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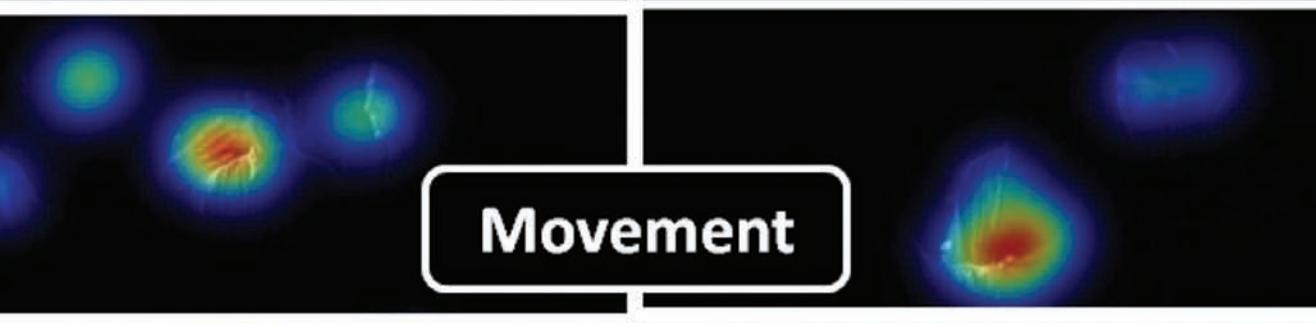
HW



Conversational turns



Gaze cue



Movement



Pointing

Smith, T. J. Illustration from the article 'The Attentional Theory of Continuity Editing', *Projections: The Journal for Movies and the Mind*, 2012, 6: 1. © Paramount Vantage.

States of Flux: *Cognitive Science and the Moving Image Symposium*, 30 March 2011, Chelsea College of Art & Design, London

Reviewed by Gareth Polmeer

On 30th March 2011, the Cognitive Science and the Moving Image symposium convened at Chelsea College of Art and Design in London. Speakers were asked to outline contemporary threads of research into film spectatorship, suggesting ways that cognitive theories might offer methods of analysing artists' film and video. Professor Murray Smith described the emergence of cognitive studies in film, Professor Ian Christie and Steven Hinde discussed 'experimental aesthetics' and empirical observations of audience 'presence' in film viewing, and Dr. Tim Smith introduced 'attentional' theories of spectatorship and cognitive psychology.

Cognitive studies undertaken to date have been based mainly on narrative forms of cinema. The bringing together of a diversity of practitioners and scholars at Chelsea provided a forum for debate on how these ideas might relate to alternative practices. In this article, I will review the event with reference to three other authors' studies in cognitive theory that form contextual links to the debates on the day. While in the context of a short review I cannot do justice to the wider body of literature and research in cognitive science, or to the diverse topics of debate, I aim to evaluate several key points of the discussion at the symposium. First, I will outline some context for the review.

Cognitive studies of film and perception have developed around two main areas of thought. The 'Constructivist' branch of psychology (Gregory 1966; Rock 1983), suggests that the brain acquires knowledge analytically by learning, forming templates, and integrating these with the individual's expectations and habits. This differs from the 'Direct' or 'Ecological' approach that argues for a more fully innate comprehension, where the brain uses universal laws to extract information directly from the world, rather than by inference (Gibson 1979).

These theories of cognition relate to the range of presentations at Chelsea and are also relevant to the three authors that I will discuss in this article: James Peterson, who applies the Constructivist model in his book *Dreams of Chaos, Visions of Order: Understanding the American Avant-garde Cinema* (1994); Yvonne Spielmann who writes on the Direct/Ecological approach in her essay *Paul Sharits: from Cinematic Movement to Non-directional Motion* (2007); and Jocelyn Cammack who mixes both approaches in her Ph.D. research *Visual Deception and the Beholder in Cinematic Space: The unstable image and the role of imaginative perception in film viewing* (2010). Reference to these three authors does not provide a comprehensive appreciation of the developments in cognitive theory, but in my discussion I will use them to broadly encapsulate some of the arguments made at Chelsea by presenters and audience members. Having no specialist knowledge in

the field of cognitive studies, I will be responding to these ideas principally as a video-maker and attendee at the event.

