2018-04-02 Attention

PSY 525.001 • Vision Science • 2018 Spring

Rick Gilmore

2018-04-02 14:17:14

Today's topics

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Scheduling student presentations

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Attention

> "*Everyone knows what attention is. It is taking possession of the mind, in clear and vivid form, of one out of what seems several simultaneously possible objects or trains of thought. Focalization, concentration of consciousness are of its essence. It implies a withdrawal from some things in order to deal effectively with others.*"
>
> William James

OBITUARIES

Anne Treisman, Who Studied How We Perceive, Dies at 82

By NEIL GENZLINGER FEB. 13, 2018

Dr. Anne Treisman receiving the National Medal of Science from President Barack Obama at the White House in 2013. Jason Reed/Reuters

Anne M. Treisman, whose insights into how we perceive the world around us provided some of the core theories for the field of cognitive psychology, died on Friday at her home in Manhattan. She was 82.

Her daughter Deborah Treisman said the cause was a stroke after a long illness.

Dr. Treisman considered a fundamental question: How does the brain make sense of the bombardment of input it is receiving and focus attention on a particular object or activity?

What she came up with is called the feature integration theory of attention, detailed in a much-cited 1980 article written with Garry Gelade in the journal Cognitive Psychology, then refined and elaborated on in later work.

Capacity limits on processing =>

Requires recruitment & focusing of resources

When does information get selected?

Early vs. Late

Attention as 'filter' (Broadbent's shadowing experiments)

Stimulating in 'unattended' areas

'Inattentional blindness' or perception without attention

Rock, I., Linnett, C. M., Grant, P., & Mack, A. (1992). Perception without attention: Results of a new method. *Cognitive Psychology*, *24*(4), 502–534. Elsevier. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/1473333

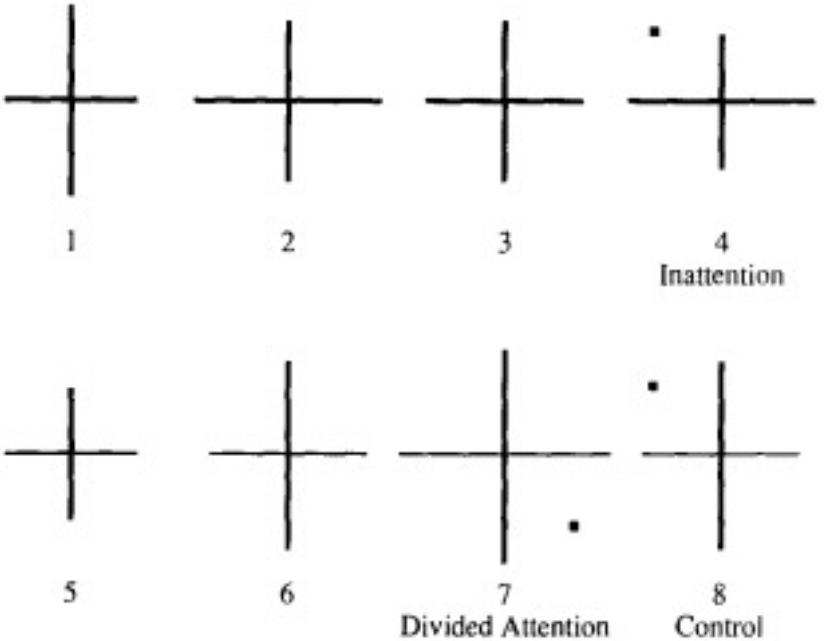


FIG. 1. The sequence of eight trials used in all experiments as well as a scale version of one possible set of cross figures and arrangement of the blobs in the critical trials of Experiment 1.

