

Grouping/conjunctions of basic features sometimes give way to incorrect discriminations: False Pop-Out (FPO).

True Pop Out False Pop Out

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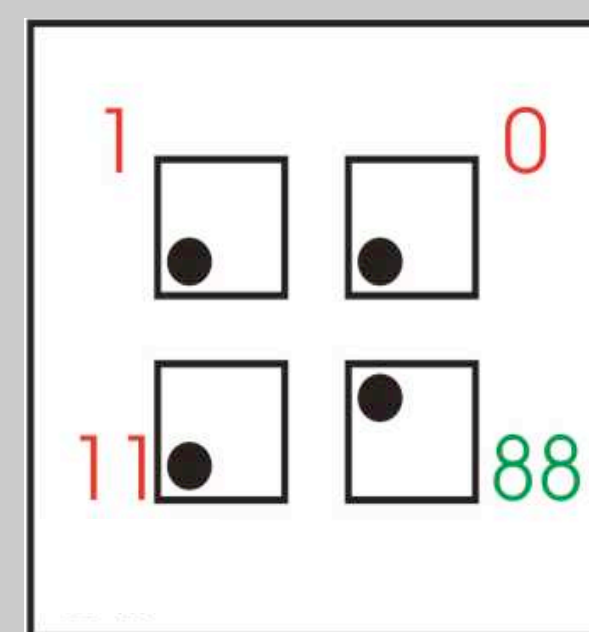
o FPO may be defined as a distractor posing as a target in a search task.

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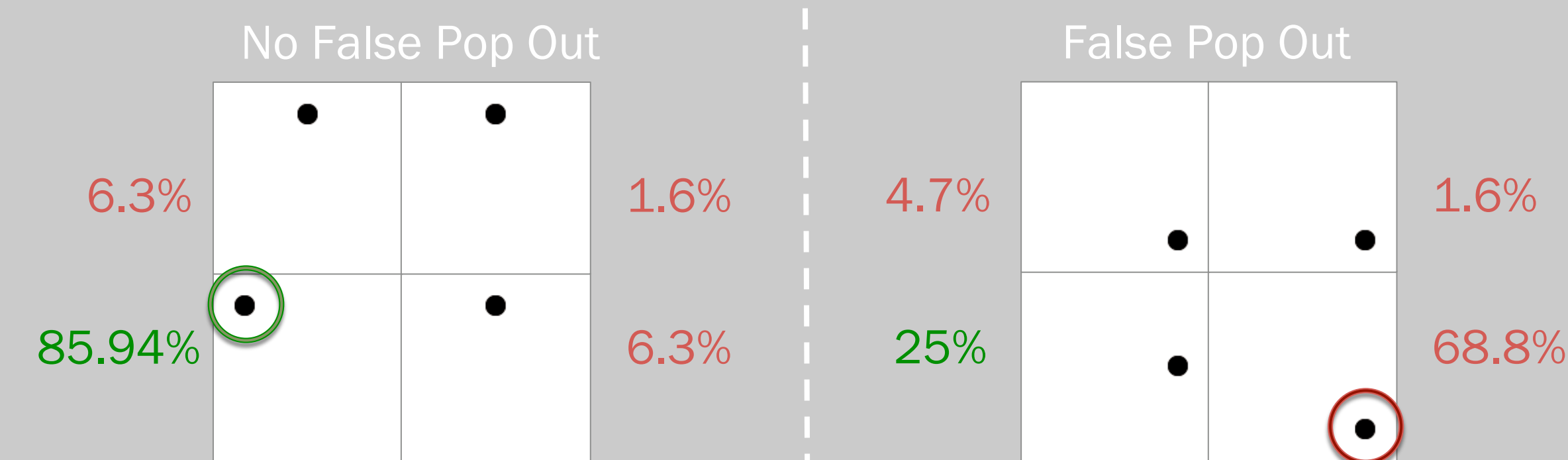
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o Causes uneven response distributions.