Murray Smith's presentation gave an historical outline of the emergence of cognitive theories in film studies and the relationship between experimental psychology and the humanities. Smith referenced James Peterson's book as one of the first and most significant texts to venture theories of avant-garde film and cognitive science. Peterson uses the Constructivist model, which adapts Immanuel Kant's concept of the schema to propose a framework for understanding films (Peterson 1994: 1–25). Peterson explains that schemata come into play while 'sifting through the data provided by our senses looking for familiar structures' (Peterson 1994: 17). In film, he suggests, schemata function as templates that might allow the viewer to predict events, recall earlier scenes or recognize patterns.

Peterson proposes that some of these cognitive frameworks are intuitive and some are acquired in response to viewing films drawn from, for example, a particular genre. The viewer develops a mental apparatus, or 'strategies of comprehension' to seek coherent meaning. He relates this to an evolution of 'viewing heuristics', templates against which hypotheses might be tested and developed. Peterson identifies 'strains' of avant-garde film with particular aesthetic traits ('poetic', 'minimal' and 'assemblage'). He proposes that these can be evaluated independently, or in combination, as interpretative frameworks for understanding film.

While discussing works in the 'minimal' strain for instance – with factors like abstraction, flicker or rapid montage – Peterson suggests that problems in comprehending a film for a viewer are due to having not yet developed a relevant schema. Having seen one type of 'minimal' work, a viewer could subsequently bring to bear knowledge from a newly developed schema on subsequent interpretations and so on. An example of how

this might work relates to comments offered by Murray Smith, who, at the symposium, screened the film *Saturday Morning* (1978) by Dan Curry. This work demonstrated how our expectations of depth in an image based on pre-existing cognitive templates could be disoriented. *Saturday Morning* opens to an uncertain set of geometric shapes. The viewer is then somewhat puzzled when the tops of people's heads come into the frame. It then becomes apparent that we have a birds-eye view of a scene and what appeared as flat shapes are three-dimensional architectural structures photographed from above.

Tim Smith's intriguing research presentation at Chelsea on what he called the 'attentional' theory of spectatorship (Smith 2005) referenced the well-established conventions of 'classic' film production. Smith screened an excerpt from Paul Thomas Anderson's *There Will Be Blood* (2007), superimposed with computer-generated data that indicated how eye-tracking technologies analyse spectators' viewing patterns. A collection of circles appearing over the film image mark viewers' successive points of focus and these can be traced as they shift across the screen.' Through this work, Smith considers how our 'attention, perception and memory is influenced by film form, and how film has evolved to be compatible with cognition' (2011: 1). Smith's assertion invites us to reflect dialectically on how cognition might have evolved to become compatible with film, and his work opens engaging new avenues for studying the moving image.

This introduces some of the problems around perception, mind and brain disputed at Chelsea, as well as other issues relating to technology and theories of knowledge, to which I will return. There are inherent difficulties in slipping between physiological measurements and explanations of how we experience, 'see' or 'make sense of' visual stimuli. Tim Smith demonstrated degrees of congruence between the perception of real-world events and the

1. Smith's version of the film can be viewed at: <http://www.davidbordwell.net/blog/2011/02/14/watching-you-watch-there-will-be-blood/> Accessed 31 March 2012. He also posts regular updates on his research on his blog: <http://continuityboy.blogspot.co.uk/> Accessed 31 March 2012.

film image, for example, in facial recognition. He also showed how Hollywood models of production contrive to orientate the spectator's attention towards particular loci on-screen through, for instance, continuity editing or framing, what Noël Burch termed cinema's 'spatial and temporal articulations' (Burch 1973: 3–16).