Rock et al., 1992

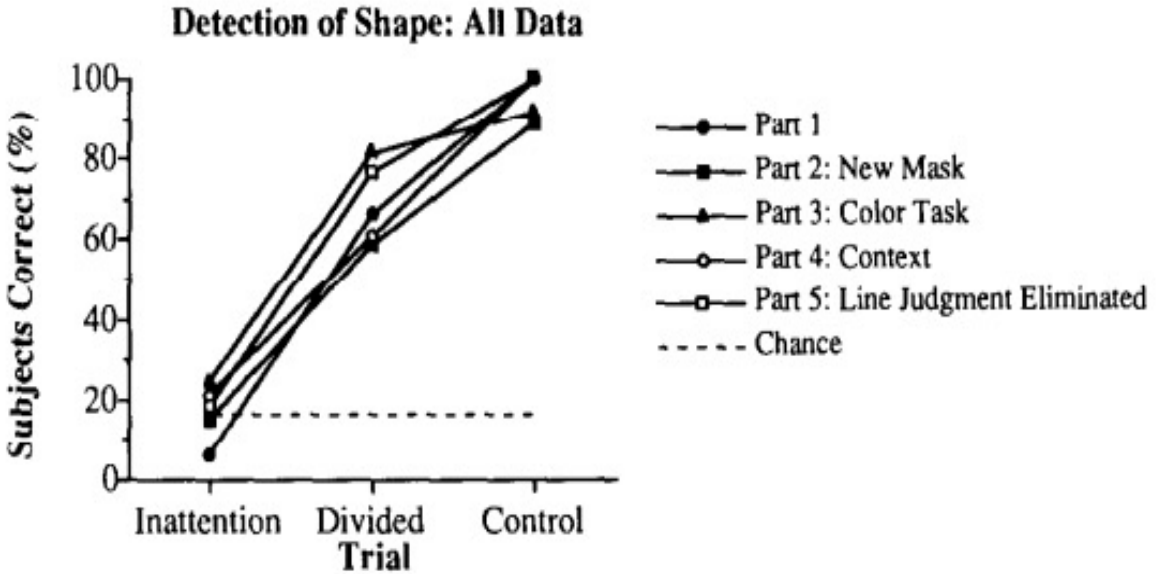


FIG. 5. The results for all variations of Experiment 4 on shape detection for the three critical trials and showing the chance level of 16.7% based on the fact that six choices were given in the recognition test.

Rock et al., 1992

Evidence for 'late' selection: personal relevance, emotional intensity, etc.

Task load and selection: high 'early', low 'late' (Lavie)

Temporal factors

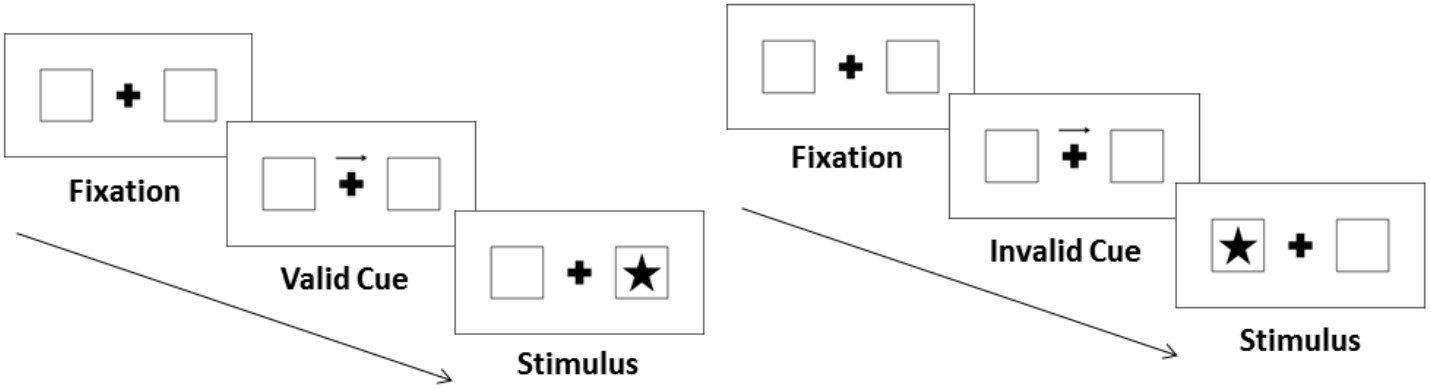
Attentional 'blink'

