The 31st International Congress of Psychology (ICP2016), July 24-29, 2016, Yokohama, Japan.

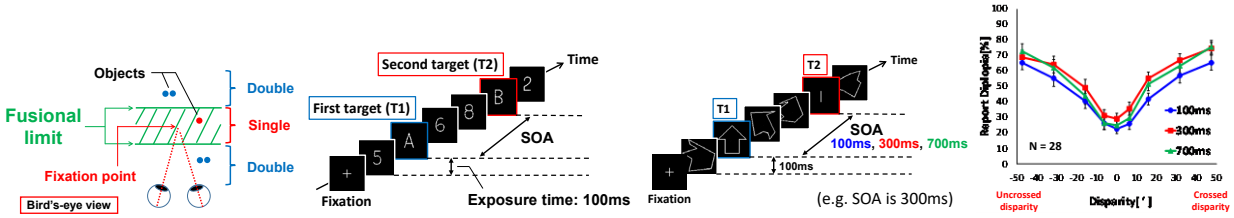
Visual attention affects the fusional limit of a centrally located object when using an attentional blink task

Yuji Nosaki[1], Ken Kihara[1], Hiroshi Ono[2], Sakuichi Ohtsuka[1]

Abstract

Fusional limit is the maximum disparity at which we can fuse the retinal images of both eyes and perceive single vision (Fig.1A) [1]. The fusional limit is influenced by external factors (e.g., size of stimuli, retinal eccentricity) [2] [3]. However, the influence of internal factor (e.g., attention, training) on the fusional limit is unclear. To reveal a relationship between fusional limit and attention, we used attentional blink (AB) task where two targets (T1 and T2) are embedded among distractors, sequentially presented on the center of visual field (Fig.1B) [4]. In this task, the intensity of attention to T2 becomes higher when SOA is 100ms (i.e., T2 is presented just after T1), since the appearance of T1 enhances the attention. Also, when stimulus onset asynchrony (SOA) between two targets is 200-500ms, the intensity of attention to T2 becomes lower because of suppression by T1's following distractors. When SOA is 700ms, the intensity of attention recovers to a base level.

In this study, we measured the frequency of double vision when changing the intensity of attention by using a vertical line with disparities as T2 in AB task (Fig.1C). We created a line stimulus with various disparities using a stereoscopic 3D display (120Hz) and Liquid crystal shutter goggles. T1 was one of arrows (eight directions) and distractors were random octagons. T1 and distractors were not overlap a line stimulus. Participants were asked to identify arrow's direction and report line seemed single or double. We found that the frequency of double vision depended on SOA. Further, in AB task, we found that visibility of stimuli did not impact fusion process by an experiment which no item was presented after T2. The results of experiments showed that the higher intensity of attention decreased frequency of double vision (Fig.1D). These results suggest that paying attention to a centrally located object strengthens the fusion of binocular stimuli and increases the fusional limit.



A B C D

Figure 1. Figures used in the poster.

References

1. I. P. Howard, "Binocular fusion and rivalry", *Seeing in Depth Volume I Basic Mechanisms*, Toronto, pp. 271-315, 2002.
2. D. E. Mitchell, "Retinal disparity and diplopia", Vision Research, Vol. 6, no. 7-8, pp. 441-451, 1966.
3. D. A. Palmer, "Measurement of the horizontal extent of Panum's area by a method of constant stimuli", Optica Acta, Vol. 8, no. 2, pp. 151-159, 1961.
4. J. E. Raymond, K-L. Shapiro, and K-M. Arnell, "Temporary suppression of visual processing in an RSVP task: An attentional blink?", Journal of Experimental Psychology, Vol. 18, pp. 849-860, 1992.

[1] Department of Science and Engineering, Kagoshima University, 890-0065, Kagoshima, Japan
[2] Department of Psychology, York University, M3J-1P3, Toronto, Ontario, Canada