In this way, the data generated by the *There Will Be Blood* footage showed what one might expect from a carefully choreographed scene: that viewers attend to characters' faces, particular bodily gestures, or areas significantly differentiated in the *mise-en-scène* (such as a bright lamp in an otherwise dark setting). Sound too played an important part in this process directing attention to individuals or objects within the frame. In the data visualization this was shown with a clustering of the circles, each representing viewers' 'saccadic' (rapid) eye movements between specific points on screen. The circles increased in size the longer a viewer's gaze was fixed on a point. However, and perhaps most interestingly, the experiment also highlighted apparent discrepancies, where some viewers attended to areas towards the edge of the screen, or away from the main areas of directed activity. The more ambiguous measurements aroused a great interest from audience members. What could such an experiment tell us about the arguments around the positioning of the viewer's gaze? What would this reveal about the impact of flicker or rapid montage on where a spectator looks? And what about off-screen space? Moreover, how do the physiological measurements relate to sensation and the viewer's experience? This latter point seemed missing from the general discussion.

Beyond Smith's research, which has roused interest in Hollywood, some commercial interests in eye-tracking techniques would likely suggest a way of more precisely directing and regulating the viewer's gaze towards the exact pixel coordinates of the raster grid. This last point relates to

the historical debates around ideology and cinematic conventions contended in Theresa De Lauretis and Stephen Heath's *The Cinematic Apparatus* (1980) for instance, where questions around perception and spectatorship are considered within the commercial demands of technology. Such links and their relation to commodity exchange and standardization are considered further in Sean Cubitt's writings, such as *The Cinema Effect* in which he argues that, 'The historical study of the object of film is [...] also a study of the evolution of the commodity form' (2004: 2). To further contextualize these positions we might look to the ideas of Walter Benjamin. Reflecting on the developing technologies of the twentieth century, he wrote in the 1930s, 'The way in which human perception is organised – the medium in which it occurs – is conditioned not only by nature but by history.' (Benjamin 2002: 104). For his part, in *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (1990), Jonathan Crary offers an historical examination of such questions – and their variability – considering how theories of knowledge and perception might be evaluated in their social relation to new kinds of cultural or institutional forces. In advanced technological societies, the production and representation of social relations plays out daily within configurations of moving images manifesting across cinema and television, and embedded in online and mobile content. We cannot always speak with such general certainty about 'the' spectator or user as an abstract exemplar, but we must consider how practices and ideologies contribute to hegemonies of vision, and critically, how they impact on the particular, concrete circumstances of the individual. These issues were not explicitly discussed at Chelsea.

Ian Christie's presentation began with the work of Hugo Münsterberg, whose text *The Photoplay: A Psychological Study* (2002), first published in 1916, is significant as one of the earliest treatises

on the nature of film and reality. This related to Christie's discussions of experimental psychology and the work undertaken in the 'Vision' group at Bristol University. Christie, together with his collaborator Steven Hinde, outlined the findings of their research into the nature of spectator 'presence'. This was defined as the degree to which viewers felt immersed in the narrative world based on factors such as shot length and the effects of 3D film. James Cameron's *Avatar* (2009) was given as an example of a recent commercial 3D film that aspires to create an experience of seamlessness and immersion – a kind of realistic enhancement of the diegetic world. Christie and Hinde's ongoing work might shed further critical light on the effects of these endeavours.

The question of presence is interesting, but what the Chelsea event lacked overall was any significant reference to experimental film and video works with an interest in psychology and perception. Contributions from some current film-makers, or references to past works, might have supplemented the science-based presentations and provided more concrete grounds for debate. I think it will be instructive here to refer to one such film-maker, so that we might also consider the other field of investigation in discussion at Chelsea, namely, James Gibson's Direct/Ecological approach.

