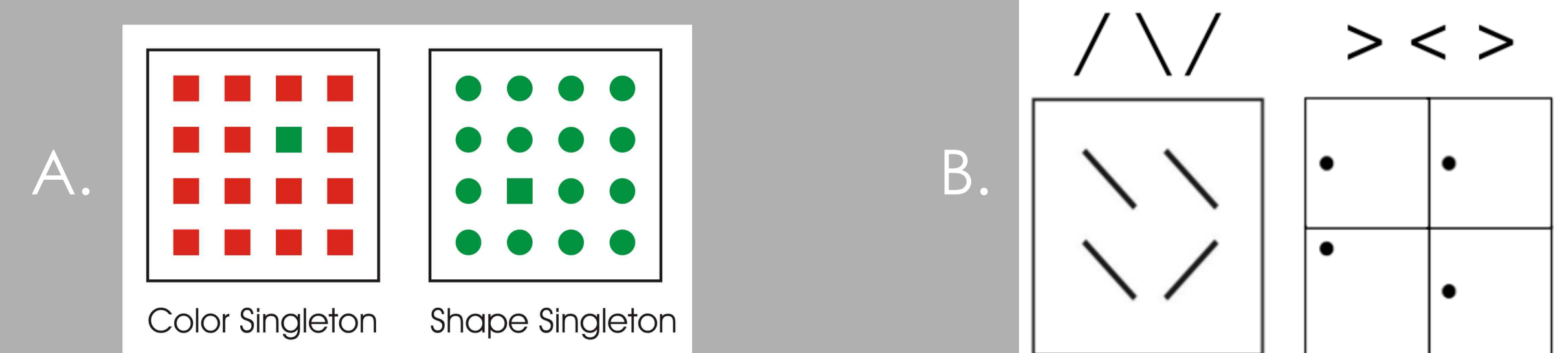


What is False Pop Out (FPO)?



