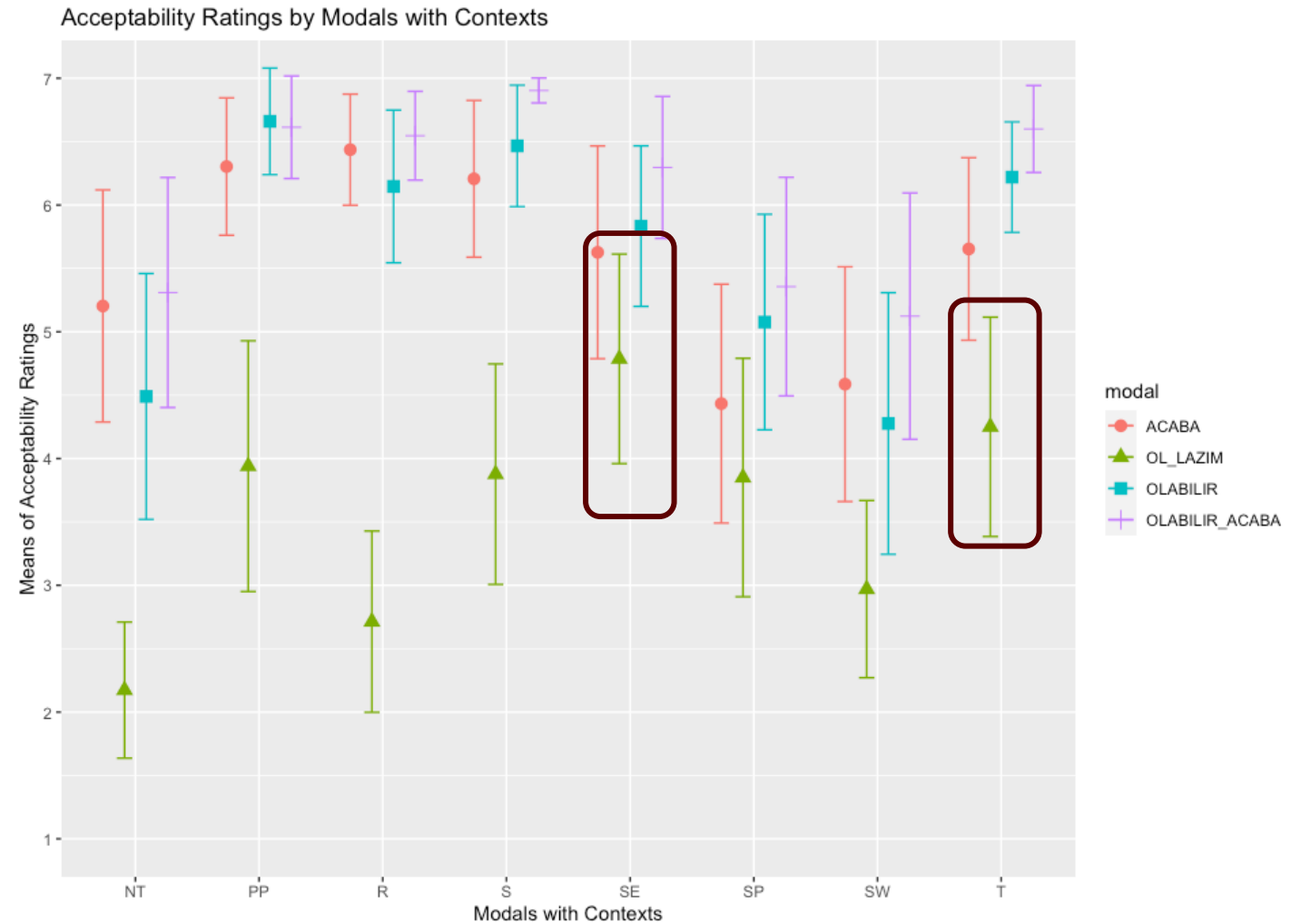
# Task II: Acceptability Rating

- Significant effects of modals ( $\chi^2 (4) = 174.16, p < .001$ )
- Significant effects of contexts ( $\chi^2 (7) = 14.709, p = .04$ )
- Significant interaction of modals and contexts ( $\chi^2 (39) = 279.61, p < .001$ )
- No effect of age of acquisition