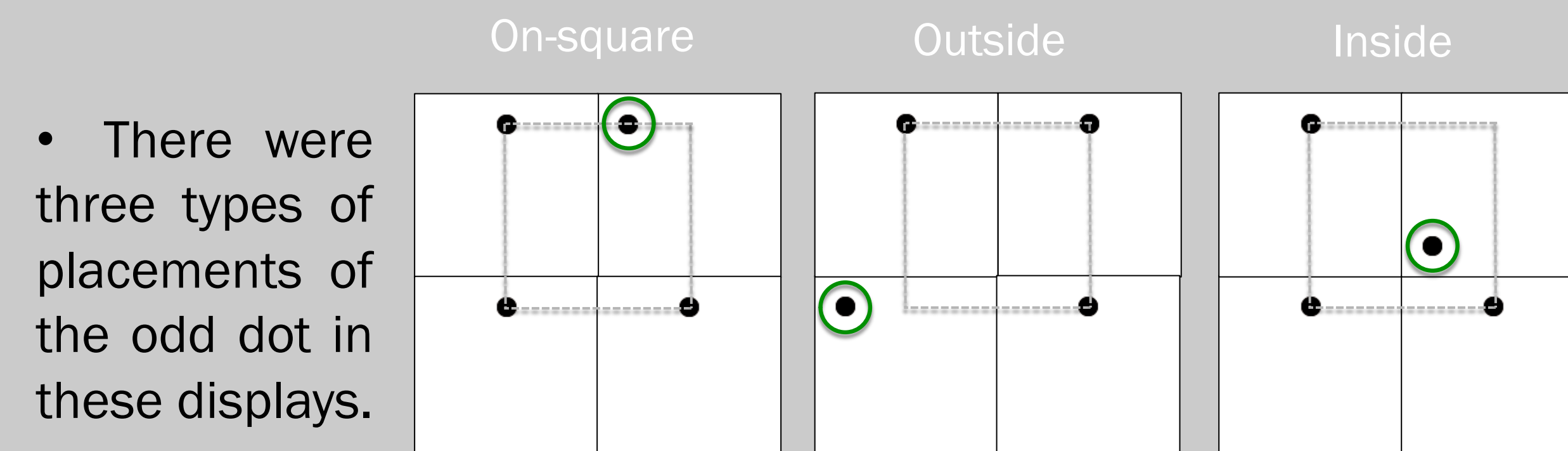
Display from Pomerantz & Portillo (2004)

Closer examination of the phenomenon found more FPO when feedback on responses was eliminated.



