

Presence-absence asymmetries in predictive perception

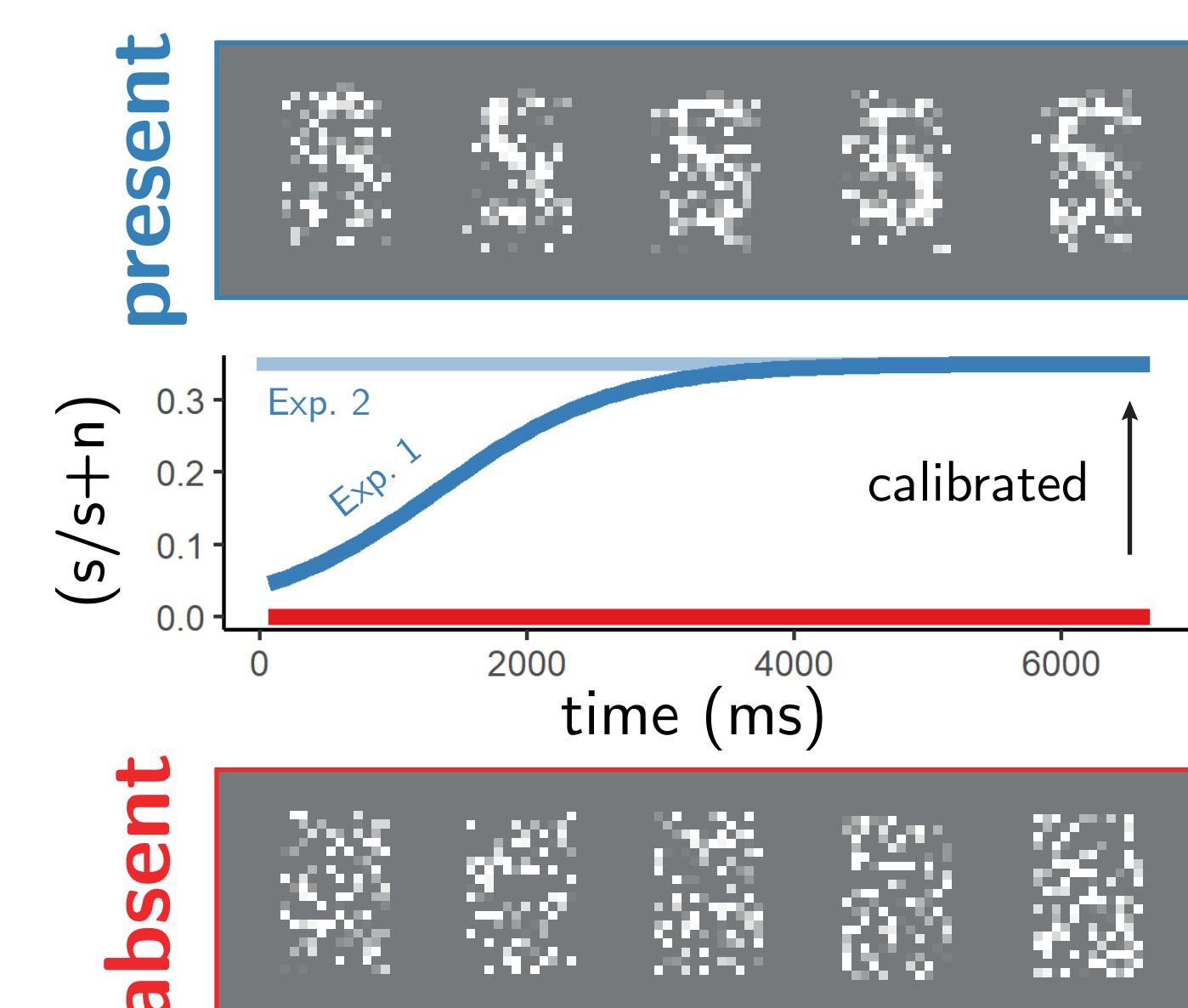
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1. ABSENCE IS INFERRED: We decide that something is absent when we believe we would have perceived it if it were present [1,2].

