

Explorations in Creativity, Technology and Embodied Mind

John Haworth

Manchester Metropolitan University, Manchester, UK

To appear in:

Freire, T. (ed) *Understanding Positive Life: Research and Practice on Positive Psychology*. Lisboa: Climepsie Editores 2008

Explorations in Creativity, Technology and Embodied Mind

Introduction

The nature of creativity and consciousness is an important topic in the arts and sciences world-wide, as indicated by web sites which can be accessed from www.creativity-embodiedmind.com. The centrality of unconscious thought in perception, knowing and understanding, and creativity, is now becoming more widely recognised. The Arts and Humanities Research Council, Arts Council UK, and the Department of Trade and Industry in the UK, have also identified a strong economic case for studying The Nature of Creativity.

A paradigmatic change is occurring in our conception of what it is to be a human being in the world, and how we come to understand things and act in innovatory and creative ways. Varela, Thompson and Rosch (1991) in their book 'The Embodied Mind: cognitive science and human experience', present cognition as embodied action. Likewise, Lakoff and Johnson (1999) in their book 'Philosophy in the Flesh: the embodied mind and its challenge to western thought' emphasise that the mind is inherently embodied. They stress that thought is mostly unconscious; and that abstract concepts are largely metaphorical. They discuss in detail how the body and the brain shape reason, contrary to traditional Western Philosophy which sees reason independent of perception and bodily movement. The authors of these books acknowledge their indebtedness to the philosopher and psychologist Maurice Merleau-Ponty and his embodiment theory of perception. However, unlike Merleau-Ponty, they do not examine the importance of the interaction with materials and the role of technique and technology, in helping to shape consciousness.

Merleau-Ponty's Theory of Embodied Mind and Creativity

In his writings Merleau-Ponty gave us a route to follow, rather than a finished theory. In 'Phenomenology of Perception' (1962) he presents knowing and understanding as embodied action, and makes an important distinction between reflexive and pre-reflexive thought, the latter being seen as playing an important role in

perception and creativity. He argues that the body has its world or understands its world without having to use its symbolic objectifying function, “...to perceive is to render oneself present to something through the body” and “consciousness is in the first place not a matter of 'I think that', but of 'I can' ” (p 137). Merleau-Ponty proposes that the visible unfolds and is concentrated by the body over time. Meaning is not found pre-existent in the world, but called into existence by bodily activity, with inter-subjectivity resulting from the communality of the body.

Merleau-Ponty (1964 a) in ‘The Primacy of Perception’ considers that because we are temporal beings “the idea of going straight to the essence of things is inconsistent... what is given is a route, an experience, which gradually clarifies itself and proceeds by dialogue with itself and others” (p 205) and that “To experience a structure is not to receive it into oneself passively, it is to live it, to take it up, assume it and discover its immanent significance” (p 258). While Merleau-Ponty does not accept that truth endures for all time, he recognises that truth endures for a time. Euclidian geometry is still with us and useful, even if it is not the only geometry. But it is truth which results from an “inherence in things”. It is truth which is relative to a system or medium; it appears when we allow ourselves “to come to rest in it” (1962 p 396). Truths and ideas are thus cultural objects rather than absolute certainties. Yet this does not detract from their organising force. They may indeed give a firm focus to action and thought.

Merleau-Ponty does not deny the importance of reflection for knowing and understanding. In defending his embodiment thesis in the 'Primacy of Perception' he states “it is the unreflected which is understood and conquered by the reflective, left to itself perception forgets itself (and) is ignorant of its own accomplishments” (p 203). He also recognises in 'Eye and Mind' (1964 b) that there can be a different emphasis on the reflective mode of thought in some realms of life, such as scientific endeavour and philosophy.

Scattered throughout the writings of Merleau-Ponty is an Embodiment Theory of Art, which he uses to support his embodiment theory of perception, (Haworth 1990, 1997). This views the artwork as “enriched being” in its own right, as distinct from an analogue for an external truth or essence, as traditional aesthetic theory claims. It proposes that this enriched being is not produced primarily by intentional acts, the traditional view, but by the reciprocal influence of consciousness, the body, techniques and materials. It “gives visible existence to what profane vision believes

to be invisible” (Merleau-Ponty, ‘Eye and Mind’ 1964 b, p166). Merleau-Ponty (1964 b) drew on the writings of modern artists and concluded that the painter’s vision is not a view on the outside, but a concentration or coming to itself of the visible (p 181). He considered that works of art contain matrices of ideas that have their origins in embodiment (Merleau-Ponty 1964 c in Signs p 77) He also claimed “that modes of thought correspond to technical methods, and that to use Goethe’s phrase ‘what is inside is also outside’ ” (‘Sense and Nonsense’ 1964 d, p 59). As Merleau-Ponty indicates, we do not see the world, but see with the world. In artistic terms different media with which we interact have different voices which play a part in the creation of enriched being, perception and consciousness.