# Task II: Acceptability Rating

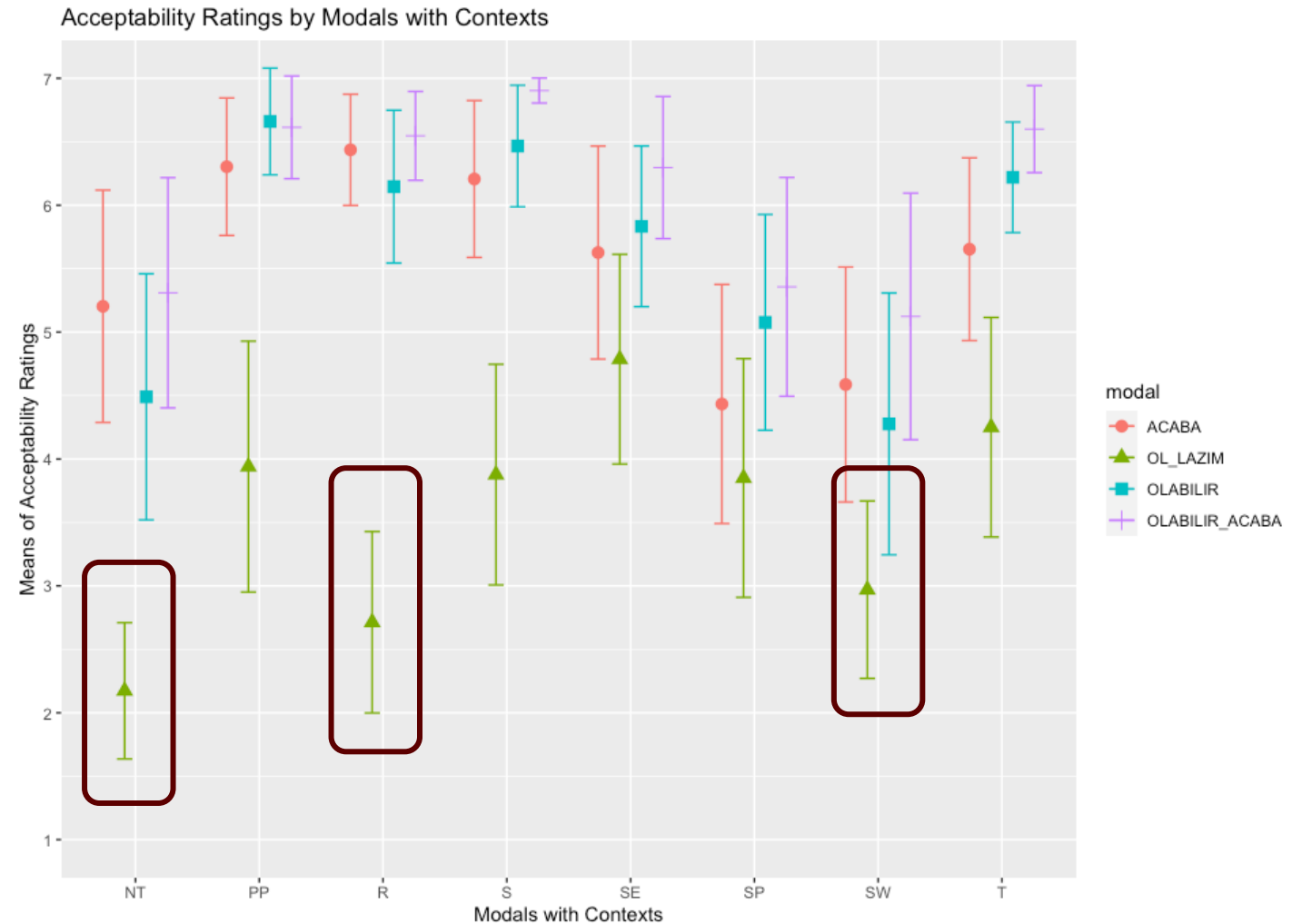
- BE NECESSARY requires a strong inference in epistemic contexts.





