

Search efficiency scales with audiovisual semantic relatedness

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Do semantics guide audiovisual search?

Semantic information is crucial to understanding real-world environments¹

Sounds speed search for “perfect match” images (e.g., meow, cat)^{2,3}

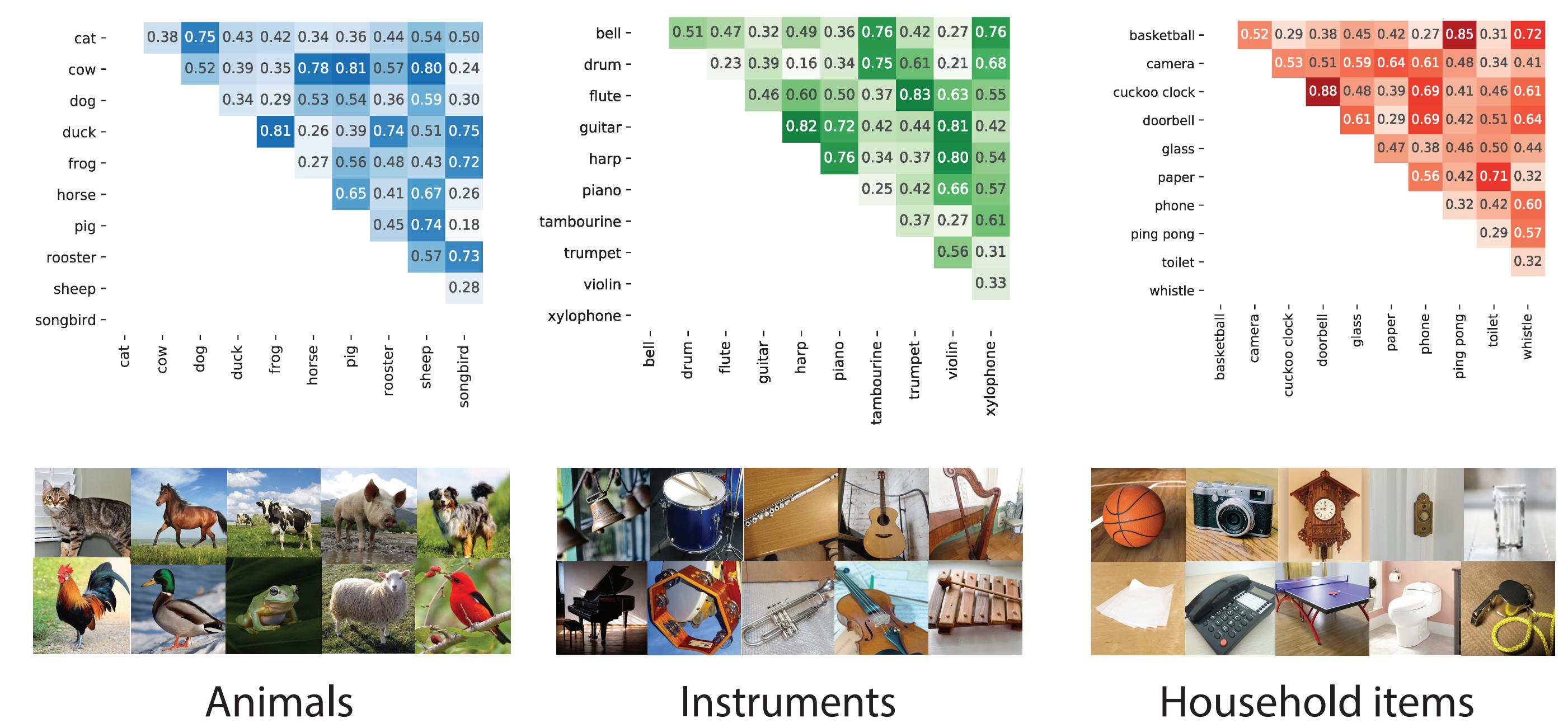
Is the audiovisual search benefit **specific** to perfect matches?

Is it **generalizable** across semantic relationships (e.g., causal, categorical)?

Is it **sensitive to context**, such as search array size?