The practitioner I have in mind is Paul Sharits, an experimentalist whose work constituted an investigation of the viewer's sensations and psychology (Vasulka and Weibel 2007). Sharits wrote that his works – such as the dynamic colour flicker film *Ray Gun Virus* (1966) – explore 'the two-dimensional reflective screen surface / the viewer's retina screen, optic nerve and individual psychophysical subjectivities of consciousness' (1971: 57). Through this, he suggested, 'contradictory concepts of perception-consciousness/known-meaning' might be synthesised into a shifting and reflexive form of understanding' (Sharits 1978: 108). Many of Sharits's contentions

are tied into the speculation and polemic of an experimental film-maker's practice. Yvonne Spielmann's writing has attempted to relate his work to the psychological implications of Gibson's Direct theory of perception (Spielmann 2007: 197 – 215). Considering Sharits's works on apparent motion in film, and his various experiments with frame rates and flicker, Spielmann observes how the paradoxes of variability and invariability in film (filmstrip/photogram or movement/stillness) are explored by Sharits within the same terms of 'variant' and 'invariant' properties of perception suggested by Gibson. Following Gibson's theory, she says, 'It is crucial that when we regard the transformation of objects and events in a temporal flow we also know that there are invariant structures in the perception of transformation' (Spielmann 2007: 198). To some extent, Sharits's works appear consonant with Gibson's theory of perception, but interestingly, only by being dissonant with the 'normal' illusion of motion in film. Most films try to conceal invariance (the frame) through the variant continuum of motion. However, Sharits's films bring to light the interaction between distinct photograms and their apparent seamless flow. He therefore 'separately visualizes the two components of perceiving motion in time' (Spielmann 2007: 198).

The presenters at Chelsea all speculated on ways that future research might be developed, but it seems there is still something of a gap between existing studies – working from a basis in narrative – and any investigation of alternative practices. Here I would like to refer to an example of recent cognitive research by another attendee at the Chelsea event, Jocelyn Cammack, whose work links neuroscientific experiments to theories around the uncertainty of perception (2010).² Cammack refers to a range of studies in her work, and proposes a 'state of flux' between Direct and Constructivist theories. Her writings focus mainly on experimental film practices, out of which she hypothesizes a 're-cognition'; a

2. Cammack's Ph.D. research involved practice-based elements. One experiment was structured around ambiguous visual stimuli or 'bi-stable' figures that can be read plausibly in more than one way (similar to the 'duck-rabbit' image attributed to Joseph Jastrow). Using Magnetic Resonance Imaging (MRI), Cammack examined the neurological activity of participants as they 'flipped' between different interpretations of the images. Cammack also produced a number of video works to explore perceptual uncertainty. An example is *The Walk* (2007), in which an 'oscillation' between abstraction, representation and imagination is developed in the unstable image of a figure walking in a woodland landscape.

protracted, unstable state of knowledge, which 'exposes the interactions between the sensory and cognitive components of perception' (Cammack 2010: 12). One of the film-makers Cammack discusses is Peter Gidal. Speaking of the experience of watching his works, such as *Key* (1968) and *No Night, No Day* (1997), she suggests they induce a phenomenological state of 'fugitive percepts' characteristic of the early stages of perception, where recourse to pre-existing knowledge is either not directly available, or is put into a tensional relation (Cammack 2010: 55).

When watching these films the viewer's comprehension of the image remains uncertain, representing what she terms a 'slippage' between perceptual and imaginative activity. This can, she notes, sometimes occur in narrative films and is not exclusively a feature of experimental works, but films such as Gidal's sustain these uncertainties creating a form of reflexive perception. As a concrete example of uncertainty or slippage, Cammack cites Gidal's film *Key*, in which forms and shadows obscure an image of a face, resulting in an unstable representation. The viewer is oriented towards the particular rather than the general, tracing the image with attention searching for meanings within discrepant areas of light and shade. Cammack suggests that where many forms of cinema rely on pre-existing cultural knowledge, Gidal's films reflect on a problem of recognition that leaves a gap for imaginative activity between what we think we understand as a viewer and what we actually see (2010: 76). In his book *Materialist Film*, Gidal writes, 'the film material and the process of viewing together transform film into a new object and process. Filmic "trying to see" instead of seeing, trying to know instead of (the illusion of) knowing. Not believing what is seen.' (1989: 7). Gidal's works do not proceed from an ideal reading in which film comprehension is commensurate with a pre-determined meaning, but rather a differentiated interpretation emerges through the

films. It is this 'trying to see' and 'trying to know' that activates a particular kind of spectatorship. We might interpret this process as the imaginative perception that Cammack defines in empirical terms.

