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Where are you? The Effect of Uncertainty and its Visual Representation on Location Judgments in GPS-like Displays

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Abstract: Two experiments revealed how non-experts interpret visualizations of positional uncertainty on GPS-like displays and how the visual representation of uncertainty affects their judgments. Participants were shown maps with representations of their current location; locational uncertainty was visualized as either a circle (confidence interval) or a faded glyph (indicating the probability density function directly). When shown a single circle or faded glyph, participants assumed they were located at the center of the uncertain region. In a task that required combining two uncertain estimates of their location, the most common strategy – integration – was to take both estimates into account, with more weight given to the more certain estimate. Participants' strategies were not affected by how uncertainty was visualized, but visualization affected the consistency of their responses. The results indicate that non-experts have an intuitive understanding of uncertainty and that the best visualization method is task dependent.