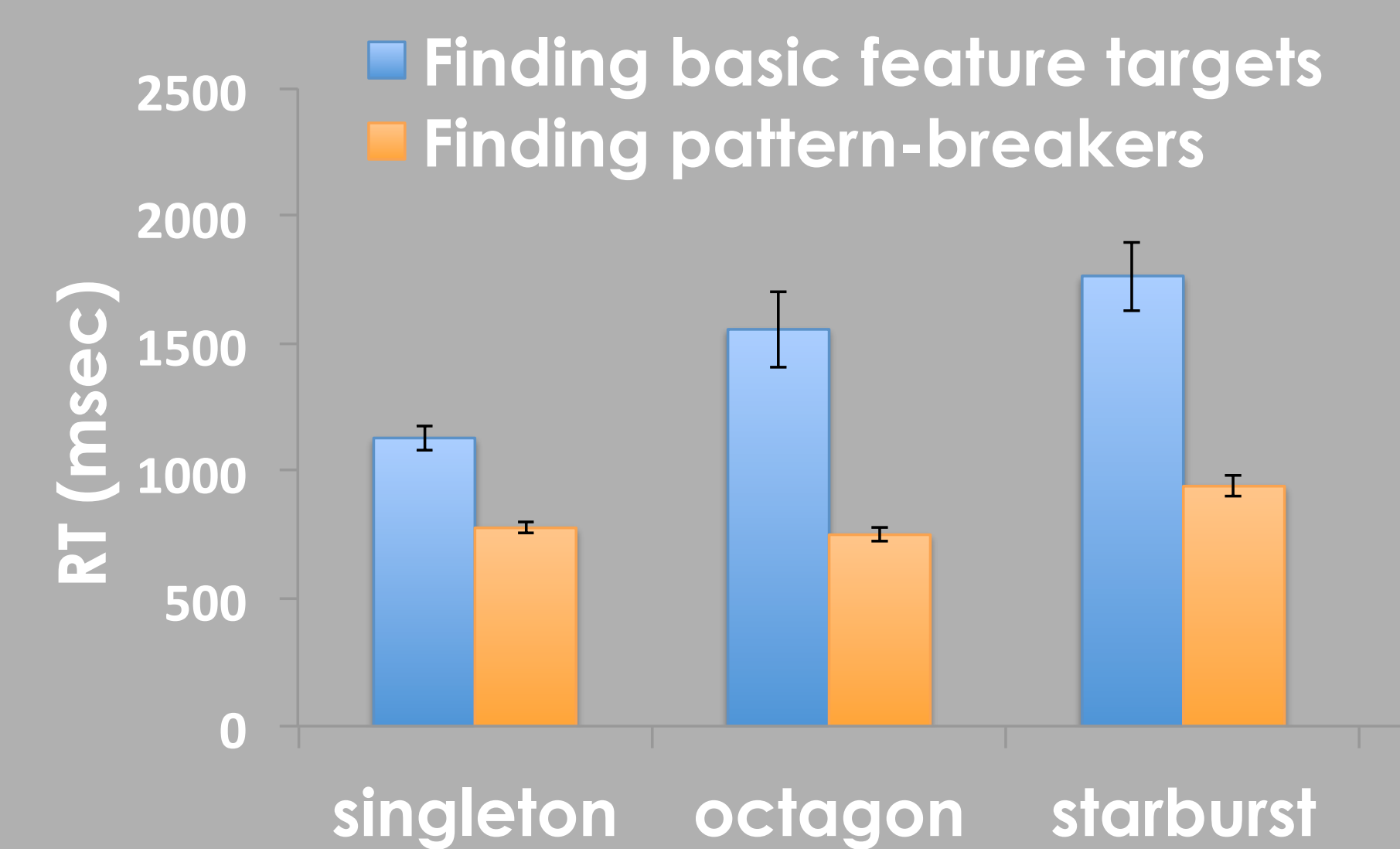
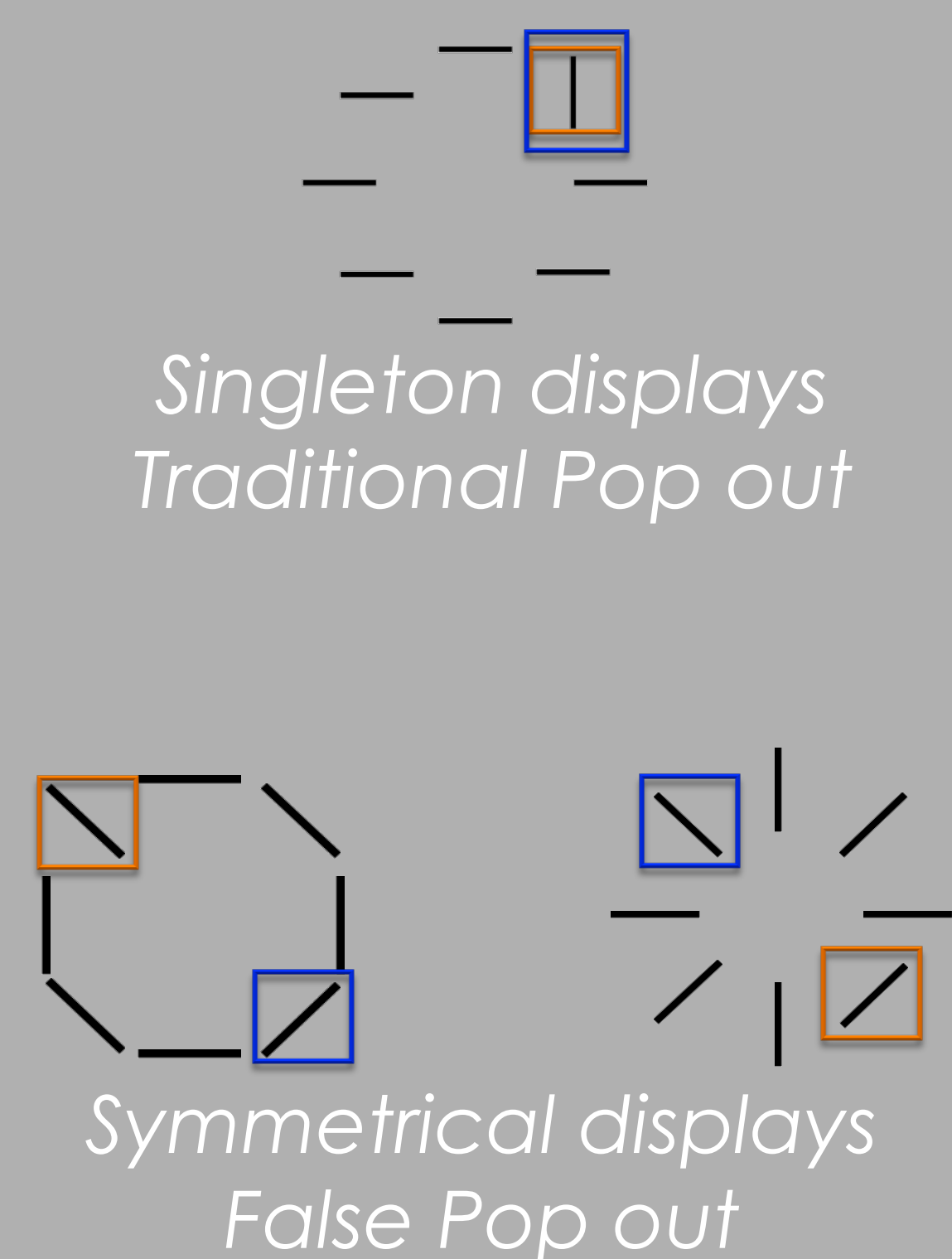
Pop out is traditionally attributed to basic feature differences (A), but emergent features arising from the display as a whole, especially symmetry, can cause distractors to falsely pop out (B).

