Already Perfect: Language users access the pragmatic meaning of conditionals first
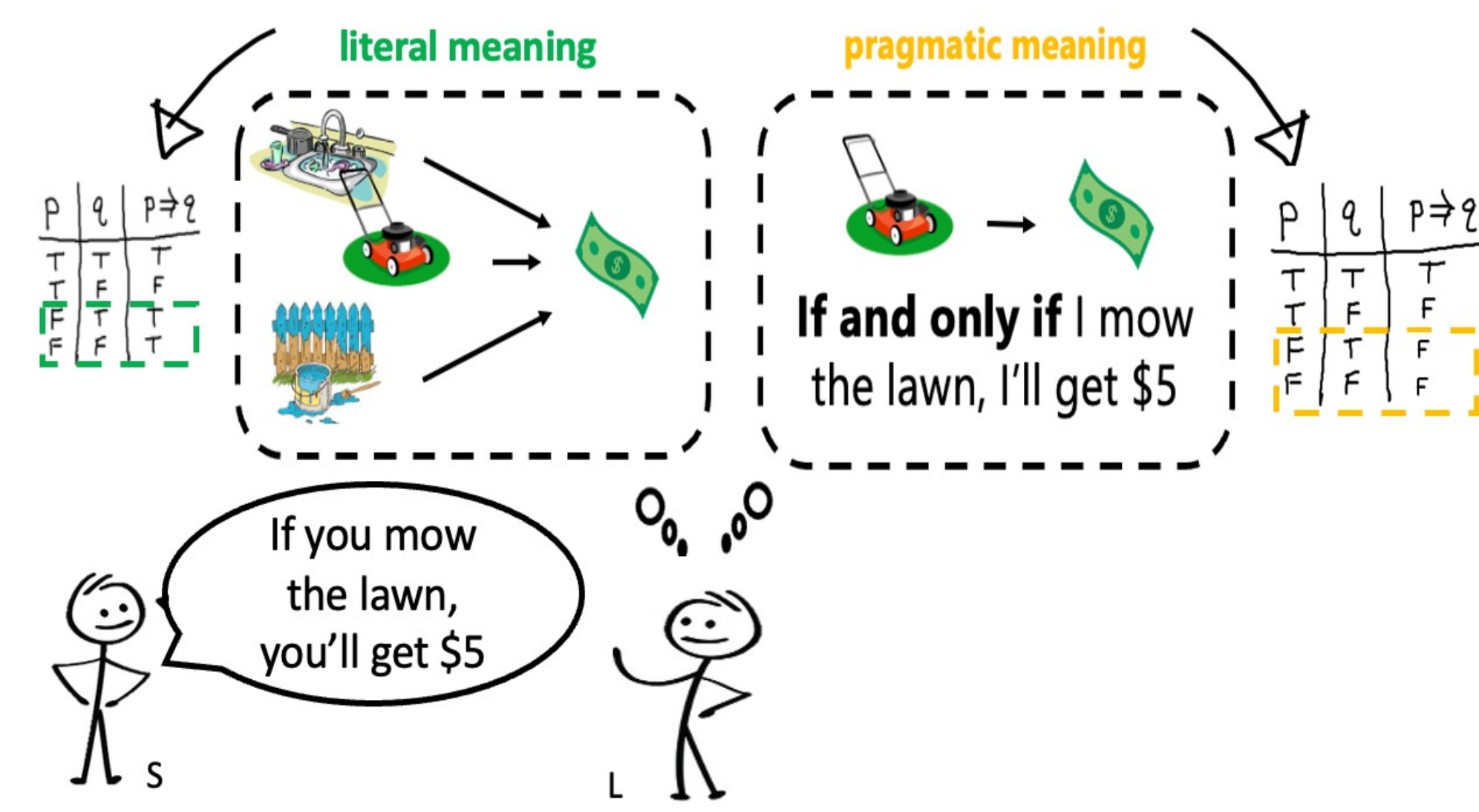
Ebru Evcen[1] and David Barner[2]

[1]*Department of Linguistics, UC San Diego*

[2]*Department of Psychology, UC San Diego*

Background

Conditional Perfection is a phenomenon in which conditionals are strengthened to biconditionals.

