

What underlies the passive advantage in visual search? It's not eye movements!

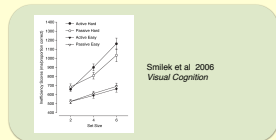
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The Passive Advantage

Instructions to "...let the unique item pop into your mind..." can improve search efficiency over instructions to "...deliberately direct your attention...".



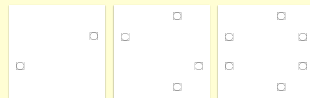
Questions

1. Is the passive advantage accompanied by a reduction in eye movements?
- Pro:** Some evidence that unnecessary eye movements contribute to inefficient search. (Klein & Farnell 1989 Perception and Psychophysics)
- Con:** Other evidence that efficient search is characterized by higher fixation rate and larger saccade amplitude. (Phillips & Edelman 2008 Vision Research; Zelinsky & Sheinberg 1997 JEP:APP)
2. Any interaction with search difficulty?

Our Approach

Replicate Smilek et al. 2006 with an eye tracker and an extra level of difficulty

Experiment 1

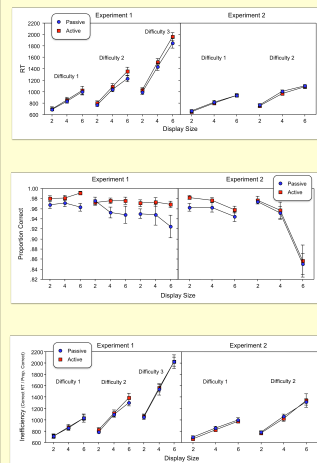


No passive advantage, so...

Experiment 2

Remove fixation-driven interface and hardest difficulty level to promote success in passive strategy, and to more closely replicate Smilek et al. 2006.

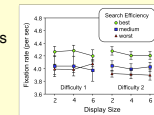
No Passive Advantage (lower accuracy & RT, same efficiency)



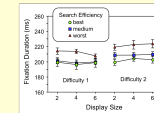
Efficient searchers have more active eye movements

Dividing searchers based on efficiency shows that best searchers have...

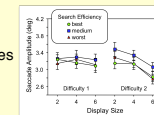
1. Higher fixation rates



2. Shorter fixation durations



3. No saccade amplitude differences



Conclusions

Passive advantage is context sensitive: eye-tracker may eliminate effect.

Passive advantage not likely a consequence of reduced eye movements: search efficiency linked to increased eye activity.

Passive advantage may have little generality:

see Brennan et al. poster on Wednesday (63.437) for active advantage in real-world search

Future Directions

How does eye-tracking affect strategy?

Which factors elicit and inhibit passive-active differences?

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