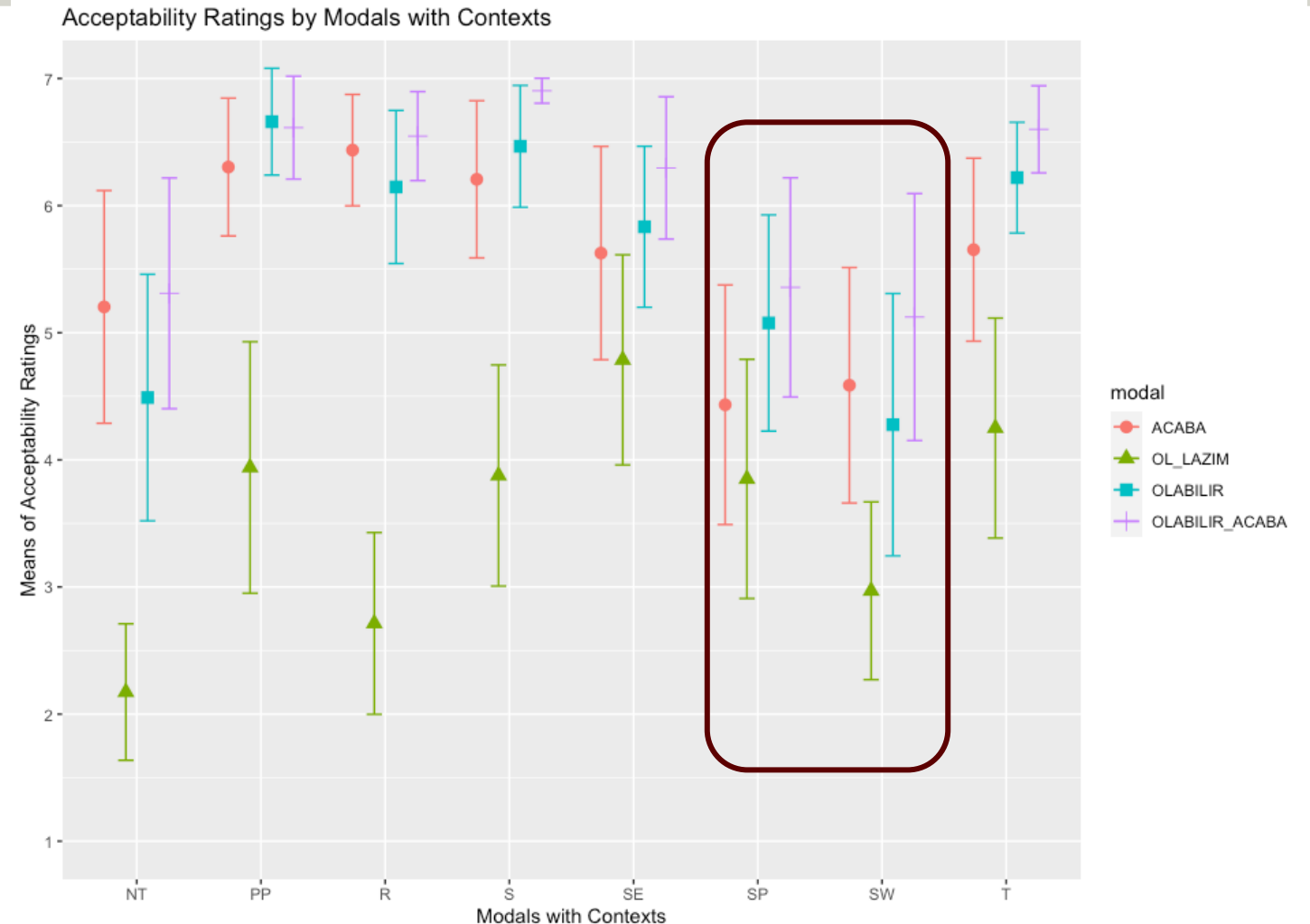
# Task II: Acceptability Rating

- BE NECESSARY requires a strong inference in epistemic contexts.
- NT (M=2.77, SD=2.63) yielded the lowest ratings, followed by R (M=2.80, SD=2.56) and SW (M=3.93, SD=2.56).



