

Understanding the “Blue Dot” in Smartphone Displays

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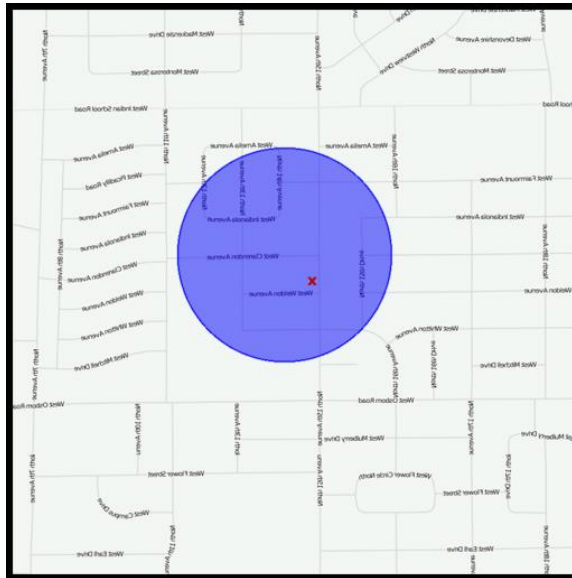
Background

- Location-based services often visualize uncertainty of location readings with the “Blue Dot of Uncertainty”.
- Previous research on visualization of uncertainty in geovisualization has focused on user intuitions not on objective measures of performance.
- Here we examined the effect of an alternative visualization to the ‘blue dot’ representation of uncertainty.
- We speculated that people might use different heuristics, and therefore make different judgments, depending on the format of the visualization provided.

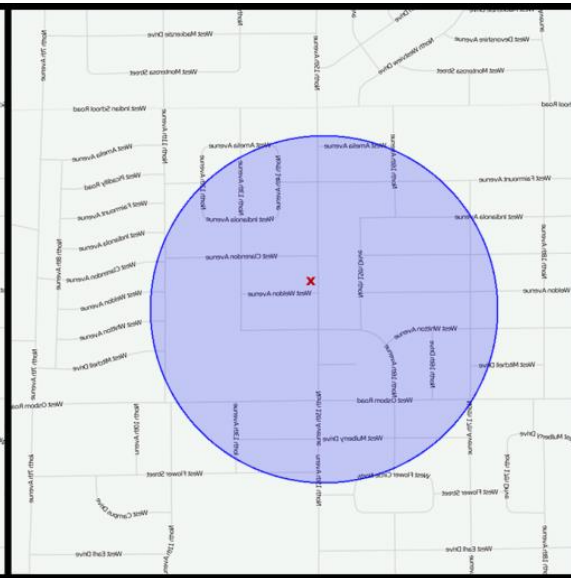
Task

You know you are at the location indicated by **X**. A and B show two different smartphone displays of where you are. Which smart phone produced the most accurate reading for your location?

Map A



Map B



Method

Design

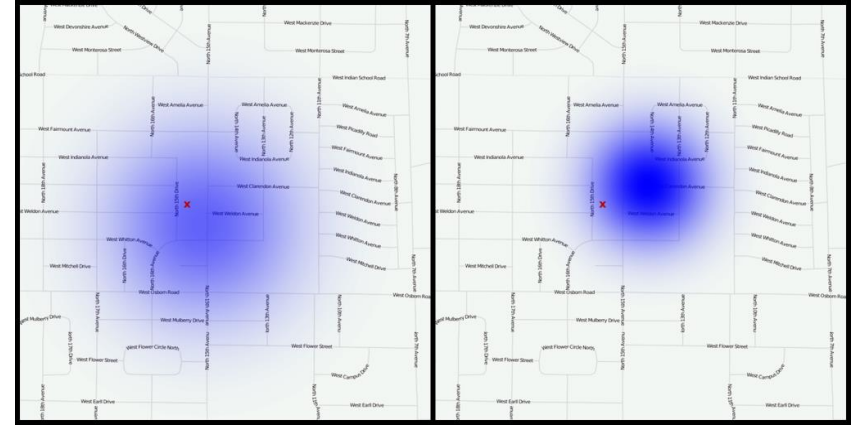
- 4 visualization formats: 2 (uniform opacity vs . Gaussian fade x 2 (centroid visible or not visible)
- Between subjects, design, N = 72
- 128 trials per participant (4 scenarios x 8 'known locations' x 4 replications)
- Know location selected to differentiate between heuristics based on responses.

