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VOL 18 NO 3 VOLUME EDITORS **LANFRANCO ACETI, JANIS JEFFERIES, IRINI PAPADIMITRIOU** / EDITORS **JONATHAN MUNRO** AND **ÖZDEN ŞAHİN**

Touch and Go is published in collaboration with Watermans and Goldsmiths College in occasion of the Watermans' International Festival of Digital Art, 2012, which coincides with the Olympics and Paralympics in London. The issue explores the impact of technology in art as well as the meaning, possibilities and issues around human interaction and engagement. *Touch and Go* investigates interactivity and participation, as well as light art and new media approaches to the public space as tools that foster engagement and shared forms of participation.

TOUCH AND *GO*

LEA PUBLISHING & SUBSCRIPTION INFORMATION

Watermans International Festival of Digital Art, 2012

Touch and Go **is a title that I chose together with Irini Papadimitriou for this LEA special issue.** On my part with this title I wanted to stress several aspects that characterize that branch of contemporary art in love with interaction, be it delivered by allowing the audience to touch the art object or by becoming part of a complex electronic sensory experience in which the artwork may somehow respond and touch back in return.

With the above statement, I wanted to deliberately avoid the terminology 'interactive art' in order to not fall in the trap of characterizing art that has an element of interaction as principally defined by the word interactive; as if this were the only way to describe contemporary art that elicits interactions and responses between the artist, the audience and the art objects.

I remember when I was at Central Saint Martins writing a paper on the sub-distinctions within contemporary media arts and tracing the debates that distinguished between electronic art, robotic art, new media art, digital art, computer art, computer based art, internet art, web art... At some point of that analysis and argument I realized that the common thread that characterized all of these sub-genres of aesthetic representations was the word art and it did not matter (at least not that much in my opinion) if the manifestation was material or immaterial, conceptual or physical, electronic or painterly, analogue or digital.

I increasingly felt that this rejection of the technical component would be necessary in order for the elec-tronic-robotic-new-media-digital-computer-based-internet art object to re-gain entry within the field of fine art. Mine was a reaction to an hyper-fragmented

and indeed extensive and in-depth taxonomy that seemed to have as its main effect that of pushing these experimental and innovative art forms – through the emphasis of their technological characterization – away from the fine arts and into a ghetto of isolation and self-reference. Steve Dietz's question – *Why Have There Been No Great Net Artists?* [1] – remains unan-swered, but I believe that there are changes that are happening – albeit slowly – that will see the sensorial and technical elements become important parts of the aesthetic aspects of the art object as much as the brush technique of Vincent Willem van Gogh or the sculptural fluidity of Henry Moore.

Hence the substitution in the title of this special issue of the word interactivity with the word touch, with the desire of looking at the artwork as something that can be touched in material and immaterial ways, interfered with, interacted with and 'touched and reprocessed' with the help of media tools but that can also 'touch' us back in return, both individually and collectively. I also wanted to stress the fast interrelation between the art object and the consumer in a commodified relationship that is based on immediate engagement and fast disengagement, touch and go. But a fast food approach is perhaps incorrect if we consider as part of the interactivity equation the viewers' mediated pro-cesses of consumption and memorization of both the image and the public experience.

Nevertheless, the problems and issues that interactiv-ity and its multiple definitions and interpretations in the 20th and 21st century raise cannot be overlooked, as much as cannot be dismissed the complex set of emotive and digital interactions that can be set in mo-tion by artworks that reach and engage large groups of people within the public space. These interactions

generate public shows in which the space of the city becomes the background to an experiential event that is characterized by impermanence and memorization. It is a process in which thousands of people engage, capture data, memorize and at times memorialize the event and re-process, mash-up, re-disseminate and re-contextualize the images within multiple media contexts.

The possibility of capturing, viewing and understand-ing the entire mass of data produced by these aes-thetic sensory experiences becomes an impossible task due to easy access to an unprecedented amount of media and an unprecedented multiplication of data, as Lev Manovich argues. [2]

In *Digital Baroque: New Media Art and Cinematic Folds* Timothy Murray writes that "the retrospective nature of repetition and digital coding—how initial im-ages, forms, and narratives are refigured through their contemplative re-citation and re-presentation—con-sistently inscribes the new media in the memory and memorization of its antecedents, cinema and video." [3]

The difference between memorization and memori-alization may be one of the further aspects in which the interaction evolves – beyond the artwork but still linked to it. The memory of the event with its happen-ing and performative elements, its traces and records both official and unofficial, the re-processing and mash-ups; all of these elements become part of and contribute to a collective narrative and pattern of en-gagement and interaction.

These are issues and problems that the artists and writers of this LEA special issue have analyzed from a variety of perspectives and backgrounds, offering to the reader the opportunity of a glimpse into the com-plexity of today's art interactions within the contem-porary social and cultural media landscapes.

Touch and Go is one of those issues that are truly born from a collaborative effort and in which all edi-tors have contributed and worked hard in order to

deliver a documentation of contemporary art research, thought and aesthetic able to stand on the interna-tional scene.

For this reason I wish to thank Prof. Janis Jefferies and Irini Papadimitriou together with Jonathan Munro and Özden Şahin for their efforts. The design is by Deniz Cem Önduygu who as LEA's Art Director contin-ues to deliver brilliantly designed issues.