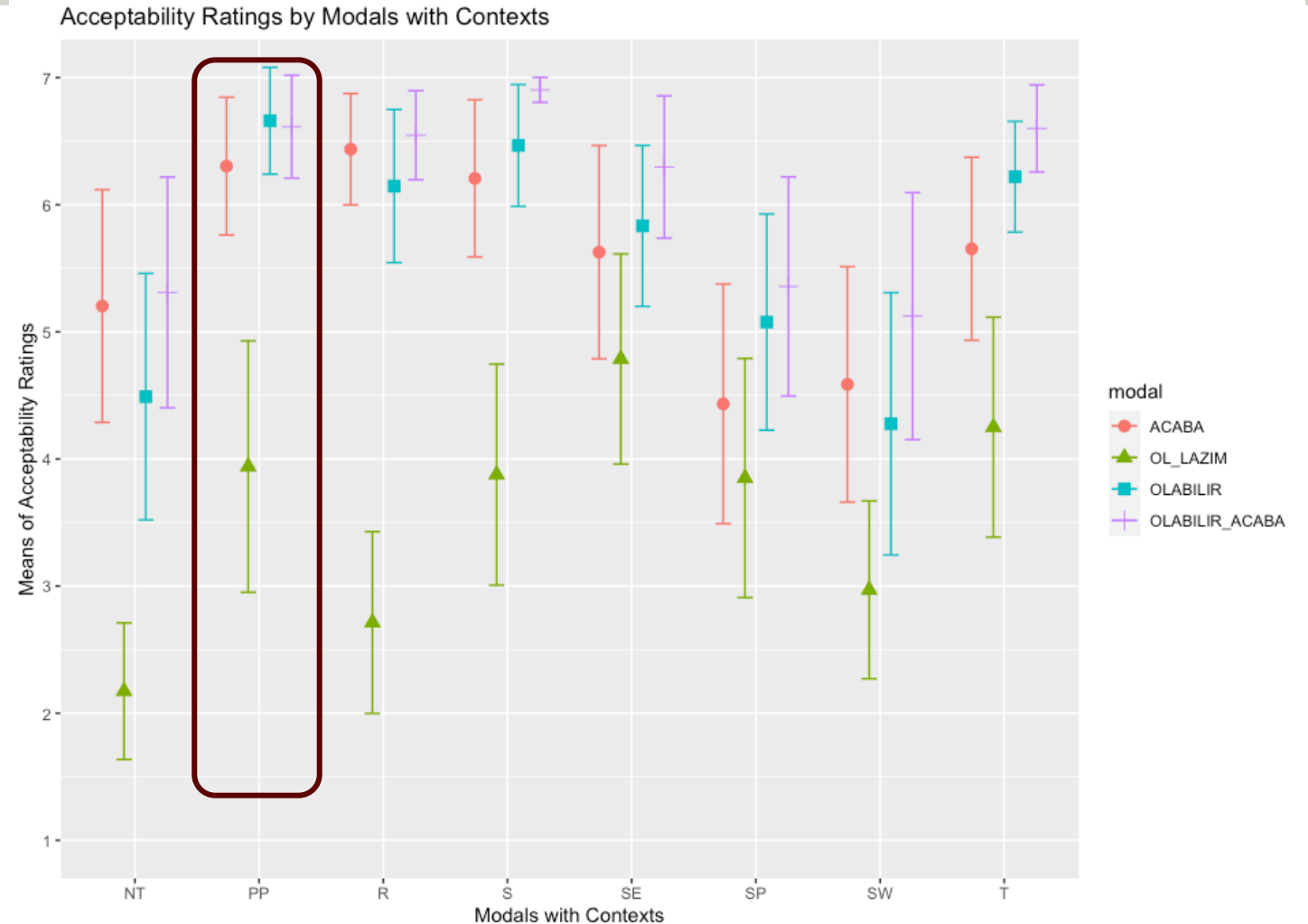
# Task II: Acceptability Rating

- SW and SP show the expected results because the signer witnesses either the whole event or its part.