4-item FPO



Competing symmetrical percepts of a square and a rectangle determined which dot popped out. (gray boxes added to show amodally perceived square/rectangle)

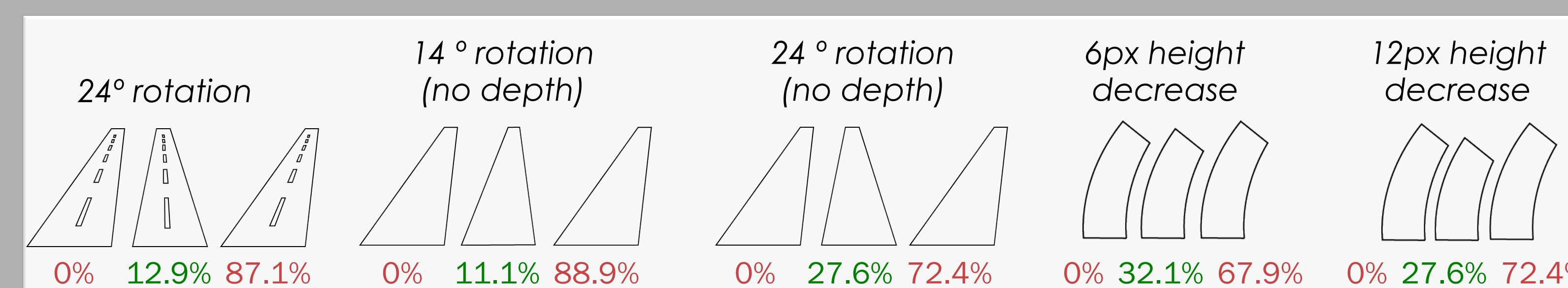
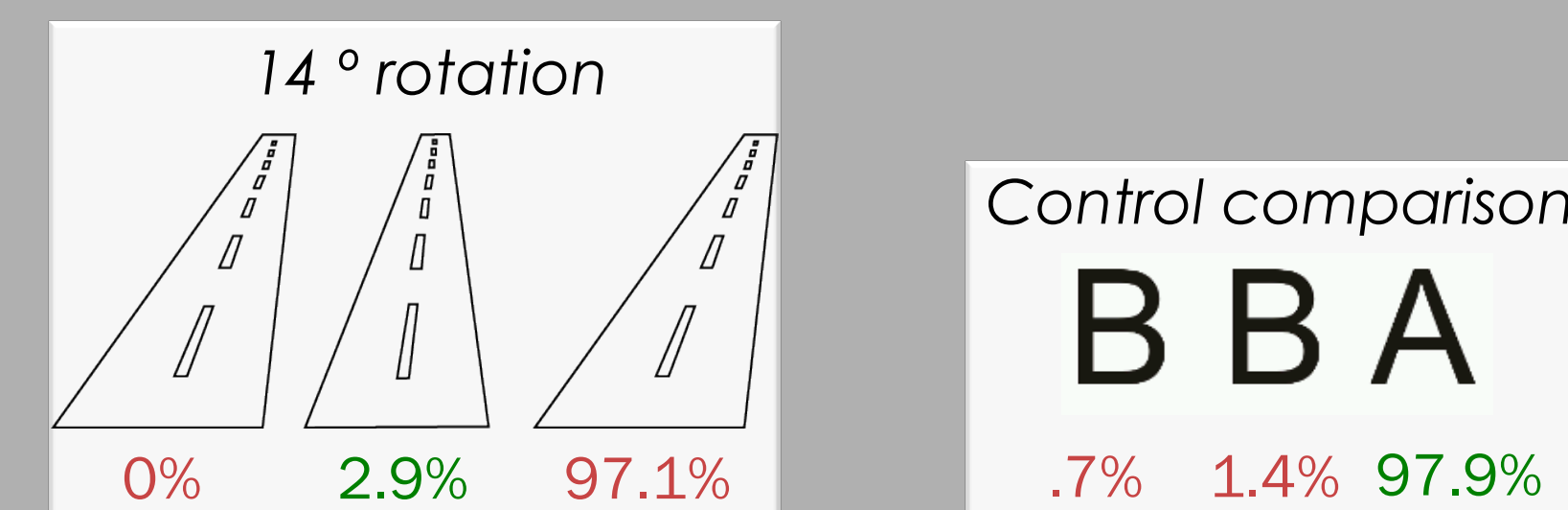
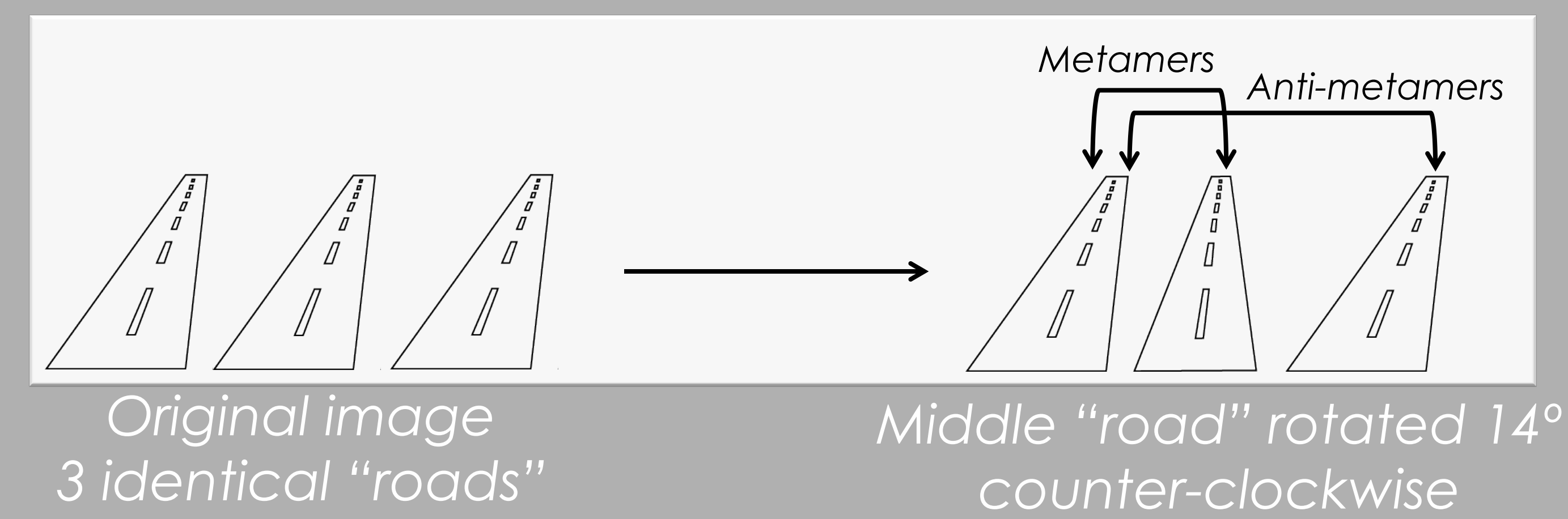
8-item FPO



Two tasks, same displays: Find the pattern-breaking (orange box), or unique (blue box) targets. The pattern-breaker was the most common item in the display, but was always found faster than the unique (basic feature) target.

