

Presentation time does not affect the superordinate-level advantage in ultra-rapid categorization

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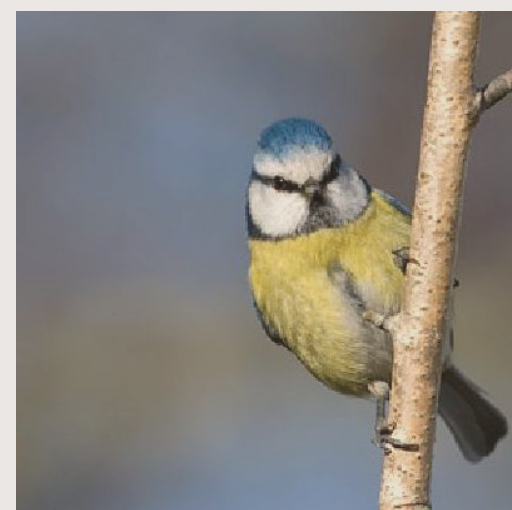
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Background

Animal?
(superordinate-level categorization)



Bird?
(basic-level categorization)

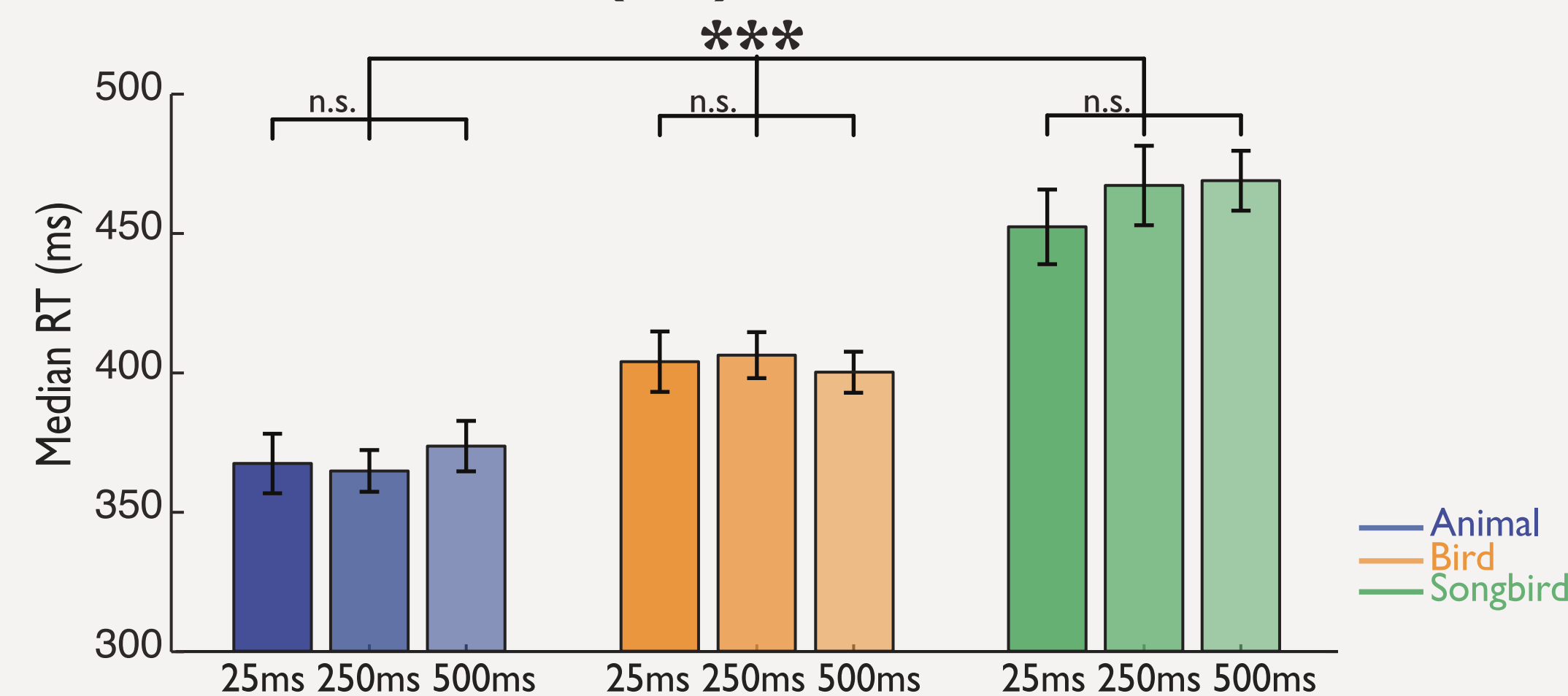
Songbird?
(subordinate-level categorization)

