# Bridging familiarity-based recognition memory and novelty detection: a matter of timing

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## INTRODUCTION

Memory and novelty detection are thoroughly intertwined since novelty detection relies on the capacity to distinguish what is already known from what is not. However, the computational mechanism underlying novelty detection is not understood yet: do novelty and familiarity (i.e., retrieval based on stimulus strength) signals stem from a same unique mechanism as the two ends of a single continuum or from two distinct processes?

## HYPOTHESES

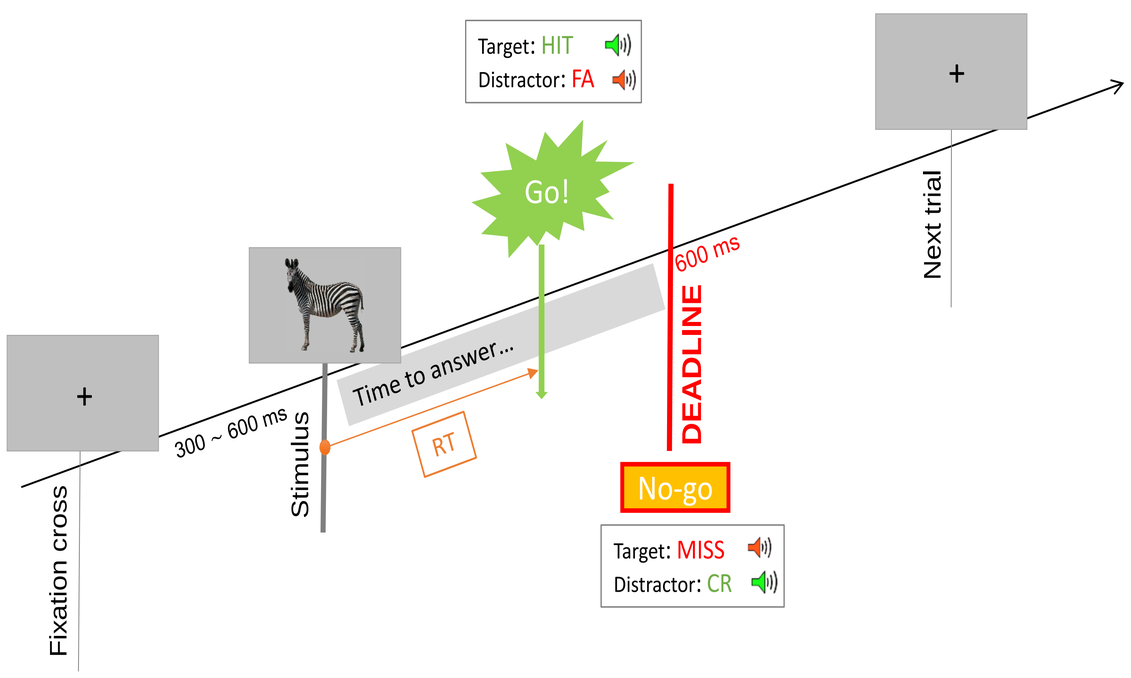
Different hypotheses arise from these two options concerning their temporal dynamics. In the first case, both processes should display a similar rapid temporal dynamics with similar characteristics. The second case would rather suggest dissociations between novelty and familiarity temporal dynamics, novelty being longer than familiarity.