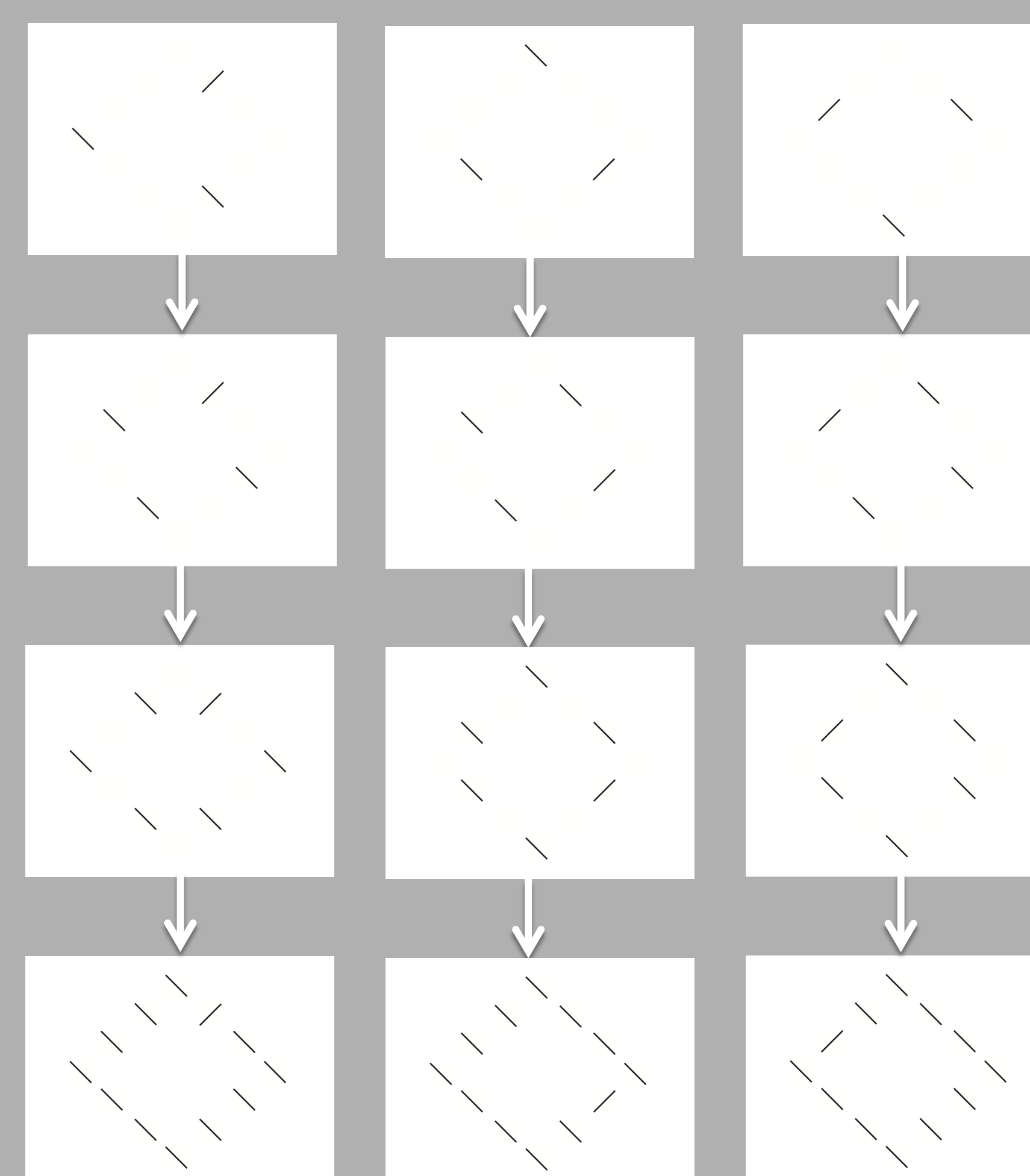
3-item Pure FPO

2 anti-metamers + 1 metamer



Other Pure displays (above) show not pure but merely strong FPO

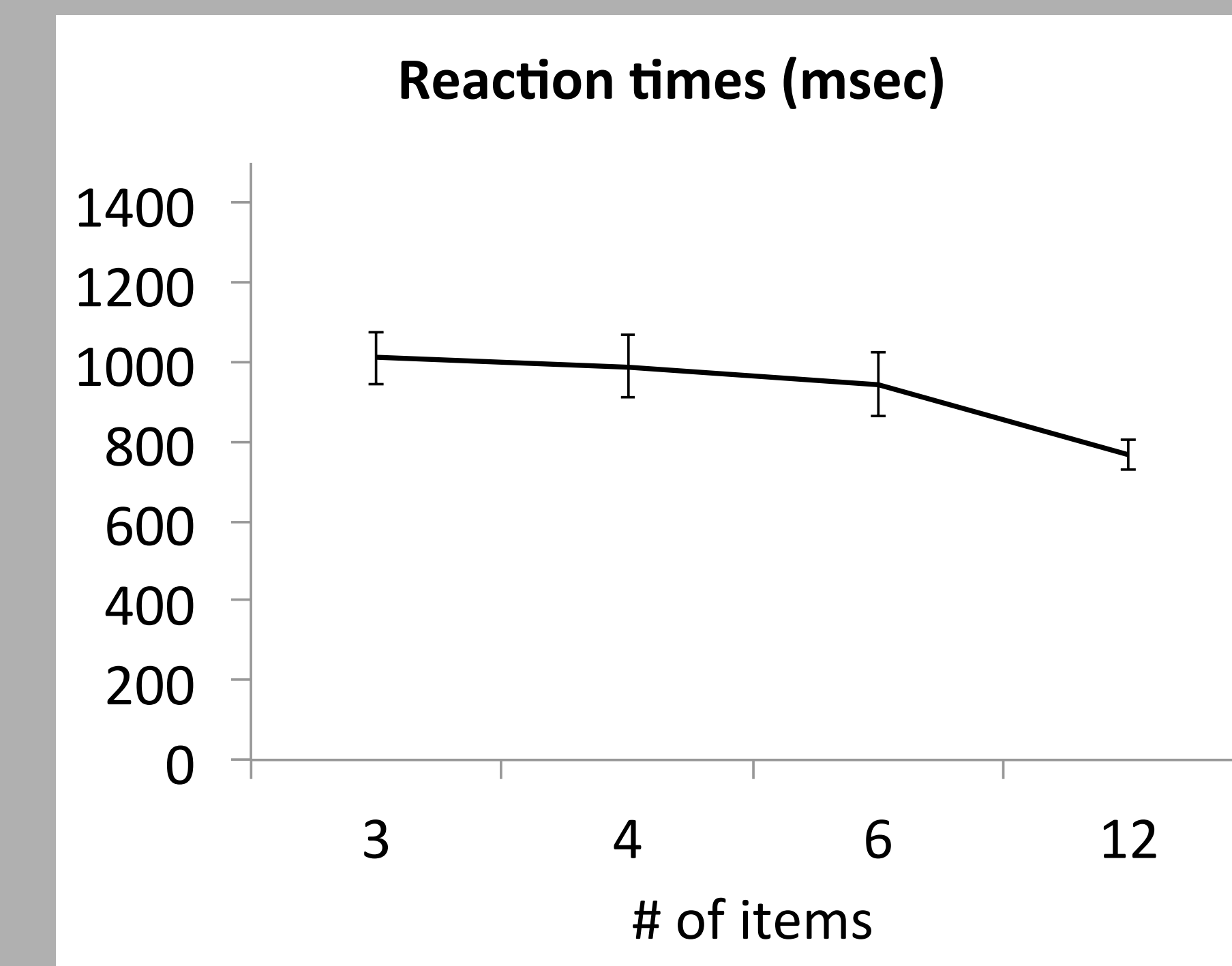
Pilot study: FPO and RT functions



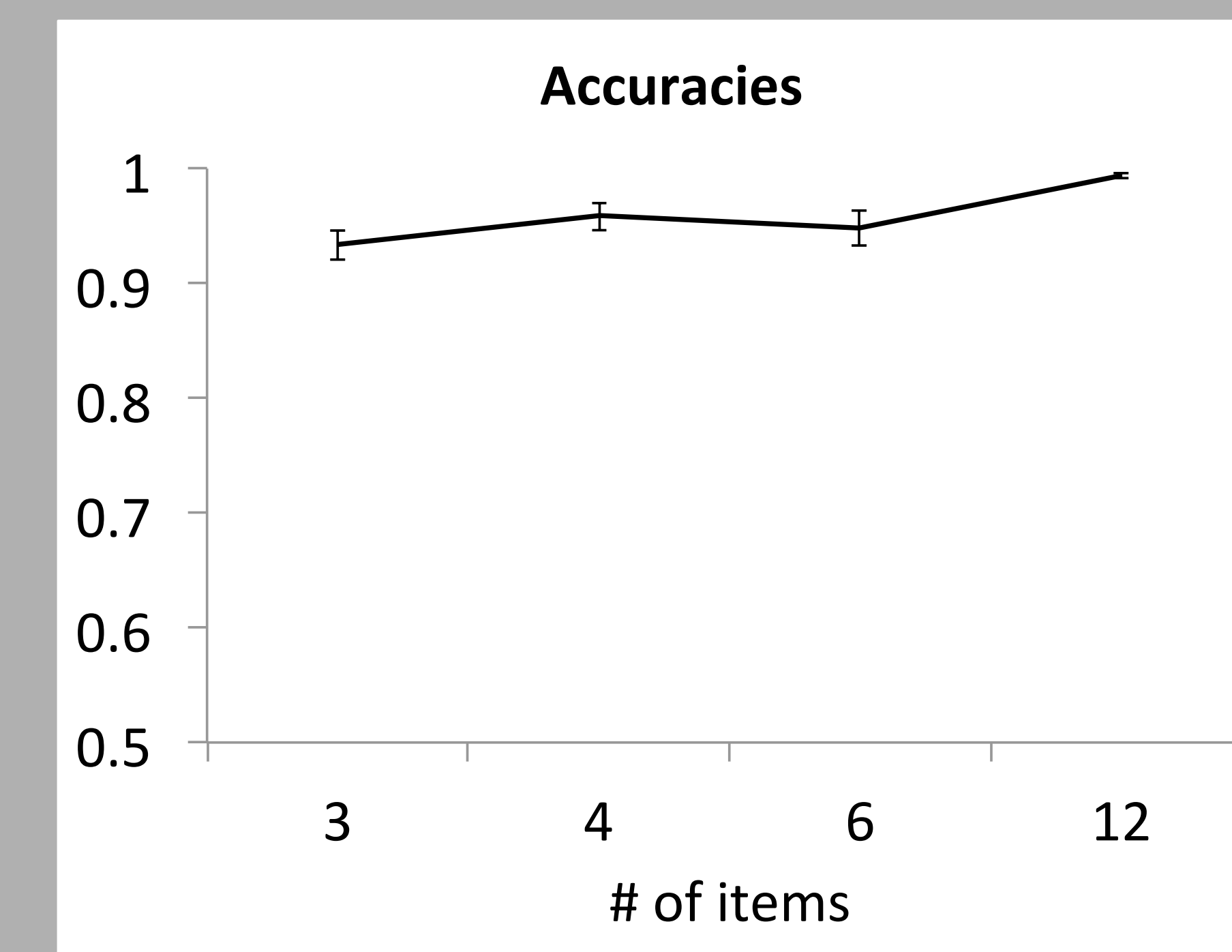
Basic feature dominant hypothesis: The target is always a positive diagonal and the distractors are identical negative diagonals; search slopes should be flat.

FPO dominant hypothesis: At display size 12, there is a decreased potential for FPO due to the perception of alternative groupings in the displays; RTs should drop for 12-item displays.

Pilot Study: Results



There was a significant negative linear component to RT slopes across display size ($p < .001$), suggesting that FPO resulting from perceptions of alternative patterns in the displays decreased as display size increased.



There was also a significant positive linear component to accuracies ($p = .004$). Subjects became faster and more accurate as the displays became less ambiguous.

Conclusions

These experiments use FPO to refute the traditional claim that pop out (visual salience) is the result of basic feature differences. Targets that differ on the basic feature of orientation are not as salient as pattern-breakers. Local property theories of visual search cannot account for 3-item Pure FPO, and RTs in simple basic feature search paradigms can be improved by eliminating the possibility of FPO as display sizes increase.

References

- Pomerantz, J. R., & Portillo, M. C. (2011). Grouping and Emergent Features in Vision: Toward a Theory of Basic Gestalts. *Journal of Experimental Psychology: Human Perception and Performance*, 37(5), 1331-1349.
- Pomerantz, J. R., et al. (1977). Perception of Wholes and of Their Component Parts: Some Configural Superiority Effects. *Journal of Experimental Psychology: Human Perception and Performance*, 3(3), 422-435.
- 3-Road stimulus @Akiyoshi Kitaoka (2010)