Rapid Serial Visual Presentation (RSVP) task

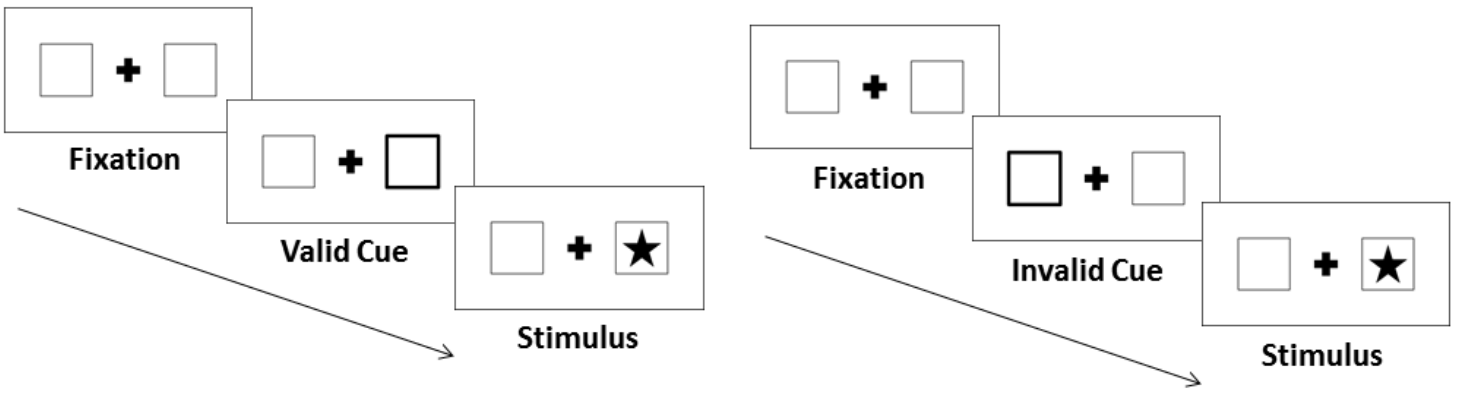
Change blindness

'Cueing' attention

Endogenous Cues



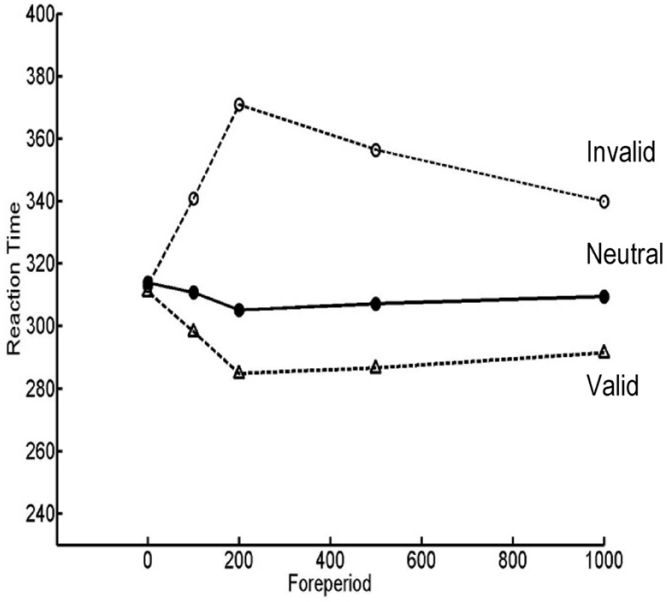
Exogenous Cues



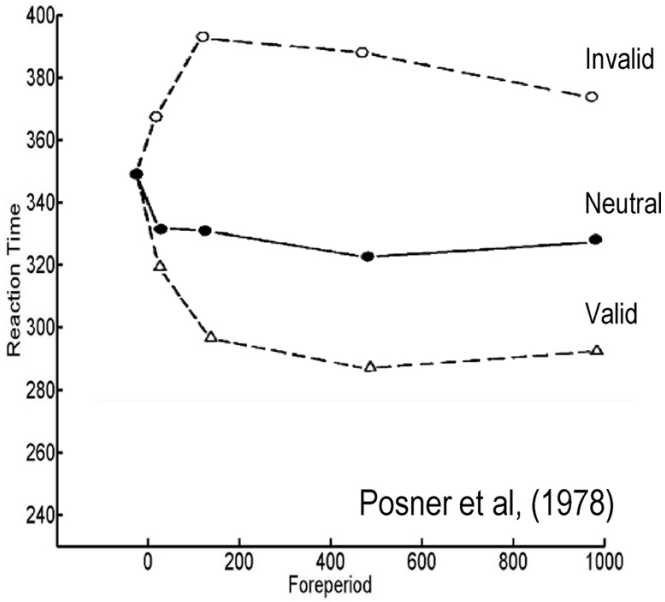
Posner cueing task

Quantifying the (RT) costs and benefits of attention

Simulated timing effects



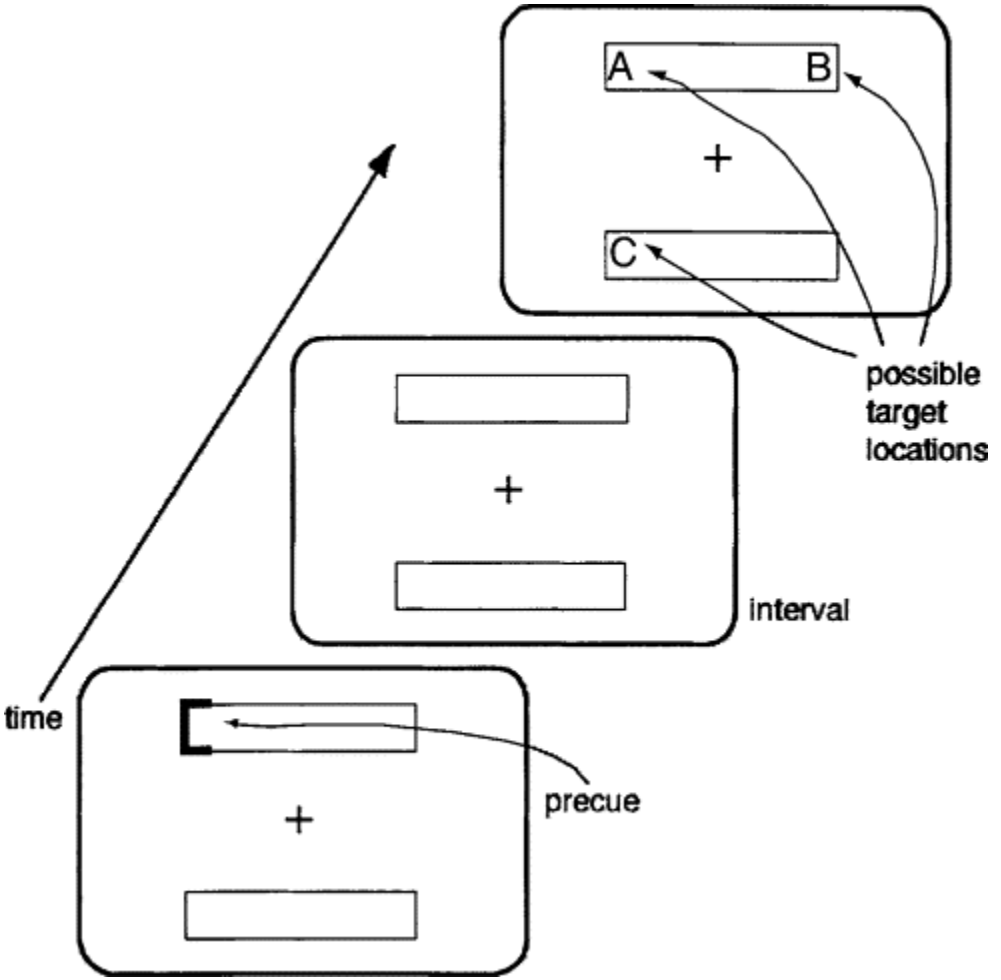
Empirical timing effects



Feldman, H., & Friston, K. J. (2010). Attention, uncertainty, and free-energy. *Frontiers in Human Neuroscience*, 4, 215. frontiersin.org. Retrieved from http://dx.doi.org/10.3389/fnhum.2010.00215