Quantifying semantic relatedness

Sight-Sound Semantics Database⁴: (Available on OSF! osf.io/v9rgy)



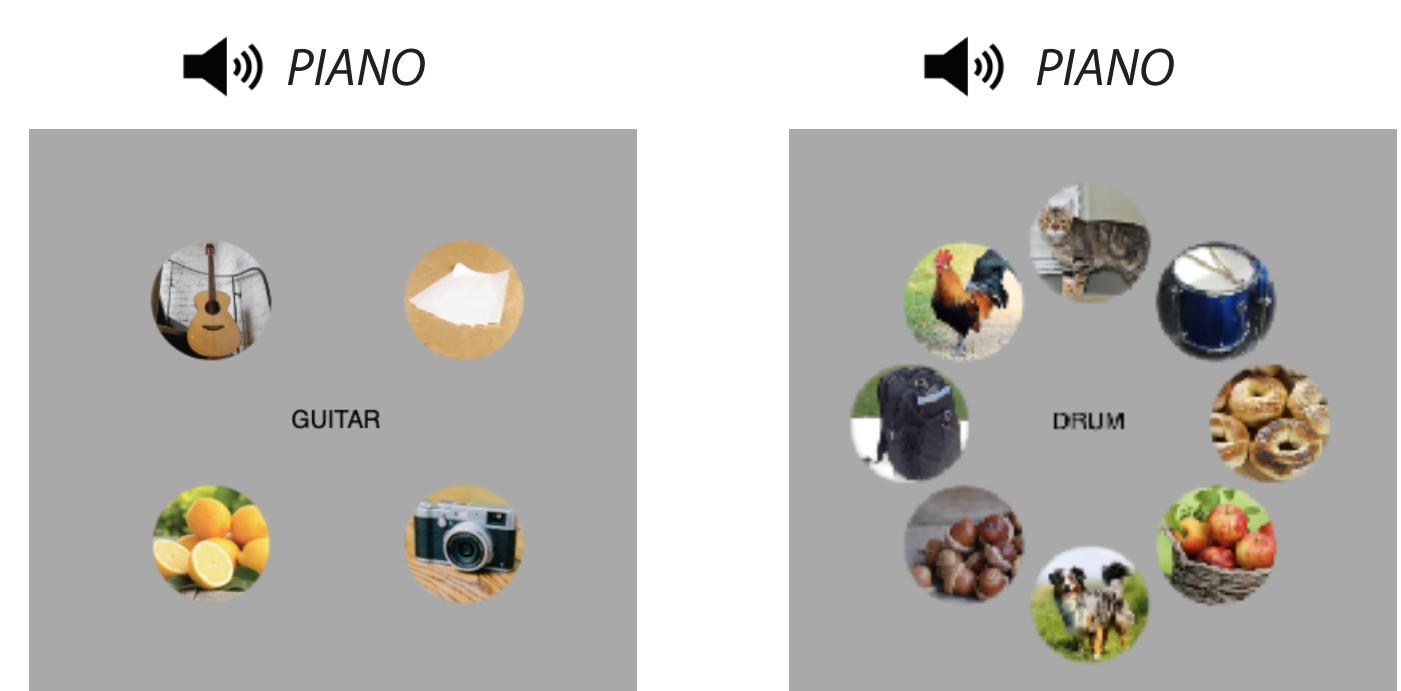
Measuring semantic influence on attention

Does a task irrelevant sound influence visual search?



- 123 participants
- 300 sound/image pairs repeated twice
- 500 ms delay before response
- Respond via key press