The importance of the intertwining of perception and technology is also recognised in the writings of anthropologists who view technology as skilled practice (Harvey 1997). Recognition of the importance of pre-reflexive thought has also received support from scientists (Gray 2004). The turn towards the importance of the senses in vision has recently been emphasised by Howes (2005) in his edited book ‘Empire of the Senses’.

Research and Practice

The fusing of thought and action in the theories of Merleau-Ponty highlights the importance of combining research and practice in innovative ways. Merleau-Ponty’s theory of art has been investigated in ‘research conversations’ with artists by Haworth, J.T. (1997). These were similar in method to those used by Sigmund Koch, reported by Franklin (2001). The Research conversations undertaken by Haworth (1997) using the perspectives of Merleau-Ponty, were held with internationally famous artists in-order to gain further insights into the creative process. The artists included the printmaker Michael Rothenstein, who can be considered a paradigmatic case for Merleau-Ponty’s Theory of Art. They also included the conceptual artist Sol LeWitt, whose statements emphasising the importance of ‘the idea’ would at first sight appear to contradict this theory. An investigation of the working process of Sol LeWitt, however, shows support for Merleau-Ponty’s Theory, while also pointing to the importance of capitalising on randomness

These and other ‘research conversations’ undertaken by the author into the creative process in fine art support the view of cognition as embodied action, and

emphasise the importance of both pre-reflexive and reflexive thought in guiding action. They show a search for viable alternatives, rather than a search for the ideal, and an intimate reciprocal influence between the person and the artwork in the various ways of probing the environment.

Practice Led Research

Considerable debate exists on the interplay between minds, machines and electronic culture. A recurring theme in digital art is whether or not the human body and the material object will become redundant. Digital fine art encompasses a vast range of practice, much of which is not concerned with the physical art object (see Christiane Paul (2004) for an excellent review). Many artists, however, are ‘Interrogating the Surface’ at the interface between traditional printmaking and digital techniques (see, for example, www.icfar.co.uk).

Scanners can be used to input textures, parts of etchings, lino and woodcuts, paintings, and photographs etc. Images and other information can be downloaded from a variety of recorders as well as digital cameras, videos, and the internet. These can be combined with other materials or images stored in the computer, and manipulated using sophisticated commercial software packages, and a pressure sensitive pen on a graphics tablet. The result can be outputted to a range of sizes and types of printer and on to a wide variety of materials to form original digital art prints in single or multiple formats or incorporated into multimedia installations.

Digital prints and sculptures can be conceived and made without the direct involvement of the hand using rapid process technology. While this may be taken to reinforce an emphasis on the importance of mind in creativity, recent advances in haptic technology are being hailed as putting touch back into creativity. What can be recognised, however, is the leap in exploratory power which the computer provides, which will significantly influence creativity in the visual arts.

Project 1.

A project by the author combining research and practice investigated ‘Creativity and Embodied Mind in Digital Fine Art’. The project was funded under

the Innovation Awards Scheme of the Arts and Humanities Research Board in the UK. It commenced in January 2002 and lasted for one year.

The problem to be explored in this project was the nature of the interplay between mind, body and technology in fine art. The aim was to bring into visibility the nature of the creative process in digital fine art. The methods of research were interlocking and included creative practice and reflection, literature and gallery research, interviews, workshops, and an interactive website. Each of these methods is important in its own right, but together they help to provide cross checks to enhance the validity of the research. The theories of Merleau-Ponty underpin the interlocking of the range of methods aimed at allowing critical insights and products to emerge, which can be put into the public realm to enhance understanding and appreciation.