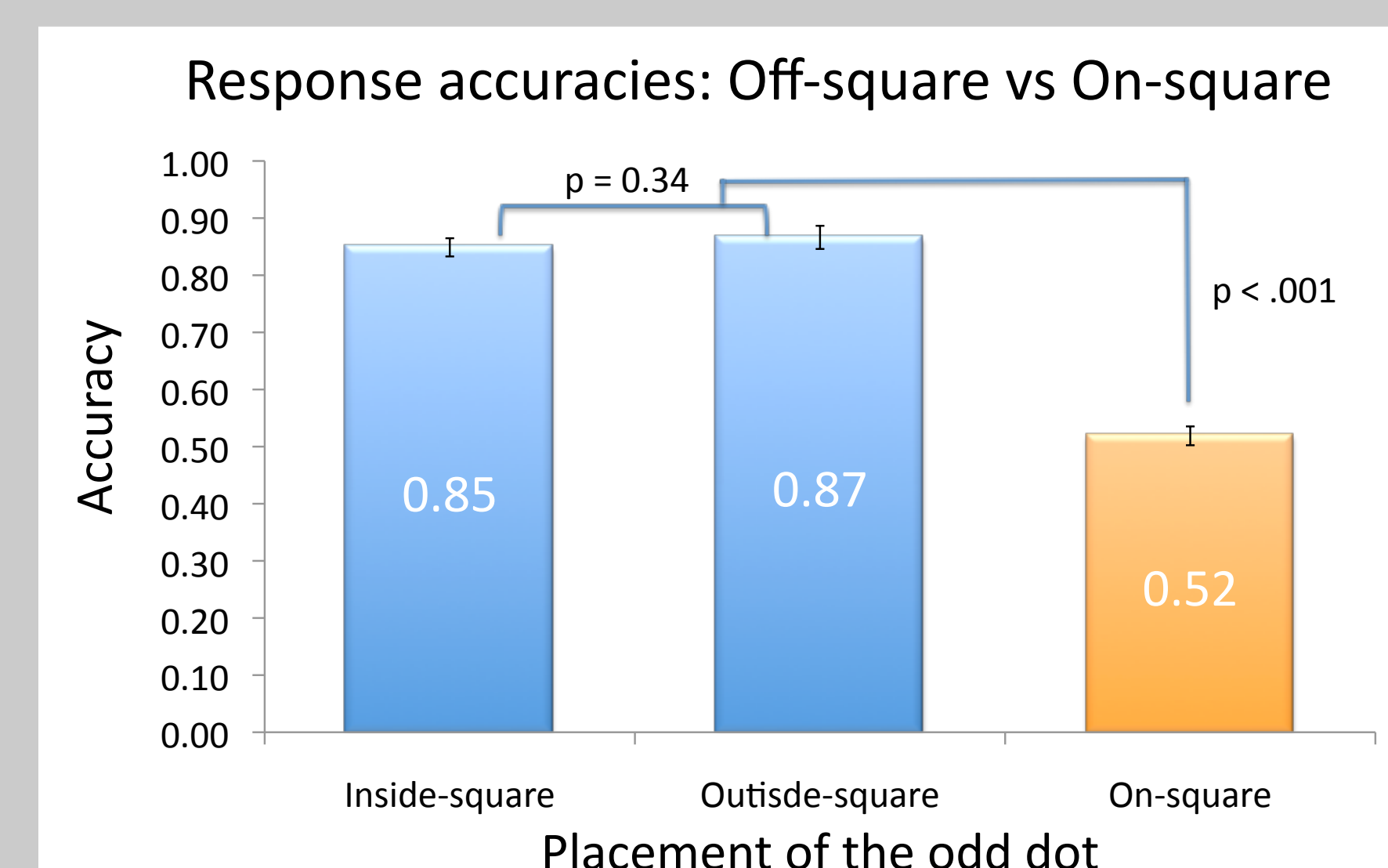
Percentages indicate frequency at which each quadrant (incorrect and correct) was chosen as odd. Circles indicate most frequent response (incorrect or correct).

The Square Principle: Any dot not falling on the border of the square suggested by the 3 identically-placed dots is odd.



• There were three types of placements of the odd dot in these displays.

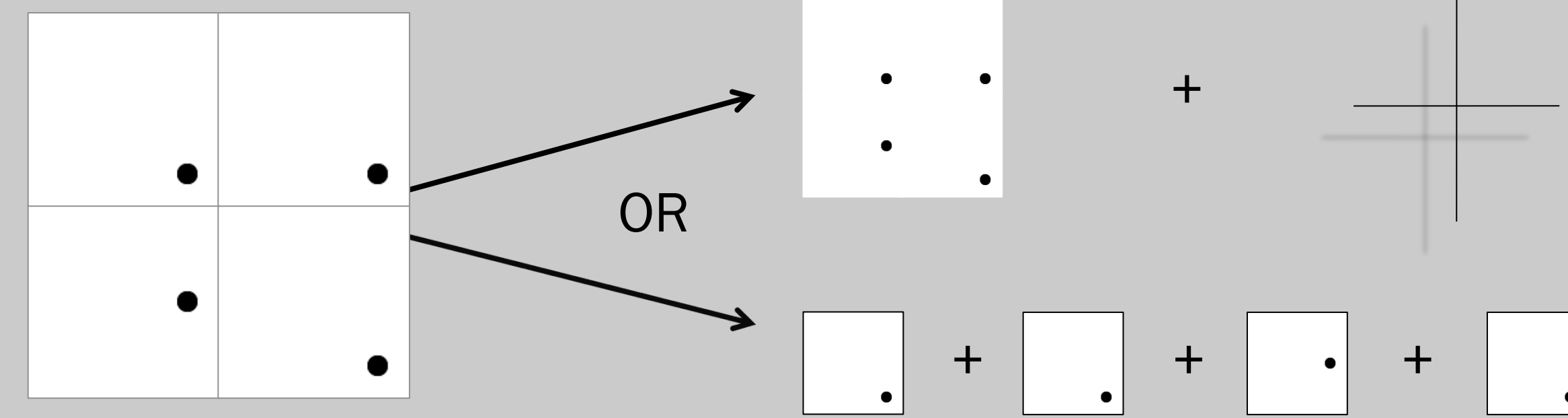
Accuracies were found to be highly correlated with the placement of the odd dot in relation to the square.



