Visual ensemble statistics induce distributed attention and increase subsequent insight problem solving

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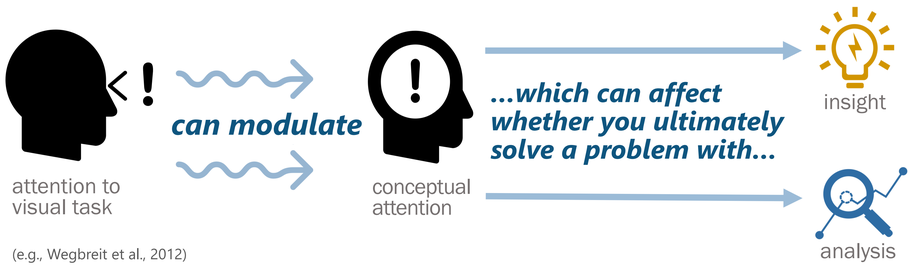


(e.g., Wegbreit et al., 2012)

Distributed or *less selective* attention is conducive to insight problem solving.

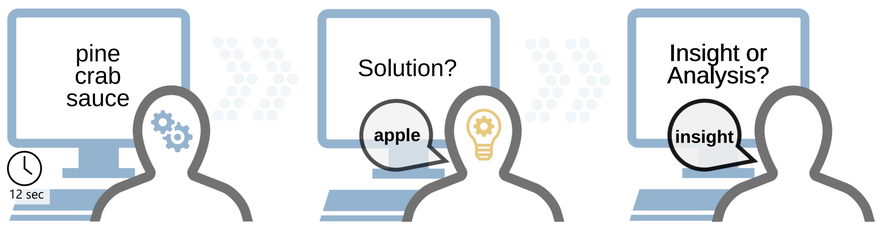
Hypothesis:
People who perform a visual attention task that demands they distribute attention among many items, such as an ensemble statistics task[2], should increase their insight solving compared to baseline.

***More selective* attention is conducive to analytic problem solving.**

Hypothesis:
People who perform a visual attention task that demands they attend to one visual stimulus while ignoring all other distracting stimuli should increase their analytic problem solving compared to baseline.

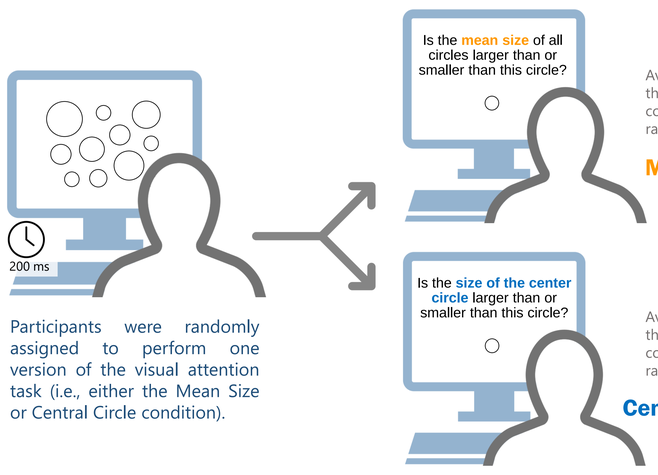
Methods

1. 50 Compound Remote Associates (CRA) problems



Come up with a solution word that can form a compound word or phrase with each of the 3 problem words.

2. Visual Attention Task



Participants were randomly assigned to perform one version of the visual attention task (i.e., either the Mean Size or Central Circle condition).

Average mean discrimination thresholds for the Mean Size condition was 12.34%, and they ranged from 3.00% to 22.50%.

