Institut d'études avancées de Paris

art et perception

Colloque organisé parJohan Wagemans (chercheur invité à l'IEA de Paris)

Abstracts

M. Dorothee Augustin (LEP, Leuven, Belgium): "The temporal unfolding of masterworks: More on the microgenesis of art perception"

Abstract: In order to scientifically understand what makes art special, it seems necessary to find out what differentiates its perception from the perception of other objects in the world around us. In particular, one needs to know what processes are involved in art perception, how they develop in time, and to what extent there are differences to "normal" object and scene perception. I will present a study in which we approached this question through the microgenetic approach, adapting a paradigm used by Fei Fei et al. (2007). Two groups of participants, one with and one without background in the arts, saw a large set of pictures at 6 presentation times between 10 and 3000 ms. The picture set included both paintings and photographs and was fully crossed in style and content. For each picture, the participants were asked to write down what they had seen. Results suggest that style and content play an important role in participants' reports from 50 ms on and show a very similar time course from as short as 80 ms. Even though the time course for style is related to art background, the exact nature of the differences strongly depends on the stylistic aspects in question. With a large range of categories considered in the analyses, our study is intended as a comprehensive overview that may trigger and provide important input for future studies on the processes of art perception.

Claus-Christian Carbon (Bamberg, Germany and Pavia, Italy): "Mona Lisa's many faces"

Abstract: Remarkably, da Vinci's La Gioconda is more than 500 years old, but still in good shape. She is, more interestingly, still inspiring for art historians as well as vision scientists. The present paper addresses a couple of intriguing properties of the painting and their relationship to recent perceptual theories. Recent experimental works combined with historic works on the Mona Lisa qualify this piece of art not only as a real masterpiece of historic value but also as a masterwork illustrating several state-of-the-art perceptual effects.

Patrick Cavanagh (LPP, Paris, France): "Two-tone images: the last discovery in the art of 3D depiction"

Between 1900 and 1904 several artists, Moser, Kienerk, Munch, and others, began producing two-tone images of starkly illuminated faces and simple scenes. Despite the absence of depth cues from shading, texture, and occlusion, these images appear strongly 3-dimensional. Although an observer can easily point out shadow areas or reflections in the scene, there is of course no difference in the image between dark pigment and shadow or between light pigment and highlight. While the 3D interpretation seems relatively effortless, computationally, it is a very powerful feat of perceptual organization and interpretation based on view-dependent memory. Most techniques for depiction of three-dimensional scenes were already in place in paleolithic, Egyptian and Greek art over 2,000 or more years ago. In contrast, this two-tone technique stands out as a puzzlingly late arrival. Superimposed, multi-tint, wood-block printing predates it by 1000 years and most likely would have, in some of its constituent blocks, included interpretable two-tone images. We can only imagine that the printers who observed this found the images crude and less appealing than the final multi-tone image. Despite the delayed discovery, these two-tone images swept the world of graphic arts in the 20th century and became a valued diagnostic tool of neuropsychology as well. Here, I will argue that they remain an underexploited window into perceptual processes.

Zoï Kapoula (Groupe IRIS, Centre d'Etudes Sensori-Motrices, UMR 8194, CNRS – Université Paris Descartes, Paris, France): "Neuroaesthetics: eye movement and body sway studies"

Neuroaesthetics is a recent research domain. We develop two experimental approaches: (1) the neurophysiology of eye movements, measured by Video-OculoGraphs (VOG) that capture images of the pupil every millisecond, (2) the physiology of postural control, measured by accelerometers or posturography platform that quantifies the body

sway in orthostatic position. With these high temporal and spatial resolution instruments, we are able to objectify the immediate impact of artwork on the viewer by analyzing physiological responses that precede awareness. I will present our work showing the impact of explicit versus hidden space, of space in depth, and of pictorial movement portrayed in major works of art. Hidden spaces of Francis Bacon's paintings are explored by the eyes of observers who are familiar with contemporary Art, but they can be ignored by naive observers. However, when confronted with the perspective, the richness and purity of architectural paintings of Piero della Francesca, the eyes of naive observers with no art training, make a spatially extended and inquisitive exploration characterized by a large modulation of the angle of two optic axes; the latter creates blurred vision but probably increases the depth of field. In other studies we show that the perspective and depth of Renaissance paintings induce significant body sway (immersion). Finally, we measured the impact of sculptures of Richard Serra at the Grand Palais (monumental steel plates erected vertically but with an inclination, challenging the sense of balance and gravity). After promenade around such sculptures body sway control became more efficient and the subjective perception of verticality more precise. Taken together these studies, confirm the interest and relevance of oculomotor and postural measures for understanding the immediate sensorimotor dialogue engaged between the observer and the artwork, involving the whole body.