(e.g., A sentence of the form p → q invites an inference of the form ¬p → ¬q)[1]

literal meaning — pragmatic meaning

If and only if I mow the lawn, I'll get $5

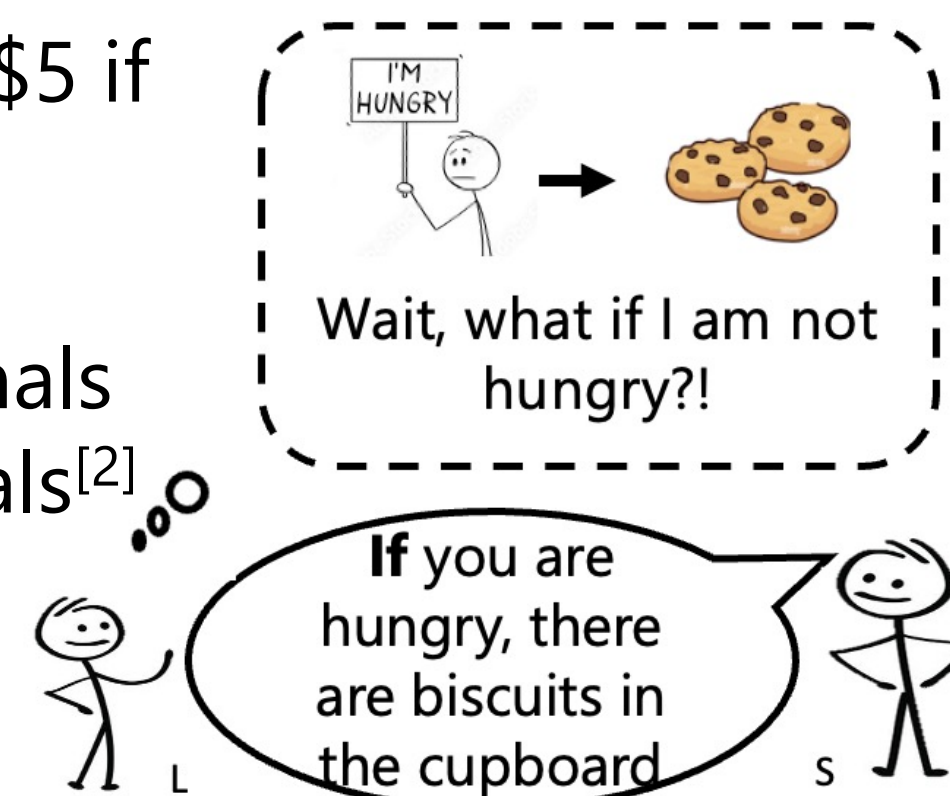If you mow the lawn, you'll get $5

Literal/Weaker meaning: If you mow the lawn, you'll get $5 (e.g., the speaker might give five dollars if you do a different chore)

Pragmatic/Stronger meaning: If and only if you mow the lawn, you will receive $5 (e.g., the speaker won't give five dollars if you do a different chore)

CP is an implicature:
- Defeasible
  - e.g., You'll also receive $5 if you do the dishes.

Wait, what if I am not hungry?!

- Non-perfectible conditionals
  - e.g., **biscuit** conditionals[2]

If you are hungry, there are biscuits in the cupboard

Previous accounts:
- CP arises from pragmatic reasoning as a form of 'scalar implicature'.[3,4]
  → takes time and cognitive effort[5, 6, 7]
- Few empirical studies have tested whether CP is costly, and have produced conflicting results.[8,9,cf.10]

We ask:
How do people arrive at the pragmatic interpretation as opposed to the literal one?

