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This article will explore how *avant-garde* artistic practices in the field of mixed reality performance, namely pervasive games such as Blast Theory's 2003 *Can You See Me Now?*, critically engage with the proliferation and implementation of virtual technologies in everyday life. I will argue that there is a cultural shift resulting from the global, massive implementation of these technologies towards a virtualisation of everyday life performance and a progressive re-calibration of sensitivities away from the immediate material and physical domains of experience. Throughout this article, neuroscientific theories will be used to provide insight into the role of the audience/participants in *Can You See Me Now?* The intersection of neuroscientific theory and performance analysis will thus serve as a methodology for exploring different paradigms and modes of engagement with mixed reality performance.

Keywords: mixed reality performance; neuroaesthetics; hybridity; participation

Introduction

This article will explore how *avant-garde* artistic practices in the field of mixed reality performance, namely pervasive games such as Blast Theory's 2003 *Can You See Me Now?*, critically engage with the proliferation and implementation of virtual technologies in everyday life, in particular focusing on the tension between the physical and virtual aspects of participation in these environments. In the context of these changes it is important to ask where the performance of everyday life is taking place. I will argue that there is a cultural shift resulting from the global, massive implementation of these technologies towards a virtualisation of everyday life performance and a progressive re-calibration of sensitivities away from the immediate material and physical domains of experience. Antonio Damasio's (2000) theory of consciousness, as outlined in his seminal work *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*, provides me with a theoretical tool to analyse the re-calibration of sensitivities of embodiment and physical participation. This article will focus on an exposition of virtual and physical modes of engagement in *Can You See Me Now?* that inspires a critical reflexivity on physical participation in the contemporary cultural landscape, where technology and virtual reality become progressively dominant ways of mediating reality. Finally, the ethical implications of the aforementioned cultural shift will be explored through Emmanuel Lévinas' face-to-face encounter with the Other. This article will address the intersection between performing arts and science by exploring how neuroscientific theories may

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serve as a methodology for exploring different paradigms and modes of audience engagement with mixed reality performance. In effect, neuroscientific theory and performance analysis grounded in intermedial paradigms will form a hybrid approach for the theorisation of technologically driven contemporary performance.

Mixed reality performances

Gabriella Giannachi and Steve Benford define mixed reality performance 'as the staging of theatrical performances in mixed reality environments' (Benford and Giannachi 2011, 2). Figure 1 illustrates the continuum of mixed reality environments, providing a good taxonomical framework for their classification.

I propose that mixed reality performances are hybrid forms, combining instances of reality, augmented reality and virtual reality performance. Following the logic of the spectrum, the left-hand of the continuum side could include instances of augmented reality such as AR Smartphone Apps, interactive city maps, and so forth. The right-hand side could incorporate massive multiplayer online role-play games and virtual reality environments. Mixed reality performances differ from those in virtual reality as they do not alienate spectators/participants from physical participation by immersing them 'into the computer-generated body of an avatar' (Grau 2003, 245). Instead, the emphasis is placed on physical performance by explicitly foregrounding the physical presence of the spectator's 'body' and its materiality by integrating its dynamics as a constitutive part of the virtual space.
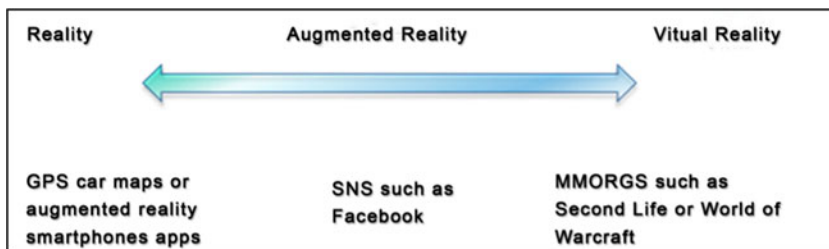

Figure 1. Mixed reality continuum based on Milgram and Kishino's (1994) concept.
Note: GPS, global positioning systems; MMORGS, massive multiplayer online role-play games; SNS, social networking services. Courtesy of Benford and Gianacchi (2011).

