Art professionals experience unique perception in painting evaluation*

Naoko Koide

Abstract

Artists, referred to as art professionals, have different visual perception from novices when viewing and evaluating paintings. Previous findings indicate that art professionals attend less to general objects such as a car or a face than novices, and attend more to visual effects such as color composition or background in a painting. The visual effects, however, do not have unified objective aspects. To obtain the unified aspects, we examined the difference in visual processing between art professionals and novices by using computational models. In this thesis, we reported two studies. The first study of this thesis is for eye scan-path when viewing abstract paintings. If art professionals have their own knowledge for painting evaluation, their fixations have less contribution of stimulus-driven visual selection. To examine that, we recorded fixation locations of six art professionals and eight novices, and calculated consistency between the fixations and an artificial map which predicts fixations based on stimulus-driven visual selection. We called the consistency 'salience effect'. Then the salience effect was compared between the art professionals and the novices. As a result, fixations of the art professionals showed lower salience effect than those of the novices. This implies that art professionals may have their own knowledge of visual effects, and conduct knowledge-based visual selection. Further, in the second study, we examined difference in dissimilarity judgement of art styles between art professionals and novices. In our experiments, five art professionals and five novices participated an arrangement task of 144 paintings, where the participants were asked

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to arrange each pair of the paintings close together if they felt similar art style, and further apart if they felt dissimilar art style. The obtained relative distances among the paintings represented the subjective dissimilarities. Then for each participant, we compared the behavioral arrangement with computational models of visual processing. As a result, the art professionals showed the lower correlation with a model of high-level processing related to object representation, and higher correlation with a model of intermediate processing. This implies that art professionals suppress high-level visual perception in dissimilarity judgement of art styles. From the findings of the two studies, we showed that art professionals experience unique perception in painting evaluation. We did not ensure that art professionals attend to same visual effects in two behaviors, viewing and categorization. However, the visual effects may not be explained by early and high-level visual processing, and be associated with intermediate visual processing.

Keywords:

artist, painting, eye movement, art style, visual perception, computational model

氏　名	小出 真子

（論文審査結果の要旨）

専門家は一般人とは異なる点によく気がつく．本研究はその仕組みを明らかにするため，芸術家を対象としてその認知的基盤が一般人とどのように異なるか，より詳細には，芸術家と一般人が注意を向ける視覚的特徴がどのように異なるかを二つの方法で明らかにしたものである．

一つめの研究では，視線を計測して従来のボトムアップ的視線分布モデルであるサリエンシーマップと比較した．ここで，絵画中の物体にトップダウン的注意を向けるのを避けるため，抽象画を利用した．その結果，芸術家の視線はサリエンシーマップとは異なる分布をすることがわかった．このことは，芸術家は一般人ほど低次の特徴量に影響されないことを示している．

二つめの研究では，絵画作品の分類をさせ，その結果を視覚的特徴による分類結果と比較した．その結果，芸術家の分類結果は，絵画中の物体ではなく中間的な表現でより説明できることがわかった．このことは，芸術家は一般人ほど高次の特徴量に影響されないことを示している．

以上をまとめると，本論文は芸術家が利用する視覚的特徴量が一般人とは異なることを実験的に示した研究であり，今後の専門家の神経情報処理研究に大いに資すると考えられる．よって，博士（理学）の学位に値するものと認められる．