Literal-First hypothesis: L starts with the logical meaning, then derives the perfected form via implicature
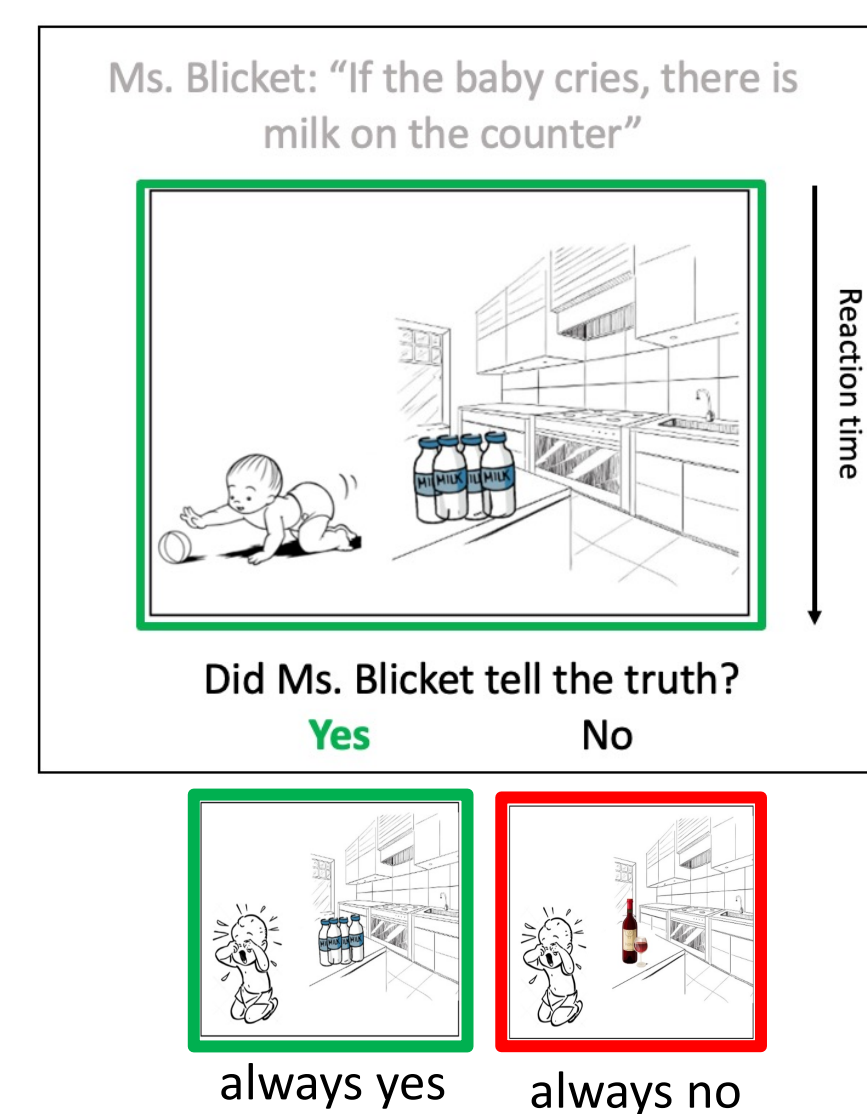
CP-First hypothesis: L instead begins with a perfected (i.e., only-if) meaning, only reverting to a literal meaning if this is required by the context
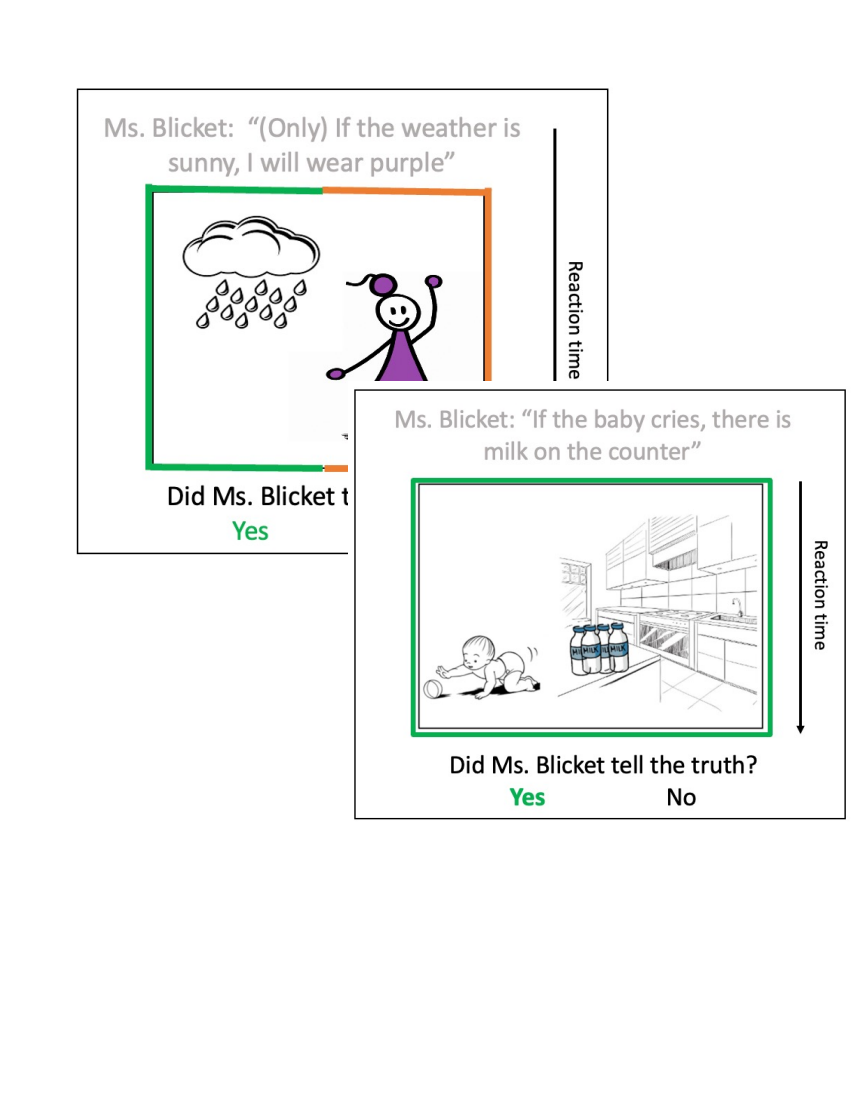
Methods and Results