2. EXPECTATION CAN SHARPEN PERCEPTION: We perceive things more readily when they are expected [3,4].

3. HERE WE ASKED: do people have a metacognitive representation of (2), such that they can use it to more readily infer absence when perception would be facilitated by expectation?

METHODS: CONTRASTING THE TIMING OF DECISIONS ABOUT ABSENCE IN CONGRUENT AND INCONGRUENT CONTEXTS.

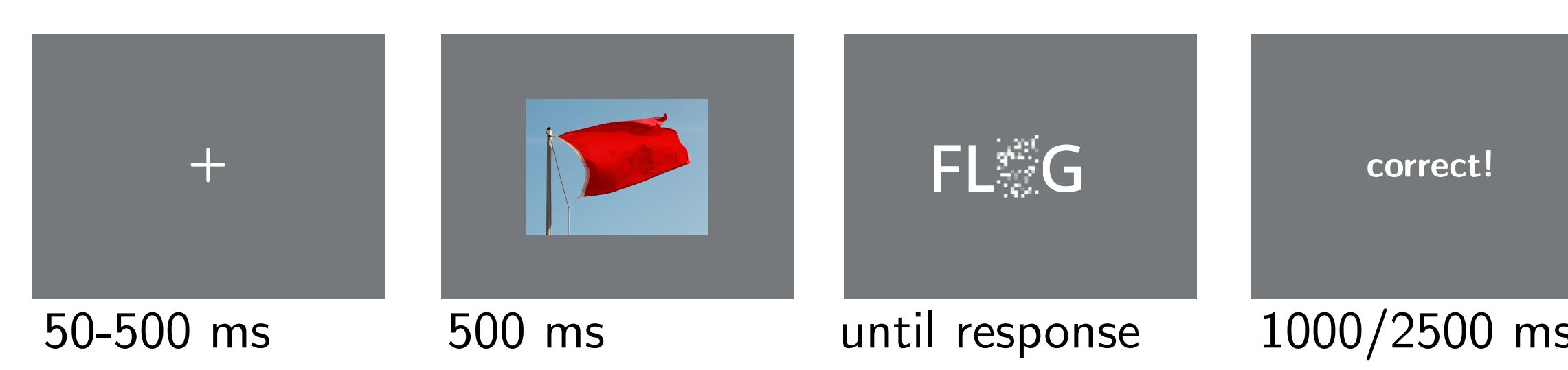


Was the 'S' present in the dynamic noise?

CONGRUENT CONTEXT:

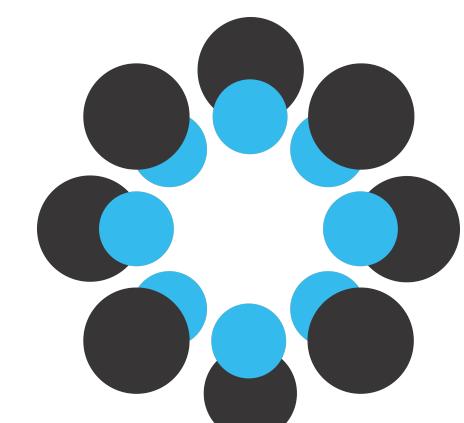


INCONGRUENT CONTEXT:



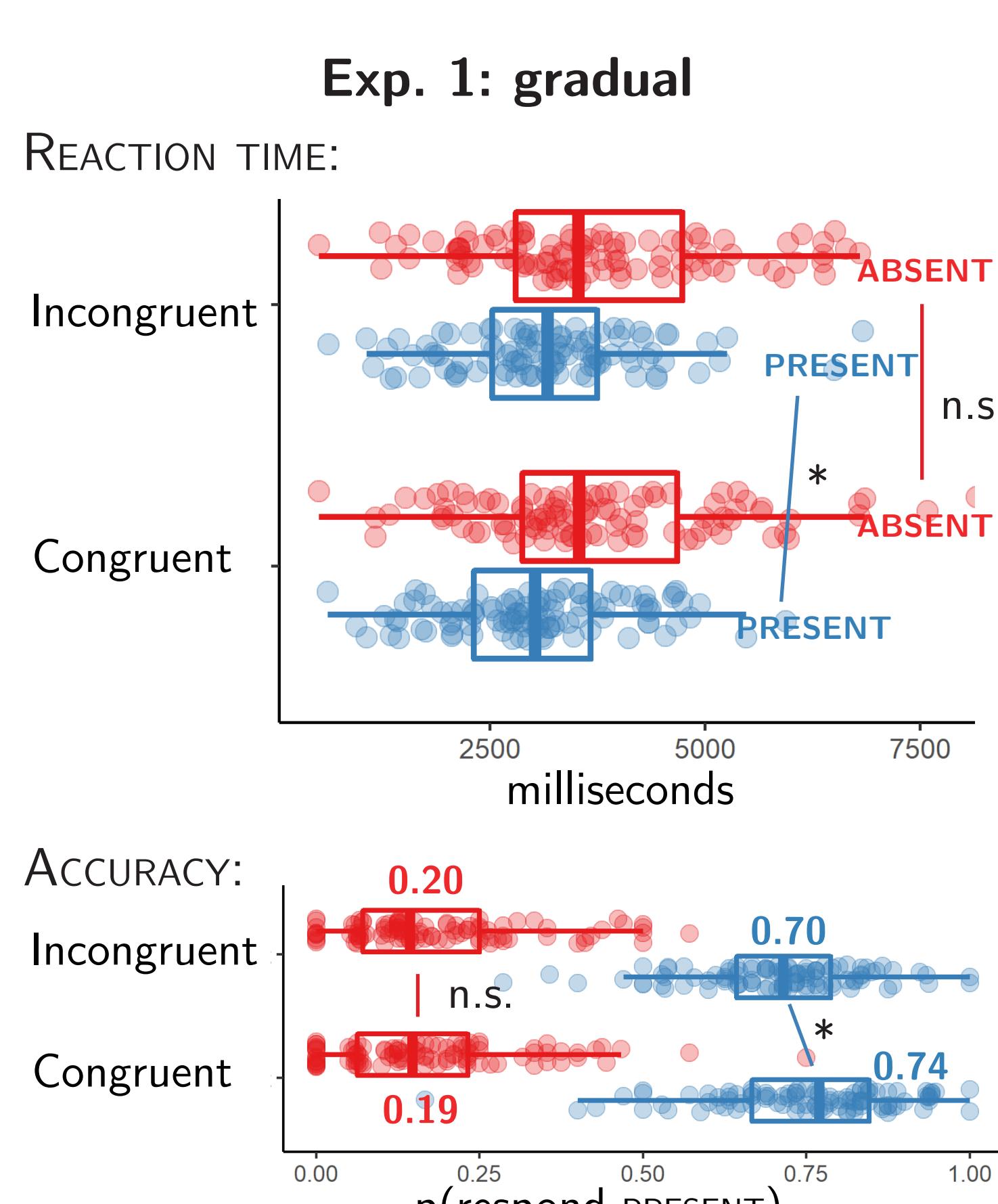
Targets appear in congruent or incongruent contexts on different trials.