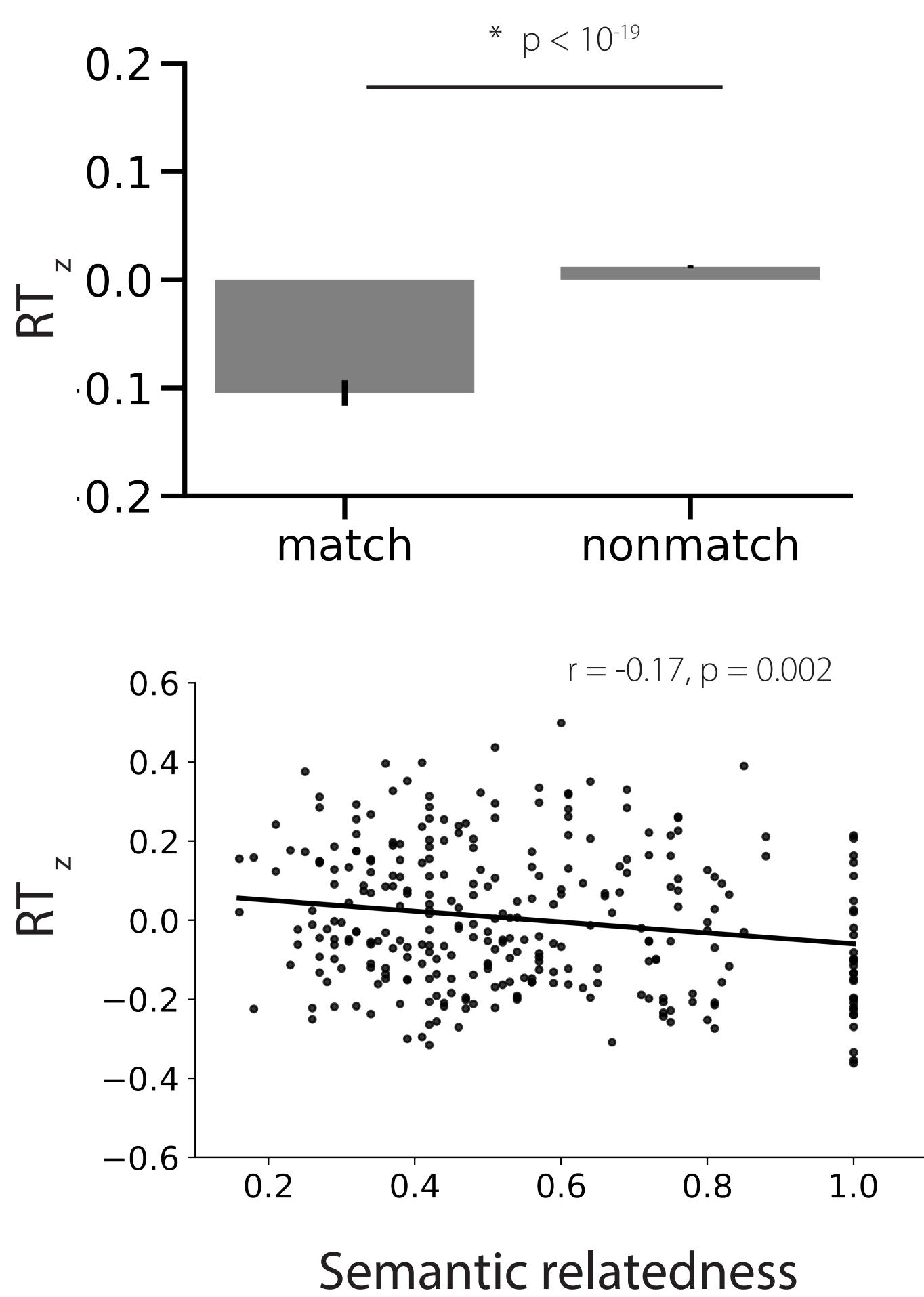
How does distractor set size modulate AV benefit?



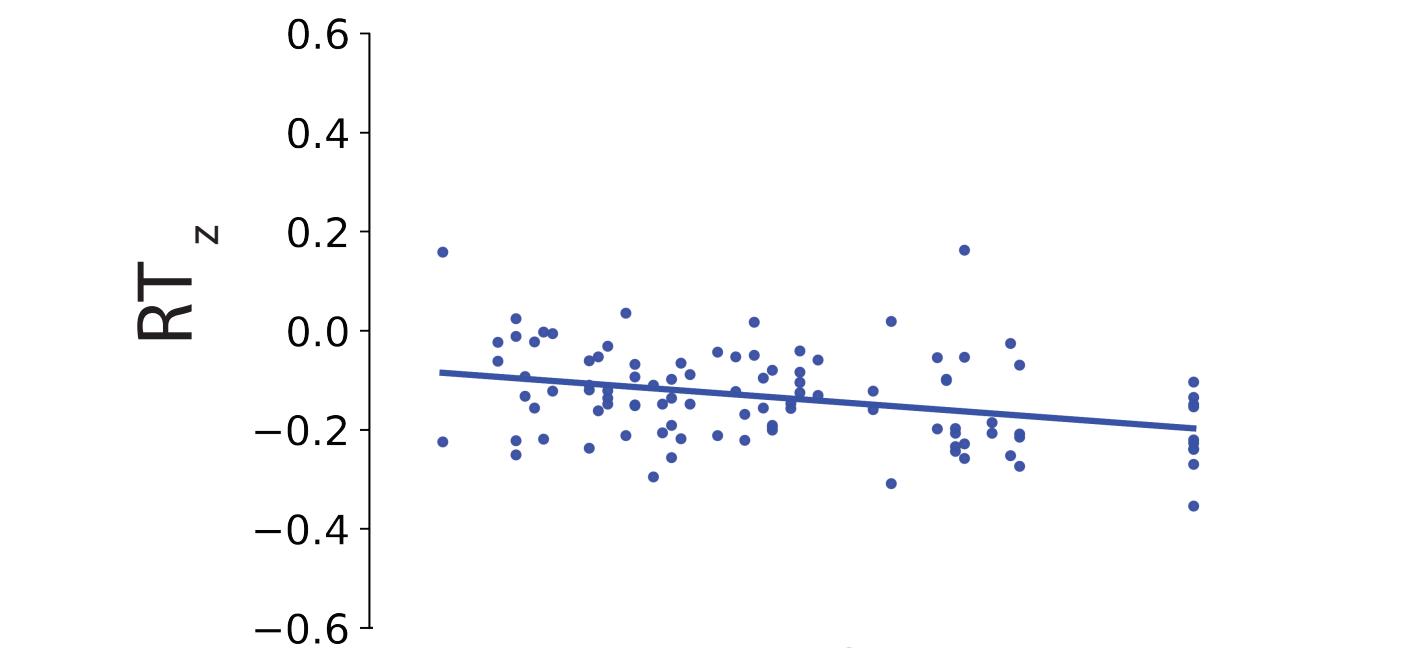
- 198 participants
- 2 array sizes: 4 or 8 images
- 300 sound/image pairs per condition
- Immediate response
- Respond via mouse click