exp 1: ONLY VS STANDARD [N=151]
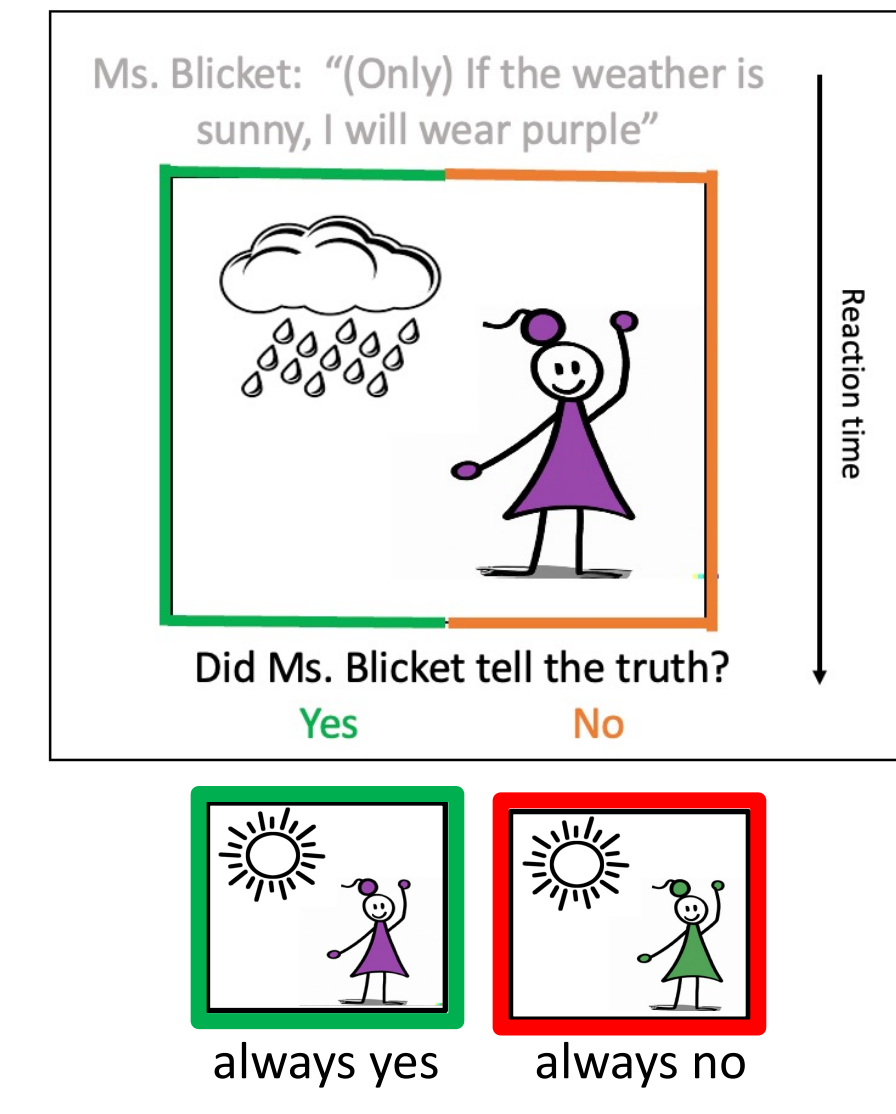
exp 2: BISCUIT [N=75]

