Color Features of the Waterscape Drawing and Drawer's Mental Image of the Water

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ABSTRACT

Following Miyake, Takahashi, and Mori (2016), relationship between image features of the waterscape drawing and drawer's personality was investigated. A hundred and thirty-two university students drew a picture per an instruction 'please draw freely a scene with water.' They also answered the semantic differential scales asking his/her mental image of the water. Pictures were scanned into digital image, and the color feature indices (Ave-L*, Ave-C*, Ave-h, and Hue-ENT) were calculated for the full image (whole picture) and for the water image (only water-depicted area). Mental image data was subjected to a factor analysis and four factors were obtained; *purity*, *capacity*, *vitality*, and *violence*. Then the correlation analysis between the mental image of the water and the color feature indices was conducted. As the results, in male participants, positive correlation was found between *vitality* and Hue-ENT of both the full image and the water image. Also, *capacity* correlated negatively with Ave-L* of the full image, suggesting that males who have a kind of 'maternal image' toward the water tended to draw dark picture. In female participants, *vitality* correlated positively with Ave-L* of the full image, suggesting that females who think water joyful and alive tended to draw light picture, or remain white face of the paper uncolored. These results were discussed in light of possible sex difference of the mental image of the water.

KEYWORDS: waterscape drawing, color features, mental image of the water

INTRODUCTION

In clinical psychology, client's production of water as a subject matter (e.g., drawing and sandplay) is often used as a clue for the psychological assessment, because water representation is thought to have much information about producer(client)'s mental state. For example, Miyake (2009) investigated relationship between characteristics of waterscape drawing (free drawing of 'any scene with water') and drawer's personality, and found that those who drew a scene of water with motion (e.g., river) tended to have more positivity and extraversion than those who drew a scene of water without motion (e.g., pond).

In the past research of waterscape drawings, as in the case of the above study, assessment was almost limited to a qualitative and subjective analysis such as interpretation of the meaning of depicted water that is told by a client him/herself. Researchers have not paid much attention to, for example, 'how deep' or 'how dense' the water was drawn, since these indices were thought to be ambiguous when subjectively evaluated. However, by employing image-analyzing technique, we can utilize these information as objective image feature indices.

Miyake, Takahashi, and Mori (2016) have investigated the relationship between color and form features of the waterscape drawing and drawer's personality. The results showed that individuals with high Ag (Lack of Agreeableness) and R (Rhathymia) scores of the YG Personality Test tended to draw water in dark blue, suggesting that those participants did the task eagerly and were highly motivated to draw the water thoroughly in the color he/she chose first (blue in the most case). Following that, in the present study, we measured drawer's mental image of the water and investigated its relationship with drawing's color features in order to further examine the psychological process underlying that relationship.

METHODS

Participants

A hundred and thirty-two university students, 53 males and 79 females, participated in this study. Their mean age was 20.3 years old (SD=0.97).

Procedure

Participants drew a picture according to an instruction 'please draw freely a scene with water.' Picture was drawn by using a black pencil, a black felt-tip pen, and 24-color crayons, on an A4-size sheet of Kent paper. Most participants mainly used crayons. It took about 30 minutes for drawing. After drawing, they answered the semantic differential (SD) scales asking his/her mental image of the water (30 adjective pairs, 7-point scales).

Measurement of Color Features

Pictures were scanned into digital image (Epson GT-X830, 24bit color, 72dpi, no color correction). Scan was conducted in two ways for each picture; the full image was obtained by scanning a whole picture and the water image was obtained by scanning water-depicted area in the largest rectangle (e.g., river, sea, and pond). Then, using originally-developed image-analyzing software (Mori, et al., 2010), images were converted into L*-image, C*-image, and h-image, therefrom calculating averaged luminance (Ave-L*), averaged chroma (Ave-C*), averaged hue angle (Ave-h)[1], and hue entropy (Hue-ENT) as color feature indices.