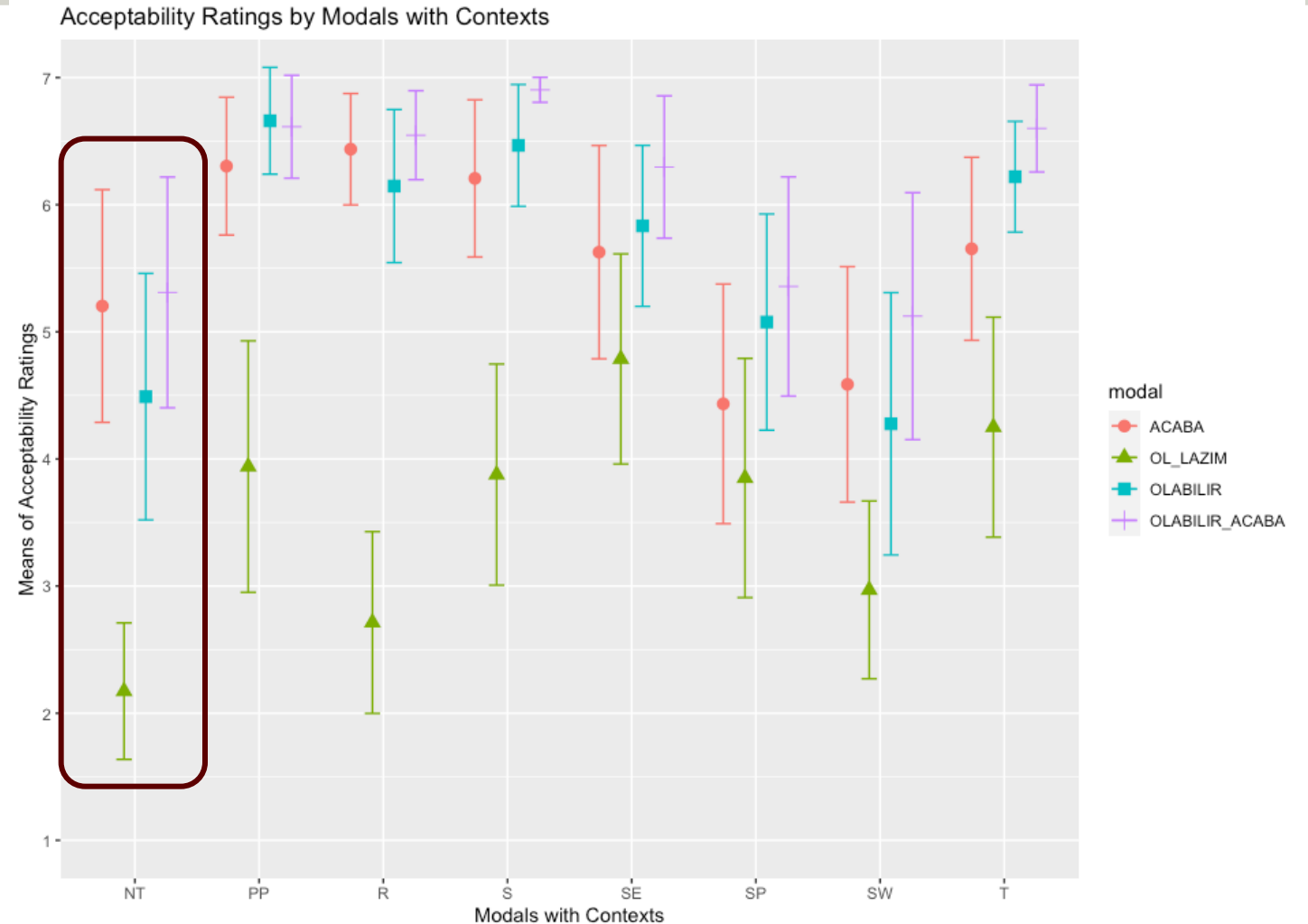
# Task II: Acceptability Rating

- PP contexts suggest that other signs are not specified for evidential requirement.



