Role of Perceived Object Structure on a Spatial Perception Illusion

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Perceiving distance between things is essential for successful action. However, our perceptions are sometimes inaccurate. An example is an illusion originally labeled “object-based warping” because it suggested that our representation of space is distorted by perceived object structure (Lebed et al., 2023; Vickery & Chun, 2010). This illusion occurs when the separation between two stimuli appears to be larger or smaller than it actually is, depending on whether they appear inside or outside of an object, respectively. Because these misperceptions do not occur when there is no object present, they were interpreted as perceived object structure distorting perceived space. Alternatively, these misperceptions may be driven by interactions among image features including proximity of stimuli to contrast edges (Baker et al., 2024). We tested whether perceived object structure contributes to these spatial misperceptions or if instead they can be accounted for entirely by image-level interactions. We used binocular disparity to manipulate perceived object structure while maintaining nearly identical image-level information across four conditions. Two rectangles were presented at different depths defined only by binocular disparity. Two vertically separated diamonds were presented at one of the two depths thus appearing in the same depth plane as one of the two rectangles. The perceived separation between the diamonds differed depending on the rectangle with which the dots appeared. Because image level information was nearly identical across conditions, the perceived differences in separation can be attributed to perceived object structure. How, specifically, perceived object structure impacts perceived distance remains an open question.