Jan Koenderink (KU Leuven): "Adolf Hildebrand's 'wooden iron': The scene, the artwork and the eye"

Abstract: Right after the publication of the book "Das Problem der Form in der bildenden Kunst" (1893) by the sculptor Adolf Hildebrand, art critics poked fun at his concept of "Reliefauffassung" by comparing the artistic awareness of relief in the case of figures in the round to "wooden iron". What Hildebrand did was to remove the arbitrariness of the location of the eye in the scene (binocular vision, moving eye, …) by stressing the "far view" as the artistic relevant one. The artwork should "fit the eye" ("muss augengerecht sein"). This is achieved by removing the relation between the eye and the artwork, thus obtaining an artfully composed, architectural relief. The relief is described as an order of depth layers, or, alternatively, a "depth flow". Hildebrand derives certain equivalences in visual awareness from this concept. For instance, observers frequently confuse flattish (rilievo) sculpture with work "in the round". I discuss both empirical evidence for Hildebrand's interpretation of visual awareness in cases of pictures, as well as a formal, geometrical treatment of these.

Claudia Muth (Department of General Psychology and Methodology, University of Bamberg, Bamberg, Germany) and Claus-Christian Carbon (Department of General Psychology and Methodology, University of Bamberg, Bamberg, Germany; and Department of Psychology, University of Pavia, Pavia, Italy): "The Aesthetic Aha. The pleasure of having insights into Gestalt and its relevance for the appreciation of modern art"

Which kinds of insights happen when we look at modern art? Are they influencing appreciation? Drawing on the literature regarding aesthetic appreciation, two main streams of research can be identified. One stream (e.g., Reber, Schwarz, & Winkielman, 2004) claims that fluency of processing increases appreciation. Another one links aesthetics to engagement: Creation and manipulation of sense itself (e.g., Ramachandran & Hirstein, 1999) or specifically the reduction of prediction-errors (Van de Cruys and Wagemans, 2011) would be rewarding. The present contribution presents experimental results which indicate an influence of insights during elaboration on liking. Matched pairs of visual stimuli, always one hardly detectable two-tone image of a face (Mooney face) and another with the same complexity but without any Gestalt in it, were presented repeatedly. Having an insight as well as its intensity predicted subsequent aesthetic appreciation. The relevance of this effect for the perception and appreciation of modern art is discussed in the light of examples of ambiguity in modern art and descriptions of insights within reports of experiences during modern art perception.

Jacques Ninio (LPS, ENS, Paris, France): "Why must visual stimuli be ugly?"

Abstract: While it is possible to find sophisticated, pleasant illustrations in popular books on visual perception (for instance, on impossible objects), most of the stimuli used for acquiring psychophysical results are devoid of visual interest. In a first era, scientists believed in strictly minimal stimuli. They studied vernier acuity with two or three vertical segments, or symmetry perception with 4 to 6 dots on each side of a symmetry axis. Bela Julesz introduced complexity with his random dot stereograms that contained up to a million elements. His random square figures stimulated some artists, but his sandpaper figures were not particularly appealing. Then, visual perception scientists made intensive

use of gratings, preferably horizontal or vertical sinusoidal gratings. Now, the fashion is to design stimuli containing Gabor patches. There is hardly anything to learn from these Gabor stimuli that could not have been learned from stimuli without Gabor patches. The authors of the articles usually spend some time trying to persuade the readers that their stimuli are the best to study the questions raised in the articles. However, it seems to me that there are hidden (possibly false) assumptions in the author's justifications. The main conceptual error, I propose, is to reason as though our brain was working on a Cartesian x-y array of dots (or neurons). I hope to initiate a discussion with the audience on the existence or non-existence of a Cartesian neuroanatomical substrate for visual perception phenomena.

Jérôme Pelletier & Luca F. Ticini (EHESS, Paris, France): "Recognition of Emotional Intensities in Chinese Calligraphy by a non-Chinese speaking population ignorant of the art of calligraphy"

Abstract: Emotionality can affect cortical processing at very short latencies: As early as 100 ms post stimulus, the occipital P1 component of the Event Related brain Potentials (ERPs) amplitude is modulated by emotional content. We explored if encoding emotionality in art stimuli would lead to such early effects as for natural scenes, or expressive faces. We used recordings of ERPs to investigate how naive subjects perceived emotional intensity from Chinese calligraphies. Sixty Chinese calligraphies were produced by an artist by pair so as to render two versions of a same Chinese sign with different emotional expressivity intensity: one with high emotional expressivity (HEE) and a second with low emotional expressivity (LEE). Twenty one participants were asked to rate the intensity of the feeling they experienced while viewing each calligraphy. As early as 90 ms post stimulus, occipital responses differentiated LEE from IEE calligraphies, with P1 wave larger in response to HEE than to LEE calligraphies. Emotionality from abstract visual art might be encoded as rapidly as emotionality from natural scenes, or expressive faces, during the perceptive stages of information processing. Moreover, those results indicate a significant resemblance in the classification of calligraphies in emotional level between a non-Chinese speaking population ignorant of the art of calligraphy and the artist's own classification. Some implications of these results for the study of emotion perception and for the study of the perception of style in Chinese calligraphy are then discussed.