Engaging in creative practice and reflection is important. First person methods of research are now strongly advocated (Varela, F.J & Shear, J. eds (1999) *The view from within: first-person approaches to the study of consciousness.*) The collection and analysis of the views of others through literature research, gallery visits and research interviews is also important. Workshops are also a crucial element in the dialogue. Several academic disciplines now stress the importance of ‘communities of practice’ in shaping knowledge and understanding. An interactive website for Creativity and Embodied Mind also helps to facilitate ongoing group interaction in this area. It is also important that the products of creative activity are put into the public domain, whether these are artworks, articles, books or other outputs.

The Innovation Award called for projects that were inherently risky, in distinction to rigorously testing pre-set alternatives. But any prospecting for precious materials is, by definition, inherently risky. This is also the case when prospecting for materials of the mind. The route map provided by Merleau-Ponty, however, is encouraging.

The first person method of investigation used in the project is concerned with the practice of digital fine art printmaking, which at some stage in the working process involves the computer, and in many cases commences with a photograph. The digital print medium, with its fine surface quality and potential to incorporate and transmute imagery, is particularly attractive as a conduit for the idea of the vibrant transience of reality. This is explored while probing the pixels and listening to the voices emanating from the medium. The resulting work shows the important

interaction with technology in the way we see and portray the world. The prints also show an important influence of geographical place, culture and events. The work has been exhibited internationally. Examples of the prints can be seen in the gallery at www.creativity-embodiedmind.com and at www.commeccart.com

During the making of the prints, a log is kept of both the technical and thought processes involved. Notes are made on the interaction with the medium, and on the development of the work and emergent meanings, and reflections on the creative process. An account follows in relation to one print, as an example of the documentation undertaken. 'Fragmenting Square': (90cm x 90cm on canvas) is shown in figure 1 in the appendix.

This print was made shortly after the tragedy of September 11th in the USA. However, it drew on elements which had been worked on before that date, and imagery that emerged afterwards. It is composed from four prints done separately, but with an overarching concern about the vibrant transience of reality. The prints were: fading edge, fragmenting edge, broken edge, and fallen square. Some of the material and imagery in these prints came from scanned textures and colours made using turpentine on printing inks on large pieces of paper, making marks with broad palette knives. Other imagery was from the light of the sun setting on water on a harbour front, the surface of which was whipped by the wind. Some of the colours and lines came from front page pictures of the September tragedy. A previous edge print was about the contrasting sharp glow of life in the Arizona desert. The fragmenting square was in-part about the break up of this.

When the four prints were put together and printed the image looked uninspired compared with each of the individual images. The combined image was altered using the auto-levels and equalise functions, and the Gaussian blur filter which helped to combine and change some of the shapes, while at the same time integrating them. The contrast function was then used to reduce most of the blur, which seemed excessive in this print. Various areas of the print were then selected and colours changed. As is well known, the square has been an important element in the work of modernist artists searching for pure form and beauty, and absolute truth and meaning. The post-modern age questioned the viability of this. September 11 saw further crumbling of the certainties. But perhaps the print contains delicate potentials for growth and relationships.

The practice based research making many digital art prints shows that the process of exploration with the computer generates and reveals possibilities and visual experiences, as well as speaking to initial expectations. The process of exploration becomes a vehicle for seeing which is influenced by the technology. Visual explorations undertaken with the computer can influence what one 'sees' in the world, what comes into focus and what demands attention, influencing what is recorded experientially, mentally, and digitally. In turn, this influences further explorations with the computer. Artistic vision is constantly reshaping itself in interaction with the world, including technology, geographical place, culture and events. As cognition and emotion are intertwined, feelings influence seeing, as well as the reverse. Expression is also influenced by the tools and techniques that are available, and with the interaction with materials, with different potentialities and 'voices' emerging.

The Innovation Award project also highlighted the potential importance of studying freedom and constraint in the creative process. As variations on images can be produced extremely rapidly in digital art, selection is necessary. This can involve a 'feel' for the image, against an overarching concern, which itself may have taken years to emerge and be still unfolding. It generally involves a deep knowledge of the art world. The artist is situated in a tradition of art, which influences perception. It influences the way we see things and the possibilities we have for expression. Any artwork is influenced by a conscious awareness of tradition, even if it is fighting against that tradition. These potentialities are both informed and appraised by communities of practice. Thus both 'actor centred' and 'veridical' decision-making are intertwined in the process of selection. The computer enhances freedom for exploration, but also contains within it the potential tyranny of continual choice, though artists can apply constraints, intuitively or otherwise. Johnson-Laird (1988) argues that freedom of choice occurs par excellence in acts of creation, but that the set of choices is constrained by largely tacit mental criteria that determine the genre, shared by other practitioners, and the individual style.