Data Analysis

Data of the SD scales was subjected to a factor analysis (maximum likelihood method, Promax rotation), and four factors were obtained. The first factor loaded highly to items such as 'beautiful,' 'pure,' 'clear,' 'pretty,' 'holy,' 'vital,' and 'smooth,' and was named *purity*. The second factor loaded highly to items such as 'maternal,' 'generous,' 'feminine,' and 'relaxed,' and was named *capacity.* The third factor loaded highly to items such as 'joyful,' 'bright,' and 'lively,' and was named *vitality*. The forth factor loaded highly to items such as 'strong,' 'heavy,' 'dangerous,' 'dynamic,' 'deep,' and 'unstable,' and was named *violence*. The means of ratings for these items were calculated to indicate factor scores in each participant. Then, correlation analysis was conducted between factor scores and the color feature indices of drawing, separately for the full image and the water image.

RESULTS

The exploratory analysis revealed remarkable sex difference. Thus, we discuss the result for each sex. Table 1 and 2 show correlation coefficients between factor scores of the SD scale data and the color feature indices of the full image and the water image in male and female participants, respectively.

Male Participants

In male participants, as shown in Table 1, positive correlation was found between *vitality* and Hue-ENT of the full image (r=.318, p<.05) and Hue-ENT of the water image (r=.291, p<.05). Moereover, *capacity* correlated negatively with Ave-L* of the full image (r=-.336, p<.05), suggesting that males who have a kind of 'maternal image' toward the water tended to draw dark picture.

Table 1: Correlations between factor scores of the SD scale data and the color feature indices in male participants.

	purity	*capacity*	*vitality*	full image				water image			
				Ave-L*	Ave-C*	Ave-h	Hue-ENT	Ave-L*	Ave-C*	Ave-h	Hue-ENT
purity				-.253	.158	-.042	.143	-.212	.149	-.250	.111
capacity	.443**			-.336*	.205	-.117	.211	-.187	.112	.058	-.083
vitality	.456**	.288*		.002	-.079	-.209	.318*	.197	-.214	-.178	.291*
violence	-.179	-.416**	-.416**	-.062	.143	.113	-.185	-.219	.167	.010	-.152

***p<.01, *p<.05*

[1] In this software, a*-plus axis is set as the origin of the hue angle, and the counter-clockwise direction takes plus value from 0 to 180, and the clockwise direction takes minus value from 0 to -180.

Female Participants

In female participants, as shown in Table 2, *vitality* correlated positively with Ave-L* of the full image (r=.317, p<.01), suggesting that females who think water joyful and alive tended to draw light picture, or remain white face of the paper uncolored.

Table 2: Correlations between factor scores of the SD scale data and the color feature indices in female participants.

	purity	*capacity*	*vitality*	full image				water image			
				Ave-L*	Ave-C*	Ave-h	Hue-ENT	Ave-L*	Ave-C*	Ave-h	Hue-ENT
purity				.216	-.035	.191	-.156	.186	-.130	.172	-.001
capacity	.412**			.200	-.107	.190	-.177	.134	-.005	.197	-.131
vitality	.475**	.491**		.317**	-.051	.122	-.047	.193	-.094	.050	-.013
violence	-.159	-.187	-.174	-.219	.059	-.219	.140	-.150	.120	.085	.068

***p*<.01*

DISCUSSION AND CONCLUSION

The present study investigated the relationship between the color features of the waterscape drawing and drawer's mental image of the water. The results showed notable sex difference. So let us further consider this issue by referring to some sample cases.

Figure 1 and 2 show the drawings by male participant having low *capacity* (A) and high *capacity* (B)[2]. These drawers are contrasting also in their *violence* score (A: high, B: low) as shown in Table 3. Figure 1, depicting small amount of water shut up in a glass, may reflect drawer A's mental image of the water that is *not capable* and *violent*. On the other hand, Figure 2, depicting a girl held by the deep blue water, may show drawer B's mental image of the water that is *capable (accepting)* and *not violent*.