- Bird accessed first (Rosch et al., 1976; Tanaka & Taylor, 1991).
- Animal accessed first (Mace et al., 2009).
- Animal accessed first only at short stimulus duration (Mack & Palmeri, 2011): fast presentations could degrade the content of the image and emphasize coarse visual information

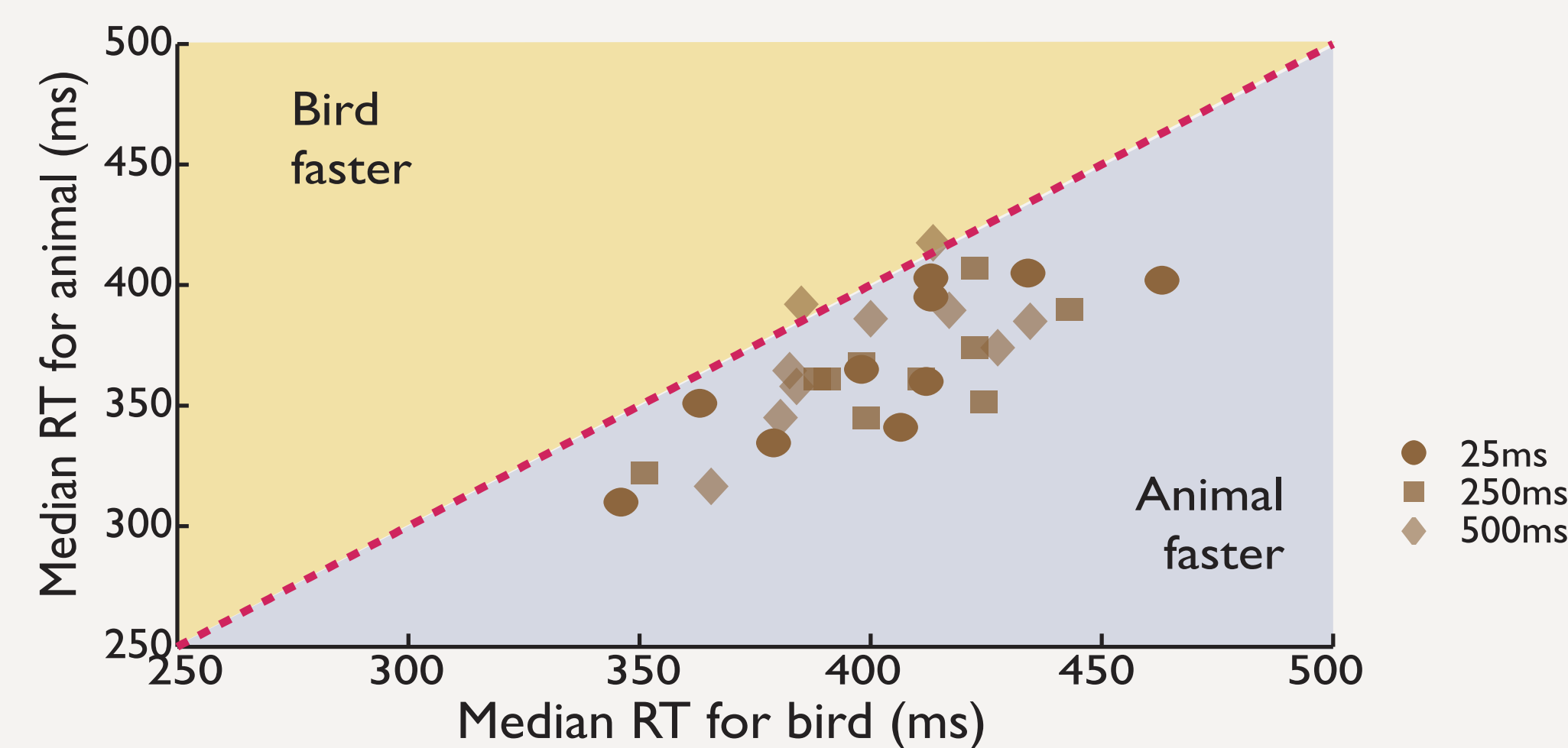
Which is faster?
Does it depend on stimulus duration?

