View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Queensland University of Technology ePrints Archive

QUT Digital Repository:
http://eprints.qut.edu.au/

Hamilton, Jillian G. (2009) ***Identifying with an avatar : a multidisciplinary perspective.*** In: Proceedings of the Cumulus Conference: 38º South: Hemispheric Shifts Across Learning, Teaching and Research, 12-14 November 2009, Swinburne University of Technology and and RMIT University, Melbourne, Australia.

© Copyright 2009 Jillian Hamilton

Identifying with an Avatar:

A Multidisciplinary Perspective

Jillian Hamilton
Art and Design, Creative Industries Faculty, Queensland University of Technology.
jg.hamilton@qut.edu.au

Abstract:

Avatars perform a complex range of inter-related functions. They not only allow us to express a digital identity, they facilitate the expression of physical motility and, through non-verbal expression, help to mediate social interaction in networked environments. When well designed, they can contribute to a sense of "presence" (a sense of being there) and a sense of "co-presence" (a sense of being there with others) in digital space.

Because of this complexity, the study of avatars can be enriched by theoretical insights from a range of disciplines. This paper considers avatars from the perspectives of critical theory, visual communication, and art theory (on portraiture) to help elucidate the role of avatars as an expression of identity. It goes on to argue that identification with an avatar is also produced through their expression of motility and discusses the benefits of film theory for explaining this process. Conceding the limits of this approach, the paper draws on philosophies of body image, Human Computer Interaction (HCI) theory on embodied interaction, and fields as diverse as dance to explain the sense of identification, immersion, presence and co-presence that avatars can produce.

Keywords:

Avatars, design, presence, interaction, visual communication

Introduction:

In computer games and virtual environments we often experience an odd phenomenon. We come to identify with an avatar as I. As Lister, Dovey, Giddings, Grant & Kelly (2009) have observed in their book *New Media*, "Users describe their activities in an online environment in the first person: 'I went to the bar', 'I levelled up', 'I went on the guild raid'; they never say 'My avatar went to the bar' and so on" (p. 212). They argue that this happens "despite being masked by the avatar" and attribute it to "identification with the non-space of cyberspace". I would argue otherwise, and suggest that it is through identification with an avatar that the process of perceptual transferral and immersion in the screen-space occurs.

In this paper I will investigate how we identify with an avatar. I will consider this phenomenon through a complex range of functions that avatars perform. At a base level, an avatar describes the manifestation of the self in a screen-world. In this, an avatar provides an expression of identity. In networked space, it affords a means of non-verbal communication, which shapes the way we present ourselves to others and how they respond to us. Avatars also perform a locative function in the interface and, by extension, facilitate the expression of our motility through the screen-space. However, an avatar is more than a place-marker or cursor that relays the fine motor movements of our wrist and mouse, joystick or Wiimote. We not only direct an avatar through our motion, we also find ourselves involuntarily dodging and weaving the obstacles it encounters. We become coupled with the avatar through the process of embodied interaction.

Because of this complex interplay of roles and effects, our understanding of avatars must be grounded on theoretical perspectives from multiple disciplines. Studies from the perspective of social psychology have so far provided the largest body of readings on the subject. However, critical theory, visual communication, interface design and art theory can also help us to understand how their visual form functions in the expression of identity. Film theory and Human Computer Interaction (HCI) can provide insights into their expression of motility, and fields as diverse as dance and philosophy can contribute to ways of thinking about the embodied interaction they can afford. In this paper I will therefore combine a range of interdisciplinary perspectives from the arts and humanities, as well as HCI and social psychology, to help explain how we use avatars to express our identity and to facilitate our interaction, and how this identification can contribute to a sense of "presence" (a sense of being there) in a virtual space.