Project 2.

As part of a further Arts and Humanities Research Board award for practice led research, a workshop was held on 'Freedom and Constraint in the Creative Process in

Digital Fine Art', Haworth et al (2005) (see also workshop 2 at www.creativity-embodiedmind.com and Haworth, 2006).

The workshop was attended by internationally known British artists and academics from different disciplines. Papers presented at the workshop showed that:

- Computer aided art manifests a diversity of practice, in which the fusion of thought and action is critical to the creative process.
- Technology influences perception and thinking; while at the same time concepts, ideas, and feelings influence the use of technology.
- In the use of technology in the process of making art many unexpected effects can occur. These can be critical to the creative process, enhancing freedom of choice. In turn, however, choice can be tyrannical, if it is not embedded in constraints, which may originate from the individual, group, and society.
- Advanced technology is leading to the emergence of a tacit digital creative practice and a nurturing environment.
- Dynamic interactive techniques enable the viewer to have an active role in creating or changing the art object.

In line with new conceptions of what it is to be a human being in the world, and how we come to understand things and act in innovatory and creative ways, the workshop emphasised that creative thought can be largely unconscious. Also, that creativity involves the interaction of thought, the body, techniques and materials. The importance of bringing tacit knowledge into visibility was recognised.

Johnson-Laird (1988) argues that the paradox of creativity leads to the view that there are many criteria on which the creator must rely and that by no means all of them are available to overt inspection. Some of these are common to many practitioners, and constitute the genre or paradigm. Other criteria are unique to individuals, and constitute an individual style of thought within the more general framework. Merleau-Ponty (1964 c) in his writings on the embodied nature of creativity and consciousness emphasises that an artist's style is not something developed consciously in order to depict the world, but is an 'exigency that has issued from perception' p 49. It is a personal system of equivalencies that the artists make for themselves for the work, which manifests the world as they see it: 'it is the universal index of the 'coherent

deformation' by which he (the artist) concentrates the still scattered meanings of his perception and makes it exist expressively' (Merleau-Ponty, 1964 c)

These views on creativity could be seen in the presentations made in the AHRB workshop. They support an emphasis on diverse experience and training in the life of artists, coupled with an ability to retain an open perspective, while at the same time recognising the importance of operating within certain parameters, even if these change over time.

Csikszentmihalyi (1988) argues that creativity is the product of three main shaping forces: a set of social institutions, or *field*, that selects from the variations produced by individuals; a cultural *domain* that will preserve and transmit the selected new ideas or forms to the following generation; and the *individual* who brings about some change in the domain which the field will consider to be creative. Abuhamdeh and Csikszentmihalyi (2002) consider that the *field* has a perpetual need for novelty, and that as a result the field's aesthetic preference is guaranteed to change constantly. The field includes all the individuals who act as gatekeepers to the domain, including art critics, art historians, art dealers, art collectors, and artists. Arguably, digital art and its practitioners are expanding the range of ideas and forms considered acceptable by the field; while at the same time broadening and democratising the field (see Christiane Paul, 2004). Part of this process may be an intuitive recognition that creativity is not a search for absolute unchanging truths, but ideas and forms in which we can come to rest provisionally, with inter-subjectivity resulting from the communality of the body.

Current project 2006/2008.

This project continues the exploration of mind, technology and creativity, initiated with grants from the Arts and Humanities Research Board (www.creativity-embodiedmind.com). The practice led research has a focus on **The Way We are Now**. It constitutes a photo-ethnographic project. The results can be presented in different ways: for example, as an artistic object for contemplation; as individual visual profiles for comparative research; as analysis of themes across a group of individuals, and between groups.

The objectives of the research include those of bringing into visibility the nature of the creative process in digital fine art, and putting critical insights and products into the public realm to enhance knowledge, understanding and

appreciation. The project also includes visual and qualitative measures of subjective well-being. It extends both the subject matter of digital fine art, and the visual portrayal of subjective well-being and quality of life.