Lanfranco Aceti
Editor in Chief, Leonardo Electronic Almanac
Director, Kasa Gallery

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1. "Nevertheless, there is this constant apparently inherent need to try and categorize and classify. In Beyond Inter-face, an exhibition I organized in 1998, I 'datamined' ten categories: net.art, storytelling, socio-cultural, biographical, tools, performance, analog-hybrid, interactive art, interfac-ers + artificers. David Ross, in his lecture here at the CAD-RE Laboratory for New Media, suggested 21 characteris-tics of net art. Stephen Wilson, a pioneering practitioner, has a virtual – albeit well-ordered – jungle of categories. Rhizome has developed a list of dozens of keyword categories for its ArtBase. Lev Manovich, in his Computing Culture: Defining New Media Genres symposium focused on the categories of database, interface, spatialization, and navigation. To my mind, there is no question that such categorization is useful, especially in a distributed system like the Internet. But, in truth, to paraphrase Barnett New-man, "ornithology is for the birds what categorization is for the artist." Perhaps especially at a time of rapid change and explosive growth of the underlying infrastructure and toolsets, it is critical that description follow practice and not vice versa." Steve Dietz, *Why Have There Been No Great Net Artists? Web Walker Daily* 28, April 4, 2000, http://bit.ly/QjEWlY (accessed July 1, 2012).

2. This link to a Google+ conversation is an example of this argument on massive data and multiple media engage-ments across diverse platforms: http://bit.ly/pGgDsS (accessed July 1, 2012).

3. Timothy Murray, *Digital Baroque: New Media Art and Cinematic Folds* (Minneapolis: University of Minnesota Press, 2008), 138.

Touch and Go: The Magic Touch Of Contemporary Art

It is with some excitement that I write this preface to Watermans International Festival of Digital Art, 2012. It has been a monumental achievement by the curator Irini Papadimitriou to pull together 6 ground-breaking installations exploring interactivity, viewer participation, collaboration and the use or importance of new and emerging technologies in Media and Digital Art.

From an initial call in December 2010 over 500 submissions arrived in our inboxes in March 2011. It was rather an overwhelming and daunting task to review, look and encounter a diverse range of submissions that were additionally asked to reflect on the London 2012 Olympic and Paralympic Games. Submissions came from all over the world, from Africa and Korea, Austria and Australia, China and the UK, Latvia and Canada and ranged from the spectacularly complicated to the imaginatively humorous. Of course each selector, me, onedotzero, London's leading digital media innovation organization, the curatorial team at Athens Video Art Festival and Irini herself, had particular favorites and attachments but the final grouping I believe does reflect a sense of the challenges and opportunities that such an open competition offers. It is though a significant move on behalf of the curator that each work is given the Watermans space for 6 weeks which enables people to take part in the cultural activities surrounding each installation, fulfilling, promoting and incorporating the Cultural Olympiad themes and values 'inspiration, participation and creativity.'

Some, like Gail Pearce's *Going with the Flow* was made because rowing at the 2012 Olympics will be held near Egham and it was an opportunity to respond and create an installation offering the public a more interactive way of rowing, while remaining on dry land, not only watching but also participating and having an effect on the images by their actions. On the other hand, Michele Barker and Anna Munster's collaborative *Hocus Pocus* will be a 3-screen interactive artwork that uses illusionistic and performative aspects of magical tricks to explore human perception, senses and movement. As they have suggested, "Magic – like interactivity – relies on shifting the perceptual relations between vision and movement, focusing and diverting attention at key moments. Participants will become aware of this relation as their perception catches up with the audiovisual illusion(s)" (artists statement, February 2011). Ugochukwu-Smooth Nzewi and Emeka Ogboh are artists who also work collaboratively and working under name of One-Room Shack. *UNITY* is built like a navigable labyrinth to reflect the idea of unity in diversity that the Games signify. In an increasingly globalized world they are interested in the ways in which the discourse of globalization opens up and closes off discursive space whereas Suguru Goto is a musician who creates real spaces that are both metaphysical and spiritual. *Cymatics* is a kinetic sculpture and sound installation. Wave patterns are created on liquid as a result of sound vibrations generated by visitors. Another sound work is Phoebe Hui's *Granular Graph,* **a** sound instrument about musical gesture and its notation.

Audiences are invited to become a living pendulum. The apparatus itself can create geometric images to represent harmonies and intervals in musical scales. Finally, Joseph Farbrook's *Strata-caster* explores the topography of power, prestige, and position through an art installation, which exists in the virtual world of Second Life, a place populated by over 50,000 people at any given moment.

Goldsmiths, as the leading academic partner, has been working closely with Watermans in developing a series of seminars and events to coincide with the 2012 Festival. I am the artistic director of Goldsmiths Digital Studios (GDS), which is dedicated to multi-disciplinary research and practice across arts, technologies and cultural studies. GDS engages in a number of research projects and provides its own postgraduate teaching through the PhD in Arts and Computational Technology, the MFA in Computational Studio Arts and the MA in Computational Art. Irini is also an alumni of the MFA in *Curating* (Goldsmiths, University of London) and it has been an exceptional pleasure working with her generating ideas and platforms that can form an artistic legacy long after the Games and the Festival have ended. The catalogue and detailed blogging/documentation and social networking will be one of our responsibilities but another of mine is to is to ensure that the next generation of practitioners test the conventions of the white cube gallery, reconsider and revaluate artistic productions, their information structure and significance; engage in the museum sector whilst at the same time challenging the spaces for the reception of 'public' art. In addition those who wish to increase an audience's interaction and enjoyment of their work have a firm grounding in artistic practice and computing skills.

