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Author(s)	**Yeung, YS; Chow, HM; Tseng, C**
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INFORMATION OF OCULAR ORIGIN IMPAIRS TARGET DISCRIMINATION DURING VISUAL SEARCH

Yuk Sheung Yeung, *Hiu Mei Chow* and *Chia-Huei Tseng*

Visual features such as colour, orientation, luminance, eye-of-origin information are reported to modulate attentional deployment and thus visual search. Among them, the effect of ocular origin of information on visual search performance is less clear: Zhaoping (2008, 2012) found that an ocular singleton improves visual search performance when it was the target, while we (Yeung et al, 2014) found consistent search impairment by ocular singleton/column targets across experiments, except in one condition when a luminance-defined distractor was also presented. In this case, ocular singleton/column had no effect on target discrimination. To further examine how ocular information interacts with luminance information, here we addressed two concerns related to the previous experiment: (1) imperfect binocular fusion, and (2) ocular effect masked by high salience of the luminance feature.

We adopted a search display similar to our previous one: one eye viewed a 9x9 vertical-grey-bar-array in mid-grey against dark-grey homogeneous background. There was a randomly-selected luminance-defined singleton column of light-grey. The other eye viewed another independently selected singleton column. We (1) assisted binocular fusion by including a binocular outer ring. For (2), we adjusted the contrast of the luminance-defined singleton column against background at 4 levels to lower its feature salience.

After we lowered luminance salience, we discovered consistent search impairment by ocular singleton column that was not apparent before. Our result suggests that eye-of-origin information was available to observers during search, and an ocular singleton column hinders target detection, similar to the effect of a collinear singleton column (e.g. Jingling & Tseng, 2013). Our finding highlights the possibility of collinearity and eye-of-origin sharing common mechanisms in influencing attentional allocation in visual search.