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The Effect of Monocular and Binocular Occlusion Cues on Stereoscopic Image Recovery

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Shimojo and Nakayama (1990) pointed that for real world scenes there are opto-geometrical constraints which determine whether particular combinations of relative depth and right-eye-only or left-eye-only stimuli are ecologically valid or invalid. Moreover, Nakayama, Shimojo, and Silverman (1989) suggested that occlusion relation composing of monocular occlusion cue and binocular disparity is important to image recovery. Experiment 1 examined the importance of occlusion relation in illusory contour (IC) formation and depth discrimination task which were designed for different binocular and monocular occlusion conditions. The exp1 result showed that both binocular disparity and monocular occlusion cue are essential to stereoscopic IC recovery. The absence of either cue or conflict of each other reduced the task performance of participants, while the congruence condition generated the best. Experiment 2 used similar condition of Bacon and Mamassian (2002), but manipulated three kinds of background and occluder to test the influence of occlusion relation, and the suggestion Bacon and Mamassian showed that amodal completion allows visual system to assign stereoscopic depth in the absence of binocular correspondence. Although the main effect of occlusion relation in exp2 wasn't significant, there was a trend that legal occlusion relation improved the possibility of task performance corresponding to the true experimental condition. On the basis of different concave-response rate in different kinds of background and occluder, we may take Bacon and Mamassian's study as a special case and suggest that the more binocular correspondence unit be, the more stable depth we will capture. Our results supported that both monocular and binocular occlusion cues play important roles in stereoscopic image recovery, and the interaction between these two cues might indicate the integration of two processing channels.

Keywords: *binocular disparity, illusory contour, legal occlusion, monocular occlusion cue, occlusion, right-eye-only/left-eye-only*