Consequently, I am particularly excited that the 2012 Festival Watermans will introduce a mentoring scheme for students interested in participatory interactive digital / new media work. The mentoring scheme involves video interviews with the 6 selected artists and their work, briefly introduced earlier in this preface, and discussions initiated by the student. As so often debated in our seminars at Goldsmiths and

elsewhere, what are the expectations of the audience, the viewer, the spectator, and the engager? How do exhibitions and festival celebrations revisit the traditional roles of performer/artist and audiences? Can they facilitate collaborative approaches to creativity? How do sound works get curated in exhibitions that include interactive objects, physical performances and screens? What are the issues around technical support? How are the ways of working online and off, including collaboration and social networking, affecting physical forms of display and publishing?

As I write this in Wollongong during the wettest New South Wales summer for 50 years, I want to end with a quote used by the Australia, Sydney based conjurers Michele Barker and Anna Munster

> *Illusions occur when the physical reality does not match the perception.* [1]

The world is upside down in so many alarming ways but perhaps 2012 at Watermans will offer some momentary ideas of unity in diversity that the Games signify and *UNITY* proposes. Such anticipation and such promise!

Janis Jefferies
Professor of Visual Arts
Goldsmiths
University of London, UK

23rd Dec 2011, University of Wollongong, NSW, Australia

1. Stephen L. Malnik and Susana Martinez-Conde, *Sleights of Mind: What the Neuroscience of Magic Reveals about our Everyday Deceptions* (New York: Henry Holt and Company, 2010), 8.

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CO-AUTHORED NARRATIVE EXPERIENCE

Affective, embodied interaction through combining the diachronic with the synchronistic

by

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A B S T R A C T

Examination of perception tends to look at senses in isolation, but Neuroaesthetics and Gestalt design principles treat perception as an embodied synaesthetic experience. The Diasynchronoscope *project takes time-based techniques from animation and converts them to spatiality, animating static objects through projected light and creating transient visual cues that, when combined with sound, demand selective attention. The work challenges the use of passive nouns to describe participants such as 'user' or 'audience' or 'viewer' and instead asks participants to recognise their true position to be that of 'exegete,' reading and interpreting the gaps in space and time. Their interaction with the work provides narrative meaning transcending the static and hidden, to create a Gestalt systemic whole, making each participant a truly immersed co-creator. Using audience analysis, the paper evaluates the work against more traditional media such as screen-based visuals and makes the case for further research into somatic perception of dynamics.*

1 INTRODUCTION

By removing the mediation of a screen, and suppressing image recognition factors to create a narrative based primarily on movement, the *Diasynchronoscope* is designed to test the hypothesis that change is a key signifier in perception [1] and that all change can only be perceived through attention. In visual terms, this last has been demonstrated in a number of reproducible psychological tests such as studies in "change blindness." [2]

The creators of the project are from audio visual industry backgrounds, and felt that ideas on continuity of perception and how to 'direct' the eye had not moved on greatly from psychologist Richard Gregory's observation that perceptions can be seen as predictive hypotheses. [3] Indeed the powerful influence of the 'just seen/heard/perceived' is an essential tool for all screen media. Marchant et al of Leeds University, UK, showed through a three-year eye-tracking experiment in attention mapping of audiences watching scenes from Hitchcock's *Vertigo* [4] that attention *can* be directed about a screen with a surprising commonality. [5] This commonality of viewing could be attributable to a number of factors (perhaps not least to Hitchcock's skill in directing an audience's attention and that *Vertigo* is generally regarded as the best film made by a virtuoso film director), but also appears to be physiologically attributable to the way our visual cortex divides and processes four separate parallel pathways of perception: form, color, movement and depth. This paper looks at the first phase of the *Diasynchronoscope* project where experimental media designed by the authors to explore notions of directed attention in an audience unmediated by screen, and with suppressed cultural and contextual content, is documented. It is the intention that this first phase should be scaled up to a larger space and to incorporate longer narrative elements, where some current restraints such as audience number and restricted viewpoints will be removed.

1.1 What is a Diasynchronoscope?

The name *Diasynchronoscope* comes from combining Diachronic, (the study of a phenomenon as it changes through time) with synchronous and scope (view). In being so named, it evokes the early animation simulators such as the *phenakistoscope* and the *zoetrope* which we regarded as direct ancestors of the piece acting both as art object and experimental media.

Used in a performance environment, the *Diasynchronoscope* is a real architectural space where prepared 3D objects are arranged in a way that they change incrementally in shape and/or position (Fig.1). Although nothing in the room actually moves, the objects are revealed through serial illumination in a dark room, sequenced using the technique of projection mapping. This technique enables creation of a dramatization over time, encouraging the common perceptual shortcuts of a participant to create sequences and a narrative from static abstract objects.

Fig. 1. A range of objects in the Diasynchronoscope.

The closest practical examples for the *Diasynchronoscope* are the 3D zoetropes created by Pixar and studio Ghibli. Here a rotating turntable is lit by strobe lighting to give the illusion of 3D characters as real objects performing in loops in a real space. Because the illusion relies on a turntable, there is no narrative just looped action. Nonetheless, the 3D zoetropes are objects that create great wonder in modern spectators.

It appears that medium does impact significantly on the qualia of experiencing movement and that there is something special about seeing 3D unmediated by screen or camera. [6] Because the *Diasynchronoscope* uses masks to create specifically applied, sequenced projected illumination, a narrative is possible, as is synchronization of the effect with audio. In this first phase we showed a restricted chunk of narrative to an audience of ten participants from various backgrounds and ages and recorded their perceptual responses.