## METHODS

**Participants**: 20 healthy subjects (mean age: 23 ± 3 (SD), range: 20-32; 13 females, 1 left-handed)

**Procedure**: 10 blocks of a recognition memory task

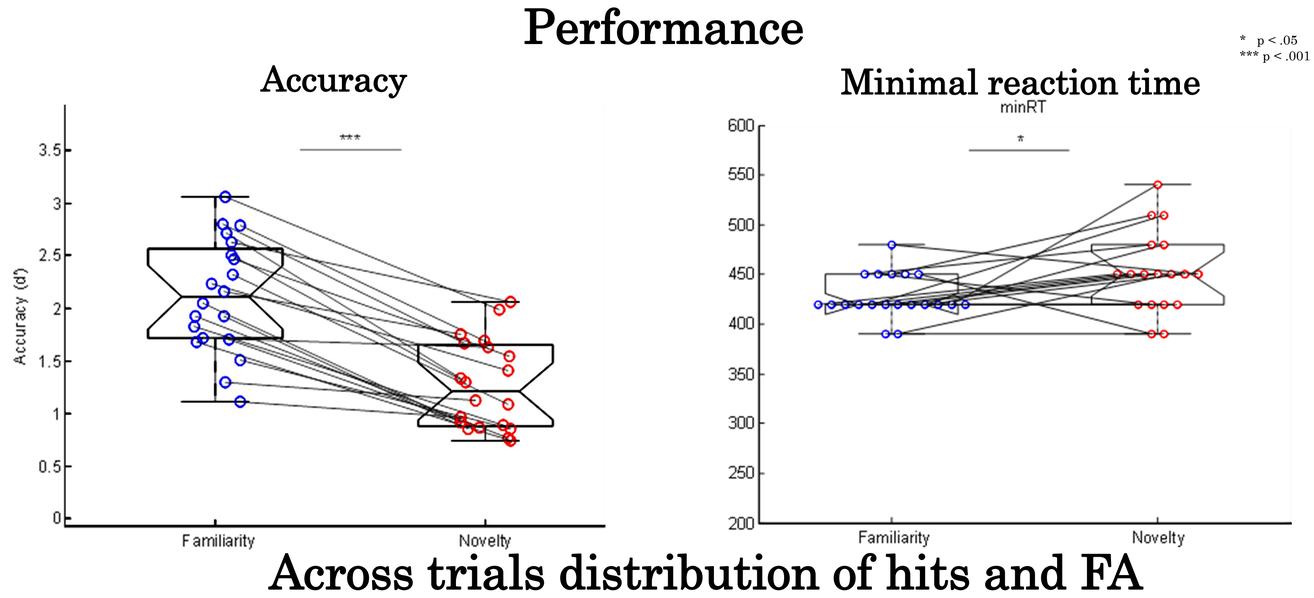
- Study: 30 items/block
- Test:
  - 30 targets & 30 distractors/block
  - 2 conditions: familiarity versus novelty detection
    - 5 blocks/condition, counterbalanced across participants
  - Speed and Accuracy Boosting procedure (SAB) [1, 2] : new task that constraints subjects to use their fastest strategy