It was evident at Chelsea that many new fields of enquiry are emerging. Cammack suggests that trends in cognitive science are revisiting traditionally oppositional models to seek multi-disciplinary frameworks. In the audience discussions, several issues were raised in relation to this point. I aim here to broadly represent a range of the questions voiced and the avenues they signal for further investigation. It was noted that cognitive studies of film vary substantially, but do tendencies towards classificatory models omit the possibilities for sensuous experience in the reflection of concepts? If categories of comprehension used in some theories are necessary as preconditions to understanding films, and as a means to somehow organize spectatorial experience, then what of their own conceptual formation? Does a certain rigidity form that risks limiting the possibilities of thought, with experience veering towards tautology and cognition aligning to a set of categories posited beforehand?

If an alignment is needed to comprehend, then does something misaligned also slip past? Should we dismiss this as incomprehension when watching films, or see it as possibility and contradiction to be worked through? As is widely acknowledged, some films and videos deliberately build on or work against conventions and expectations that might be aligned, in principle, to pre-existing categories, and they may well provide useful bases for analysis. However, some may argue that they may also lead towards a foundational theory of spectatorship, advancing from the tropes of generic convention. In this view, do films not comprehended on the basis of established theories become deviations from a norm rather than being understood in their own processual and

objective particularity? Rather than view the elements that slip past as a deficit of cognition, dissonance should perhaps be examined as a fundamental element in a reflective spectatorship.

This suggests that not all works can be evaluated from normative bases – as Theodor Adorno contended, ‘What is essential to art is that which in it is not the case, that which is incommensurable with the empirical measure of all things’ (1997: 335). In drawing upon the strengths and questioning the limits of Constructivist and Direct/Ecological frameworks, Cammack’s ‘micro-level’ examination of the frame and image indicates a necessary reflection on the particular qualities of the film and video object, through which movements of the viewer’s thought occur reflexively in the ‘uncoupling of perceptual and conceptual activity’ (2010: 23). Although admitting some limitations in the scope of works considered in the research, Cammack’s study suggests that certain types of film and video practice can be particularly active in stimulating ‘imaginative perception’, a reflexive ambiguity between seeing and thinking. This relates to what many practitioners have intended in their attempts to destabilize the image so as to engender a different kind of aesthetic experience. In such works, irresolution is resolution of a different sort. It resolves in the creation of reflexive thinking.

Simon Payne, a contemporary video-maker, is further developing this approach through his perceptual investigations in colour field works such as *New Ratio* (2007) and *Vice Versa Et Cetera* (2010). Discussing his two-screen work *Thirds* (2006) in the arts, science and technology journal *Leonardo*, Payne comments that ‘the colour fields cease to be discrete in value or shape, and the separate cycles give rise to illusions of movement that the viewer isn’t able to fully grasp’ (2008: 535). Payne’s work is engaged with the shifting and contradictory experience of colour perception. His work could well be evaluated in the historical traditions

and experimental aesthetics referenced by Murray Smith, Ian Christie and Tim Smith at Chelsea. This suggests that more dialogue between film and video practitioners and cognitive theorists could lead to interesting developments. One important area of investigation would be the discrepancies or anomalies in data, or the reactions that confound categorization: the unexpected elements that flash up in Tim Smith’s visualizations or underscore Cammack’s ‘state of flux’.