As semantic relatedness increases, search speeds decrease

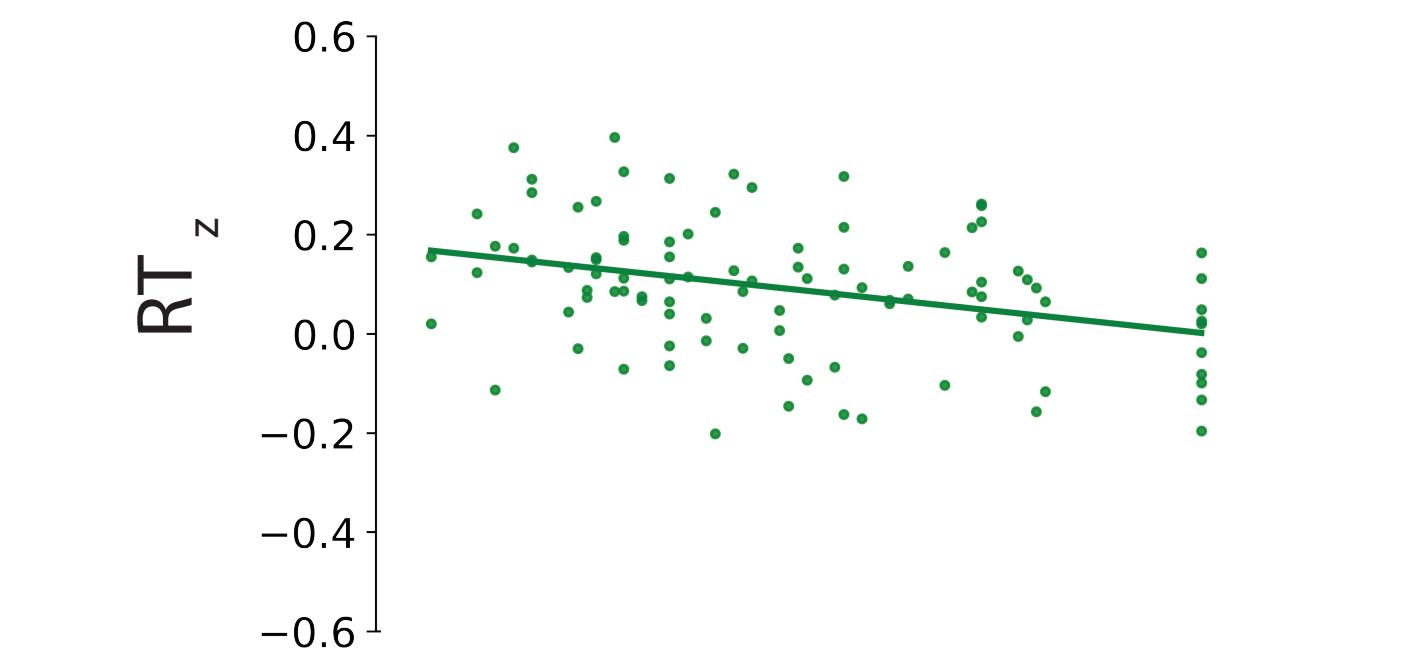
All categories



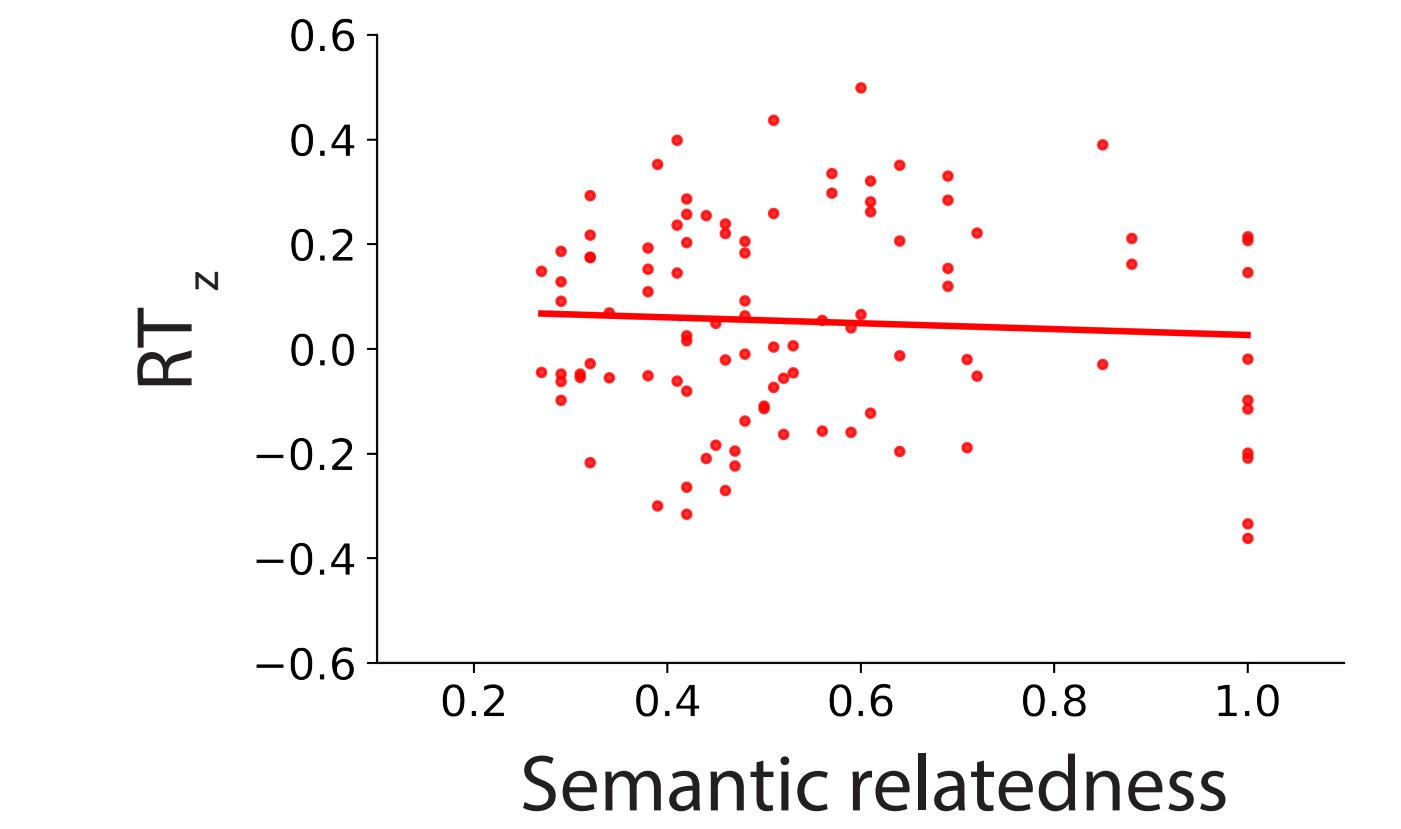
Animals



Instruments



Household items



Conclusions

Search efficiency is modulated by audiovisual semantic relatedness

The audiovisual semantic benefit is:

1. not specific to “perfect matches”
2. sensitive to category factors
3. sensitive to overall context & information available

Leading to larger theoretical implications, such as:

1. More types of semantic relationships may influence attention than thought
2. Attentional prioritization is dynamic and highly contextual

Future questions

What neural mechanisms underpin attentional prioritization for semantically related sounds & images?

Are attentional prioritization maps multisensory in nature?

Can visual information modulate attentional priority for auditory signals?

References

- (1) Malcolm, et al 2016 (2) Iordanescu, et al 2008
- (3) Kvasova, et al 2019 (4) Wegner-Clemens, et al, 2022

Acknowledgments

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