AGED COLOR PERCEPTION

Shengzhou CHEN[1] and Saori KITAGUCHI[2]

[1] *Kyoto Institute of Technology Kyoto Japan, e-mail: d9821502@edu.kit.ac.jp*
[2] *Kyoto Institute of Technology, Kyoto, Japan, e-mail: kitaguchi@kit.ac.jp*

Abstract: Color difference has been widely used to evaluate the aging of material colors, but there is no standard guideline for the evaluation of aged colors, and the correlation between the perception and measurement of color difference for aged colors has not been discussed. Our previous study [1] also indicated that the perception of aged colors is affected by the original color of the material. Therefore, investing the characteristics of aged color perception compared to measured color differences contributes to the assessment of color of material aging. In this study, one hundred and four simulated aged colors and a near-white reference color were utilized as color pairs, and the visual assessment of aged color differences was conducted by comparing the color pairs with a color-staining grayscale [2, 3], as shown in Figure 1. The CIEDE2000 formula [4, 5] was used to calculate the color difference of the samples. The results of the study showed that the measured color difference (ΔE) and the visual color difference (ΔV) did not show an apparent linear relationship (Figure 2 (a)). The visual aged color difference (ΔVA) was modeled by a linear formula, and its multiple relations coefficients are shown in Table 1. The visual aged color difference was well modeled with the measured lightness difference (ΔL) and chroma difference (ΔC) between the color pairs (R^2 = 0.889), as shown in Figure 2 (b). This result suggests that aged color cannot be directly described by ΔE, but it can be predicted using color parameters.

Keywords: *aged color, visual color assessment, color difference, grayscale, correlation*

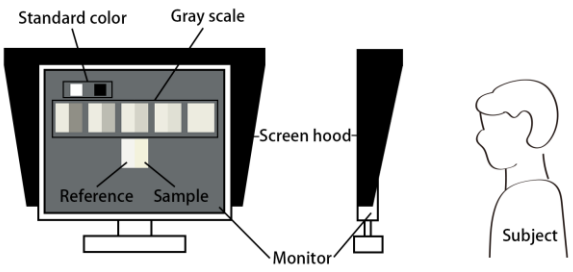

Figure 1 Experiment setup

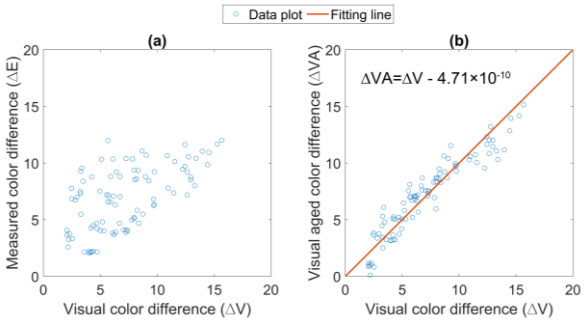

Figure 2 Distribution of the measured color difference and visual aged color difference relative to the visual color difference

Table 1 Multiple relations coefficients of formula

	Unstandardized		***Standardized***	***t***	***Sig.***
	B	***Std. Error***	***Beta***		
(Constant)	-0.974	0.332		-2.934	0.004
ΔL	-0.673	0.030	-0.810	-22.622	0.000
ΔC	0.556	0.030	0.667	18.628	0.000

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