1. The Avatar as I

To understand our identification with avatars, we might first consider them as an expression of identity. As illustrated by the above quote, analysis of avatars in media studies has often focused on their capacity to "mask" our identity, that is, to facilitate the production of alternate, anonymous personas. This preoccupation reflects an enthusiasm of early thinking about the potential of computer-mediated communication, which can be summed up as follows. When we join geographically dispersed communities in a virtual environment, we are no longer bound by our physical location and social situation. We are therefore free to cast off existing social ties, institutional and social structures and formalities, as well as the conventional markers of our "real world" identity (gender, age, ethnicity, social status and so on). Unfettered by the social cues and constraints of our located communities, we

can adopt (multiple) new identities in alternate worlds. As Sherry Turkle (1995) famously wrote in *Life on the Screen*, "[in computer-mediated communication] there is unparalleled opportunity to play with one's identity and 'try out' new ones" (p. 356). While Turkle was referring to early textual avatars, this capacity is now supplemented by image-based avatars, which provide an additional layer of identity production – what we might describe as a "pixel skin". Tales of second lives, secret identities, tricksters, trolls and sock puppets facilitated by such avatars continue to capture the imagination of the media, but the pleasures of carnivalesque masquerade also continue to underpin much of the discourse on avatars in academic literature.

On the face of it, the potential that avatars provide for anonymous identity play appears to suggest a remove from, or rupture with, the (authentic) self, which is hardly a condition for strong identification. However, we must consider this aspect of avatars more closely. We can do this through Turkle's text, which is founded upon her understanding of Lacanian psychoanalysis. Lacan proposes that the ego (as it is formed during the mirror stage) develops as a "fabricated" identity, which provides a link between the subject's psyche and the world outside by performing the role of "character" or protagonist. Turkle's interpretation of online identity play is therefore predicated on an understanding that identity is already constructed, performative and "decentered". Virtual environments simply afford the opportunity to extend this production and performance of the self because, as Turkle puts it, "people are able to build a self by cycling through many selves" (Turkle, p.178). That is, avatars, as Turkle understands them, provide an opportunity for (extended) identity formation. In this case, even when they are part of role-play, they are not separate from, but part of, an expanded production and expression of self.

We might also align the potential that avatars provide for fluid identity play with other postmodern understandings of identity. Critical theory of the 1990s not only critiqued the "regulative structures" (the social frames, institutional powers and bodily constraints) that bind identity (Foucault, Butler, Grosz and so on), it also positioned the formation of the self as a "nomadic" and discursive process of "becoming" (Deleuze and so on). If we consider avatars from this perspectives, rather than simply as providing a "mask" that obscures our identity, we might think of them as providing a mechanism and context for exploring and playing out aspects of the self through an unbounded discursive process. Indeed, Lister et al's (2009) discussion on avatars can be interpreted in this way when they write, "[through avatar based interactions] we can experiment with other parts of ourselves,

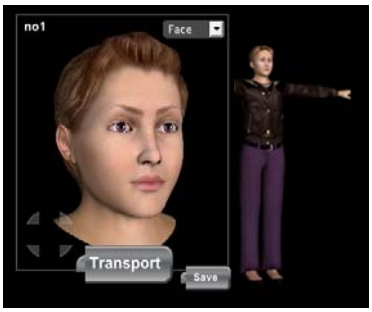
take risks, or express aspects of the self that we find impossible to live out in day to day 'meatspace'" (pp. 201-211). That is, they are adopted as part of an emergent and discursive process of becoming.

It is also important to establish that the roles of avatars are increasingly broadening along with the expansion of computer-mediated communication. Like divisions between the authentic and inauthentic self, distinctions between physical and disembodied presence; material and discursive space; and located and online communities were never as clear-cut as some analysts have claimed. Nonetheless, any such distinctions are increasingly breaking down. We no longer "enter" digital worlds; we are now always, already connected through ubiquitous networked technologies (3G phones, wireless Internet and so on). As our social interactions and communications flow between online and offline contexts, the emphasis is shifting from a detachment from geographically and contextually located community ties to strengthening them. So while avatars continue to provide a vehicle through which we can perform a role through a pre-designed and dramaturgically fixed character in scenario-based computer games (for example *Mario*, *Duke Nukeham*, *Everquest*, *Spore*), or dramaturgically fluid online role-playing (for example *Habbo Hotel*, *Second Life*), their contexts and functions have expanded. Avatars are increasingly being deployed to form a contiguity between our "online" and "offline" selves.