Spotlight (move/enhance/disengage) vs. Zoom lens

Object-based attention



Vecera, S. P., & Behrmann, M. (2001). 6 - Attention and Unit Formation: A Biased Competition Account of Object-Based Attention. In T. F. Shipley & P. J. Kellman (Eds.), *Advances in Psychology* (Vol. 130, pp. 145–180). North-Holland. Retrieved from http://www.sciencedirect.com/science/article/pii/S0166411501800261

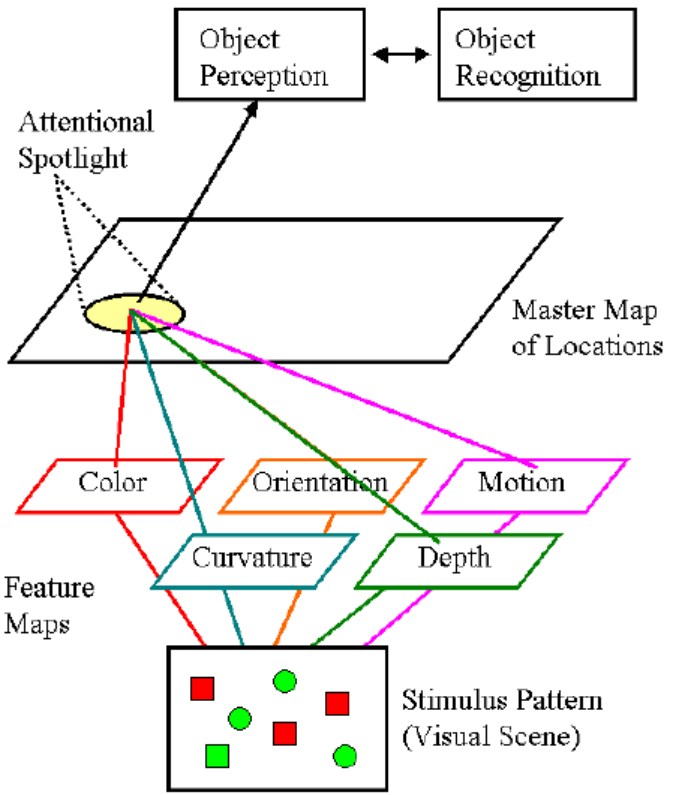
Attention to properties/dimensions

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, 18(6), 643. Psychological Review Company. Retrieved from http://psycnet.apa.org/record/1936-01863-001