# Task II: Acceptability Rating

- NT shows that epistemic modals do not only report the possibility of proposition, but also the signer's commitment.



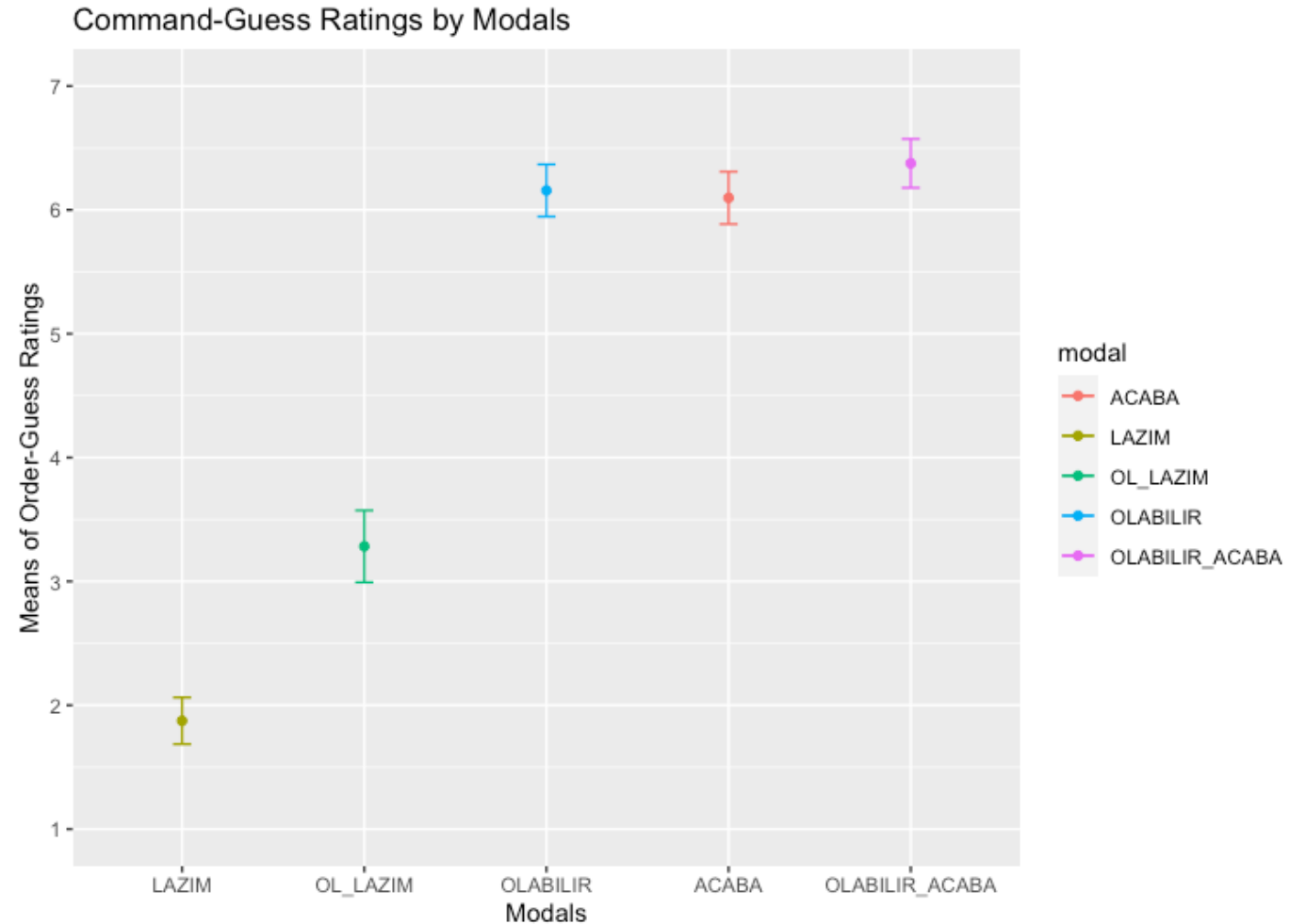
# Summary of Findings

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- BE NECESSARY requires strong evidence or inference contexts.
- Other epistemic signs are acceptable across all conditions.
- But they are less acceptable in Not-Trusting the Source condition.
- NECESSARY and BE NECESSARY were rated significantly differently both in acceptability ratings and order-guess ratings.

# Puzzle of BE

- NECESSARY clearly requires BE to be interpreted as epistemic in addition to the right kind of epistemic context.
- TİD does not have copula. BE (ol) is borrowed from Turkish.



# Why do we need BE?

- OL seems to encode the change of state when it appears alone.

(9) MAN SEE, FACE HANDSOME, SEE, IN-LOVE **BE**, TOMORROW IX-1 FOLLOW  
'The man was so handsome that I fell in love. I followed him next day.'

(Makaroğlu & Dikyuva, 2017)

(10) IX-POSS-1 MOM BEFORE MEAL TASTE^GOOD++, NOW MEAL TASTE^BAD

                  bf

**BE**, SHOCK

'Mom's meals tasted good before, now it happens to taste bad, I'm shocked.'

(Makaroğlu & Dikyuva, 2017)

# Possible Direction

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- Epistemic meaning in BE NECESSARY comes
  - The combination of two morphemes
  - BE gives what NECESSARY needs as an epistemic – situation argument (Ramchand, 2014).



# Further Puzzle

- When we compare **BE** and **POSSIBLE** they are the same sign only differing in their mouthings.
- Where does epistemic come from in **POSSIBLE** sentences?