The research continues to be underpinned by the writings of Merleau-Ponty (1962), in particular, the claim ‘that modes of thought correspond to technical methods, and that to use Goethe’s phrase ‘what is inside is also outside’’. The project has a particular focus on the use of new technology with an innovative method. The new technology is a mobile phone/camera/recorder. The innovative method is the Experience Sampling Method (ESM) extended to include images, which has not been done before. Delle Fave (2007) notes that the ESM can be used to capture emotions, motivations and cognitive processes as they occur, and that it reduces the problem of distortion of memories occurring in retrospective methods, though the ESM is seen as complementing and not replacing other research methods.

The ESM in this project involves a series of short questions being answered on a card, and a photograph of the surroundings taken, at a signal from the mobile phone, eight times a day at randomly selected times between 9.30 am and 9.30 pm, pre-programmed in the phone, for seven consecutive days. Full details of signal sampling, and the questions are given in the appendix.

The questions are on activity, enjoyment, interest, challenge, skills, visual interest and happiness. The questions on activity and subjective well-being have been used previously in research with the ESM. (e.g. Clarke and Haworth, 1994; Haworth and Evans, 1995; Haworth, Jarman, and Lee, 1997) With the exception of the question on the activity being undertaken, answers are chosen from pre-coded alternatives, making recording on a card simple: for example:

Q2 How much were you **enjoying** the activity

1 2 3

low enjoyment moderate enjoyment high enjoyment

Q3 How **interesting** did you find the activity

1 2 3

low interest moderate interest high interest

There is a small space on the card for any comments at each signal. At each signal, brief comments are also recorded on the mobile phone. Each day a photograph was taken of a heading to an article in three newspapers: The Guardian, The Sun, and the Lancashire Telegraph. Each day a photograph was also taken of a

topical image in the newspapers. The papers were saved from the week, and material can be selected at a later date. The two images from the newspapers for each day (one of the headings to the news paper articles, the other of a topical image) constitute a media view of the world. The images can be taken from other aspects of the media, such as TV, magazines, etc. They provide a comparative view to the images of daily life taken at the ESM signals.

The previous is downloaded into the computer to provide the raw material for the creative production of large-format, and smaller, prints. A qualitative evaluation is also made of how typical the week of the ESM was for the participant. In parallel with the ESM project, a digital camera is used to take pictures of the season for use in making separate prints.

The investigation was undertaken for one week in each of the four seasons of the year. At least one large-format print (44 inches x 65 inches) will be made for each season. An image of the print for autumn is shown in figure 2 in the appendix. It can be seen in more detail at the website www.creativity-embodiedmind.com The print combines selected text and images from newspapers, including the political, with images of daily life, to produce a statement on **'The Way We Are Now'**. Each column in the print represents one day. The print has some similarities in structure to the panelled works by Gilbert and George (e.g. Jonquet 2004). A presentation on the project was made at the IMPACT 5 International Printmaking Conference in Tallinn in October 2007. The conference had a concern with investigating slices of time and the production of political-poetic statements.

Prints are also being made where each image taken at an ESM signal has colour codings along side it of the answers to the questions asked at the ESM signal. For example, the question on enjoyment is coded low enjoyment: pale red, moderate enjoyment: bright red, high enjoyment: deep red. The question on interest in activity is coded, low interest: pale blue, moderate interest: bright blue, high interest: deep blue. Challenge is coded using orange; Skills is coded using green; Visual Interest is coded using purple; Happiness is coded using yellow. The key to the colour codings is presented with the print. An example of part of day one for the winter ESM can be seen at the website www.creativity-embodiedmind.com and in figure 3 in the appendix.

A large cylinder print on transparent plastic will also be made. The circumference of the cylinder will be 42 inches and the height will be 65 inches. On

the upper part of the cylinder will be the band of modified images taken from the newspapers. The seven vertical strips of images, one for each day, will have further graphic work associated with them related to the questions in the ESM study. Each image will have next to it colour coded bars relating to the answers to questions in the ESM on psychological states, and challenge and skill. Each day will form a tube in the overall cylinder. The outside of the cylinder will also have graphic work on it based on the life history of the person doing the ESM (based on a graphic technique used in sociological research). The sound recordings made in association with each image could be selectively activated electronically. The cylinders will thus constitute a new form of portrait of the person. The idea for the cylinder is based on modern theories of the brain and consciousness, relating to quantum computing occurring in tubules in nerve dendrites (Hameroff and Penrose 1996; Woolf and Hammeroff 2001; www.consciousness.arizona.edu) The ideas for the cylinder print occurred during the process of making the first large format print, and related to the structure of that print.