• We speculate that if the odd dot falls on the border of the square, it is not clearly symmetry-breaking, making the display more difficult.

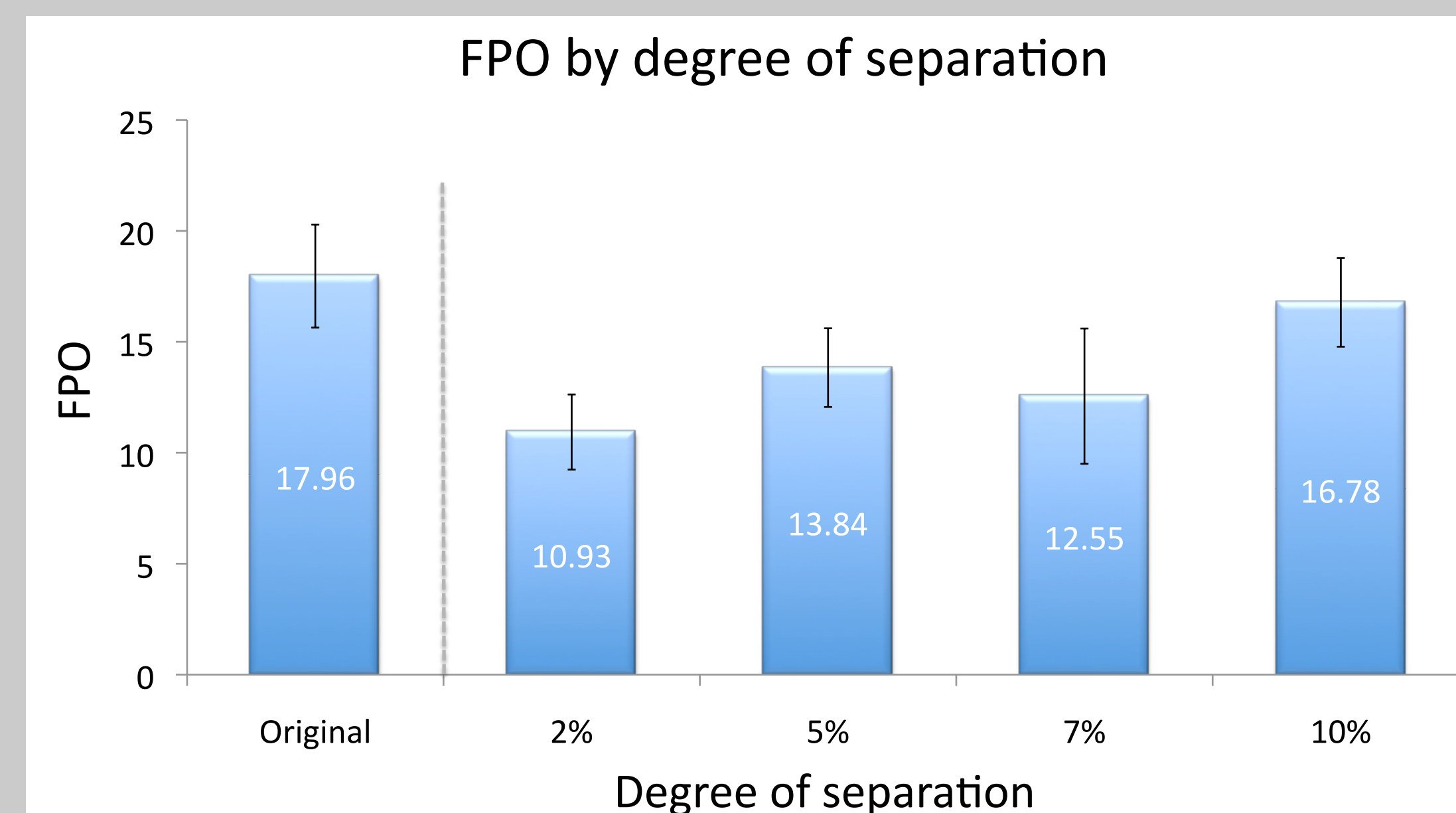