1.2 Physiology versus personal schemas

Although today's audiences may not share the same geographical or cultural space, they do share the same cognitive neural architecture and perceptual shortcuts. The interesting question is if they would create the same narrative from abstract movement in an embodied experience. [7] This introduces two main, at first sight competing, areas for investigation: physiological, universal shared cognition; and individual responses drawn from personal schemas of movement.

The four separate parallel pathways of perception in our visual cortex transmit signals devoted to form, color, movement and depth. Of these four the least explored appears to be movement, perhaps because it is so hard to separate from other attributable contexts. The first experiments in phi phenomenon were made by Gestalt founder Max Wertheimer in 1912, where he observed that rows of flashing lights created the illusion of motion even when there was none. [8] The discoveries of Wertheimer are credited with launching a perceptual revolution giving designers the Gestalt laws of similarity, *pragnanz,* proximity, continuity and closure. Although as Filip Pizlo of Purdue University points out, the literature on the phi phenomena or 'pure' movement and Beta movement, or 'apparent' movement is very confused indeed, [9] both require attention in order for cognition to take place. Further, although Beta movement has been divided into short-

range and long-range apparent motion the definitions of what these terms actually constitute when translated to cognitive perception is still opaque in most literature with, as Joseph and Barbara Anderson remark in their seminal paper *The Myth of Persistence of Vision Revisited,* little consensus on the perceptual differences between Phi and Beta. [10] The *Diasynchronoscope* explores the two physiological functions (Phi and Beta) in a new way, by including synchronization with audio and embodied phenomenological observation. The experiment exploits Gestalt laws and human cognition shortcuts to achieve an illusion of movement through selected attention.

Put simply, a personal schema is what makes us all respond differently, eg. One man's famine is another's feast. Each person's upbringing and experience means we cannot help but bring our 'personal baggage' along with us when we encounter any phenomena. Personal schemas are shaped by 'relevance,' [11] and relevance can be defined in terms of a cost-benefit analysis weighting effort against effect. The more information processing effort it would take to bear x in mind in the context of y, the more costly it would be, giving an equation of High cost = Low relevance. It is not that we pre-compute just what effort and effect would be involved in considering this or that connection/belief before picking the most economical one, but that we have evolved unconscious psychological mechanisms that have much the same result. [12] Salience is what makes us apply attention to a stimulus, and salience can be either personal, or an evolutionary imperative. For any set of sensory data, there are generally multiple interpretations possible, but we need to rapidly come to a perceptual conclusion if we are to spot an aggressor or potential food source: Better to duck a fleeting shadow than be hit by a rock. If a common narrative were to be interpreted from an abstract movement it would indicate salience taking precedence over personal schema, but this could only

be tested in an embodied way. By combining Gestalt principles with media theory and cognitive neuropsychology we have developed a new form of kinetic perception, with novel implementations of sequenced images in time unmediated by the camera or screen. It is the first step in a new way of looking at attention in perception, communication and action that poses the question: Does the unconscious perception of movement provoke a stronger emotional response than image recognition, particularly if synchronized with sound?

2. METHODOLOGY

Because the *Diasynchronoscope* used projected light, it was essential that the sculpture took place in a blacked out space. The creators achieved this by erecting a 2200 sq mm gazebo indoors and covering the frame with heavy black velvet. After some experimentation it was decided that the optimum material for creating the objects was white medium density polystyrene cut to shape. The polystyrene had to be painted black so that it would not be visible to the viewer in the blacked-out space. The lit result was pleasingly hard to register as material, imbuing the finished artifact with a level of ambiguity.

As no object can really be construed and labeled as 'abstract,' an early challenge was to design objects that deliberately emphasized movement and were less likely to be culturally loaded than recognizable. This led to considerable debate about the character/object. We finally settled on a basic 'hero' object/block measuring 60 × 100 × 30 mm. Aside from practical considerations, we were very clear that we did not want anything that resembled either a ball or a 3D pixel, i.e. cube. As when we developed the movement in virtual 3D, we decided we want a to include a level of animated squash and stretch.
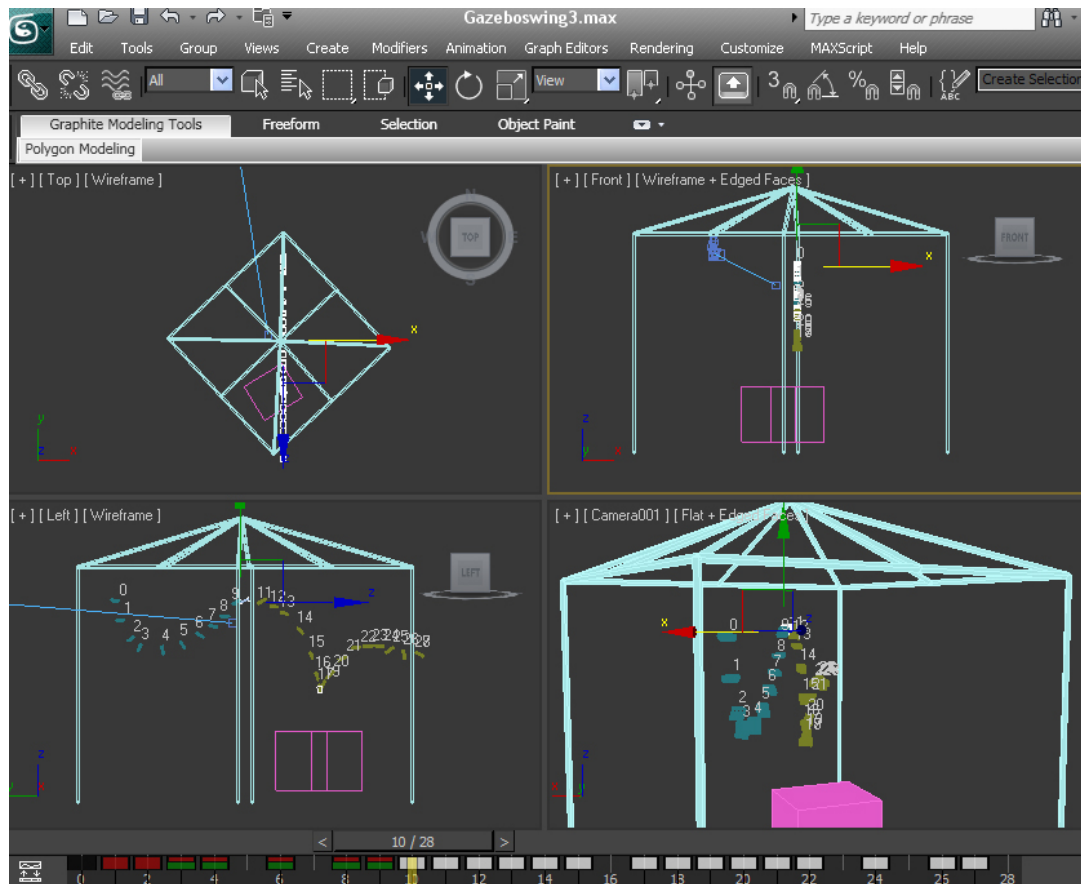
Fig. 2. 3DS Max mock-up.