Superordinate categorization is faster than basic by 35ms, irrespective of stimulus duration

Median reaction times (RT)

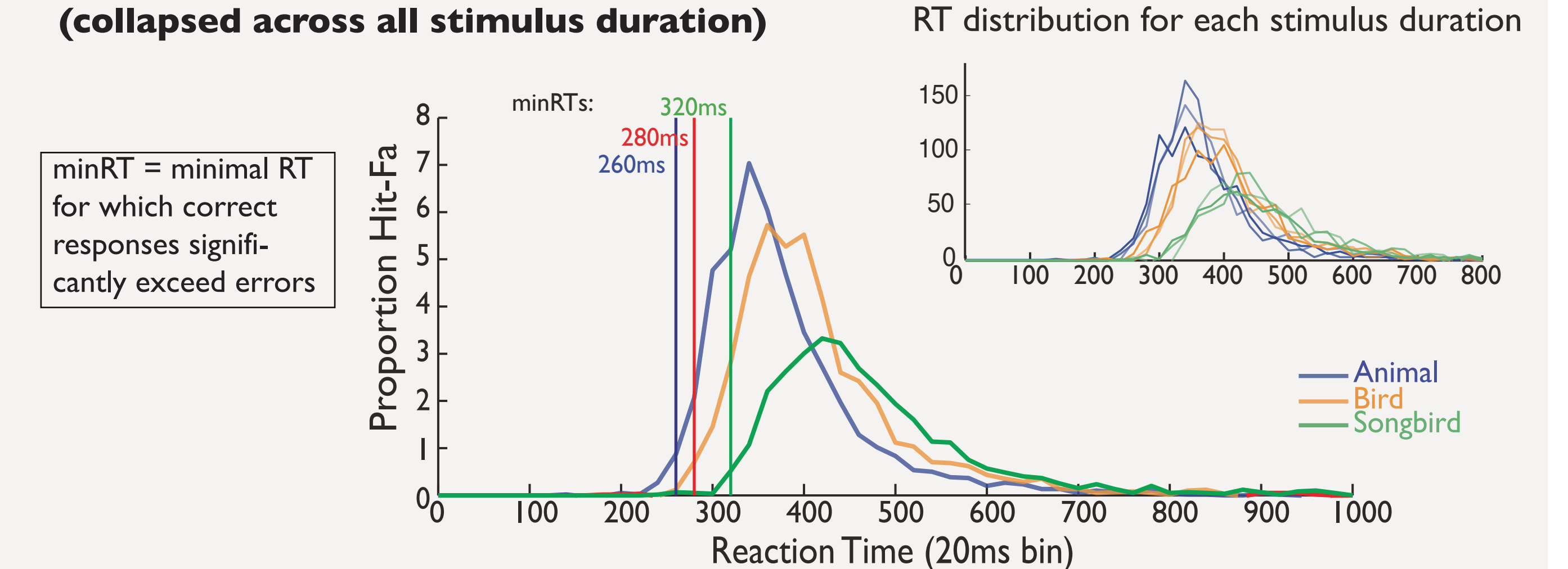


Individual median RT

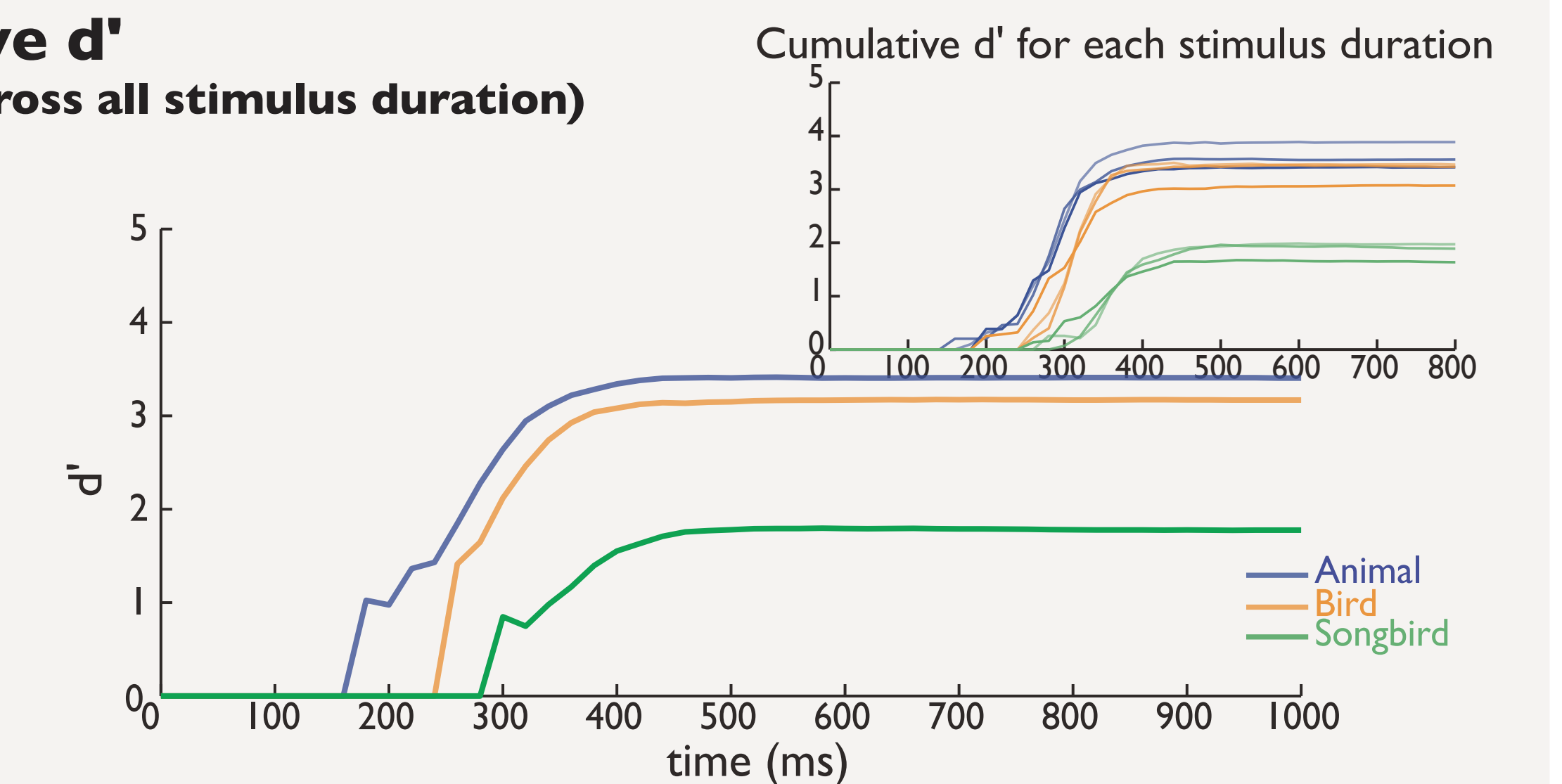


- For all subjects: RT animal < bird << songbird
- Within category, performance does not depend on stimulus duration
- Same results obtained with a yes/no task at a stimulus duration of 250ms

RT distribution (collapsed across all stimulus duration)



Cumulative d' (collapsed across all stimulus duration)



