

## Are Shadows Only Coarsely Processed? Exploring Depth Discrimination with Cast Shadow Cue Conflicts Across Spatial Frequency

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**Abstract.** Shape-from-shading is a ubiquitous cue informing object identification and depth judgements. Cast-shadows contribute towards these judgements (see Mamassian, Knill and Kersten, 1998). A number of studies have reported that search-times for inconsistent shadows vary according to whether the scene is presented as-if illuminated from above or below. Though the direction of these inhomogeneities is sometimes contested (see Rensink and Cavanagh, 2004 and Lovell et al, 2009). Lovell et. al. posit that the processing of shadows is handled by coarse-scale processes, but only in light-from-above presentations. The current study explores depth discrimination judgements informed by cast shadows. We create stimuli featuring a pair of floating discs, casting shadows onto a fronto-parallel surface. Participants were asked to identify the disc protruding the most towards them. One disc featured a cast-shadow with a cue-conflict, where low and high spatial-frequency components conveyed different depth information. This allowed us to estimate the weight assigned to the different cues when depth discrimination judgements were made. Firstly, we find that depth judgements consistently reflected the coarse-scale cues, fine-scale cues were largely ignored. Secondly, we found only small differences in the cue weightings for stimuli presented as-if light were above or below. The latter result is perplexing as previous studies have shown a difference between light-from-above and below conditions. We speculate that this difference reflects the task undertaken, i.e. discriminating depths rather than searching for odd shadows.