exp 3: STANDARD VS BISCUIT [N=72]
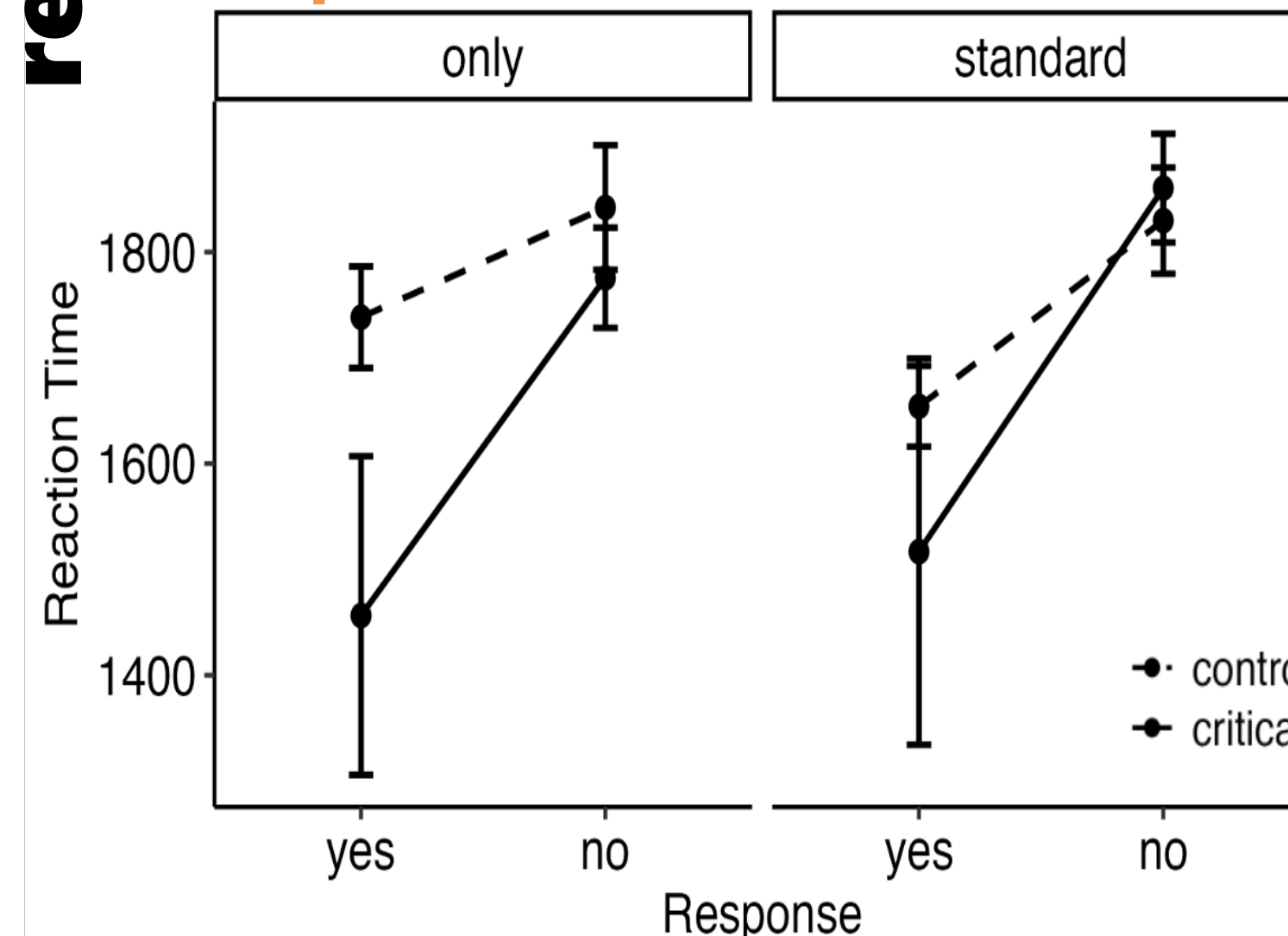

- Sentence-picture verification task
- Online study via Prolific
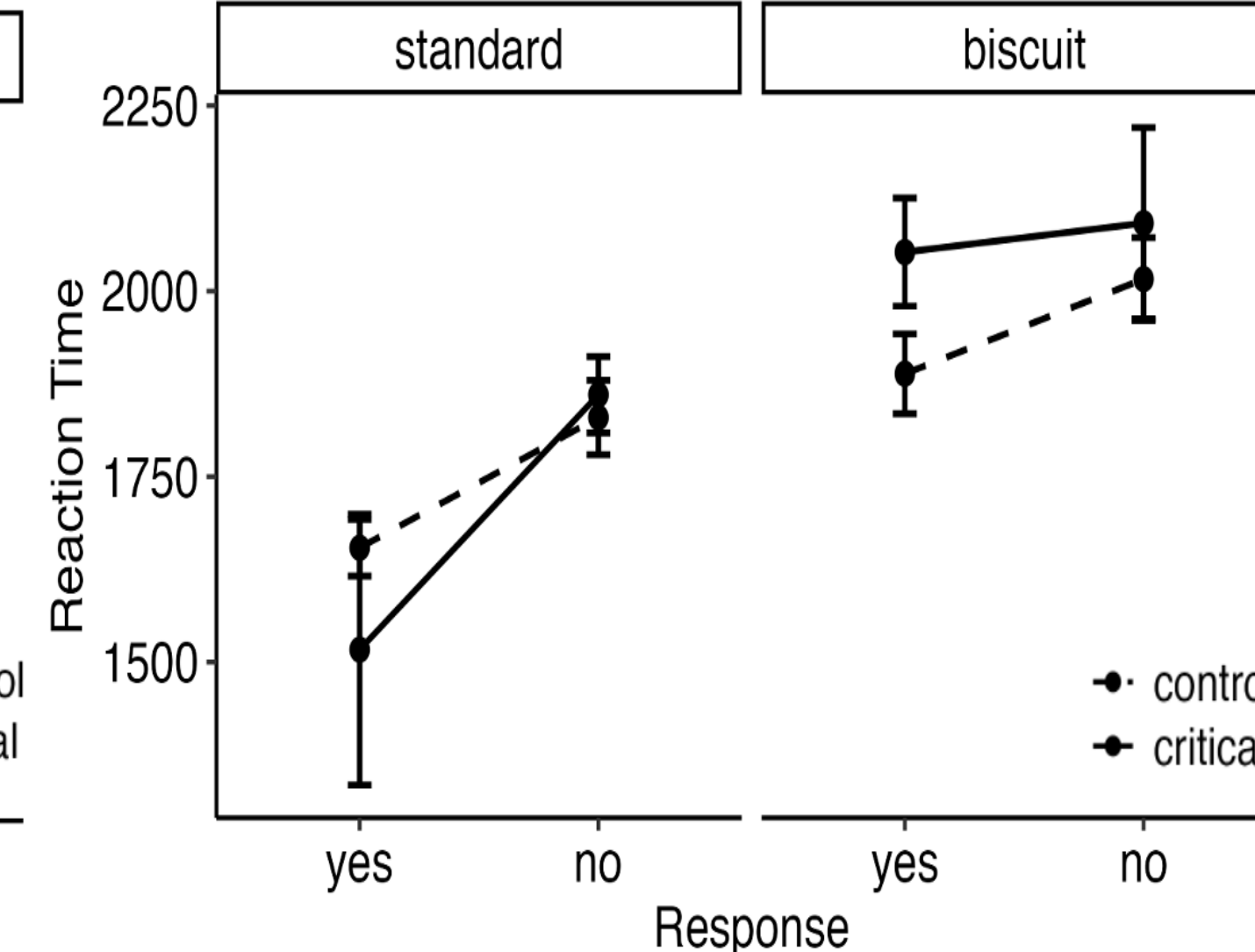- 9 critical items per Conditional 3 per Trial Type [control: (p & q), (p & ¬q); critical: (¬p & q)]

