"What do we see?" A study on the variability of the visual strategy over time to explore a work of art

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Introduction

Starting out from a preliminary study into the behavior of museum visitors, and more specifically the average time spent in front of a picture, this research is intended to highlight the information picked up by viewer as a function of time spent exploring the work. Since the first work of Yarbus (1967), eye movement research is related to diverse fields from reading to information processing (Kayner 1998).

Objective

The aim of this research is to study variations in visual trajectory in a pictorial work of art as a function of the time allowed to the observer.

Population

Fifteen subjects were studied (10 males, 5 females). People averaging 31.6 +/- 6.7 years old, all subjects were right-handed and a single subject was left-handed. The frequentation of artistic places was defined by the adjective "rarely" for 8 subjects and "sometimes" for 7 subjects.

Materials and Methodology

Eye movements were recorded with the Tobii 1750 from SRlabs (Milan), a high performance eye tracker. It is a completely non-intrusive creation, the outstanding tracking ability - works with dark or bright eyes, young or old, people with different ethnic backgrounds, with glasses or contacts and in varying light conditions. Binocular, it is a 50 Hz tracking, and with a very high accuracy of 0.5 degrees. Three paintings ("The 3 of may 1808" of Goya, "Odalisque in grey trousers" of Matisse, and "Child and women in an interior" of Paul Mathey) were submitted to the population with different durations 5, 30 and 60 seconds. Three groups of five people were realized with a crossed sequence for the duration. A post-test survey (emotion, first glance, already seen, and specific detail) was analyzed. Detailed statistical analysis of eye movements (fixation, saccade and movement orientation) and the definition of visual strategies (areas of interest) were determined and analyzed.

Results

There is dissociation between "the visual landing" and the concept of first vision. The shorter is the discovering time, the better is the evaluation of the first glance (53.3 % for the group 5 sec. vs. 33.30% and 26.6 % for respectively groups 30and 60 sec.). 37.77 % of the subjects have a correct evaluation of their first vision. The first fixation is sometimes associated to a movement, an action. The subjects in dissociation confuse the first glance and the longest fixation, the principal zone of interest, the most emotional spot (blood, death, breast, and glance of the child). There is no correlation between the memory of details and the assigned time. Five subjects do not recall particular details which however, were observed. The number of zones of interest is not always proportional to the time of observation. The common area of interest to the three paintings is the face. The coefficient of emotion is not correlated to the time of observation. The measure of visual paths (scanpaths), defined as repetitive sequences of fixations and saccades (Noton and Stark, 1971), show that in the three examples the first fixation is used in the majority of the cases (62.23 %) as a period "of landing" before the decision of which path to use is taken. The peripheral vision plays a significant role in these visual paths.
The visual strategy, for the three paintings, expressed by the direction of the saccades, is distributed at the four cardinal points in an equal way (low saccades 24.4 %, high saccades 25.6 %, right saccades 23.3 %, and left saccades 26.7 %).

Acknowledgments

A special thank you to Jaqueline Régis and Antoine Lazergues from the Centre Design Marseille for the help provided during the experiment.

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