Where these discrepancies are closed-off by the priorities set within some experiments, knowledge based on a wider constellation of thinking might remain out of reach. What Sharits and Payne attempt in their work, for instance, is an unfolding of experience through colour and light. Their conceptions of spectatorship are not just concerned with the functions of consumption – how we watch or learn to watch films – but on the modes of material production and practice implicit in making moving images. And taking a wider view, they observe how society is sedimented within the techniques and technology of cinema. It has also been the aim of many alternative artists’ film practices, in their own historical specificity, to point towards a paradox of appearance in the moving image; that is, an abstraction that is nevertheless constituted through the concrete terms of social production. In doing so, new ways of thinking have emerged which open the possibilities of experience, and a reflection on the terms of knowledge through which theories of spectatorship are mediated. My discussion has explored some possibilities in relation to the questions emerging at Chelsea. It would take considerably more debate to establish the extent to which these might be understood in relation to different kinds of film and video practice. The Chelsea event provided a good basis for future investigations, but Cammack’s ‘state of flux’, moving between different models of cognition, offers a reminder of the

complex and reflexive thinking needed for the task.

REFERENCES

- Adorno, Theodor W. (1997), *Aesthetic Theory*, Gretel Adorno and Rolf Tiedemann (eds.) (ed. and trans. Robert Hullot-Kentor). Minneapolis, MN: University of Minnesota Press.
- Benjamin, Walter (2002), 'The work of art in the age of its technological reproducibility, second version', *Walter Benjamin: Selected Writings, Volume 3: 1935–1938*, Howard Eiland and Michael
- W. Jennings (eds.), Harvard, MA: Harvard University Press, pp. 101–33.
- Burch, Noël (1973), *Theory of Film Practice* (trans. Helen R. Lane), Princeton, NJ: Princeton University Press.
- Cammack, Jocelyn (2010), 'Visual deception and the beholder in cinematic space: the unstable image and the role of imaginative perception in film viewing', Ph.D. thesis, London: Royal College of Art.
- Crary, Jonathan (1990), *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*, Cambridge, MA: MIT Press.
- Cubitt, Sean (2004), *The Cinema Effect*, Cambridge, MA: MIT Press.
- De Lauretis, Theresa and Heath, Stephen (eds.) (1980), *The Cinematic Apparatus*, London: Macmillan.
- Gibson, James J. (1979), *The Ecological Approach to Visual Perception*, Boston, MA: Houghton Mifflin.
- Gidal, Peter (1989), *Materialist Film*, London: Routledge.
- Gregory, R. L. (1966), *Eye and Brain: The Psychology of Seeing*, New York: McGraw.
- Münsterberg, Hugo (2002), *The Photoplay: A Psychological Study* London: Routledge.
- Payne, Simon (2008), 'Full colour video', *Leonardo*, 41: 5, pp. 534–35.
- Peterson, James (1994), *Dreams of Chaos, Visions of Order: Understanding the American Avant-garde Cinema*, Detroit, MI: Wayne State University Press.
- Rock, Irvin (1983), *The Logic of Perception*, Cambridge, MA: MIT Press.
- Sharits, Paul (1971), 'Statement of intention for Knokke-Le Zoute fourth international experimental film competition' in Cornwell, Regina (ed.), *Paul Sharits: Illusion and Object*, Artforum, September 1971, New York, pp. 56–62.
- (1978), 'Cinema as cognition', *Afterimage, Hearing Seeing*, 7, Summer 1978, pp. 108–09.
- Smith, Tim J. (2005), 'An attentional theory of continuity editing', Ph.D. thesis, Edinburgh: University of Edinburgh.
- (2011), 'Programme for the cognitive science & the moving image event', <http://www.kent.ac.uk/arts/hpa/aestheticsresearchgroup/CognitiveScienceMovieImage.pdf>. Accessed 15 September 2011.
- (2012), 'The attentional theory of continuity editing', *Projections: The Journal for Movies and the Mind*, 6: 1, pp. 1–27.
- Spielmann, Yvonne (2007), 'Paul Sharits: From cinematic movement to non directional motion', in Graf, Alexander and Scheunemann, Dietrich (eds.), *Avant Garde Film*, Amsterdam: Rodopi, pp. 197–215.
- Vasulka, Woody and Weibel, Peter (eds.) (2007), *Buffalo Heads: Media Study, Media Practice, Media Pioneers, 1973–1990*, Cambridge, MA: MIT Press.

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