In an increasing number of games and forms of networked communication, the role of the avatar is not anonymity and masquerade, but its opposite: self-representation. Through templating, we are now afforded personalisation of game avatars such as Miis in Wii and personal avatars in the Xbox 360 and PlayStation Home. We can easily produce an avatar that looks like us (albeit in cartoon-like form). And, in Internet forums, instant messaging services and online chat, while avatars currently tend to be produced as small, flat images that are often abstract representations, abstraction is not driven by an intention to produce an alternative identity. Overwhelmingly, such avatars represent a merged online/offline identity. Far from obscuring the user's gender, ethnicity and so on, they often make explicit reference to such traits (Kennedy, 2006; Messinger, Ge, Stroulia, Lyons, Lyons & Bone, 2008).

While such profile avatars are not the same as the "new identities" Turkle refers to, it is important to note that neither are they singular or static and fixed. The image the user wants to project may be different in different social contexts, just as we might change clothes and shoes in the physical domain depending on the activity we are undertaking, who we are interacting with, the context we are in, and the aspect of our identity we want to express. We might adopt a range of avatars or multiple versions of an avatar because, as a form of visual communication, we are mindful of their audience, and

the context and the purpose of the interaction or communication. Moreover, we might project ourselves differently next week or next year. After all, the formation of identity is a lived and emergent process. It is responsive to shifting relationships and understandings of the world. The projection of identity, as well as identification with an avatar, must therefore be framed at the outset as contextual, fluid, and socially continuous. We will identify with an avatar only to the extent that it provides a good fit – in the here and now and for the purpose at hand.



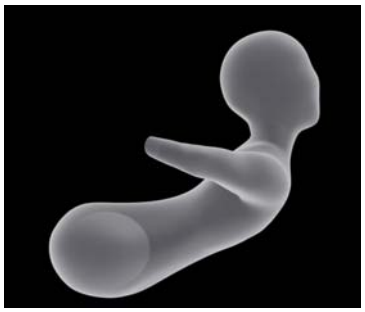
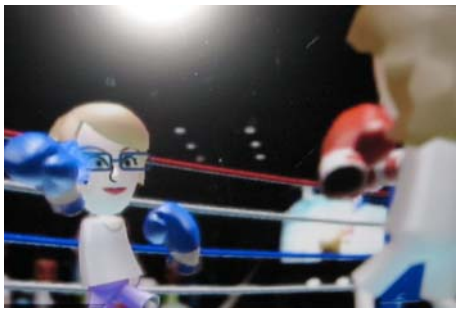



Figure 1: Evolver, templated 3D avatar, 2009

Figure 2: Avatar showing abstracted, minimal form. design by Stewart Lawson, *Intimate Transactions*, Transmute collective, 2006

Figure 3: Mii, Wii Fit, 2008

2. The visual form of avatars: abstraction and identification

Avatars are produced in a wide spectrum of visual forms–from 48 x 48 pixel instant-messaging avatars and slightly larger 2D images in Internet forums and profiles, to cartoon-like, minimal and highly rendered 3D figures in games and networked environments. They may represent the participant in varying degrees of likeness–from abstract shapes, creatures or even objects, to highly stylised self-portraits. They may be illustrative, image-related, concept-related, arbitrary or symbolic in their visual realisation. However, they are rarely photographic and are usually abstracted. Abstraction is important because, as a function of the visual interface, an avatar is, by minimum definition, an icon. In this section I will consider how avatars function as icons and, through reference to theories on portraiture, consider whether abstraction limits our capacity to identify with them.

