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Vision Sciences Society Annual Meeting Abstract | September 2015

# Evidence for a functional and anatomical dissociation in the use of size constancy for perceptual report and goal-directed grasping

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Journal of Vision September 2015, Vol.15, 187. doi:<https://doi.org/10.1167/15.12.187>

## Abstract

On a moment-to-moment basis, we experience the visual world as permanent and unchanging despite the fact that the retinal image size of objects in the scene change with changes in viewing distance. After all, to the 'naked eye', the real size of objects rarely changes over short time scales and our visual system faithfully delivers this experience in terms of visual object-size constancy. Arguably, visual size constancy operates during prehension as well: objects can vary in retinal image size at different positions within reachable space and yet the visuomotor system codes grasping movements on the basis of the target's real size. Previous evidence from our laboratory, however, suggests that visual size-constancy for perception and for goal-directed grasping are not unitary. Here, we demonstrate conclusively that visual size constancy for perception and for grasping are functionally and anatomically dissociable. We tested a cortically blind patient, MC, who has large bilateral lesions encompassing almost the entire occipital lobe. We first demonstrate that MC's verbal and manual reports of target size depend entirely on retinal image size. Next, we show that despite MC's reliance on retinal image size for explicit reports of target size, her grasps are tuned to trial-to-trial changes in the real size of the targets – even when their retinal image size remain constant. Critically, for both perceptual report and grasping, the targets were presented at eye

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level in the absence of any environmental cues. We conclude that MC's spared size-constancy for prehension depends on the dorsal visual pathway's privileged access to shifts in horizontal gaze angle and/or accommodation to calibrate her grasps.

Meeting abstract presented at VSS 2015