Literal-First hypothesis → a computation cost (from literal to perfected meaning)

CP-First hypothesis → a cancellation cost (from perfected to literal meaning)
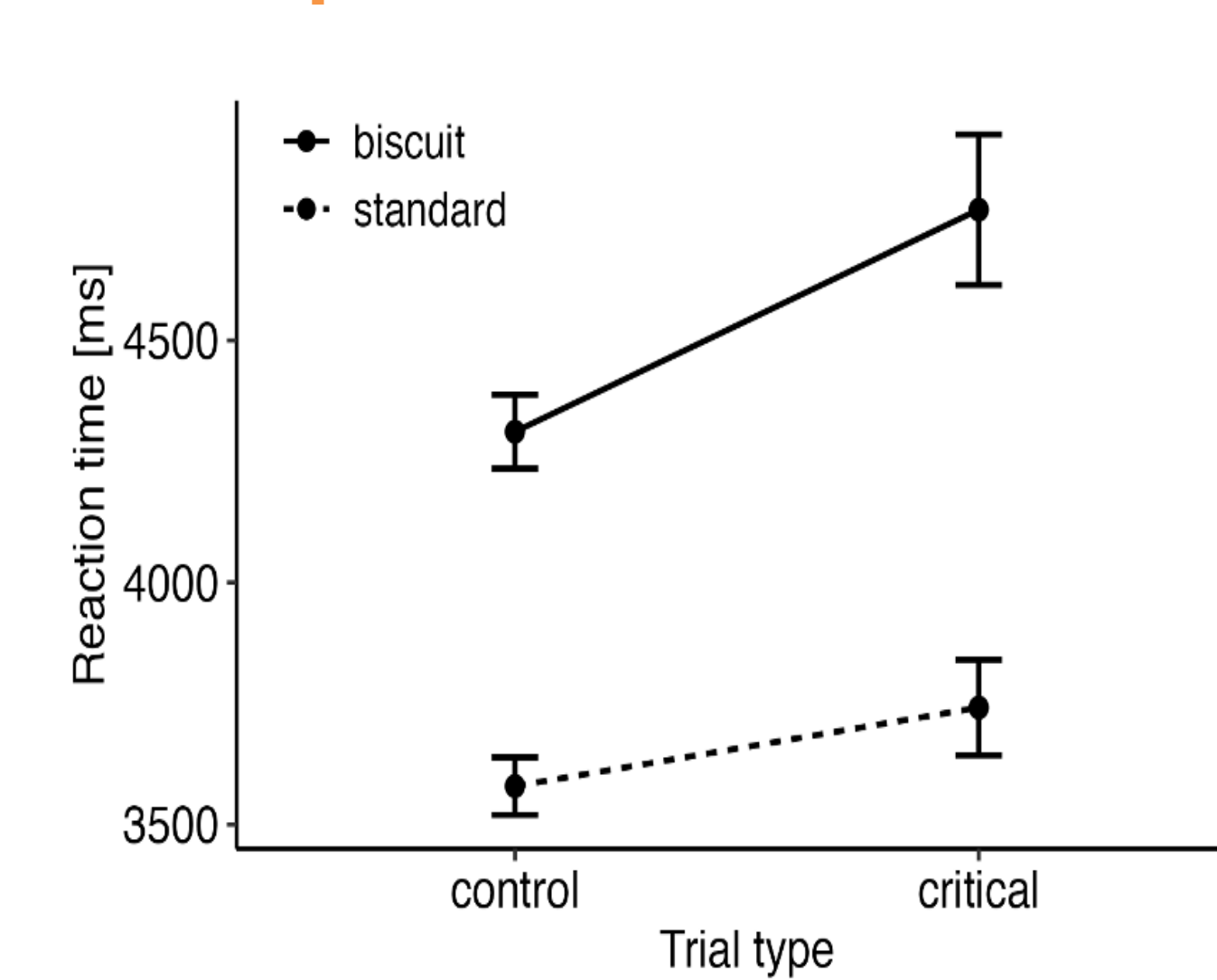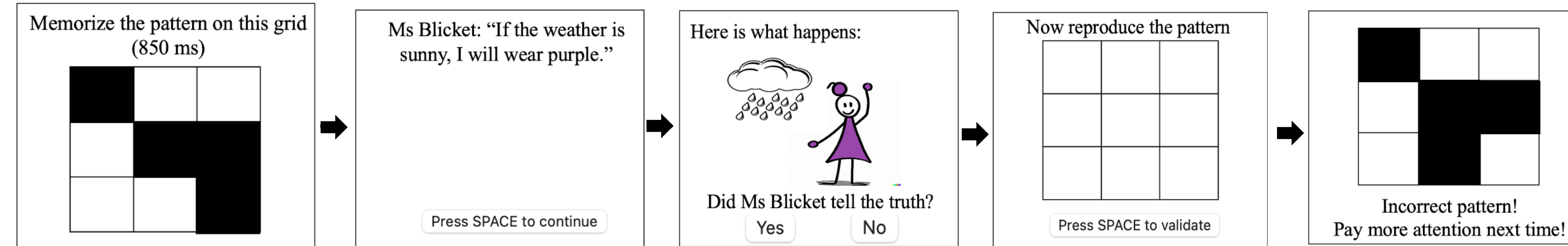
reaction time