# Conclusion

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- To be interpreted epistemic, T1D modal NECESSARY requires
  - right morphology – BE
  - Right kind of context – inference, strong evidence
- Then, what is the function of BE?
- Is there a difference between BE and POSSIBLE?

# Methodological Take-aways

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- Native signers' intuitions can guide the right directions like right morphology.
- Using their own terms can help to fasten the process of task description.
- It is crucial to find what they are NOT accepting.

# Thanks to

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- Purdue Ross-Lynn Research Foundation
- Purdue Promise Awards for data collections
- Purdue University Sign Linguistics Lab
- University of Chicago Sign Language and Linguistics Lab
- Boğaziçi University Sign Language and Linguistics Lab

# Thank you



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# Questions?

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# Sample of Contexts

(9) Pure Possibility Context: You are chatting with your friend about other planets and your friend asked if aliens exist. You share your idea:

ALIENS EXISTENTIAL POSSIBLE / MAYBE / POSSIBLE MAYBE / NECESSARY / BE NECESSARY

(10) Rumors Context: There are rumors about someone that you know. They say Ali won the lottery. You say:

ALI LOTTERY WIN POSSIBLE / MAYBE / POSSIBLE MAYBE / NECESSARY / BE NECESSARY

(11) Hearsay and Not Trusting Source Context: You are chatting with your friend. He told you that Ali won the lottery, but you don't trust your friend. You say:

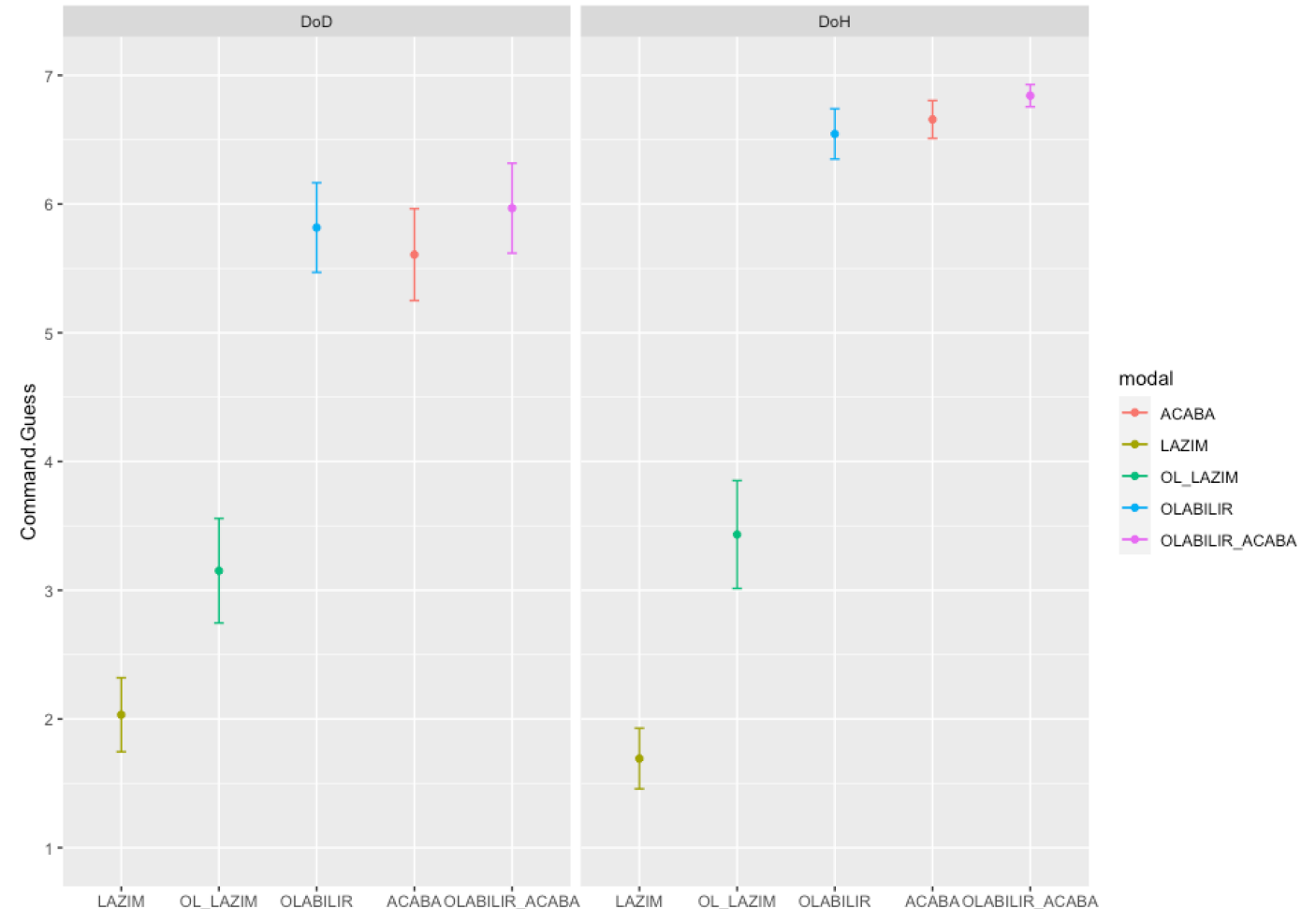
ALI LOTTERY WIN POSSIBLE / MAYBE / POSSIBLE MAYBE / NECESSARY / BE NECESSARY

(12) Hearsay and Trusting Source Context: You are chatting with your friend. He told you that Ali won the lottery, and you trust your friend. You say:

ALI LOTTERY WIN POSSIBLE / MAYBE / POSSIBLE MAYBE / NECESSARY / BE NECESSARY

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# Methodological Puzzle

## ❖ Wrong nonmanuals