Mean Size Condition
(Ensemble Statistics)
n = 36

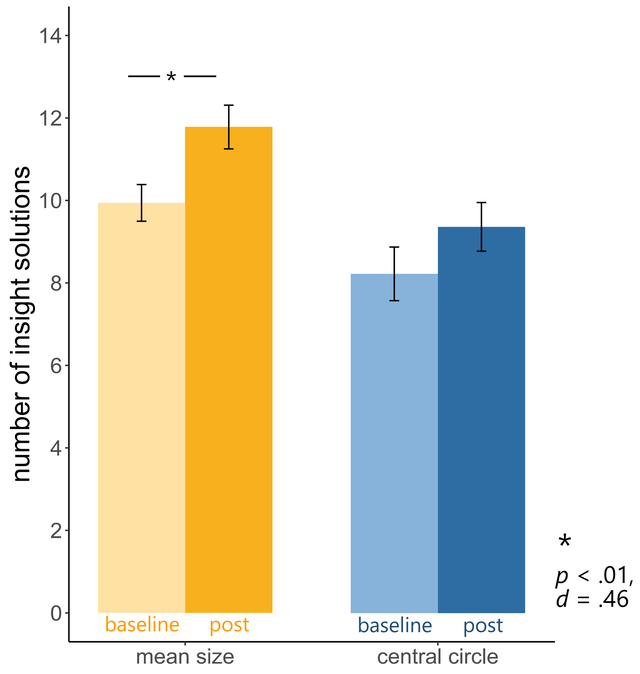
Average mean discrimination thresholds for the Central Circle condition was 11.15%, and they ranged from 2.50% to 29.25%.

Central Circle Condition
(Selective Attention)
n = 36

3. 50 CRA problems with reinduction of Visual Attention Task

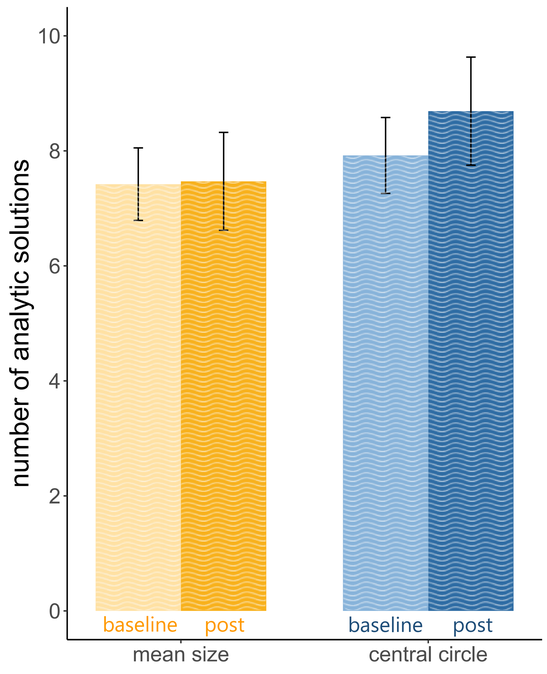
Results

People **reliably increased their insight solving** after performing the **Mean Size** (ensemble statistics) **task** that encourages **distributed attention**.



*
$p < .01$,
$d = .46$

People **did not reliably increase their analytic solving** after performing the **Central Circle task** that encourages **more selective attention**.



Why did distributed attention induce more insight?

- Visual attention *distributed* across a display may be analogous to a *distributed state* of conceptual attention conducive to insight solving.
- Weak and non-dominant associations may have a greater opportunity to capture attention and "pop" into conscious awareness (i.e., insight) when attention is *distributed* across conceptual space.
- Attention that is too selective may narrowly focus our unconscious search processes on dominant or incorrect semantic associations.

Why didn't the central circle task induce more analysis?

- Analytic problem solving demands working memory.
- Attention that is *more selective* should be conducive to analytic solving by suppressing distracting information and preventing irrelevant information from entering and interfering with working memory.
- Since the central circle always appeared in the same position, it is possible that the Central Circle task did not demand enough selective attention to facilitate analytic problem solving.

References

1. Wegbreit, E., Suzuki, S., Grabowecky, M., Kounios, J., & Beeman, M. (2012). Visual attention modulates insight versus analytic solving of verbal problems. *The Journal of Problem Solving, 4*(2), 94–115.
2. Chong, S. C., & Treisman, A. (2005). Attentional spread in the statistical processing of visual displays. *Attention, Perception, & Psychophysics, 67*(1), 1–13.

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