Visualization Variations

Uniform Opacity with border at 95% CI



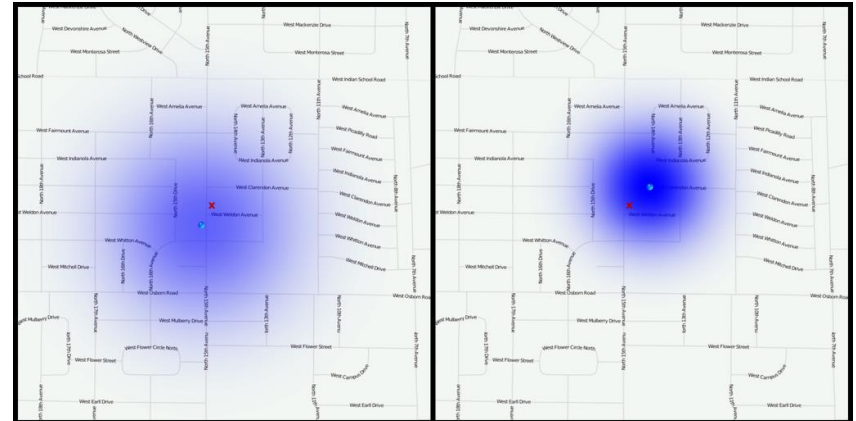
Gaussian Fade without Visible Centroid



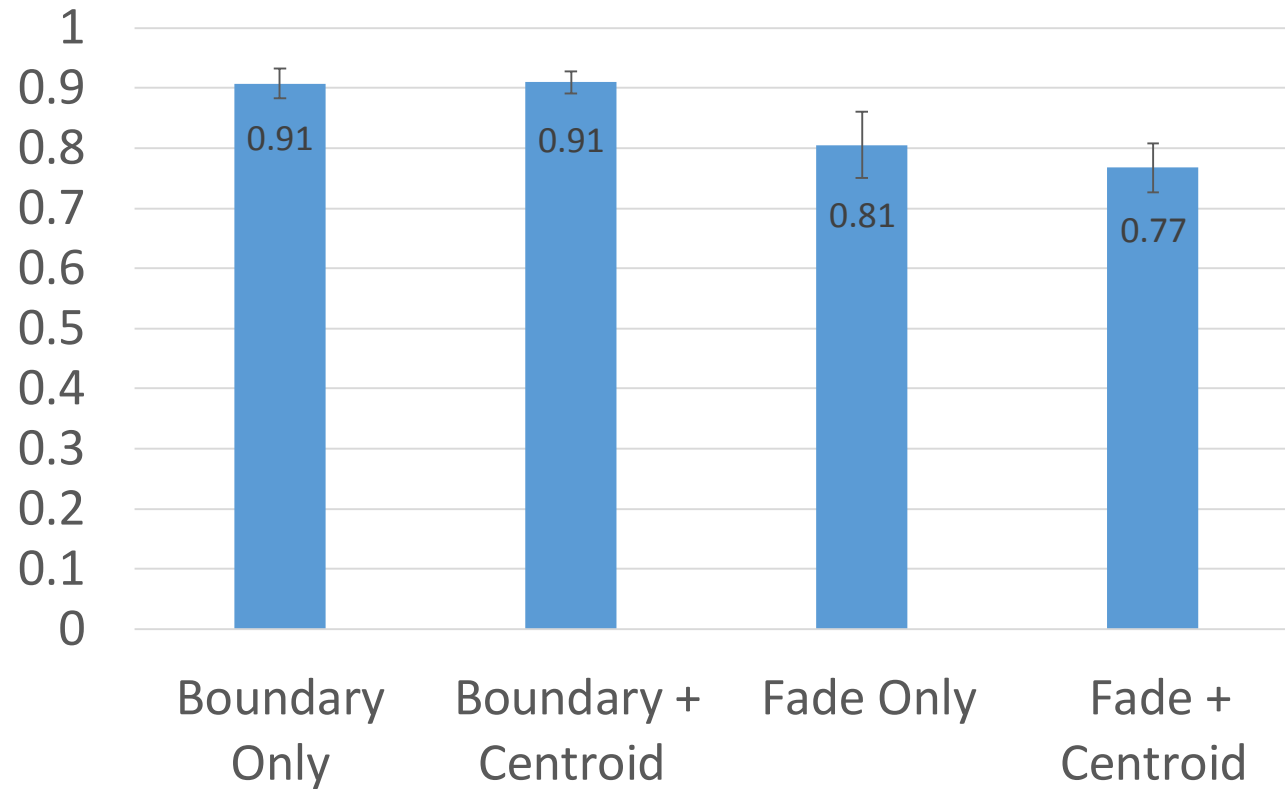
Uniform Opacity with border at 95% CI
and Visible Centroid