From the perspective of visual communication and interface design, abstraction is necessary because an avatar must assume the role of figure in the figure-ground relationship with the scene they inhabit (whether this is a Web page or forum, mobile phone screen or rendered game world). The term figure-ground relationship, which is taken from gestalt theory, refers to the relationships we perceive

between visual elements within a scene. We identify visual forms as either the object of focus (figures) or as the broader perceptual field (ground) (Lidwell, Butler, & Holden, 2003, p. 80). Factors that contribute to the effective production of a figure include symmetry, definition and a simple shape. This simplification of form can be brought about through visual concision–the reduction of detail through an economy of line and form–while retaining and emphasizing the essential qualities, or "essence" of the thing represented. This principle, which is exploited by designers of icons for graphical user interfaces more broadly, causes a figure to stand out from, and appear to sit in front of, the ground. It thus becomes more visible, and will receive more attention and be better remembered than the scene it inhabits. In the case of avatars, differentiation, visibility and memorability are highly desirable attributes. They mean that an avatar will be more easily located and followed by the user. And they help to provide a measure of visual stability for the figure when it, the ground, and the camera are in motion.

As with other forms of icons, abstraction therefore strengthens the capacity of an avatar as a function of the interface. It might be assumed that the cost is a weakened capacity for identification. However this is not necessarily the case. We might draw upon theories of portraiture to help explain this counter-intuitive conclusion because, like avatars, it is often thought that, as an exemplary form of mimetic representation, it is exactitude that defines the "quality" of the portrait and identification with its subject. However, what constitutes a convincing portrait in the traditional sense, according to Ernst Van Alphen (1997), is not its literal representation of the subject, but whether it captures the subject's essence. He writes,

> … the portrait brings with it two referents. The first is the portrayed as body, as material form. The second is the essence of the sitter … Within the traditional notion of the portrait … the strength of the portrait is being judged in relation to this supposed essence not in relation to the looks of the person. (Van Alphen, p. 240)

Photography then, with all its capacity for exactitude, is not the portrait's ideal. Indeed Van Alphen describes it as its failure, because while the camera has a supreme capacity to capture the physical appearance of the sitter, it is rarely able to capture their "essence". Roland Barthes (1981) provides a graphic example of this failure in his desperate search for his mother–"looking for the true HER"–in a pile of photographs, which he recounts in *Camera Lucida*. Photography's "accuracy" and "objectivity" can create a reduction–a complete flattening out of the subject into an equivalence with the surface of visual resemblance.

While capturing the essence of the subject is possible through photography (Barthes eventually finds a photograph that satisfies him), as well as portrait painting, it is not guaranteed, and it is possible (albeit in another form) through abstraction. Picasso's sequential abstraction of a bull (1945) is a classic example of abstraction that reduces visual complexity while retaining the subject's essence. By emphasising key characteristics (the horns, the shoulders, the genitals), the final image retains–indeed emphasises–the bull's essential qualities (physical strength, masculinity and so on) even while its use of line is minimal. We live in a world saturated by signs, which depart from representational accuracy in the interests of their signifieds. Besides animated characters; pictograms, way-finding and screen icons all harness this strategy. The user-designers of avatars are therefore already heavily acculturated to the process of reduction of visual complexity with the attendant retention and emphasis of key characteristics or qualities.

Research in social psychology supports the argument that abstracted avatars can function effectively. Indeed Kristine Nowak and Frank Biocca (2003) argue that abstraction appears to increase rather than decrease identification with the avatars of others. Their study concluded that,

> When the virtual human's image was more unusual and iconic (less anthropomorphic), people felt more co-presence, social presence and telepresence … than those interacting with partners represented by either no image at all or by a highly anthropomorphic image of the other. (Nowak and Biocca, p.489)

This, they argue, is because people are more comfortable communicating with those who look like them, which promotes a feeling of familiarity. When the avatar of someone we are communicating with is generalised, we can more easily project traits of similarity, as opposed to difference, onto him or her. We might extend this argument to include avatars that represent ourselves, if we consider what I have said about the need we have for both contextual and temporal fluidity of identity.

We might also consider this from the opposite direction through the 'uncanny valley effect'. The uncanny valley effect, identified by roboticist Masahiro Mori suggests that our emotional response and empathy will be enhanced up to a point of human realism, after which we are quickly repulsed. While Mori associated this effect with robots, it has been extended to criticism of highly realistic 3D computer animation (MacDorman, Green, Ho, & Koch, 2009). If we apply this principle to the design of avatars, it would suggest that a high degree of realism does not necessarily increase identification with an avatar as representation, and may even have the opposite effect, once it reaches a tipping point. However, this

effect tends to be reduced by the averaging effect produced in templated avatars, even when they have a sophisticated 3D rendering (see figure 1).