A log is kept of the project, for both the ESM phase and the creation of prints. This includes thoughts on the project, techniques, and the creative process. The output from the project will include exhibitions of the art work, a seminar on Mind, Technology and Creativity, a CD Rom of the project, and an article on the project

A similar study, based on the 'The Way we are Now' has been undertaken by a group of 11 staff at Manchester Metropolitan University from the Centre for Social Change and Well-Being, in which the author is a member. Preliminary results were presented at a National Conference on 'Health and Social Change: Challenges and Controversy' at Manchester Metropolitan University in 2007, organised by the Research Institute for Health and Social Change (RIHSC 2007). The study is being prepared for presentation at other conferences, including a conference on 'Research in Real Life' at Manchester Victoria University in September 2008. Papers are being written for publication. Further analysis of the data will be undertaken, drawing on research and concepts presented in Haworth and Veal (2004) and Haworth and Hart (2007), including an analysis of themes across the group, such as the incidence of 'flow' and the pursuits involved; and the relationship between work, leisure and well-being. Currently there is considerable interest in innovative qualitative research, including visual research methods (e.g. Pink 2006, Rose 2007).

Conclusion

The practice based research making digital art prints shows that the process of exploration with the computer generates and reveals possibilities and visual experiences, as well as speaking to initial expectations. The process of exploration becomes a vehicle for seeing which is influenced by the technology. Technology influences perception and thinking; while at the same time concepts, ideas, and feelings influence the use of technology. Random happenings in the process of making art are also critical to the creative process, enhancing freedom of choice. In turn, however, choice can be tyrannical, if it is not embedded in constraints, which may originate from the individual, group, and society.

Digital fine art manifests a diversity of practice. Merleau-Ponty (1964 c) emphasises that an artist's style is not something developed consciously in order to depict the world, but is an "exigency that has issued from perception" p 49. This view, and research reported in this chapter, supports an emphasis on diverse experience and training in the life of artists, coupled with an ability to retain an open perspective while at the same time recognising the importance of operating within certain parameters, even if these change over time. The research shows the important interplay between freedom and constraint in the creative process. The research also shows the value to creativity of the cross-fertilisation between disciplines, which is now recognised and supported by some funding agencies.

Dissemination of research is also crucial, and rightly a concern of funding agencies. Dissemination can be through many different ways. Traditional means are valuable. New technology, such as Web 2, is also continually opening up new opportunities, and creating new communities of participation and interaction, which in turn, influence the nature of the endeavours, and the understandings and appreciations in which we come to rest, however provisionally.

New endeavours are always possible. For example, in the posthumous publication *The Visible and the Invisible* edited by C. LeFort (1968) Merleau-Ponty viewed his theories as incomplete, and indicated that one of the areas destined for review was the study of the imaginary "which is not simply the production of mental images, but the baroque proliferation of generating axes for visibility in the duplicity of the real" p. lii

Research into creativity has a long tradition in psychology (e.g. Getzels and Csikszentmihalyi, 1965; Csikszentmihalyi, 1988; Franklin, 2001). It is a core concern for a positive focus on human behaviour and endeavour. Models of consciousness, as proposed by Merleau-Ponty, emphasising the complex and subtle interplay between mind, body, and the physical, social and technological environment; supported by the paradigm shift to theories of quantum computing in the brain (Hameroff and Penrose 1996; Woollf and Hammeroff 2001), provide exciting challenges for positive psychologists, not least in the concepts and methods used in research.

References

- Abuhamdeh, S., and Csikszentmihalyi, M. (2002) The artistic personality: a systems perspective, in R.J. Sternberg, E.L. Grigorenco, & J.L. Singer (eds) *Creativity: from potential to realization* Washington, D.C. American Psychological Association.
- Clarke, S.E., and Haworth, J.T. (1994) 'Flow' experiences in the daily life of sixth form college students. *British Journal of Psychology*, 85, 511-523.
- Csikszentmihalyi, M. (1988) Society, Culture and Person: a systems view of creativity, in R.J. Sternberg (ed) *The nature of creativity: contemporary psychological perspectives*. Cambridge: Cambridge University Press.
- Delle Fave, A. (2007) Theoretical Foundations of ESM. In J.M.Hektner., J.A. Schimdt., and M. Csikszentmihalyi. *Experience Sampling Method: measuring the quality of everyday life*. London: Sage.
- Franklin, M.B. (2001) The Artist Speaks: Sigmund Koch on Aesthetics and Creative Works. *American Psychologist* 56, 5, 445-452
- Getzels, J.W., and Csikszentmihalyi, M. (1965) *Creative thinking in art students: The process of discovery*. HEW Cooperative Research Report S-080. Chicago: University of Chicago.
- Gray, J. (2004) *Consciousness: creeping up on the hard problem*. Oxford: OUP
- Harvey, P. (ed) (1997) Technology as Skilled Practice. *Social Analysis*. 41, 1 Special Issue.
- Hameroff, S.R and Penrose, R. (1996) Orchestrated Reduction of Quantum Coherence in Brain Microtubules: A Model for Consciousness. In: S.R.Hameroff.,