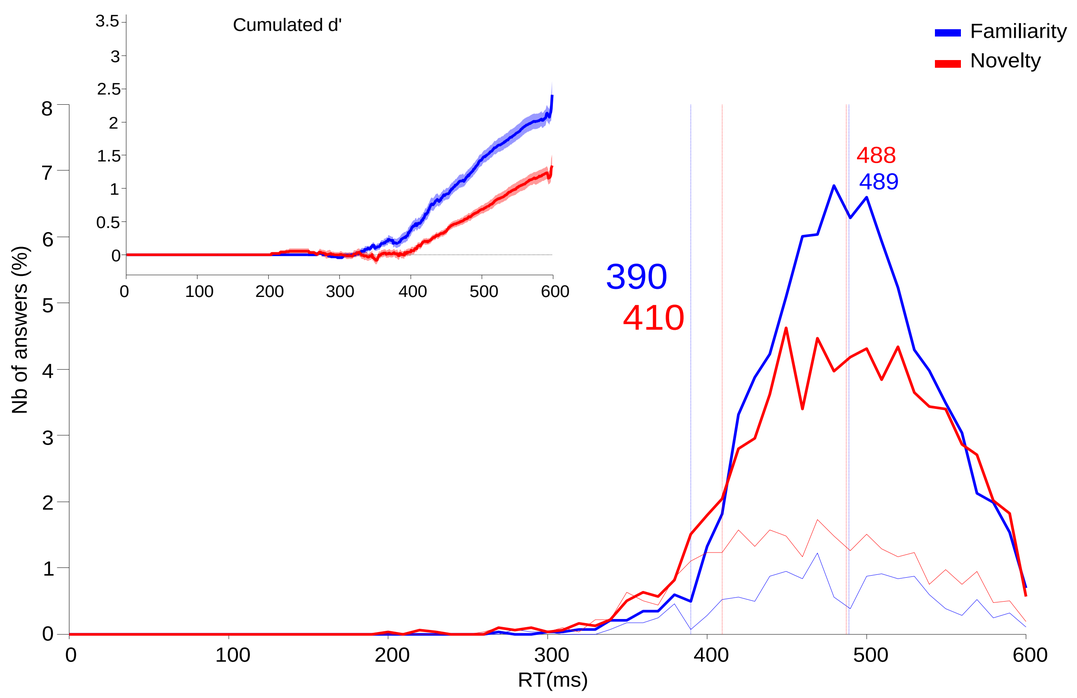

**Minimal reaction time:** time at which the number of correct answers (hits) significantly outnumbers the number of false alarms (FA)

## RESULTS

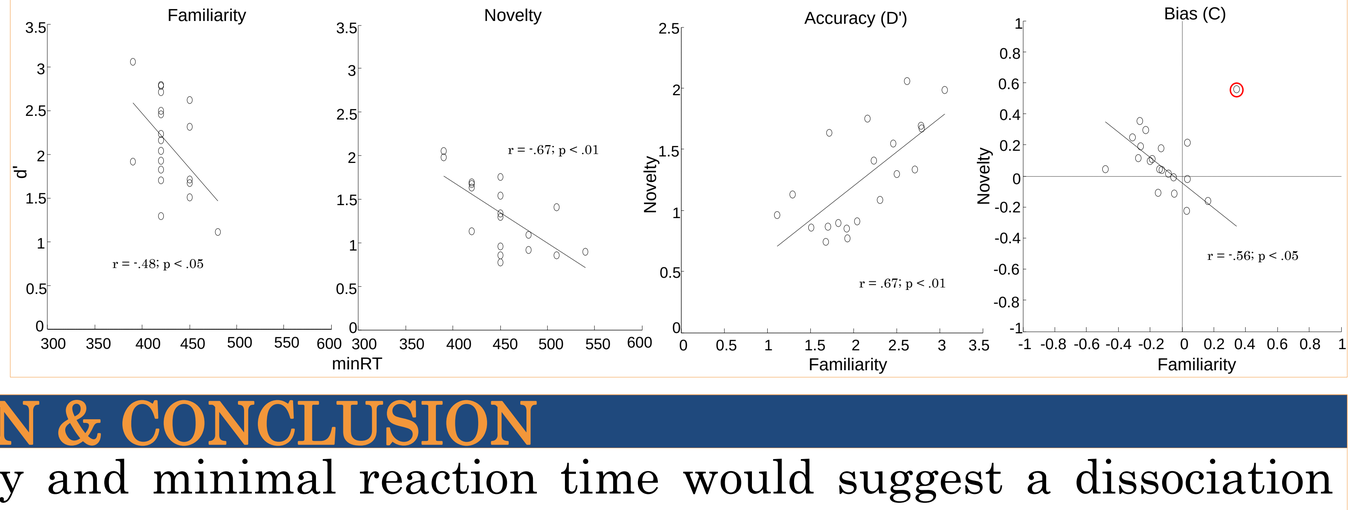
### Performance




### Across trials distribution of hits and FA




### Correlations




## DISCUSSION & CONCLUSION

Although the observed differences in both accuracy and minimal reaction time would suggest a dissociation between novelty detection and familiarity, a further interpretation suggest that these differences are mainly due to an inverse symmetry in the response bias, explaining both a better performance and shorter reaction time for familiarity. As for the correlations, they rather tend to show clear similarities between novelty detection and familiarity-based recognition memory. Taken together, these results lead us to argue in favor of a unique familiarity/novelty discrimination system as the two ends of a single continuum.

**REFERENCES**
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[2] Besson, G., Ceccaldi, M., Tramoni, E., Felician, O., Didic, M., & Barbeau, E. J. (2015). Fast, but not slow, familiarity is preserved in patients with amnestic Mild Cognitive Impairment. *Cortex, 65,* 36-49

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