Figure 1:Sample A

Figure 2: Sample B

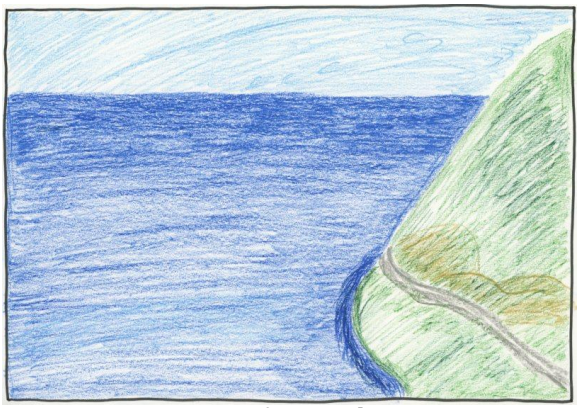

Figure 3: Sample C

Figure 4: Sample D

[2] All pictures in this paper are shown not as the original ones, but as the reproductions by the authors, in order to protect participants' privacies.

Table 3 : Individual scores of the mental image and the color feature indices in sample drawings.

	purity	*capacity*	*vitality*	*violence*	full image				water image			
					Ave-L*	Ave-C*	Ave-h	Hue-ENT	Ave-L*	Ave-C*	Ave-h	Hue-ENT
A	7.00	3.25	3.00	7.00	95.1	3.8	101.8	2.835	90.3	5.6	-81.0	5.797
B	6.14	7.00	5.33	2.67	61.7	19.6	9.7	6.693	68.7	29.0	-87.3	5.811
C	7.00	6.00	5.00	7.00	80.0	17.9	-36.6	6.529	74.5	23.6	-88.5	5.008
D	5.86	5.75	5.67	3.00	93.0	3.7	96.7	3.133	86.5	15.2	-118.9	5.342

Now, let us compare Table 1 and 2 again to notice remarkable difference in the relationship among image scores themselves between male and female participants. In males, *violence* correlates negatively with *capacity* and *vitality*, which is not the case in females. It suggests that the mental image of the water characterized as 'strong,' 'heavy,' and 'dangerous' may coexist with 'maternal' and 'joyful' in females, but not in males.

Figure 3 shows the drawings by female participant having high *violence* (C). Unlike the male drawer A, who shows the maximum score of *violence* similarly, drawer C shows relatively high *capacity* and *vitality* as well. Open and wide ocean depicted by the drawer C may reflect such her mental image of the water. Finally, Figure 4 shows the drawings by female participant having low *violence* (D). Though her image profile of the water is similar to that of the male drawer B (see Table 3), the characteristics of their drawings are quite different; i.e., somewhat 'introversive' girl depicted in Figure 2 versus 'extraversive' girl depicted in Figure 4. Such difference of the mental image of the water, as compared above, may have influenced the relationship with color features of their waterscape drawings.

In Jungian psychology, water is thought to represent maternity. And the Great Mother, an archetypal image of the maternity, is thought to have both the positive aspect (e.g., producing something) and the negative aspect (e.g., swallowing everything up) of it (Neumann, 1955). Four factors of the mental image of the water obtained in this study, *purity*, *capacity*, *vitality*, and *violence*, seem to overlap with such multiple image of the Great Mother, and the *violence* would correspond to its negative aspect. Viewing the present results this way, female participants might have the water image with its positive and negative aspects integrated as the Great Mother, whereas in male participants these aspects may have not been integrated, as shown by the negative correlation between *violence* and *capacity* and *vitality*. Such different image structure of the water between males and females might be reflected in the features of their drawings as well. In the future study, we should investigate drawer's mental image of the water more deeply by employing interview method to clarify this possible relationship.

ACKNOWLEDGEMENTS

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