Monitoring the Physiology of the Creative Process.

Y.D. van der Werf[1,2], J.B.F. van Erp[3]
[1]Dept Emotion and Cognition, Netherlands Institute for Neuroscience, an Institute of the Royal Netherlands Academy of Arts and Sciences, Amsterdam, The Netherlands. Y.van.der.werf@nin.knaw.nl
[2]Dept Anatomy and Neurosciences, VU University medical centre, Amsterdam, The Netherlands.
[3]Perceptual and Cognitive Systems, TNO, Soesterberg, The Netherlands. jan.vanerp@tno.nl

Most people would agree that creativity is what makes us unique in the animal kingdom. For some, art is the highest expression of the human spirit. Interestingly, we understand little of the processes that drive creativity in the artist, or the processes in people experiencing art. Are they the same or at least similar? Or do the production and the appreciation of art rely on different mechanisms? Both the artist and their audience often report a feeling of 'flow', which appears to involve a change in the perception of time and a modulation of emotional tone. Such a state bears at least a superficial resemblance to trance, meditation and certain drug-induced states. In addition, the content of the art may be reflected in the viewer's mental state. Subjective reports of experiencing romance, beauty, horror, disgust or pornography differ widely, while they can all be part of creating and of experiencing art.

We are currently investigating these 'productive' and 'receptive' aspects of art in a study using prose as the model art form. Both writing and reading involve prolonged periods of reasonably well-described feelings and behaviours, with relatively little movement that might interfere with measurement, unlike, for example, the performing arts.

We have obtained detailed and multimodal measurements of Dutch author Arnon Grunberg while writing his new novel in a period of two weeks. The measurements included ambulatory recording of electrical brain activity (28-electrode electroencephalography - EEG), heartbeat (electrocardiography - ECG) and bodily processes reflecting arousal and emotion (galvanic skin response - GSR), under continuous recording of the writer's facial expressions. Each day, we performed a standardized measurement of basic emotions that we induced in the writer by showing him emotional images and asking him to write a portion of text according to the emotion portrayed; after this standardized measure, we commenced the recording of the author writing his novel. With these recordings in one individual, we aim to obtain a proof-of-principle of the multimodal recordings and will attempt dissociating the different emotions in the standardized measurements and the 'free writing' epochs, using novel and state-of-the-art methods (a.o. template matching algorhithms). Using these methods, we will perform the second phase of the project, in which we will study members of the public reading the novel in a controlled laboratory setting (n=~100). A third phase of the project involves recording brain activation in several thousand readers, using novel hard- and software that will be developed as part of this project in a collaboration with the industry.

Future efforts will involve broadening the project to include other art forms alongside reading and writing (for example, composing and listening, cooking and eating). We foresee that the technical developments, in terms of software and analysis techniques, will impact on fields not necessarily related to the arts, such as sports, ergonomics, healthcare and education.

Proceedings of Measuring Behavior 2014, (Wageningen, The Netherlands, August 27-29, 2014).
Editors: A.J. Spink, L.W.S. Loijens, M. Woloszynowska-Fraser & L.P.J.J. Noldus. www.measuringbehavior.org