A.W.Kasniak.,and A.C.Scott (eds) *Towards a Science of Consciousness- The First Tucson Discussions and Debates*. Cambridge, MA: MIT Press 507-540

Haworth, J.T. (1990) The Embodiment Theory of Pre-reflexive Thought and Creativity. In: K.J. Gilhooly, M.T.G. Keane, R.H. Logie and G. Erdos, (eds) *Lines of Thinking* Vol 2 Chichester, UK: John Wiley

Haworth, J.T., and Evans, S. (1995) Challenge, skill and positive subjective states in the daily life of YTS students. *Journal of Occupational and Organisational Psychology*. 68, 109-121.

Haworth, J.T., Jarman, M., and Lee, S. (1997) Positive subjective states in the daily life of a sample of working women. *Journal of Applied Social Psychology*, 27, 4, 345-370.

Haworth, J.T. (1997) Beyond Reason: Pre-reflexive Thought and Creativity in Art *Leonardo* 30, 2, 137-145

Haworth, J.T. and Veal, A.J.(eds) (2004) *Work and Leisure*. London: Routledge.

Haworth, J.T. & Hart, G. (eds) (2007) *Well-Being: Individual, Community and Social Perspectives*. Basingstoke UK: Palgrave Macmillan.

Haworth,J.T., Gollifer, S., Faure-Walker, J., Coldwell, P., Kemp, T., and Pengelly, J. (2005) Freedom and Constraint in the Creative Process in Digital Fine Art: an AHRB Invited Workshop. Creativity & Cognition 2005. Conference Proceedings, Goldsmiths University, London, UK, pp 310-317. NY:The Association for Computing Machinery ISBN: 59593-025-6

Haworth, J.T. (2006) *Creativity, Technology and Embodied Mind*: proceedings of a workshop on 'Freedom and Constraint in the Creative Process in Digital Fine Art'. Manchester: Research Institute for Health and Social Change, Manchester Metropolitan University, UK. CD ISBN 1-905476-04-03

Howes, D (ed) (2005) *Empire of the Senses*. Oxford: Berg

Johnson-Laird, P.N (1988) Freedom and constraint in creativity, in R.J. Sternberg (ed) *The nature of creativity: contemporary psychological perspectives*. Cambridge: Cambridge University Press.

Jonquet, F. (2004) *Gilbert and George: intimate conversations with Francois Jonquet* London: Phaidon.

Lakoff, G and Johnson, M.(1999) *Philosophy in the flesh: the embodied mind and its challenge to western thought*. NY, Basic books.

LeFort, C. (ed) (1968) *The visible and the invisible*, Evanston: North Western University Press.

Merleau-Ponty, M. (1962) *Phenomenology of Perception*. London: Routledge and Kegan Paul.

Merleau-Ponty, M. (1964 a) The primacy of perception, in J..M. Eddie. (ed.) *The primacy of perception*, Evanston: North Western University Press,

Merleau-Ponty, M. (1964 b) Eye and mind in J.M.Eddie, ed, *The primacy of perception* Evanston ILL. North Western Univ. Press.

Merleau-Ponty, M.(1964 c) Indirect Language and the Voices of Silence' in J.Wild, ed *Signs*. Evanston, IL, North Western University Press.

Merleau-Ponty, M. (1964 d) *Sense and nonsense* Evanston ILL. North Western Univ. Press.