3D effect, but this was not possible for every block.
If we could have accommodated two projectors, we
could have used one as a 'key' light and the other to
act as a 'fill' light. When we were happy with the block
positions, we mapped the light projection using a
sequence of mattes animated in *Adobe* After FX. This
had to be done with much precision as each pixel be-
came crucial; too few and the definition of the object

Fig. 3. Viewer's perspective in virtual 3D.

Because the artwork required the dimension of time
to be translated into spatial dimensions, the work
could not have been made without using 3D visu-
alization. (Fig. 2) In fact, all animation requires the
animator to translate the dimension of time to that
of space but this phenomenon is rarely made visible
to the consumer, who only receives the data when it
is translated back into time. Animators automatically
switch between time/space when animating, always
aware of how, for instance, higher speeds translate to
greater gaps between objects in space. Because the
objects were solid and the movement was so rapid, it
would have been very difficult to have accomplished a
reasonable animation without testing and adjusting it
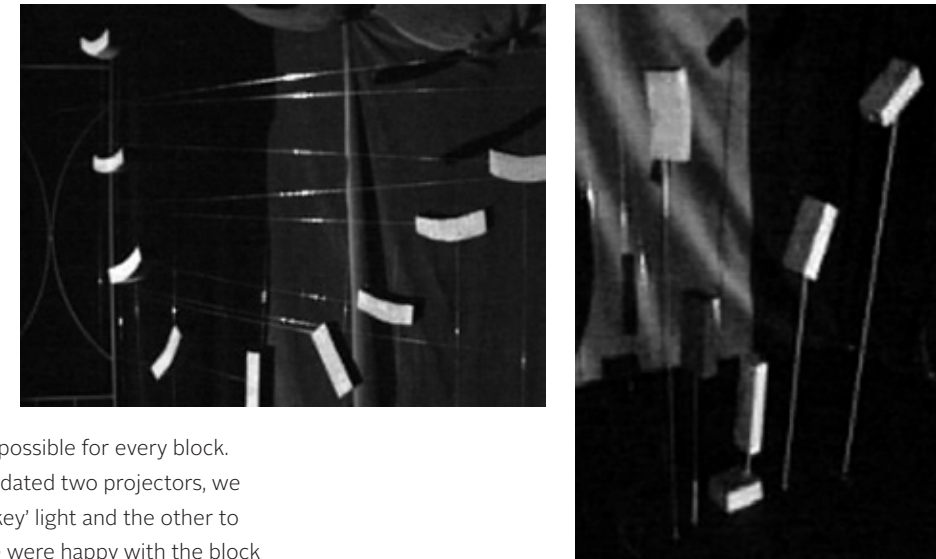in 3D first.

The creators first worked out the sequence in *Au-
todesk's* 3DS Max at 12 frames per second (fps). The
normal rate of film in the UK is 25 fps, but there is
a long tradition in model animation and claymation
of animating on 12 fps and holding each frame for 2

frames to make up a second's worth of animation.
This is clearly less labor intensive and we trusted it not
to look too jerky if the animation held an optimum
path. We also could not 'overlap' action frames, so
we knew that the animation would have to consist
of fast movement and that we could not stay on one
plane but wanted to explore all axes of the 3D space.
Because of space restrictions, the animation was kept
very simple and short using just 23 objects that trans-
lated into exactly two seconds of animation (objects
10 and 17 were held for 3 frames). (Fig. 3)