Robert Pepperell (Cardiff, U.K.): "Depicting visual perception in science and art"

Abstract: This paper will discuss my attempts to depict the contents of visual perception in painting and drawing. This means trying to capture natural scenes as they are experienced rather than as they might appear in, say, a photograph or computer generated rendering. I will discuss features such as the differentiation between central and peripheral vision and the relative indeterminacy of objects in the periphery, deformations of space relative to viewing position, and the presence of the viewer's own body in the field of view. Once these features are accommodated into the depiction, I argue, we arrive a image that is much closer to actual visual perception than conventional forms of imaging, which conform to linear perspective and omit the viewer's own body from the visual field. I will consider the implications of this approach for the scientific study of perception, how it links to some recent neuroscientific research, and how artists and scientists might benefit from further developing the methods outlined here.

Baingio Pinna (Sassari, Sardegna, Italy): "Laws of coloration in vision, art and biology"

Abstract: The aim of this work is to investigate the problem of perceptual organization of color through an integrated study based on art, vision science and biology. The color organization is approached starting from the amodal completion of shape and by introducing the phenomenal notions of modal and amodal completion of color in the three multidisciplinary domains. Just as a shape is completed amodally behind another occluding shape, so is a color behind another occluding color or behind a bright light reflected by a three-dimensional object. The modal completion of color was studied through children pictorial reproductions of artistic paintings and photographs of real objects/animals. The phenomenal results showed the effectiveness of the amodal completion of colors used by artists and by nature in biological coloration. Some general principles of the amodal completion of color, useful to understand the more general problem of phenomenal organization of color in art, vision science and biology, are suggested.

Bilge Sayim & Patrick Cavanagh (Université Paris Descartes, Sorbonne Paris Cité and CNRS UMR 8158, Paris, France) : "Depiction of material properties in paintings"

Abstract: Artists are able to depict various material properties in paintings, such as transparency, gloss, and roughness, by manipulating pigments of different color and lightness. Often observers perceive these properties in paintings, even when the artist did not attempt to create a photorealistic picture but instead depicted simplified, distorted, or caricatured objects and scenes. For example, artists have successfully depicted transparency in simple line drawings, strongly violating physical constraints of transparency. Such pictures show us that stimuli that deviate from or misrepresent object properties may still trigger the perception of various material qualities. Here, we investigate the techniques artists used to depict material properties in paintings, discussing which principles they followed and which they ignored. We show how such paintings may help us to understand the processes underlying visual inferences in the brain.

Sander Van de Cruys & Johan Wagemans (LEP, Leuven, Belgium): "The pleasure of prediction error: Testing a predictive coding approach to visual art"

In a recent theoretical paper (Van de Cruys & Wagemans, 2011) we proposed that part of aesthetic pleasure is derived from the unpredictability or prediction violation in artworks, based on the predictive coding model for visual perception. We argued that a transition from a state of prediction errors to a state recovered predictability is conducive to a positive appreciation. To allow for the possibility of returning to predictability, however, the amount of prediction violation in artwork has to be just right. In this talk I want to briefly compare this approach with existing ones and discuss some preliminary findings from an experiment we designed to test a core assumption of our approach, namely that predictability influences appreciation.

Johan Wagemans (University of Leuven, Laboratory of Experimental Psychology), Jan Koenderink (University of Leuven, Laboratory of Experimental Psychology, Delft University of Technology, EEMCS), and Andrea van Doorn (Delft University of Technology, IO): "Pictorial relief from Picasso's twisted line-drawings"

Abstract: Cartoon-style line drawings offer very sparse information, because most of the page is left blank by the artist. Perhaps surprisingly, such drawings constrain the contents of immediate visual awareness to an extraordinary extent though. This holds just as well for drawings that are not even in central projection, although nominally «representational». The relation of pictorial relief to the structure of a drawing is hardly understood because the strokes used in a drawing stand for a very diverse and ill defined set of entities in the world. We consider Picasso drawings dating from the nineteen-forties. In these Picasso apparently combined multiple viewpoints. We report that the pictorial reliefs obtained from various observers agree to a large extent. The differences are of a very specific nature, typically involving differences between the mutual spatial attitudes of rigid body parts in figure studies. (Figure studies are of course typical for Picasso's work.) Although the purely planar layout of the drawing accounts for much of visual awareness, observers also use the sparse depth cues provided by the artist to evoke volumetric impressions. Perhaps remarkably, but certainly not unexpectedly, observers also freely insert their «template knowledge» about the structure of familiar generic objects.