Alienation in the new media landscape

By considering the increasing popularity of mainstream mixed reality platforms and their integration into daily routines via a global network, it becomes possible to talk about a global cybernetic theatre; a world as a virtual cyberstage, where significant parts and aspects of performance of everyday life take place.

Erving Goffman's concept of social performativity developed in the 1960s, proposing that life can be seen 'as an interplay of behaviours where players with different motives rehearse their actions, manoeuvre to present themselves advantageously, and often perform at cross purposes with one another' (Goffman in Schechner 2002, 174). This concept can be applied directly to virtual environments, where people perform, construct and re-invent their identities. Douglas Kellner

(1992) argued that 'traditionally' identity has been perceived as stable, fixed and solid. In the age of modernity, this interpretation of identity was partially replaced by the notion that identities are 'mobile, multiple, personal, self-reflexive, and subject to change and innovation' (1992, 143). Even though the experience of these virtual environments integrates both physical and virtual dimensions, they arguably tend to 'emphasise' the virtual stage as the main site of performance. As Oliver Grau comments 'many virtual environments reduce the observer to a disembodied state within a Cartesian space that is clear for miles around and often quite empty' (2003, 192). It could be the case that physical participation becomes secondary or repressed in these virtual environments, as in the case of immersive games or social networking sites where so-called 'real life' turns into a concealed 'backstage'. In her book *Alone Together*, Sherry Turkle exemplifies this cultural tendency with a case of a college student whose online existence became a dominant part of his everyday life. She recounts that:

> he played four avatars, distributed across three different online worlds. He always had these worlds open as windows on his computer screen along with his schoolwork, e-mail program, and favorite games. He cycled easily through them. He told me that RL 'is just one more window.' And, he added, 'it's not usually my best one'. (Turkle 2011, xii)

This is not to say that one is not physically present embodying a space whilst in front of a computer screen, but there seems to be a certain hierarchy of experience at play when it comes to mainstream virtual environments, where the cognitive immersion with a virtual environment is being prioritised. Although it is difficult to encapsulate how different people respond to virtual environments, design hints at an implicit hierarchisation of these different components encouraging a particular mode of engagement, which emphasises cognitive immersion.

The contemporary cultural landscape is filled with augmented reality platforms and technologies ranging from the widespread use of global positioning systems (GPS), particularly locative media contained in smartphones, to online virtual environments such as massive multiplayer games, to virtual working environments, ubiquitous computing and social networking sites. In western societies – where the speed of communication, virtualisation of capital and, by extension, other spheres of society are becoming the paradigms of progress – the proliferation of virtual technologies has contributed to a cultural shift. What we are witnessing is an increase in hours per week spent by people on transferring their social, recreational and work activities into new media environments. The virtual performance of everyday life is progressively moving upstage, whilst the physical side of these experiences are taking a backstage role in what could be seen as a hierarchised model of theatre.

Katherine N. Hayles' provocative observations on the posthuman condition emphasise this cultural shift away from the physical into the digital/virtual. She claims that 'the great dream and promise of information is that it can be free from the material constraints that govern the mortal world' (Hayles 1999, 13). To what extent, however, virtual experiences can become 'liberated' from the constraints of materiality, both spatially and temporarily, is a very contestable issue. Elizabeth Grosz has argued that if 'we don't just have bodies, [...] but are bodies, there can never be the threat of displacing the body in favour of mind or abandoning the real for the virtual' (2000, 86). It is hard to discern from Grosz's account what she

actually means by 'the body'. As Susan Melrose points out, the use of the term 'the body' is often unproblematised in performance criticism (2011, 6). She suggests abandoning the notion of the body as a noun defined by its material functions and viewing the body from a Bergsonian–Deleuzian perspective, which sees the body as a 'living individuality', 'a complex relation between differential velocities' and which has 'the capacity for affecting and being affected' (2011, 8). In this context, the body becomes a technology for generating perception – a perceptual apparatus with a focus on the affective, intuitive, immediate and instinctual sphere of response and signal interpretation. For the purposes of my discussion I would like to consider 'the body' as a medium, or more precisely as a technology; a biological perceptual apparatus that is focused on affective pre-conscious experiences – in effect, I will adopt a neuroscientific approach that effaces the mind/body dualism by positioning the body as a stratum of the perceptual process.