Break

Treisman, A. M., & Gelade, G. (1980). A feature-integration theory of attention. *Cognitive Psychology*, *12*(1), 97–136. Elsevier. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/7351125

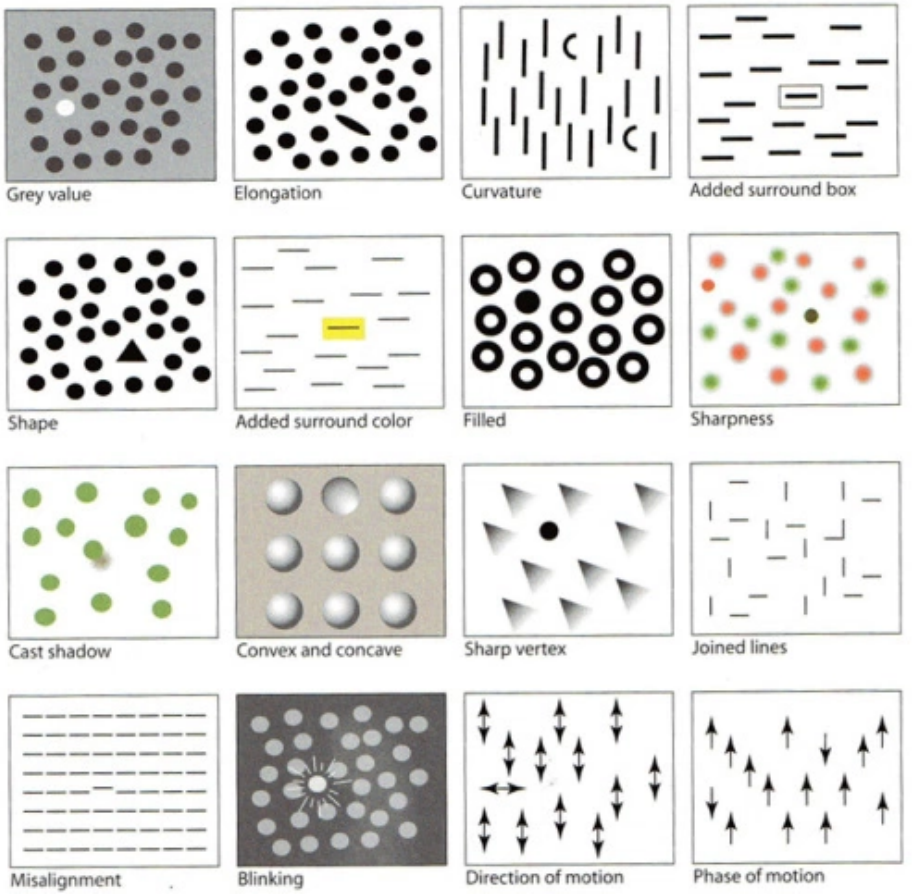
Feature Integration Theory (Treisman)



Integral vs. separable dimensions (Garner)

Separable: color vs. shape

Integral: color saturation and lightness; length & height


Grey value
Elongation
Curvature
Added surround box
Shape
Added surround color
Filled
Sharpness
Cast shadow
Convex and concave
Sharp vertex
Joined lines
Misalignment
Blinking
Direction of motion
Phase of motion

Pop-out

Tachistoscope

Why are search slopes for single features 'flat' as the number of items increases?

Why are search slopes for single features 'flat' as the number of items increases?

Why are search slopes for 'negative' (conjunction target not present) conditions ~2x those for 'positive' (conjunction target present) conditions?

Simons, D. J., & Chabris, C. F. (1999). Gorillas in our midst: Sustained inattentional blindness for dynamic events. *Perception*, *28*(9), 1059–1074. Retrieved from http://dx.doi.org/10.1068/p281059

Neisser, U., & Becklen, R. (1975). Selective looking: Attending to visually specified events. *Cognitive Psychology*, *7*(4), 480–494. Elsevier. Retrieved from http://www.sciencedirect.com/science/article/pii/0010028575900195

Becklen, R., & Cervone, D. (1983). Selective looking and the noticing of unexpected events. *Memory & Cognition*, *11*(6), 601–608. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/6669028

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