This argument about realism and abstraction should not be confused with likeness to the self. Social scientists who have analysed quantitative and qualitative data collected from Second Life residents have argued that people tend to design avatars that look like themselves, with moderate enhancements (slightly younger/older, thinner, taller, and so on).[1] Messinger et al. (2008) ague that this arises out of "balancing motives for self-verification and self-enhancement" (p.15). (Self-verification is the desire to maintain a consistent self-concept and sense of truth to self, while self-ehancement is the tendency to promote a positive self-concept and to "propel the ego upward".) There are two strong, intertwined motivators for self-enhancement. Messenger et al. conclude that,

> people with more attractive avatars than their real selves are more confident and extraverted in virtual worlds than they are in the real world, particularly those who have low confidence and are introverted in the real world. (p. 15)

This impact of the avatar's enhanced appearance on confidence and social behaviour is what Yee and Bailenson (2007) refer to as the Proteus effect. Secondly, more attractive avatars solicit more positive social responses (Messinger et al., 2008). And of course, both of these outcomes are mutually reinforcing. However, according to Messinger et al., the desire for self-enhancement is counter-balanced by the need for self-verification, so enhancements are moderate. This suggests that retaining an essence of identity in avatar representation is clearly important to our capacity to identify with an avatar.

On the other hand, avatars may take a symbolic or even arbitrary form. I have discussed the use of such avatars for role-play above. Here I will focus of the arbitrary and symbolic avatar/icons in social networking (such as small 2D avatar icons used in instant messaging and discussion forums). As I have already established, such avatars are not necessarily, or even usually, driven by an intention to produce anonymity or alternative identities. Instead, they are produced in continuity with offline identities and can be understood as a form of branding (of the self), in the context of self-publication. We might compare such avatars with logos that establish a brand identity. Through recurrent use and recognition of a logo, we come to identify it, as well as its connoted meaning, with a product and its attributes. For

[1] It would also be interesting to investigate whether this includes a tendency towards the 'most average facial effect', a principle that suggests that we find faces that are an average (in terms of the form, size, and arrangement of facial features) of the overall population more attractive and 'familiar' than those that deviate from this "norm" (Lidwell et al., 2003).

example, the Nike swoosh denotes a shoe but it also connotes the shoe's "qualities": mythical power, high performance, luxury (which are reinforced by other, multimodal signs in advertisements and PR). Similarly, a symbolic or arbitrary avatar can represent a user (lets call her Jane). Through recurrent use, I will begin to read the avatar as Jane in our online interactions and conversations, while I might also assign the denotations of the avatar to her identity (especially if these attributes are reinforced through other multimodal communication). In this way, the avatar operates as a sign.

Abstraction then, is not necessarily an impediment to our identification with an avatar. Indeed, abstraction and reduction of visual specificity can increase identification, as it provides a more familiar, and malleable representation of identity, to both ourselves and others. Moreover, we might identify just as strongly with an arbitrary or symbolic pixel art image in some contexts as a highly rendered, highly individuated 3D self-portrait in others. This is because it is not visual exactitude that produces identification, but capturing a likeness, essence or even a signified.

3. Beyond visual representation: From motility to embodied interaction

Beyond visual representation, there is another, significant contributor to our identification with an avatar. Our identification with it has a great deal to do with the avatar's representation of our motion and our intentions. I will therefore now turn to consider the role that avatars play in representing our motility, interaction and spatial engagement.

A number of writers have proposed that film theory provides a reference point for understanding motion in computer games and virtual environments (as well as character design, cinematic narrative, and art direction). Texts such as Deleuze's *The Movement-Image* (1986) can help to make sense of the camera views that coincide with the motility of the avatar. (Deleuze considers perception images (which convey what is seen), affection images (which express what is felt) and action images (which focus on duration and action). Deleuze also suggests that, instead of describing figures in motion; it is continuity of movement that describes the figure in films. (p. 5) This, he suggests, allows for the "production of the new", where the character may be open to chance and accident (he cites the examples of Charlie Chaplin and Fred Astair) (p. 7). All of these aspects of film can be aligned with the motion of avatars.