exp 1:

exp 2:

exp 3:

cognitive load

exp 4: STANDARD VS BISCUIT under HIGH VS LOW LOAD [N=90]

exp 5: STANDARD VS BISCUIT under NO LOAD [N=45]
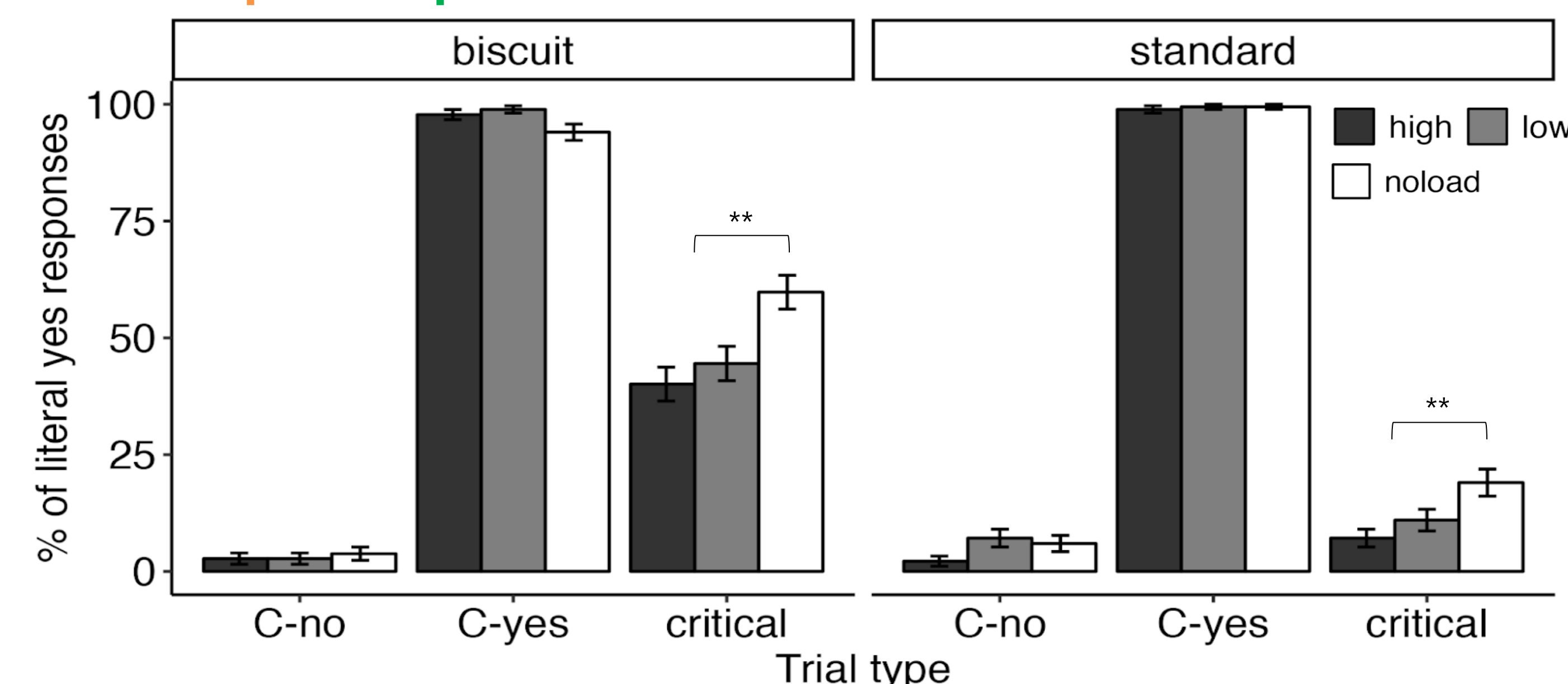