The virtual objects were recreated in polystyrene and
hung in place using fishing line. This was fiddly and
required each block to be tethered to the top, bottom
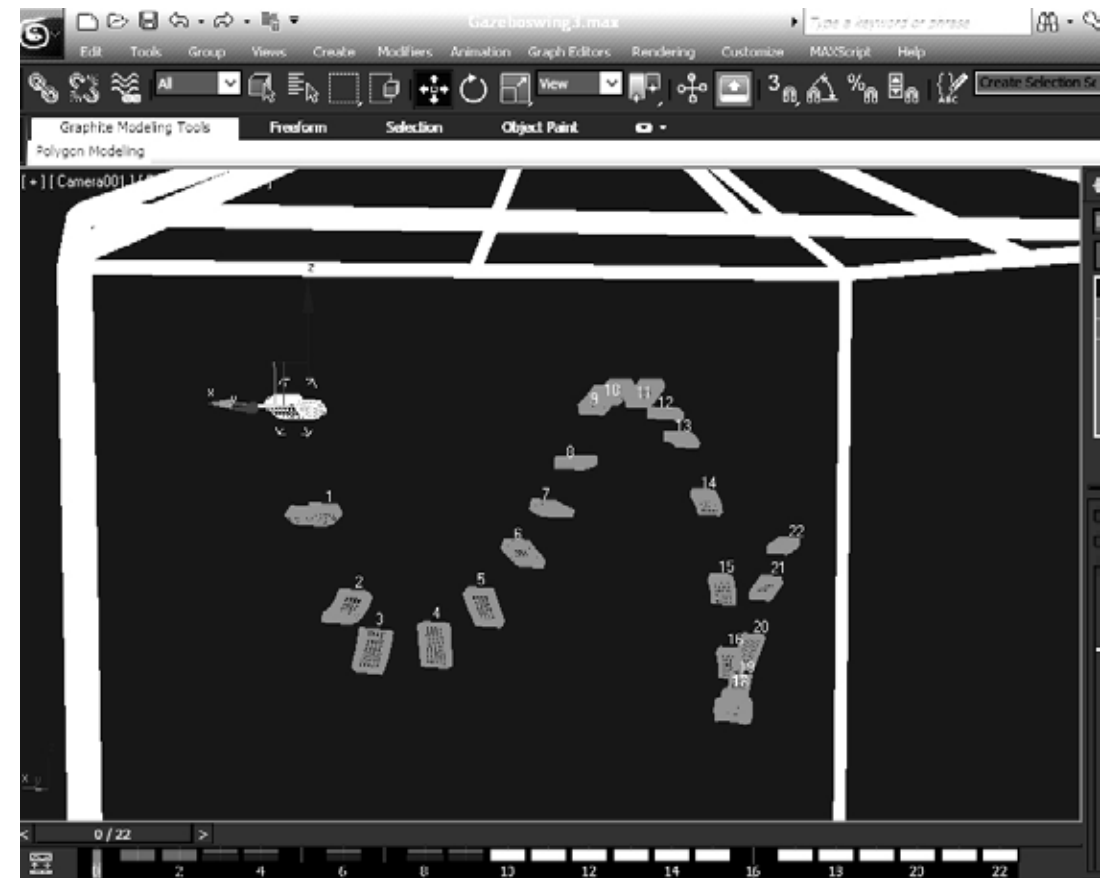and side of the gazebo to achieve stability. (Fig. 4)

It was necessary to avoid hanging the 3 dimensional
objects perpendicular to the projection as only one
side would be illuminated. The optimal positioning
was where 3 sides are illuminated, emphasizing the

was lost, too many and the light spilled off the object and bled onto the black backcloth dividing attention.

Sound effects were added to the movement and relayed via stereo speakers. The sound was designed to draw attention and synchronize but not to provide a solid identification for the objects as objects or characters.

The restrictive space meant we could only accommodate one viewer at a time, and that viewer was placed on a particular spot so that they might best view the work's 3D form. Each viewer was each shown the sequence three times, interviewed, and then asked to turn around so they might experience the whole art object at once. (Fig. 5)

For this first phase of the project, the participants were drawn via open invitation to friends and colleagues. The participants (whose ages ranged from 25–81) were: Juliet – a Jazz singer (and tennis player), Janet – a tennis player, Ruth – a retired doctor, Clem – a graphic designer, Peter – a web designer, Rob T – an actor and writer, Rob M – a film director, Livia – a music therapy teacher, Joseph – a painter (and tennis player), Lucie – a lecturer in digital media. Individual responses to the artwork were recorded on film at the time of viewing, then the participants were asked some deliberately open questions such as: 'What are your first impressions?' and 'What was going on?' This was followed by a filmed plenary discussion.
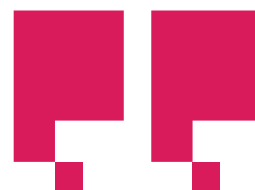
3. FINDINGS

Generally the findings of audience response could be divided into three areas: response to the animation, response to the holistic artwork, and influence of personal schema. This last proved particularly interesting as it yielded the strongest sense of co-authored narrative, and was most satisfying for both artists and participant. It also shed interesting indications on the way personal schemas or memories are laid down, offering a rich seam for further research.

3.1 Response to the animation
The two second animation was played three times. http://vimeo.com/32451411 Participant responses were recorded as they watched the animation and they were then asked a number of questions. The animation evoked a variety of responses from 'Is that it?' to 'wonderful!' to laughter. All participants read the movement as movement and were content that it felt 'natural.' The majority felt that the action was that of a ball bouncing. The animation had been designed to give the impression of a swing and bounce, with sound that served both character and object, so this was what we expected. Where participants did

Fig. 5. Picture of the whole artwork.