However, watching a film as part of an audience is very different to interacting with a responsive screen interface. Our relationship with a movie character is ultimately one of passive observation. In contrast, the avatar facilitates a performative, choice driven relationship with events, the

scene, characters and other participants. In social computing this agency is extended further since the participant operates in a context that involves a network of relationships, activities and practices, which are both contingent and emergent. This produces a generative quality to the interaction and decision-making around the paths taken, relationships established and actions pursued.

Secondly, while our body remains disassociated and inactive when we are watching a film, as I have established elsewhere (2007) through reference to the writing of a pioneer of interactive cinema Toni Dove (2002), interacting with a screen interface by way of an avatar requires an active physical engagement. This increases our identification with an avatar because the avatar reflects our intentions through motion. But it is more than this. When we exert our agency to interact with other objects, events and participants, the avatar responds immediately to our actions. Dove argues that this immediacy leads to a perceptual integration with the avatar. She suggests that, "[the subject becomes] simultaneously aware of their presence 'in' their body and 'in' the screen" (Dove p. 210) and describes this as the "tug" of the avatar. She goes on to argue that, to overcome the split in location, we perceptually traverse the intermediate space. We experience partial transference of the self into the screen-space as we become connected with, or "stuck to", the avatar. This causes the physical properties of the screen, and its two-dimensional surface, to perceptually recede. It is being stuck to the avatar in this way that causes us to duck and weave around the "virtual" objects that our avatar encounters.

HCI theorist Paul Dourish (2001) also discusses "embodied interaction". He explains the effect of perceptual integration with the interface through reference to Heidegger's concepts of "intentionality" and "ready-to-hand" (where you act *through* a tool or device causing it to perceptually recede into the background). Using a mouse and cursor as examples, he observes that, as the hand moves with the mouse, and the cursor moves with the mouse, the entire system (hand, mouse, cursor) is perceptually "coupled", the subject/object distinction is overcome, and we can get on with higher-level activities such as selection, navigation, or composing text, image or code. While it was not written in relation to interaction, the work of philosopher Liz Grosz (1994) on body image and body boundaries provides a similar insight. Through reference to psychoanalyst Paul Schilder's work, Grosz argues that the boundaries of our body image are not perceived as fixed but are fluid and "osmotic". We absorb objects, implements or instruments (from a pen or scalpel to a car or jet aircraft) into our body image when we use them as a tool or medium of expression. We relay our intentions through them, becoming less aware of their physicality and our operation of them, than our effect beyond them.

Extending Grosz's conception of osmotic body boundaries and Dourish's process of coupling, we might transpose the mouse for any input device and the cursor for an avatar in so much as they provide an intermediate tool and representation of our action and form a bridge to a higher intellectual program or pursuit. For this cognitive leap to occur, we must absorb both the physical tools (the mouse and screen) and the conceptual tool (the avatar) into our body image and concept of self and "enter" the screen space, through what Dove describes as perceptual transferral. But of course, glitches in the system (latency or lag for example) can cause us to become acutely aware of the system again, disrupting this coupling and perceptual transferral. Or, to borrow a term from film theory, such glitches break "suture", a term that refers to the process through which we become perceptually "stitched in" to the narrative or fabric of a film and its encompassing story-world. Suture is broken when watching a film if we become aware of the actors as actors, or the mechanics of the film-making process. We might transfer this principle to becoming aware of the avatar as interface and the sense of separation this causes, as well as the computational process that causes the disruption.

