

EEG Patterns Related to Drawing Saliency in Design

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Abstract—There is now some debate that pursuit of successful design, based upon creativity, may be hampered by the use of mouse and CAD rather than freehand drawing in the first steps of a project. The very movements of the hand while drawing are supposed to nurture cerebral activity, hence creativity. But so far there is no direct biological support to such hypothesis. We now present some preliminary data which may provide clues in the right direction. Electroencephalography (EEG) is a useful tool to investigate cerebral activity occurring before, during and immediately after voluntary movements [3]. For technical reasons, only constrained movements have usually been investigated, leaving aside more natural, ecological gestures. A recent publication reported a new technique that can be employed to study movement related EEG activity during freehand drawing on a digital tablet or mouse handling. It demonstrated that larger EEG activity could be recorded when the drawing object was a meaningful one. We now used such technique in 5 young subjects who were first asked to freely draw on a digital tablet and later to use mouse and CAD. Their task was to trace over some ready made images as best as they could. The results showed that a negative going wave could be recorded in the 600 ms before movement in free hand drawing in all subjects. The mean latency of its peak was 175 ms before movement and its amplitude 2.5 microV. On the other hand, drawing by mouse and CAD elicited a broad, slightly positive going wave in the same time epoch before movement, with mean amplitude 0.5 microV but no definite peak. Relevant EEG activity was also recorded during and after movement. In both epochs, such activity did not significantly differ between freehand tablet and CAD mouse drawing. This latter finding is related to proprioceptive afferents and suggests that the extent of movement was similar in both cases. These preliminary experiments, although performed in a limited amount of subjects, were consistent and reliable enough to provide definite clues as to the implications that the two design styles have upon cerebral motor activity and warrant further investigations on a larger sample. So far, we may conclude that the cerebral activity preceding repetitive movement in freehand drawing has a definitely different character than in CAD mouse drawing. Given the time dimension of such activity, it can be safely inferred that it is linked with motor planning ahead of the movement. Whether such difference may suggest that there is a cerebral activity leading to improved creativity in freehand drawing cannot be said with certainty at the moment. Further experiments should be able to answer such question now that the path is found through which pursue future research.

Keywords—Creativity, Design, Digital Tablet, Electroencephalography

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