E44

Do Semantic Expectations Influence Object Detection? A Stringent Test Using Figure Assignment Reponses

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QUESTION

Can semantic expectations initiated by object names (i.e., words) influence object *detection*?

Object names related to their referents via semantics

BACKGROUND

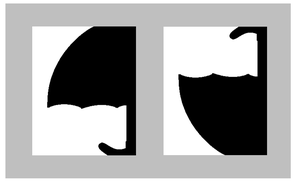
Continuous Flash Suppression[1-3] & 4-Alternative Forced Choice with degraded displays or very brief sandwich masked displays[3]

→ **Yes, but mechanisms unclear**

Figure Assignment just *is* Object Detection

→ ideal assay

Familiar Configuration is a Figural Prior

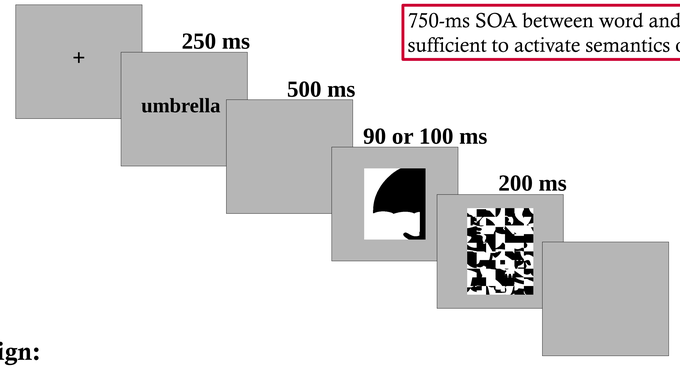


Control Exps: % Detection Accuracy

	Upright	Inverted
90-ms:	75%	72%
100-ms:	80%	75%

Orientation dependency implicates configured object representations (not parts or features)

PARADIGM



750-ms SOA between word and display sufficient to activate semantics of word

Design:

- Task: which side is figure (Left/Right)?
- Test Displays not repeated: N = 72; (½ up; ½ inv; B/W & L/R; balanced)
- Words not repeated (1 Basic-Level & 1 Unrelated per display; balanced)

Unrelated words from different superordinate category (Natural/Artificial)

STUDY 1: 90 ms test display exposure

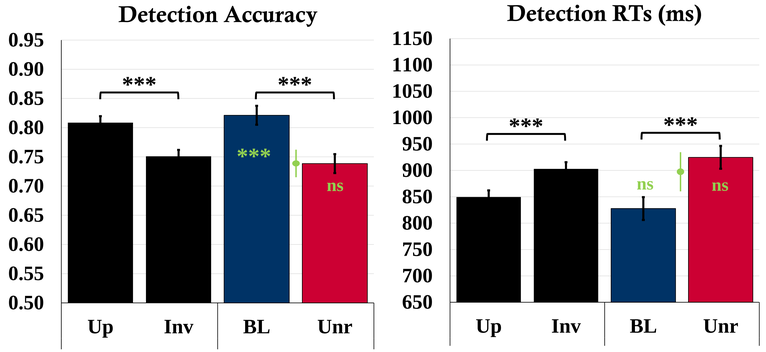
Experiments 1A & 1B: (N = 32 ea) (1B an exact replication of 1A)

→ Results of Exp 1B replicated Exp 1A; hence, combined

Control Experiment (No Words): (N = 64)

Comparison to Control Can Elucidate Mechanism

EXPERIMENTS 1A & 1B (Combined) vs. 90-ms Control



Orientation Effect in both Detection Accuracy and RTs

→ Effects attributable to configured object representations

BL > UNR in both Detection Accuracy and RTs

Did BL word increase OR did UNR word decrease accuracy & RT?

Answer found in comparison to control (green symbols on figure):

Detection Accuracy was enhanced after BL word; UNR word no effect

RTs were unaffected compared to control

Mechanism

Words activate the population of units for denoted object shape.

Enhancement occurs when input activates the same population.

When input activates a different population, no interference occurs.

→ words don't generate predictions re features

STUDY 2: 100 ms test display exposure

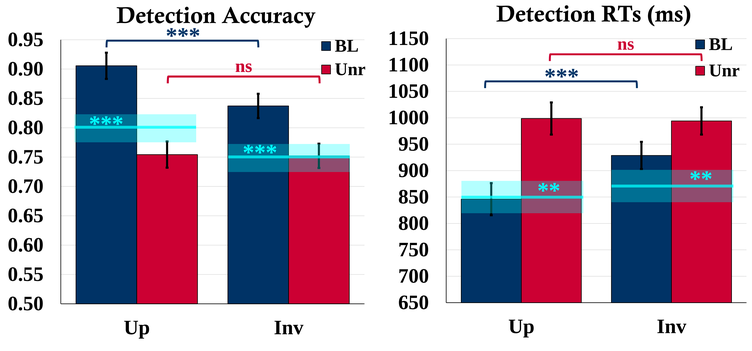
More time for familiar configuration to activate semantics

Experiments 2A & 2B: (N = 32 ea) (2B an exact replication of 2A)

→ Results of Exp 2B replicated Exp 2A; hence, combined

Control Experiment (No Words): (N = 64)

EXPERIMENTS 2A & 2B (Combined) vs. 100-ms Control



Orientation Effect in both Detection Accuracy and RTs

→ Effects attributable to configured object representations

BL > UNR in both Detection Accuracy and RTs

Compared to control (see cyan symbols on figure):

Detection Accuracy was enhanced after BL word; UNR word no effect

Yet RTs were substantially longer after UNR word; BL word no effect

Mechanism

With more time for semantics of Familiar Configuration to be activated conflict emerged with semantics of UNR word.

Familiar configuration wins conflict through recurrent processing.

Takes time to resolve conflict → longer RTs following Unr.

Object detection delayed until semantic conflict resolved

→ Object Detection Entails Semantics

1) Costello, P., et al. (2009). Consciousness and cognition, 18(2), 375-382.
2) Lupyan, G., & Ward, E. J. (2013). Proceedings of the National Academy of Sciences, 110(35), 14196-14201.
3) Stein, T., & Peelen, M. V. (2015). Journal of Experimental Psychology: General, 144(6), 1089.

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