

K. YAMANAKA, K. SHIODA, M. KAWAKAMI. **Color Universal Design for use by elderly adults.**

Gerontechnology 2016;15(suppl):68s; doi:10.4017/gt.2016.15.s.937.00 **Purpose** Today, streets are flooded with color-coded information, and home entertainment devices display images that are sometimes easy and sometimes difficult to perceive. It is unclear whether these images were created according to well-established designs, but it is hard to believe that they are supported by scientific evidence¹. In addition, adults older than 65 years account for 25% of the Japanese population today and are projected to account for $\geq 40\%$ in 2060². In other words, Japan is on its way to becoming a globally unprecedented super-aged society. With aging, there is an increasing risk that we humans misread signs and notices presented to us. In this study, toward establishing guidelines for Color Universal Design systems, we investigated how color patterns affect visual perception by using visual stimuli generated by different signs.

Method Participants were 15 adults aged 64–74 years (9 males and 6 females). A participant with the head secured on a chinrest evaluated the visibility of images displayed on a large monitor placed 50 cm in front. Mean brightness (\pm standard deviation) during tasks was 91.9 ± 14.25 cd/m² on the monitor and 276.6 ± 18.25 cd/m² right in front of their eyes. After receiving a careful explanation of the study, the participants provided informed consent to participate in the study. Tasks were performed as follows: (i) Different combinations of colors were ranked according to the rules shown in *Figure 1* based on the ranking, a visual analog scale (VAS) was used to score the color combinations. To reveal whether the ranking in each combination was consistent among the 15 participants, the Friedman test was performed using Kendall's coefficient calculated for each combination³. The analysis results showed that rankings were all significant, indicating that the perception of the 15 participants was consistent.

Results & Discussion We normalized VAS scores for each participant. Combinations B and E had high scores and thus high visibilities, whereas groups C and D were scored low. As for combinations A and F, their visibilities were rated neither good nor bad. White color was contained as a font or background color in combinations B and E. This indicates that compared with the combinations of red, blue, and green, the combinations of colors including white somehow improve visual perception. On the other hand, the colors used in combinations C and D showed a small difference between the font and background colors, resulting in poor visibilities due to poor contrast. These experimental results reveal that visual perception in elderly adults is affected greatly by the difference in brightness and contrast between font and background colors. We plan to perform the similar experiments with young people to clarify the relationship between age and visual perception in young people and elderly adults.

References

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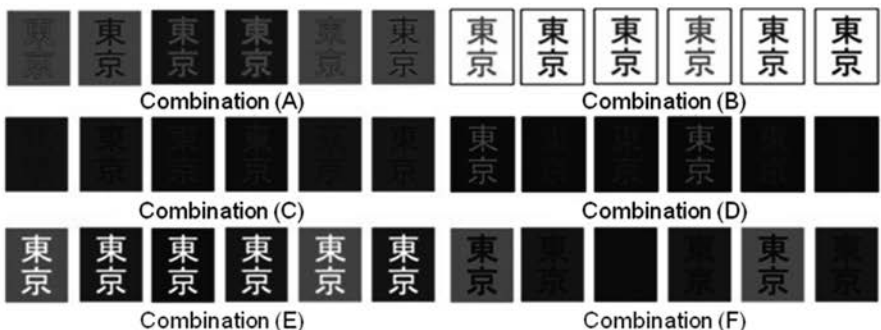


Figure. 36 images simulating a bulletin board and displaying the word TOKYO were divided into six groups A–F, each containing 6 images; brightness of red, blue, and green was modified, and black and white colors were used as foreground or background