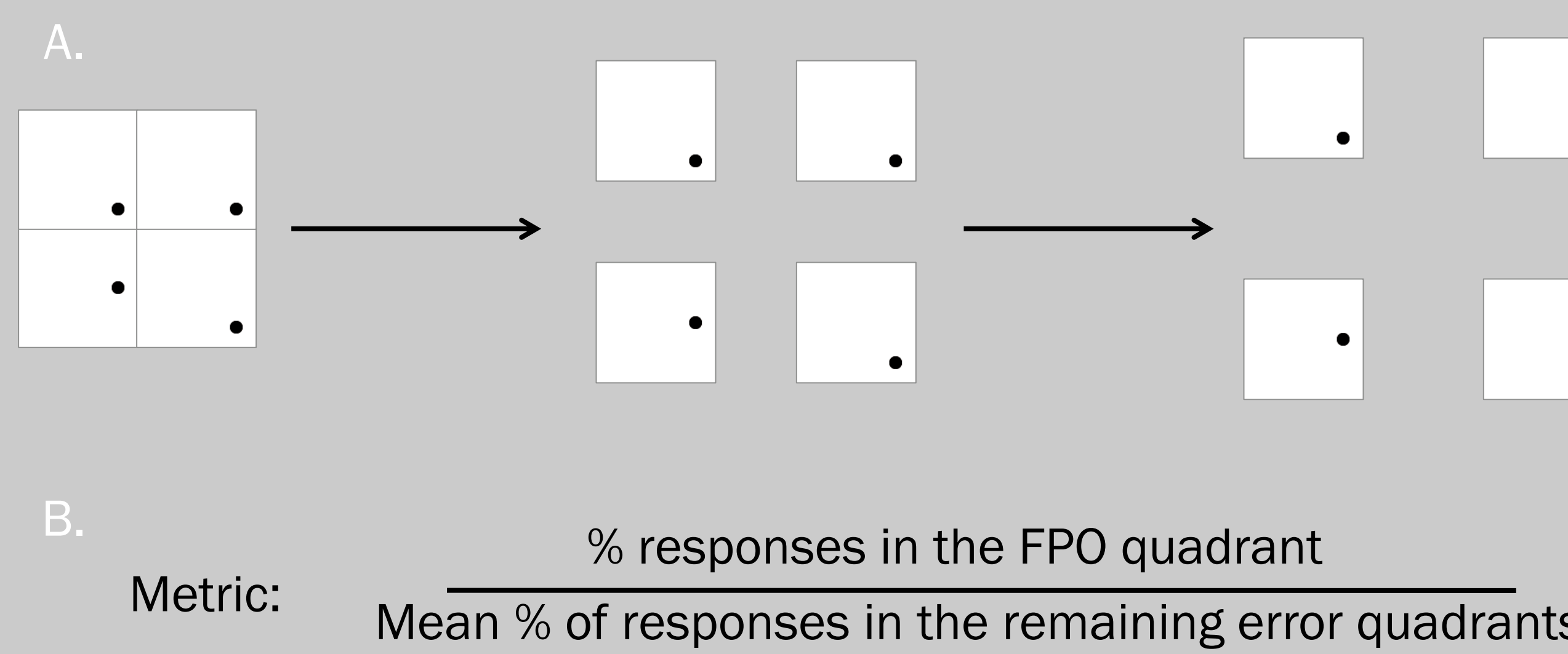
Question: Because the 'quadrants' share a border, does FPO occur as a result of the ambiguity of the display itself?