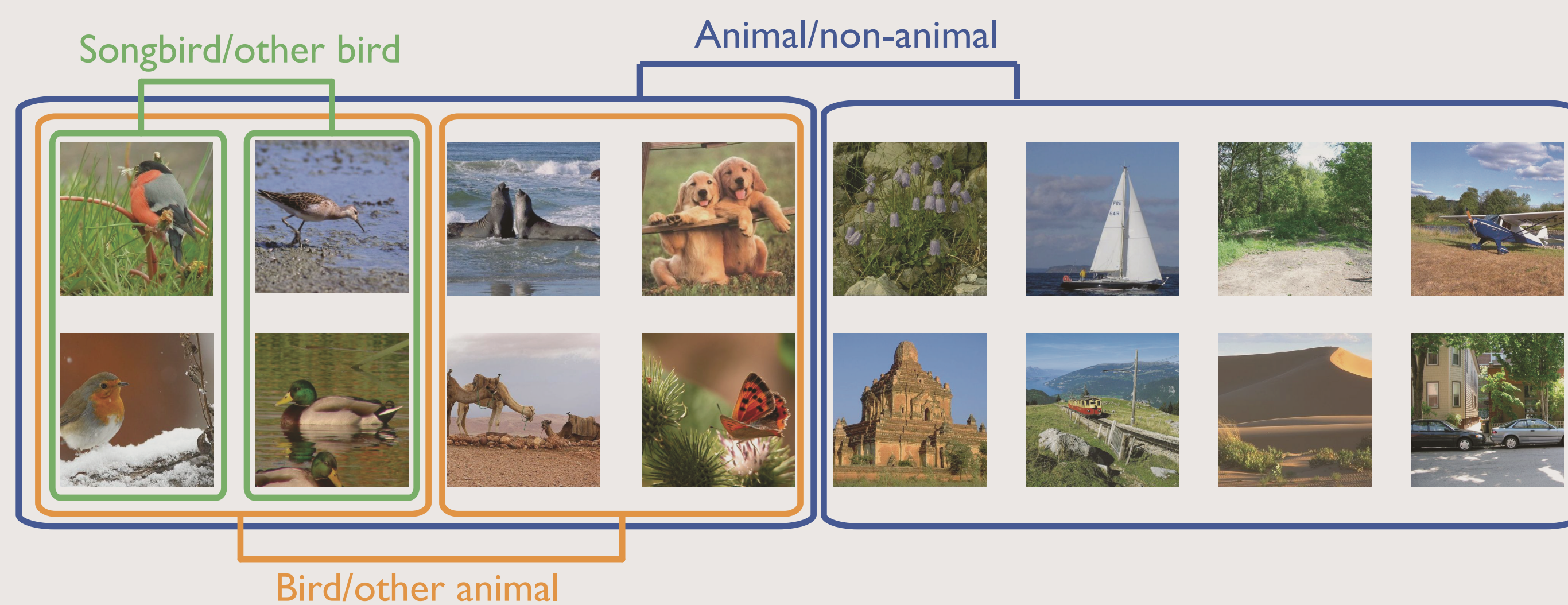
- Fastest reliable categorization: animal at 260ms, bird at 280ms, songbird at 320ms
- Accuracy for animal > bird >> songbird
- True for the entire response distribution