Consciousness can be located within a triune anatomical model of the brain. In *The Triune Brain in Evolution*, Paul MacLean postulated that the triune brain consists of the following parts, which evolved in succession: the reptilian complex, the paleomammalian complex (limbic system) and the neomammalian complex (neo-cortex) (MacLean 1990, 9). In this structure, the reptilian complex functions according to simple cause-and-effect impulses such as fight or flight. It operates by instinct and does not require considered decision-making, but is based on reflex action. This complex forms a system of interrelated parts, such as 'the brain stem, hypothalamus, and basal forebrain' (Damasio 2000, 22) that are also responsible for the regulation of the body's internal states and life support functions. The limbic system (the paleomammalian complex or the 'old-mammalian brain') comprises a number of parts such as the amygdala, cingulate gyrus and the limbic cortex that are largely responsible for the processing of emotions. For instance, the amygdala is crucial to 'recognizing fear in facial expressions, to being conditioned by fear, and even to expressing fear' (Damasio 2000, 62). The neomammalian complex (neo-cortex), where Damasio places 'the stream of thoughts' (2000, 171), is where our long-term memory and higher mental functions are located, which include language and rational thought, both of which play a key role in defining us as higher conscious beings. Damasio put forward a dual model of consciousness split into two kinds, the core and the extended. According to Damasio, core consciousness 'provides the organism with a sense of self about one moment – now – and about one place – here' (2000, 16). Extended consciousness, on the other hand, which consists of many levels and grades:

> provides the organism with an elaborate sense of self and identity and a person, you or me, no less – and places that person at a point in the individual historical time, richly aware of the lived past and of the anticipated future, and keenly cognisant of the world beside it. (Damasio 2000, 16)

Damasio outlines a hierarchy of sensorial engagements that constitute the mechanics behind the generation of consciousness. This hierarchy is insightful when exploring the notion of embodiment since it splits sensorial engagement into various layers that can be aligned to constitute Damasio's metaphor of the 'movie-in-the-brain' (2000, 9), a metaphor for the functioning of the whole nervous system comprising

many sensory tracks and sensory portals such as 'sight, sound, taste, touch, and olfaction, touch, inner senses' (2000, 9).

The levels of consciousness I have described are mapped onto what Damasio calls 'Levels of Life Regulation' (2000, 55). These comprise four distinct states of: consciousness, 'stereotyped, patterns of response, which include metabolic regulation, reflexes, pain, pleasure drives, motivations' (2000, 55); emotions, such as 'secondary emotions, primary emotions and background emotions' (2000, 55); feelings, which are subdivided into unconscious representations of emotions and a conscious awareness of having an emotion (feeling); and finally high reason, where conscious responses are made in relation to sensory intake. This hierarchical model, where one level of consciousness builds upon a preceding state, offers an approach to analyse how the body/brain apparatus processes signals. In this model the inner workings of consciousness are inextricably linked with physical manifestations. For instance, lower level background emotions such as a person feeling 'tense', 'edgy', 'discouraged', 'enthusiastic', 'down' or 'cheerful' can manifest themselves in 'subtle details of body posture, speed and contour of movements, minimal changes in the amount and speed of eye movements' (Damasio 2000, 52). Conversely, these states can be induced through prolonged physical effort and interaction with the environment. Damasio's model articulates the various levels of 'conscious' engagement of the subject with its surroundings. In this article I will attempt to apply this model to a discussion of physical participation and sensorial experience in the mixed reality performance *Can You See Me Now?*.

Can You See Me Now?