Two interpretations of this display

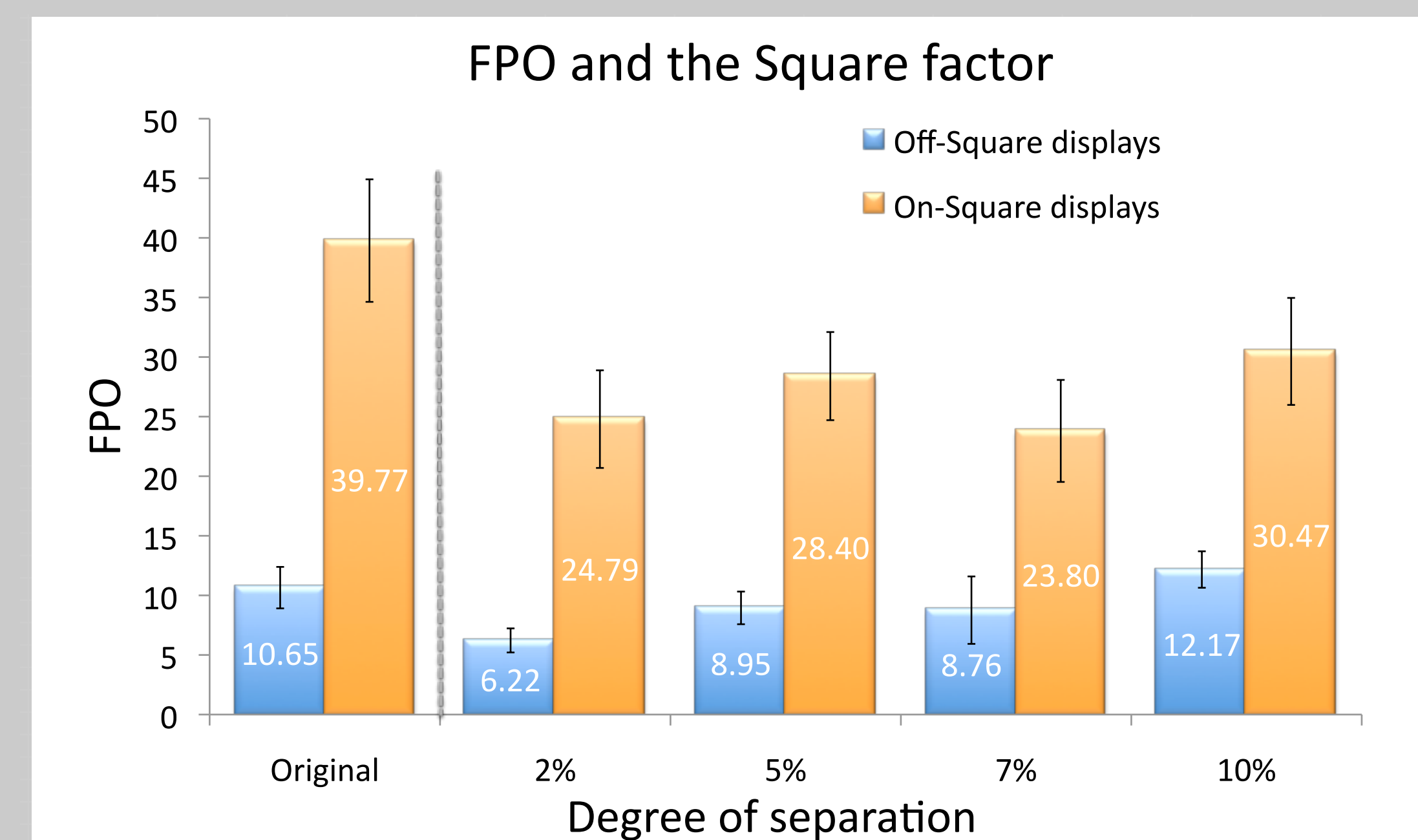


Answer: After testing different degrees of separation^A, FPO (calculated via our metric^B) was not eradicated, only reduced.