Method

3 levels of categorization
animal/bird/songbird

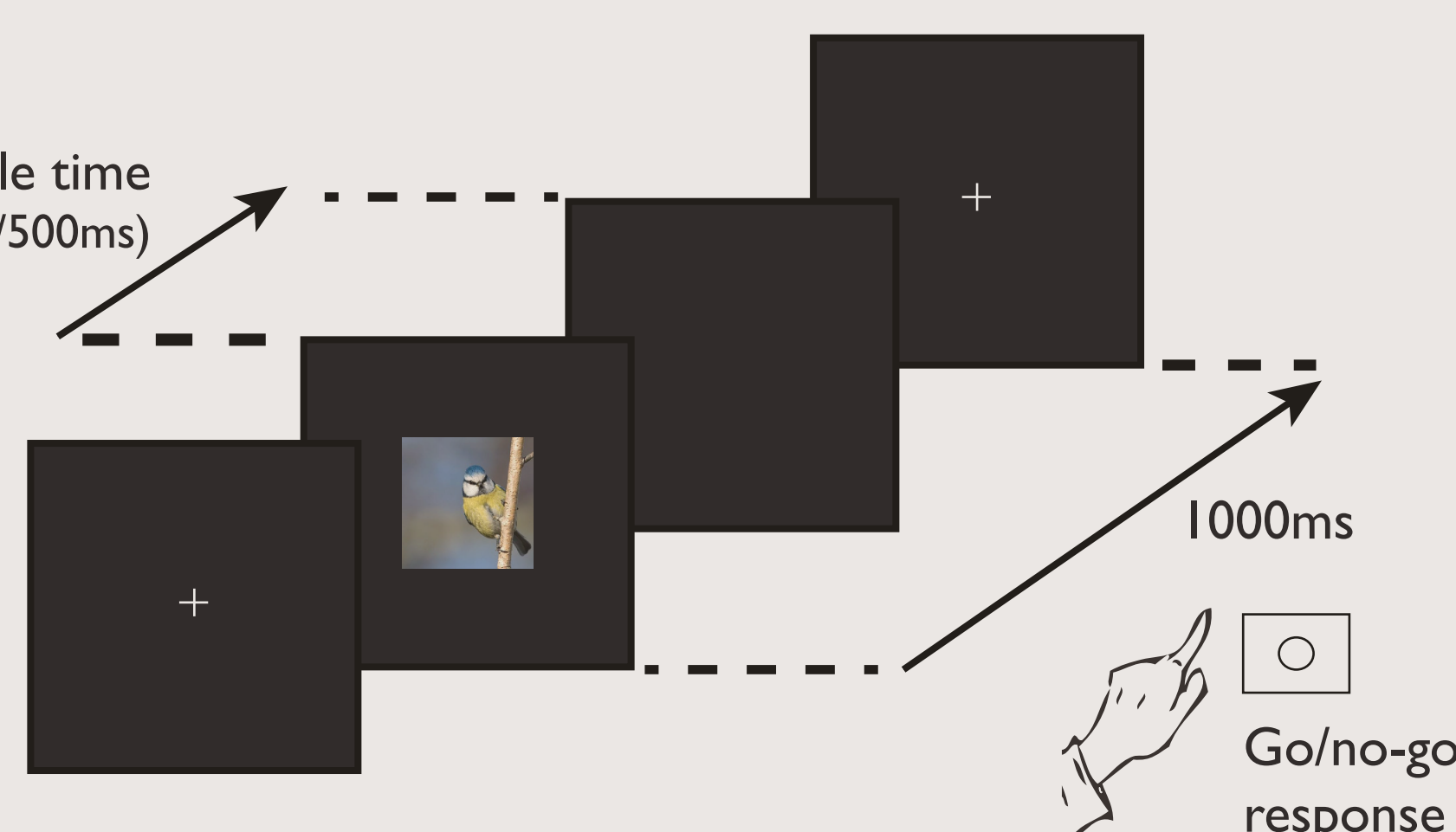
x

3 stimulus durations
25ms/250ms/500ms



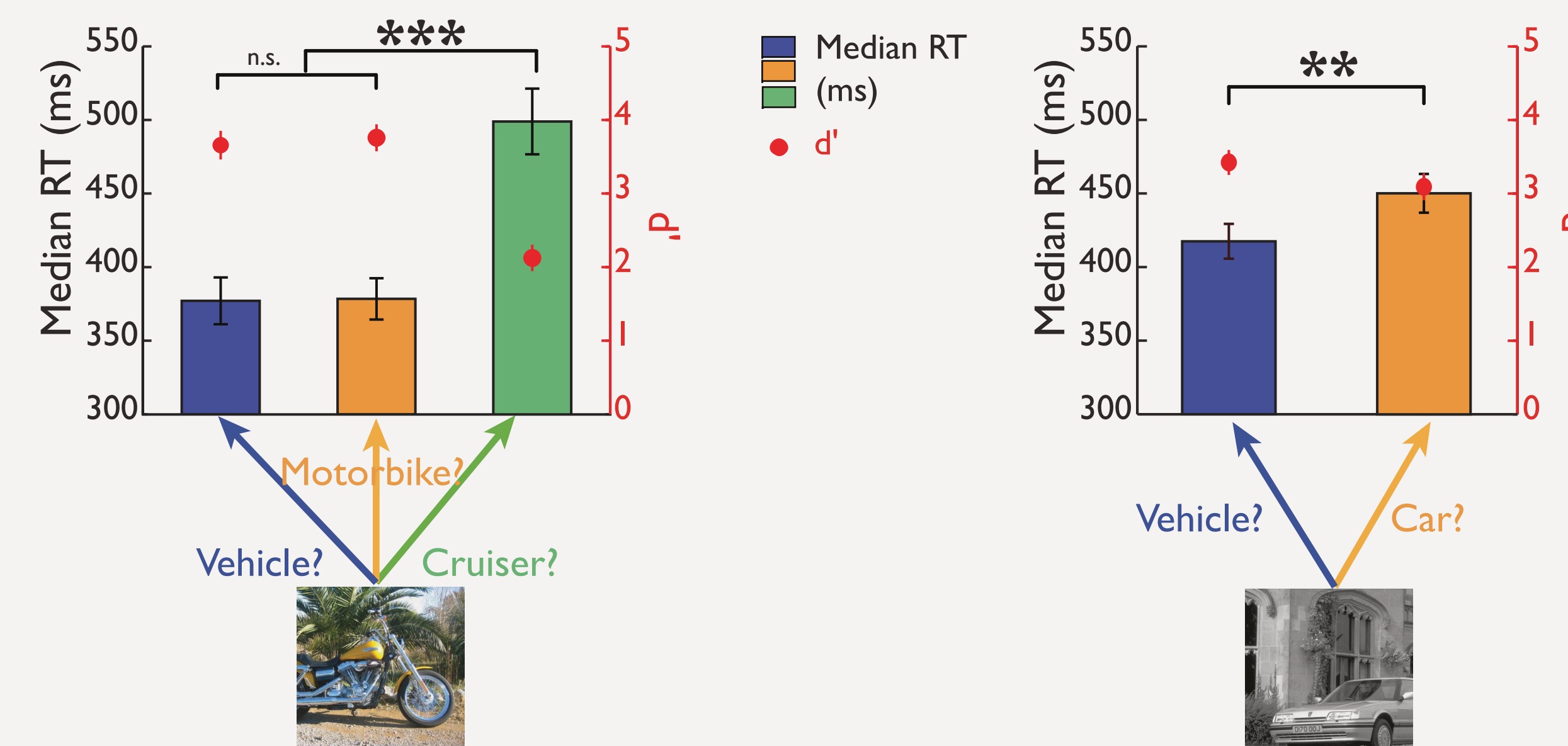
Variable time
(25ms/250ms/500ms)

« Release your finger as fast as you can if you see an animal/ bird/ songbird »



n=10
200 trials/condition/block (9 blocks)
3600 images used (no repetition)

What about man-made objects?



- No difference between vehicle and motorbike categories
- But car category is accessed 35ms later than vehicle
- Subordinate categorization (cruiser) accessed last

Discussion

- The first category to be accessed is the superordinate-level, regardless of stimulus duration
- At 260ms we are able to reliably categorize an animal but not a bird.
- However, at the same latency, we are able to categorize a vehicle as well as a motorbike
- This might not be true for all man-made categories (car)
- How do we reconcile the current findings with the ones of Mack & Palmeri (VSS 2011)?
 - Diversity of exemplars among targets and distractors?
 - Stimuli presented in block design?
 - Rapidity of responses?

References
Rosch E, Mervis CB, Gray WD, Johnson DM, Boyes-Braem P (1976) Cognitive Psychology
Mace MJ, Joubert OR, Nespoulous JL, Fabre-Thorpe M (2009) PLoS ONE
Mack ML, Palmeri TJ (2011) VSS
Tanaka JW, & Taylor (1991) Cognitive Psychology
Acknowledgements
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