Paul, C. *Digital Art* London: Thames and Hudson.2004

Pink, S. (2006) *Doing Visual Ethnography: Images, Media and Representation in Research*. 2nd edition. London: Sage

RIHSC (2007) *Health and Social Change: Challenges and Controversy*. Conference Proceedings. Manchester: Research Institute for Health and Social Change, Manchester Metropolitan University. ISBN 9781-1-900139-22-9

Rose, G. (2007) *Visual Methodologies: An Introduction to the Interpretation of Visual Materials*. 2nd edition. London: Sage.

Varela, F.J; Thompson, E. & Rosch, E. (1991) *The embodied mind: cognitive science and human experience*. Cambridge.MA: MIT Press.

Varela, F.J & Shear, J. eds (1999) *The view from within: first-person approaches to the study of consciousness*. Thorverton, UK: Imprint Academic.

Woolf, N., AND Hameroff, S.R. (2001) A Quantum Approach to Visual Consciousness. *Trends in Cognitive Sciences* 5(11):427-478

Q3 How **interesting** did you find the activity

1 2 3

low interest moderate interest high interest

Q4 How **challenging** did you find the activity

1 2 3

low challenge moderate challenge high challenge

Q5 Were your **skills**

1 Less than required by the challenge

2 Equal to the challenge

3 More than required by the challenge

Q6 How **visually interesting** did you find the scene

1 2 3

low interest moderate interest high interest

Q7 How **happy** were you feeling at the time

1 2 3

low happiness moderate happiness high happiness

Q8 Any other **brief comments**

Design of the Answer post card

A separate card is filled in for each day. The Project, day, date, and day number, is specified at the top of each card (portrait orientation). A space is left for a written answer to questions 1 and 8. The number selected for the answer to the other questions is written next to the question number on this card. The signal number is highlighted (in green in my study) Examples of answers are given for signal 1.

AHRC PROJECT Monday 23 Oct 06 Day 1

Signal 1 Q1 Booting up computer

Q2 1 Q3 1 Q4 1 Q5 3 Q6 1 Q7 2

Q8 Weather brightening up

Signal 2 Q1

Q2 Q3 Q4 Q5 Q6 Q7

Q8

Signal 3 Q1

Q2 Q3 Q4 Q5 Q6 Q7

Q8

Signal 4 Q1

Q2 Q3 Q4 Q5 Q6 Q7

Q8

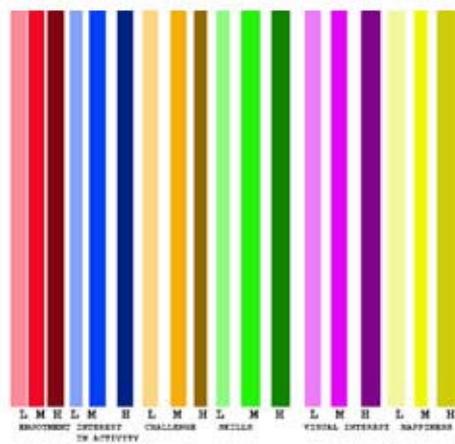
The above is repeated for all 8 signals. This can fit on a post card. The phone, question and answer card, and pen are carried with one for the whole time period for each day of the study. In some instances the phone may have to be switched off, e.g. during the period of attendance at a theatre production. If a signal occurred during that period, it is considered missed, though in some cases a picture can be taken after the event.



Figure 1



FIGURE 3 Media and signals 1-3 Day 1



COLOUR
CODING

Author Note

John Haworth is a Research Fellow (part time), in the Department of Psychology and Social Change, and the Research Institute for Health and Social Change; and an Honorary Research Fellow, Department of Fine Art, Manchester Metropolitan University, UK.

This chapter draws on grants awarded to the author by the Arts and Humanities Research Board (now Council) in the UK

John Haworth has a PhD in psychology and a Masters degree in fine art (printmaking). His fine art prints have been exhibited nationally and internationally. He has been a gallery artist for many years exhibiting prints made by traditional methods. His more recent work also involves the use of digital media. Prints have been selected in 2001, 2003 and 2004 for the Art and Technology International Digital Print Award Exhibitions, which are aimed at highlighting the best work in the area of creative digital media. Since July 2000 he has had several solo exhibitions of digital art in Manchester, curated by Comme Ca Art Ltd. Examples can be seen at www.commeart.com and also in the gallery at www.creativity-embodiedmind.com

Correspondence concerning this chapter should be addressed to John Haworth, Department of Psychology and Social Change, Elizabeth Gaskell Campus, Hathersage Rd, Manchester UK M13 0JA