Examples of separated quadrants

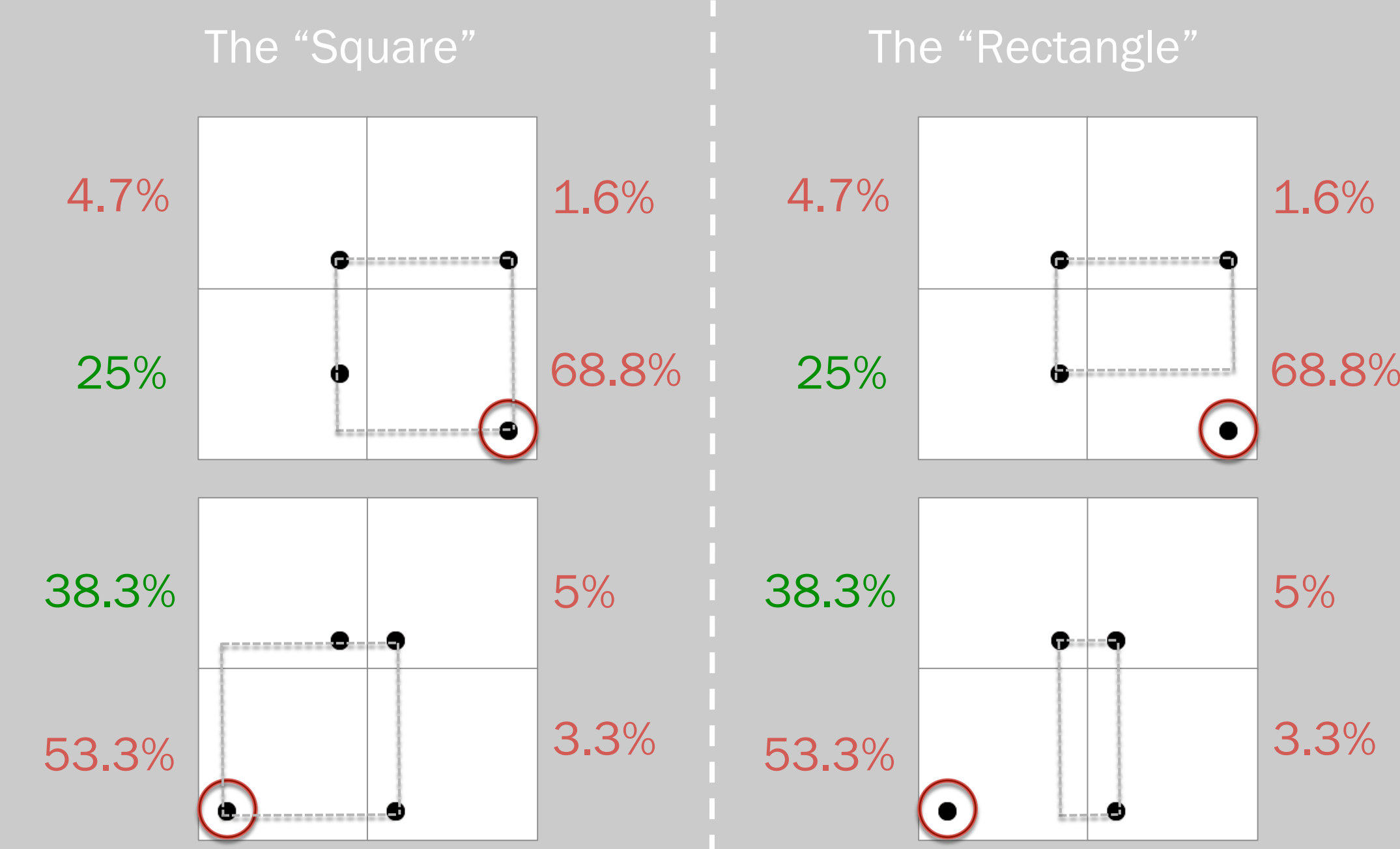


No main effect of separation ($p = 0.14$). The original version differed only from the 2% condition, and only before correction.



