

## **Size and Shape Constancies Do Not Affect Perceived Angular Size: Linton Size Constancy and Shape Constancy Illusions**

Paul Linton<sup>1,2,3</sup> ([paul.linton@columbia.edu](mailto:paul.linton@columbia.edu))

<sup>1</sup> NOMIS Foundation Fellow, Italian Academy for Advanced Studies, Columbia University

<sup>2</sup> Presidential Scholar in Society and Neuroscience, Centre for Science and Society, Columbia University

<sup>3</sup> Visual Inference Lab, Zuckerman Mind Brain Behavior Institute, Columbia University

We present three new illusions that challenge our understanding of shape and size constancies. Traditional accounts of size constancy suggest that it distorts the perceived angular size of objects, so a “far” object takes up 20% more of the visual field than a “near” object when both have the same retinal image size (Murray et al., 2006, *Nat. Neurosci.*, 9, 429-434). Similar claims have been made for shape constancy, where Thouless, 1931, *Brit. J. Psych.*, 21, 339-359 argued that the perceived angular size of a rotated object is larger than its retinal image size. Both imply a distortion of the visual field, with some regions expanded and others shrunk. By contrast, Linton, 2023, *Phil. Trans. R. Soc. B*, 378, 20210455 argues that the visual field (perceived angular size) is undistorted by size and shape constancies. To demonstrate this, we placed bounding boxes on ‘pictorial’ size constancy, ‘stereo’ size constancy, and ‘stereo’ shape constancy stimuli. Our reasoning is that, if regions of the visual field really are distorted (shrunk or expanded) by up to 20%, then any object placed in the same distorted region of the visual field (such as the bounding boxes) should also be distorted. But that’s not what we find. The bounding boxes do not appear to be distorted. This suggests that perceived angular size simply reflects the undistorted retinal image, and “size constancy” is a merely cognitive effect. We also apply this analysis to explain other purported distortions of the visual field, such as the Müller-Lyer illusion.

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