- Dual task paradigm: dot memory task & sentence-picture verification task
- In lab study, recruitment via SONA
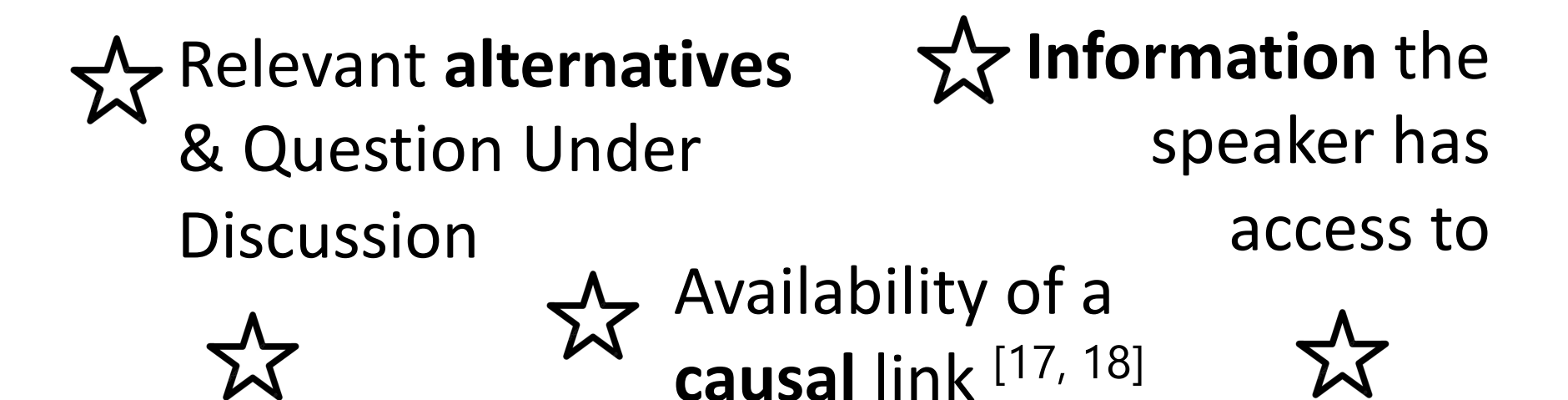- Conditional (n=12) & Load (high, low) as within-subjects using block design

- An increase in load → reduced capacity to compute pragmatic inferences[6, 12]
- If CP is an inference on top of the literal meaning → less likely under load

exp 4 & exp 5:

Discussion

- **Key findings:**
  Perfected meanings were computed quickly (compared to literal meanings) and were more likely under load, while literal meanings took more time to derive (than perfected meanings and control cases) and were less likely under load.

- Converging evidence for the **CP-first hypothesis**: Listeners appear to begin with a perfected meaning and retreat to the weaker meaning if the richer meaning is not supported.

- **Surprising** under standard Gricean accounts of implicature

- **Structural differences**: What are the stronger alternatives? [3, 13, 14]

- **A more global exhaustivity assumption:** Conditional perfection does not involve generating and negating specific alternatives, but instead relies on a more global exhaustivity assumption. [15, 16]

- Implications for development of conditional reasoning in **children** [19, 20]

- CP arises by default if all the stars align

☆ Relevant **alternatives** & Question Under Discussion

☆ **Information** the speaker has access to

☆ Availability of a **causal link** [17, 18]

References: [1] Geis & Zwicky, 1971; [2] Austin, 1961; [3] Horn, 2000; [4] van der Auwera 1997; [5] Chevallier et al. 2008; [6] De Neys & Schaneken, 2007; [7] Marty & Chemla, 2013; [8]Marcus & Rips, 1979; [9] van Tiel & Schaeken, 2016; [10] Barrouillet et al., 2000; [11] Noveck et al., 2011; [12] Chemla & Bott, 2011; [13] Atlas & Levinson, 1981; [14] Auwera, 1997; [15] von Fintel, 2001; [16] Groenendijk & Stokhof, 1991; [17] Dancygier & Sweetser, 2005; [18] Van Canegem-Ardings & Van Belle, 2008; [19] Barrouillet et al., 2001; [20] De Neys & Everaerts, 2008.