Exp. 1: osf.io/tbqz4
Exp. 2: osf.io/nh46f



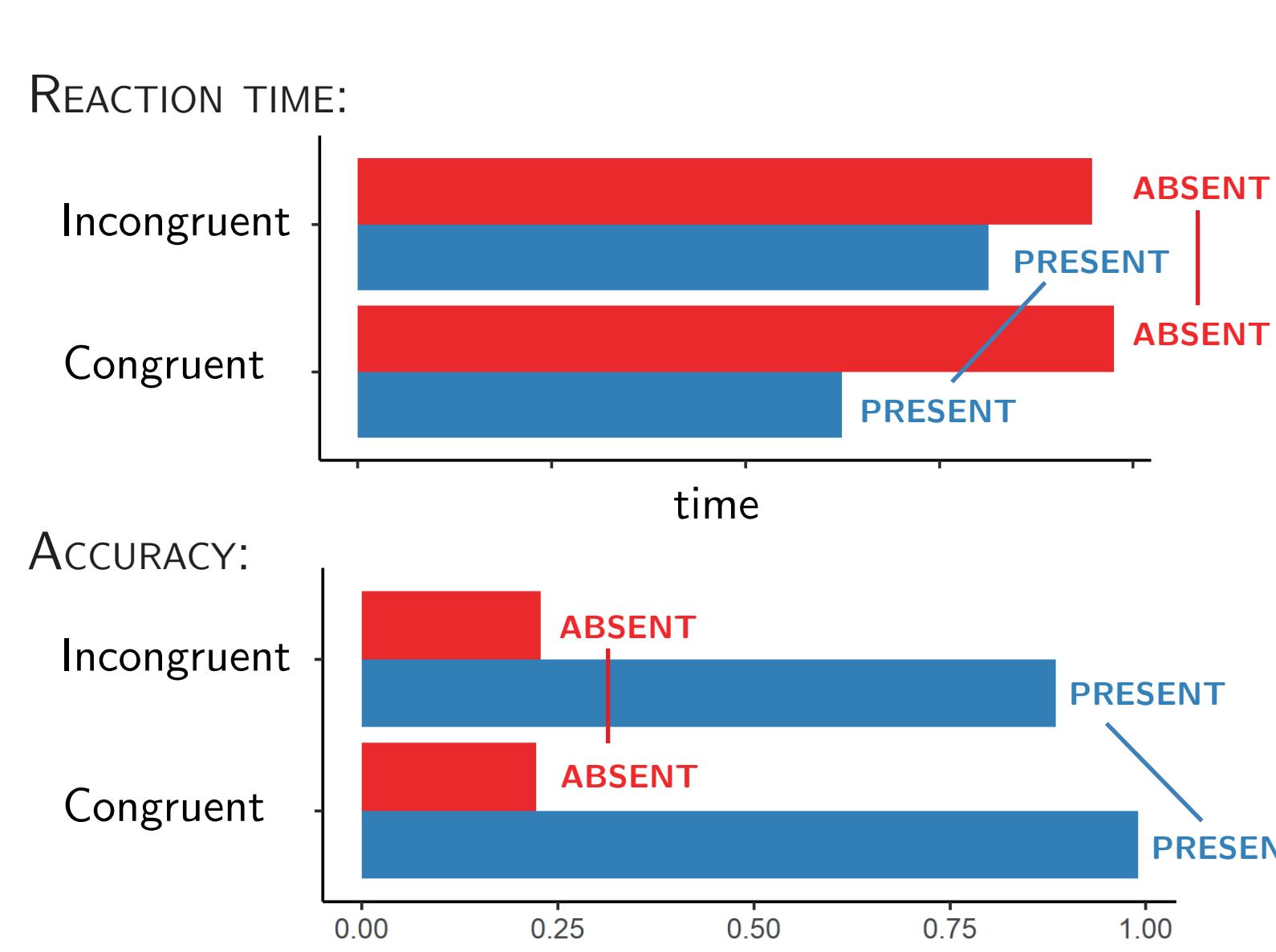
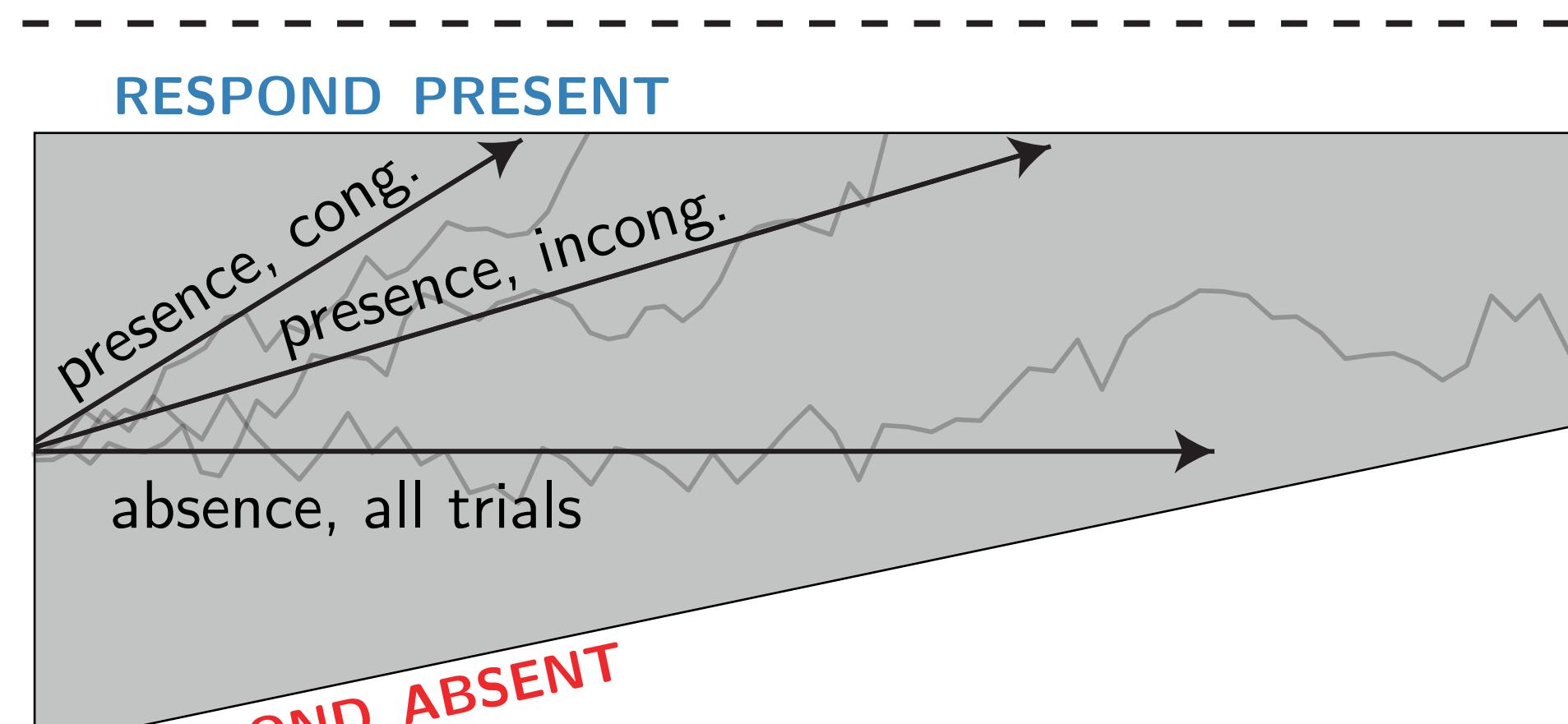
- The target letter is A or S, on different blocks (2 blocks of 16 trials per letter).
- Letter visibility on 'present' trials gradually increases (Exp. 1), or stays constant (Exp. 2). Always 0 on 'absent' trials.
- N=100 (Exp. 1), 300 (Exp. 2).