Here we are moving into the realm of phenomenology and proprioception. From this perspective, I would like to briefly consider the contribution of a dancer to the potential for identification with avatars. Collaborating on a new media artwork entitled *Intimate Transactions* by the Transmute Collective (directed by Keith Armstrong, 2006), Lisa O'Neill has worked to increase the sense of embodied interaction and immersion that avatars can provide. She questioned the confinement of our physical interaction with an input device to gestures of the wrists, hands and mouse. As a dancer, she believed that the whole body should be brought into play (O'Neill, 2007). She choreographed whole body movements, which the participant performs on a large, posterior input device with embedded motion sensors (see figure 4). Drawing on the Suzuki Actor Training Method, O'Neill focussed on the participant's middle body, which she describes as the body's "energy centre". The choreographed gestures of the participant, which revolve through this energy center, were also transposed into the design of the screen avatar, which moves through the same central axis. The movement of the participant is therefore mirrored not only in the avatar's direction, but also the energetic qualities of its movement. This shared gestural expression was designed to enrich the user's connection to and identification with the avatar.

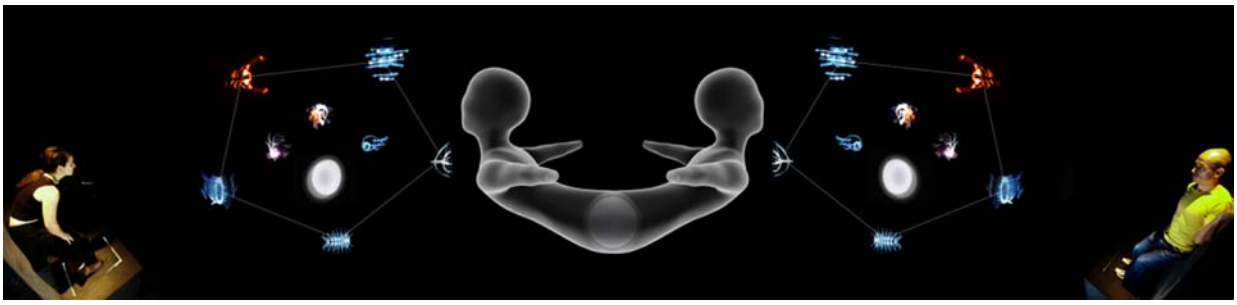


Figure 4: Conjoined avatars showing an energy centre that pivots on the same axis as the participant, *Intimate Transactions,* The Transmute Collective, 2006

The participant in *Intimate Transactions* is linked to a second user through the distributed network. Their (abstracted) avatar is similar in visual form as well as motility. It therefore has familiar visual as well as expressive qualities. This serves to extend the perceptual "tug" of the avatar to that of the avatar of the other participant. As one user commented in awareness research conducted by Madden and Viller (2007), "Once I saw the other participant, I wanted to dance" (p. 102). This comment reflects not only a high level of identification with the participant's own avatar but a co-identification with the avatar of someone else as well.

As Dourish (2001) argues, embodied interaction is not simply about physical embodiment but also situated, contextual and social experience. He argues that,

> "embodiment need not rest on a purely physical foundation. Embodiment extends to other phenomena that unfold directly in the world; conversations, mutually exchanged actions, and so on… Embodiment denotes a participative status" (p 101).

If we extend this thinking to our understanding of avatars, we might say that we identify with the avatar not simply because it represents us visually or because it relays our locomotion, but because it reflects our intentionality, our agency and our social participation. By recognising the need for interplay of our physical and social expression in the avatar, and by emphasising this relationship, O'Neill's approach not only increases embodied interaction and immersion; it increases social participation through identification with the avatar and the other, distant participant. It not only produces a sense of presence– a sense of being there in the screen-space; but a sense of co-presence– the sense of being there with someone else.

Conclusion

We have come to inhabit two, increasingly conjoined worlds. Social networking sites, collaborative tangible media, and networked multiplayer games have extended our social interaction into the digital realm. Increasingly, avatars have been adopted to express our identity; establish a social presence; communicate; interact and collaborate within this emergent space. By drawing on a range of disciplinary perspectives, and considering the range of roles that they perform, I have provided a multi-disciplinary interpretation of avatars. Understanding how we might design avatars to increase our identification with them will become increasingly important as we look forward to the increased adoption of avatars as icons of self, as mediators of social connection, dialogue and collaboration, and as the facilitators of embodied interaction.