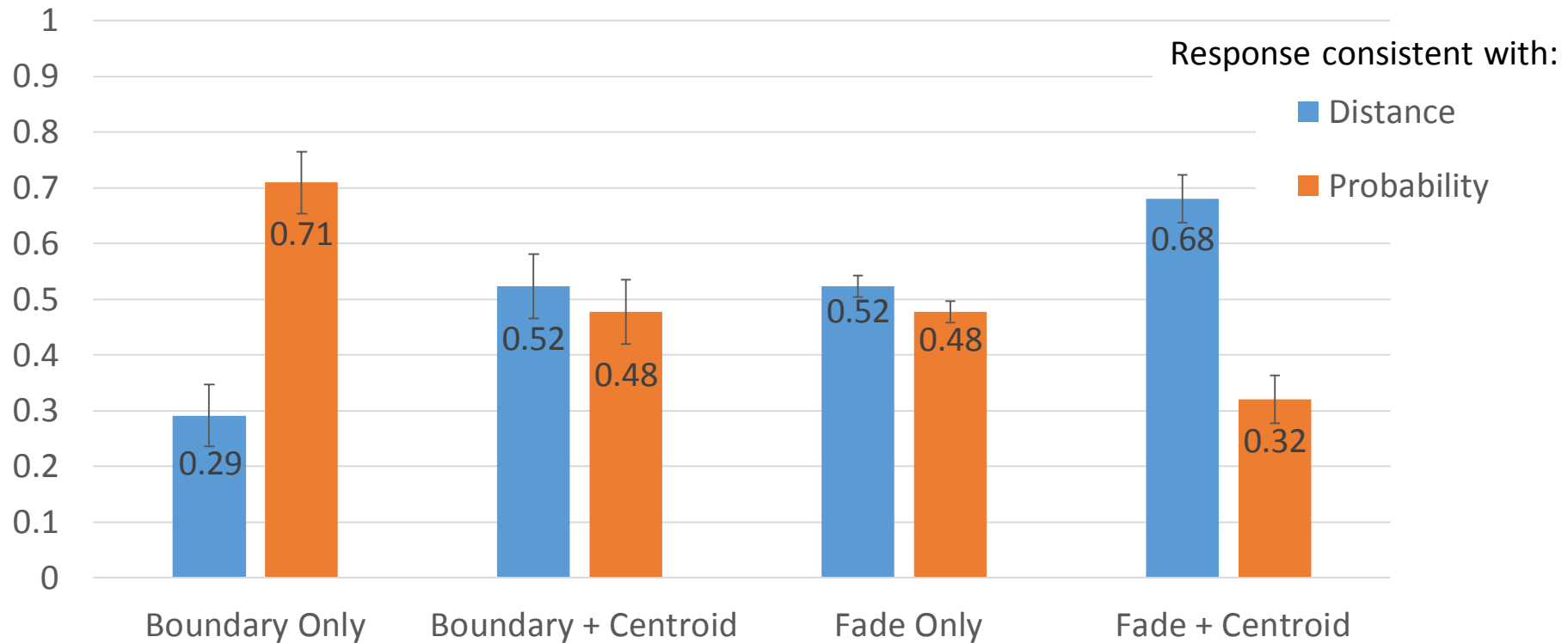
Gaussian Fade with Visible Centroid



Consistency when distance and probability predict the same response (*proportion of participants who choose that response*).



When distance and probability predict different responses



Discussion

- Participants receiving the Gaussian fade glyph with the centroid marked tended to respond more consistently with the ‘distance to centroid’ heuristic.
- Both Gaussian fade and centroid increased the saliency of the center of the glyph in relation to the boundary; combined fade + centroid had strongest effect.
- Participants receiving the blue circle only were more likely to take uncertainty into account. In this visualization, the centroid is less salient.
- While we expected the Gaussian fade to promote use of uncertainty, the increased saliency of the centroid in this glyph encouraged judgments based on distance alone that ignored uncertainty.