別紙４－１（課程博士（英文））

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Abstract (Doctor)

Title of Thesis	Visual preference for color and object composition

Approx. 800 words

The most important criterion for aesthetic judgment of a painting is considered to be a harmonious composition. Then, what is a harmonious composition? The "original painting color composition preference," in which the color composition of the original painting before hue changes is most preferred, and the "right-facing preference," in which the model is often painted facing to the right, and the facing right is preferred over left, can be considered biases that arise when the painter's preference is reflected in the painting. Since high aesthetic preference is known to be caused by the high processing fluency of the object, the high processing fluency of the color composition in the paintings and the right-facing faces may cause this bias. In order to clarify the factors that contribute to preference for color composition and object composition, we investigated the mechanisms of "original painting color composition preference (Exp. 1 & 2)" and "rightward preference bias (Exp. 3 & 4)" from the perspective of processing fluency. Experiment 1 aimed to test the hypothesis that the naturalness-based preference drives pupil dilation, based on previous research, that art paintings with image features similar to those of natural scenes are preferred. As a result, the extent of pupil dilation had a significant positive correlation with the perceptions of naturalness for the painting, whereas there was no significant correlation between pupil dilation and preference. This was observed not only in representational paintings but also in abstract paintings, suggesting that the color composition of a painting itself, rather than memory colors—the standard, known hues of objects—or other influences, is an important factor of perceived naturalness that produces pupil dilation. In Experiment 2, we test the hypothesis obtained in Experiment 1 that the reason for the original painting preference is due to the high familiarity with the color composition of the original painting using the P3 asymmetry index to visualize familiarity. As a result, P3 asymmetry was found between the original and 180 degrees of hue-rotated paintings in both abstract and flower paintings. These findings suggest a difference in familiarity and perceptual fluency between the original and the 180-degree hue-rotated paintings, which is evidence that the original paintings have a familiar color composition. Experiment 3 focused on whether a face-specific effect caused the left-right difference in preference and investigated the left-right difference in preference for face-like and non-face-like objects. The right hemisphere is specialized for face recognition, and facial parts of a right-facing face are located on the left side; hence the higher the face-likeness of objects, the more preferred it is facing to the right. As a result, we found that the greater the degree of face-likeness, the greater the preference for right-facing objects, which is consistent with our hypothesis. This suggests that the reason why the right-facing was preferred only for face-like objects is that the right hemisphere is more activated when the parts corresponding to the eyes and mouth of a face-like object are concentrated in the left visual field, and this greater activation of the brain activity may be responsible for the higher evaluation of attractiveness. Experiment 4 investigated the relationship between the left-right difference in preference and processing fluency by comparing P3 asymmetry, which reflects the perceptual fluency of stimuli, and N170 latency

and amplitude between face-like and face-unlike objects under the assumption that one of the factors causing the left-right difference in preference is the high processing fluency of right-facing faces. As a result, P3 asymmetry, which might be reflects processing fluency, occurs regardless of the face-likeness (larger P3 amplitudes in left-facing objects), indicating that the improvement in processing fluency for right-facing objects occurs regardless of face-likeness. In addition, Hemispheric differences in N170 latency and amplitude occurred depending on the face-likeness of the object and its orientation. It is possible that the P3 asymmetry was caused by the concentration of parts important for object identification in front of the object in the left visual field when the object was facing the right, increasing processing fluency. The present result that N170 latency is faster in the right hemisphere for face-like objects only suggests that processing is more fluent when faces are oriented to the right hemisphere, where face recognition is predominant. Experiments about the right-facing preference (Exp. 3 & 4) suggest that the P3 asymmetry, independent of face-likeness, results from acquired processing fluency due to previous experience. On the other hand, the higher right-facing processing fluency shown from latency N170 was only observed for face-like objects. This may reflect an innate increase in processing fluency due to an anatomical feature that the brain regions involved in face recognition are formed in the human brain. Experiments about the original painting color composition preference (Exp. 1 & 2) showed that the color processing fluency of the original painting is high, regardless of the painting category. This P3 asymmetry observed here is considered an acquired fluency enhancement due to previous experience. However, we cannot rule out the possibility of an innate factor in the color composition preference, just as an innate factor may manipulate object orientation preference based on anatomical features.