The movement of the objects elicited a number of 'ball' responses from the participants, with Ruth (aged 81) interpreting the movement as being 'just like the Dambusters' film.'

not agree was whether the object was an object or a character, i.e. what it was or whether it was a single object or a multiple one. However this did not seem to cause confusion in most. To some it felt very like a digital animated experience and to others it felt very different and 'real.' This could be attributed to the nature of the embodied experience as some moved their heads more than others and so would have achieved a sense of depth and a level of parallax. The people who moved most were non-digital artists and those who played tennis.

3.2 Response to the holistic artwork
Participant responses to the revealed whole artwork were also recorded (Fig. 5). Responses to this were extremely positive, eliciting comments such as: 'Like a dream,' 'Tactile, I want to touch it,' 'Magical!,' 'Looks larger than life,' 'Fabulous!,' 'Oh yeah!' The unlikelihood of the objects hanging in space without visible support, and the new knowledge of the previous movement made the holistic artwork a satisfying experience for all of the participants. One question we asked everyone while they viewed the holistic artwork was: 'Would you describe what you are seeing as a single object or multiple objects?' Responses were evenly divided with four of the participants choosing it as clearly representing a single entity, and four being equally emphatic that the piece consisted of multiple

objects. Two participants were happy to conclude that it was both multiple and single at the same time without seeming to find this paradoxical.

3.3 Influence of personal schemas
The artwork was a sincere attempt to isolate movement by suppressing the contexts of shape, mass and color. Thus the shape was a block constructed of no immediate contextual dimensions, and of no indicative material. Although the mass had continuity, the size was indeterminate as there was no reference point to gauge size against. The color was suppressed, deliberately neutral in context and consistent. However it became rapidly obvious that all participants imbued the experience with interpretations drawn from their personal schemas; often holding contradictory beliefs at the same time with apparent ease.

Juliet and Livia, both from musical backgrounds were primarily drawn to the audio, using their interpretations of the sound as a springboard for their interpretation of the whole artwork. Peter and Lucie, both working in the digital domain, drew digital interpretations first of all, before expanding their experience to other areas. Joseph, Janet and Juliet who were all regular tennis players interpreted the object clearly as a tennis ball despite the contradictions of it being a) a block and b) having the sound of a scrabbling creature.

The movement of the objects elicited a number of 'ball' responses from the participants, with Ruth (aged 81) interpreting the movement as being 'just like the Dambusters' film.' The synchronous nature of the sound and the 'cartoon' quality of squash and stretch elicited laughter from Rob T and Rob M (both used to performance). The designer Clem was much drawn to the holistic art object rather than the movement. Several of the participants described the object as bringing to mind a 'kitchen sponge.' This could be because of the 'squashy' nature of its mass or be indicative of the prevalence of domestic associations in their lives. Many described the final holistic object as resembling a dinosaur spine, and there seemed to be no problem for four participants to interpret the whole artwork as ball, sponge and dinosaur spine within the same contextual description.

You can watch the non participant observation and semi-structured interview here: http://vimeo. com/35434741

These interpretations proved revealing of how varied personal schemas are in individuals when they approach stimuli and led to a deeper understanding of the real nature of narrative co-authorship. Because of the abstract nature of the artwork, it also shed some interesting light on how memories may be laid down to create our personal schemas. What is highly salient and suggestive to one person may well be of no interest to another, but what triggers saliency when the stimuli is abstract?

4. DISCUSSION

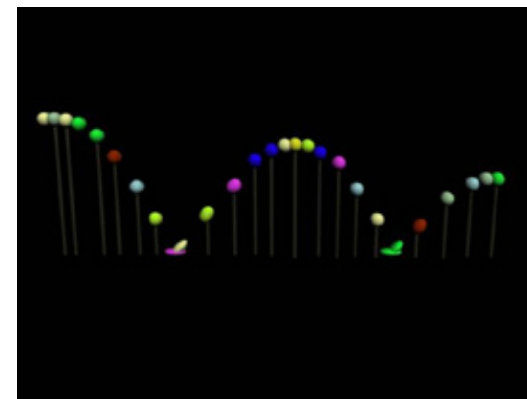### 4.1 Animation: Gestalt, Phi, Beta and apparent motion

The four separate parallel pathways of perception in our visual cortex transmit signals devoted to form, color, movement and depth and the animation was designed to use Gestalt laws of and animation principles (such as arcs, and squash and stretch) to achieve continuity of movement in all of these pathways.

Animators, magicians and film makers all exploit how an audience will endow continuity of perception to objects that displace within corresponding graded constraints of shape, color, motion and mass, particularly if they move in arcs and have verifying synchronous sound.

The Gestalt laws grew from experiments showing that we group visual objects (in space) according to similarity, *pragnanz,* proximity, continuity and closure. It also demonstrated that auditory stimuli are grouped (in time) according to similarity, proximity and closure. A closer look at the Gestalt laws reveals how important they were to underpinning the artwork in all of its forms in time and space:

》 The law of simplicity suggests that similar things tend to appear grouped together, the objects within the artwork were of sufficiently similar nature.
》 The law of *pragnanz* is sometimes referred to as the law of simplicity. This law holds that objects in the environment are seen in a way that makes them appear as simple as possible.
》 The law of proximity holds that things that are near each other seem to be grouped together.
》 The law of continuity holds that points that are connected by straight or curving lines are seen in a way that follows the smoothest path.
》 The law of closure refers to the way our brains often ignore contradictory information and fill in gaps in information to group things together if they seem to complete some entity. We do not find it easy to attribute randomness to stimuli; we cannot help but search for a pattern.