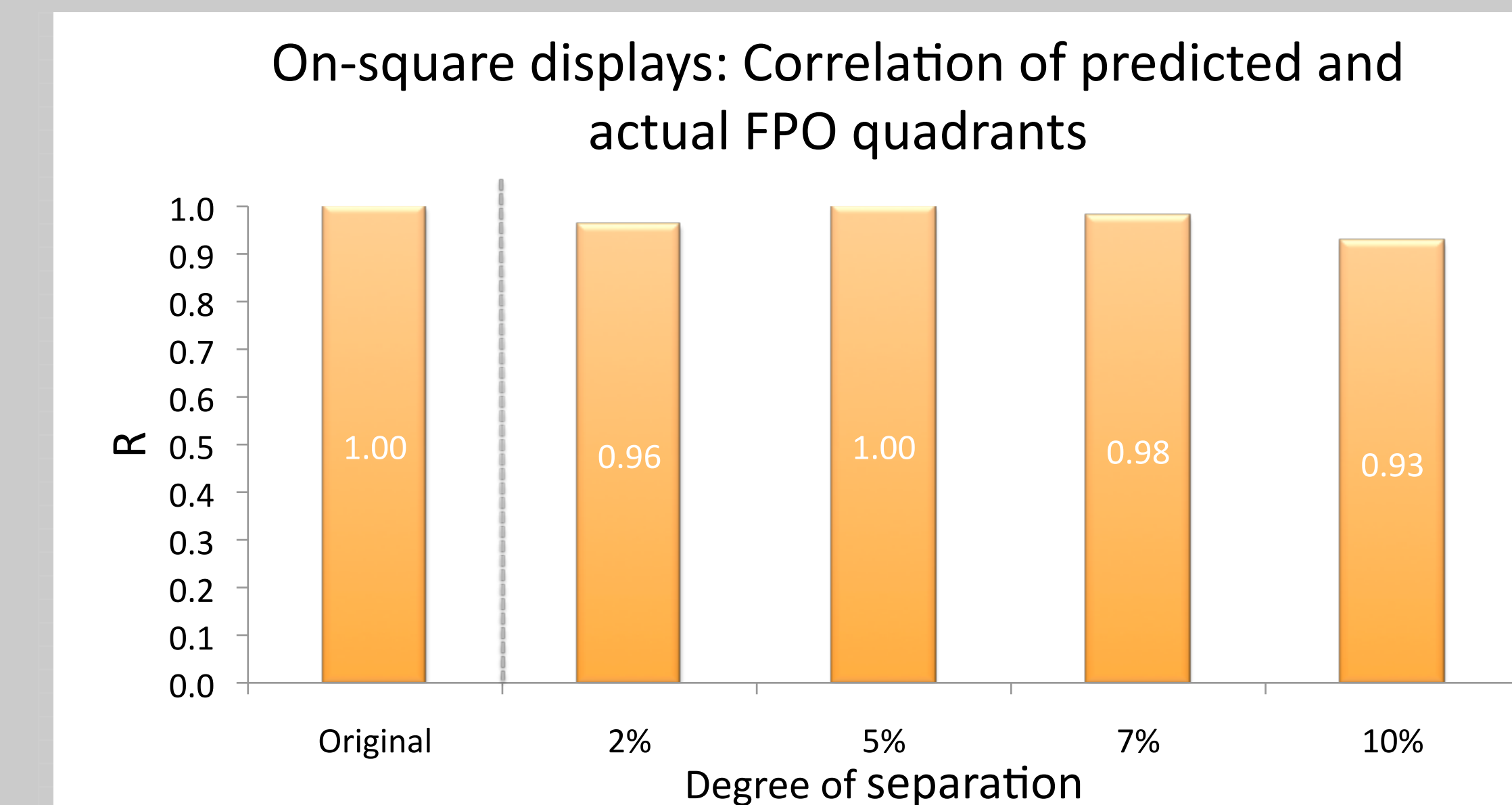
On-square and off-square displays were significantly different in all separation versions ($p < .001$).

The Rectangle Principle: The dot that breaks the rectangle's symmetry is the most qualified FPO candidate.



The smaller, implied rectangle in the on-square displays may be the next "best" completion option in the absence of the square.

Using the Rectangle Principle to predict the FPO quadrant in on-square displays resulted in near perfect correlations with actual FPO quadrants.



Conclusions and future directions

o The evidence supports the notion that the general principle underlying False Pop-Out is one of symmetry breaking or pattern breaking of elements, and that increasing distance between elements does lower FPO, but not significantly. This principle is likely to be successfully extended to other types of displays.

o The Square Principle: When the odd dot basticates (i.e., breaks the symmetry of) an implied "square", very little FPO results.

o When the odd dot falls on the border of (i.e., does not clearly basticate) the square, an alternative shape - the rectangle - is present in the display, and is clearly basticated.

o The Rectangle Principle: The basticated rectangle seems more salient than the potential square, as it consistently drives subject responses.

o This does not explain the portion of FPO still occurring in off-square displays, which is currently being addressed via the generation of new sets of prediction scores (e.g. relative dot proximities, and a more exhaustive search of all displays for all possible, alternate, basticated configurations).