References

Barthes, R. (1981). *Camera Lucida*, New York: Hill and Wang.

Bolter, J.D, & Grusin R. (1999). *Remediation: Understanding new media*. Cambridge, Mass.: MIT Press.

Deleuze, G. (1986). *Cinema 1: The movement image*. Trans. Hugh Tomlinson and Barbara Habberjam. Minneapolis: University of Minnesota Press.

Dourish, P. (2001). *Where the action is: The foundations of embodied interaction*. Cambridge, Mass.: MIT Press.

Dove, T. (2002). The Space between: Telepresence, re-animation and the re-casting of the invisible. In: M. Reiser & A. Zapp, (Eds.), *New screen media: cinema/art/narrative*. London: British Film Institute.

Grosz, E. (1994). *Volatile bodies; Toward a corporeal feminism*. St. Leonards, N.S.W.: Allen and Unwin.

Hamilton. J. (1996). *Face to face with HIV/AIDS*, Brisbane: University Art Museum, The University of Queensland.

Hamilton, J. (2007). Towards embodied communication in the distributed network. In T. G. Wyeld, S. Kenderdine, & M. Docherty (Eds.), *Exchange and experience in space and place; Lecture notes in computer science (LNCS)* (pp. 179–190). Heidelberg, Germany: Springer.

Jenkins, Henry (2006). *Convergence culture: Where old and new media collide*. New York: New York University Press.

Kennedy, H. (2006). Beyond anonymity, or future directions for Internet research, *New media and society*, vol. 8, no. 6 (pp. 859-876)

Lidwell, W., Butler, J., & Holden, K., (2003). *Universal principles of design: 100 ways to enhance usability, influence perception, increase appeal, make better design decisions, and teach through design.* Gloucester, Mass.: Rockport Publishers.

Lister, M., Dovey, J., Giddings, S., Grant, I., & Kelly, K. (2009). *New media: A critical introduction* (2nd ed.). New York: Routledge.

Madden, J. & Viller, S. (2007). Am I the lighter one? Awareness in a dual site networked installation. In J. Hamilton (Ed.), *Intimate transactions: Art, exhibition and interaction within distributed network environments* (pp. 98-105). Brisbane: Australasian CRC for Interaction Design.

MacDorman, K. F., Green, R. D., Ho, C., & Koch, C. (2009). Too real for comfort: Uncanny responses to computer generated faces. *Computers in human behaviour*, no. 25, (pp. 695-710).

Messinger, P.R, Ge, X. Stroulia, E. Lyons, K. Smirnov, K., & Bone, M. (2008). On the relationship between my avatar and myself. *Journal of virtual worlds research*, vol. 1. no. 2. Retrieved , 20th September, 2009 from http://journals.tdl.org/jvwr/article/viewArticle/352

Mulvey, L. (2008). Visual pleasure and narrative cinema. In N. Badmington & J. Thomas (Eds.), *The Routledge critical and cultural theory reader* (pp. 202–212). London; New York: Routledge. (Original work published 1975).

Nowak, K.L. & Biocca, F. (2003). The effect of agency and anthropomorphism on users' sense of telepresence, copresence, and social presence in virtual environments. *Presence.* vol. 12, no. 5, (pp. 481-494).

O'Neill, L. (2007). Placing the participant in the performing role. In: J. Hamilton, (Ed.), *Intimate transactions: Art, exhibition and interaction within distributed network environments* (pp. 36–43) Brisbane: Australasian CRC for Interaction Design.

Turkle, S. (1995). *Life on the screen: Identity in the age of the Internet.* New York: Touchstone.

Van Alphen, E. (1997). The portrait's dispersal: concepts of representation and subjectivity in contemporary portraiture. In J. Woodall, (Ed.), *Portraiture: Facing the subject* (pp. 239–256) Manchester: Manchester University Press.

Yee, N., & Bailenson, J. (2007). The Proteus effect: The effect of transformed self-representation on behavior. *Human communication research*, vol. 33, no. 3 (pp. 271–290).