One question that occurred to the writers was: Could dynamics enable or disable a viewer's comprehension and assimilation of data? In an earlier experiment, the creators of the project tested the idea of graded constraints by attributing varied colors to the objects, thus disrupting the law of simplicity. (Fig. 6) It was immediately apparent that even though we were using objects of great similarity, the color changes were too great for their movement to be held as continuous. The objects lost their grouping and became separate, even though they held constant in terms of shape, motion and mass. It would be true to say that any large change in the constraints of each pathway would also break the idea of Gestalt grouping. For instance introducing random sizes would be similarly disruptive.

Fig. 6. Random adjacent color changes across a wide range flouted the Gestalt law of simplicity so that the impression of continuous motion broke down.

This suggests that all four perceptual pathways of form, color, movement and depth are equally important, and raises the idea of further experimentation that incorporates synchronized sound and vision.

The phi movement of Wertheimer has been proved not to be a reasonable explanation for why we interpret film as motion. [13] [14] This leaves only Beta

movement as a possible explanation. Beta movement is apparent movement caused by luminous stationary impulses. Multi-element or closely spaced displays may be mediated by the same mechanisms as real motion, while more widely spaced displays (such as the usual two-flash displays used to demonstrate apparent motion) involve a different type of processing. These two types of processing are termed short-range and long-range apparent motion, respectively. The four perceptual pathways are processed in parallel, but the movement pathway carries data more swiftly to our visual cortex and according to the discoveries of neurologists such as Livingstone and Hubel and Zecki [15] our visual systems employ two different computational strategies for processing closely spaced stimuli and widely spaced stimuli.

This leads to Anderson and Anderson's intriguing conclusion:

"If we viewers process the motion in a motion picture the same way we process motion in the real world, then we must ask how we process motion in the real world. The short answer to this question is that we process movement in active meaning-seeking ways. We rapidly sample the world about us, noting the things that change and the things that do not change. We turn our heads for a better view; we move left or right to gain additional information provided by a different angle. We move closer or farther away. We actively seek more information about things that interest us." [16]

It is for this reason that we regard the *Diasynchronoscope* project as scientifically worthwhile.

4.2 The satisfaction of art

Is the *Diasynchronoscope* project a work of art or a scientific experiment?

Margaret Boden defines creativity as "the ability to come up with ideas or artefacts that are *new, surprising* and *valuable*." [17] This clearly allows for scientific experiment to be both creative and interpretable as Art. Part of the fascination for participants in experiencing the *Diasynchronoscope* was that it was viewed as an embodied experience that allowed for individual opinion and interaction. Because the artwork had different points of access (as a time-based study and as a static art object that held the time-based object inherently within itself), the two forms informed each other. Paradoxically, the holistic artwork could be conceived as though the participant is a camera on a very slow shutter speed, receiving two seconds of data in a single moment. This, coupled with the embodied 3D element, is a new and surprising sensation. The artists would also like to stake modest claim for this sensation being potentially valuable in exploring dynamic cognitive perception.

4.3 Attention, saliency and personal schemas

Change can only be perceived through attention, and attention can intrude on conscious perception because attention is drawn to an unexpected stimulus on an involuntary basis. Thus a person suffering from arachnophobia will spot a spider in a room before anyone else, as their awareness antenna for such a stimulus is always near the surface, and it is most pertinent to them. It is obvious that personal schemas are highly influential in shaping our attention through salience. Salience brings a stimulus to consciousness, and immediately we set about selecting associations from our personal schema to interpret the stimulus. Because the stimulus was abstract and open to interpretation, it seems likely that we store memories dynamically with confirmatory sensory input increasing their likelihood of truth. This is at odds with the frequently used analogy of our minds as indexical filing cabinets; How likely is a static mental model of anything if we can associate so freely, riffing mentally between dinosaur bones, sponges, balls and bombs in consecutive moments? Memories are not stored indexically but

dynamically, i.e. when movement is interpreted in an abstracted manner, we access mindful connotations that are not drawn upon through taxonomy, but athrough metaphor and metonym. Neurologically, we need to access events/objects with a degree of intrinsic abstraction, so we store memories dynamically. Hence art, poetry and metaphor and metonym are simple manifestations of the way our brains work. This tallies with the thesis of Neuroaesthetics, namely that artistic models that echo the psychophysical architecture of the mind are best for depth of communication and qualia of experience. [18] For art and poetry, metaphor and metonym are not found in the concrete, but in the 'gaps between' the concrete, and these gaps are filled by audiences acting as exegetes. Exegetes who, despite being guided by artists and sharing cognitive neural architectures tend to take the same perceptual shortcuts, consulting our personal schemas immediately and unconsciously, and bringing forward contextual associations which have been stored dynamically in our minds.

4. FURTHER RESEARCH

"When principles of design replicate principles of thought, the act of arranging information becomes an act of insight." — Edward R. Tufte [1997] [19]

The first phase of the *Diasynchronoscope* project has yielded results that appear to confirm some theories of cognitive perception such as the design theory of neuroaesthetics and the importance of personal schemas in co- authored narratives. However in some ways it is clear that the project needs to expand if it is to answer other questions raised in this text. Because the work is performative yet entirely replicable despite being unmediated by screen, it offers a new and embodied way of exploring the physiological nuances of Gestalt law and perceptual cognition.

The intention is to use this experimental artwork as a springboard for a more ambitious artwork that removes some of the restrictions of time and space inherent in the piece. ∎

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