RESULTS: REPLICATING PREVIOUS FINDINGS, DECISIONS ABOUT PRESENCE ARE AFFECTED BY CONTEXT. HOWEVER, DECISIONS ABOUT ABSENCE ARE NOT.



Our qualitative accuracy and RT results are captured by an asymmetric model where evidence is accumulated for presence, and absence is inferred when the accumulator reaches a collapsing boundary ("I should have reached the upper boundary by now").

Congruency affects the drift rate for presence, but not the boundary, which is under subjects' metacognitive control.



CONCLUSIONS

Although objects are more easily found in congruent contexts, subjects were not able to use this fact to make more efficient inferences about absence.

This may be due to the absence of a metacognitive insight into facilitating effects of a congruent context on perception, or due to an inability to flexibly adjust a decision rule between trials.

1. Mazor, M., & Fleming, S. M. (2022). Efficient search termination without task experience. *Journal of Experimental Psychology: General*.

2. Goldberg, S. (2011). If that were true I would have heard about it by now. *Social epistemology: Essential readings*, 92-108.

3. Yon, D., Gilbert, S. J., de Lange, F. P., & Press, C. (2018). Action sharpens sensory representations of expected outcomes. *Nature communications*, 9(1), 1-8.

4. Heilbron, M., Richter, D., Ekman, M., Hagoort, P., & De Lange, F. P. (2020). Word contexts enhance the neural representation of individual letters in early visual cortex. *Nature communications*, 11(1), 1-11.