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Is Color Photography Flatter: The Difference of Depth Perception between Chromatic and Achromatic Photos

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Introduction

Expression of depth is one of the most important factors in constructing the creative vision of a photographer. Photographers usually know how to create, with certain artistic sense or taste, depth impression in the process of flattening objects in a three-dimensional space. To emphasize the feeling of depth, photographers tend to choose black and white processing. This is because there has been a myth: color photography is flatter than black and white. From the era of early color photography, pleasure of flatness has been pursued rather than feeling of depth (Newhall, 1982).

The aperture and focal length of lenses are the major factors in changing depth impression (London et al, 2002). Depth impression increases when the aperture size is enlarged, resulting in shallower depth of field. When the focal length of lens becomes longer making the discrepancy of relative size among subjects smaller, depth impression decreases (Shin, 2002). This study is performed to investigate the effects of the presence of color as a photographic technique on depth perception.

Method

Fifty (N=50) Yonsei University undergraduates and graduate students were assigned two experiments. The stimuli were taken in color using two techniques: (a) aperture; $f/2.8$, $f/5.6$, $f/11$, $f/22$, and (b) focal length of lens; 28mm, 50mm, 70mm, 105mm, which were then duplicated and transformed to gray scale images. The conditions were consistently maintained to reveal the effects of the specific techniques. Every photograph included two same-sized mannequins positioned at different distances from camera. Participants were asked to compare two photographs at a glance, and were forced to identify the photograph in which the two mannequins appear to be closer to each other.

Results and Discussion

The frequency was analyzed by the method of paired comparison (Thurstone 1927a; 1927b). In the results (Figure 1, 2), the smaller aperture size and the longer focal length decreased depth perception in both chromatic and achromatic images. Color severely decreased depth impression at variations of focal length. In the mean time, the flattening effect of color was relatively weak along aperture variations. This implies that spatial frequency is a strong factor in giving a feeling of depth even in color photographs.

Black and white process is still common in the field of photography as fine art. From the results of this work, the relatively intense feeling of depth can be one of the reasons for that.

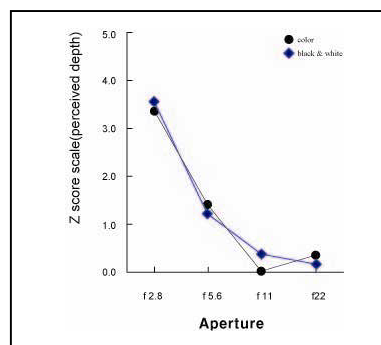


Figure 1: The effect of aperture on depth perception.

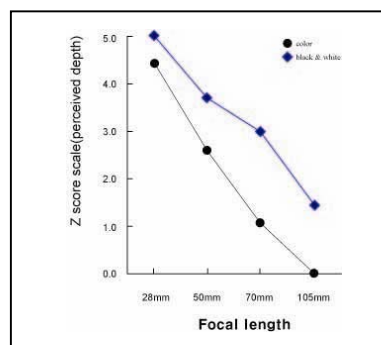


Figure 2: The effect of focal length on depth perception.

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