Designed and performed by Blast Theory in collaboration with the Mixed Realities Lab, *Can You See Me Now?* – first performed in Sheffield in 2001 – is a hybrid of a pervasive game and a contemporary site-specific performance that was performed in a number of cities across the world.[1]

The performance involved a mixed reality form of chase between runners in a real city and players controlling avatars behind desktop computers. In *Can You See Me Now?* the players/audience had access to a virtual city where their avatars were chased by four Blast Theory performers/runners located in a designated area of a real city. The runners used handheld computers with WIFI technology and GPS to assist them in capturing the participants, and often performed using rehearsed behaviours that constituted part of the framework of the project. The online environment allowed the players to move at set speeds, to see the location of other player's avatars and the runners, and to exchange text messages with each other. As a rule the players were not allowed to enter buildings and the game area was normally only approximately 200 m × 200 m, occasionally increasing to 400 m × 400 m limited by the technological framework.

The runners were able to see the players' virtual avatars on a map, read their messages and also communicate with each other via walkie-talkies. The walkie-talkie audio from the runners went on to a live stream, so players online could hear and communicate to runners via text. If a runner came within a two-metre distance of a player avatar, the avatar was considered caught and the game was terminated. A photograph of the location where the player was caught was then taken and posted on a website as a form of documentation (Benford et al. 2004). The runners

also had a dedicated channel through which they communicated without the players being able to hear them. The two city realms, the real and the virtual, were correspondent. The virtual city was a simple three-dimensional representation of the real area, with some details such as pavement and building structures. The physical reality and the virtual one were aligned with each other and the server would update and refresh the locations of the virtually controlled avatars.

The experience of *Can You See Me Now?* differed depending on whether one was a runner in the real city, a player/participant in the gallery space or a spectator onlooker in the actual city or gallery, or indeed someone reviewing the documentation of the piece. By focusing on the runner and player perspectives, and based on accounts and interviews I undertook with performers and audience members, I will examine *Can You See Me Now?* from the perspective of a performative experiment with technology that interrogates the role of physical participation in the mixed reality landscape. I will examine the way in which the performance challenges the cultural shift towards digital and virtual performance of everyday life by re-emphasising physical participation and its complex relationship with virtual participation.

I propose that the dynamic between engaging through physical participation and virtual participation in this work can be related to the dynamic between core and extended consciousness in Damasio's model. Damasio argues that a cohesive relationship between core and extended consciousness creates a 'homeostasis of perception' (2000, 138). The complex relationship between these two levels of consciousness only becomes apparent when the homeostasis is thwarted. Arguably, *Can You See Me Now?* thwarts and deconstructs this homeostasis by creating a sense of disorientation and mismatch between physical participation and virtual participation. The online players, runners and in turn audiences and commentators reflect upon the complexities of the mixed reality performance. I will outline some of the ways in which this disorientation comes about from the hybrid nature of interactions between players/participants and runners in *Can You See Me Now?* before considering how the piece encourages a reflexive stance on some of the cultural and ethical implications of the shift towards digital participation.

The player/participant perspective

Much like a mainstream online game, the virtual aspect of the player's experience in *Can You See Me Now?* consisted of a simulation seen on a computer screen through which the players interacted with the 'live' runners. This engagement was then supplemented with the documentation left on the website after the performance was over. Other aspects of virtual engagement included the online performance identity of individual players as expressed through chats and movements throughout the piece. It is clear that the creation of the player's sense of community was a result of the cooperation they experienced by being part of the community of players and, I would propose, also a result of them being relocated from a real environment into the virtual space. Physically they were inculcated as participants as they sat behind their computers engaging with a pervasive game, or through their physical presence in the gallery space. Their personal reflections offered a sense of their personal trajectory through the event as they became affected by the performance of their avatar.

Reflecting on Damasio's model of core and extended consciousness, one could argue that the players' engagement with the 'city' adhered mainly to the mechanisms of extended consciousness and higher reason. Avatar identities, micro narratives, tactics and strategies were mainly formed as a result of the analysis of virtual objects in the city simulation through high-order processing. The lower areas of perception comprising primary emotions, background emotions, low-level attention and life-regulating functions (Damasio 2000, 55) were not directly affected by the city environment, since the players were not physically present in the environment. Any effects or *affects* induced by the game/performance were thus mediated through *extended consciousness* mechanisms and looped back onto the lower levels of *core consciousness*.

The online players had a very limited interface through which to experience the city. Both visually and in terms of the information received online, limited information was available on the location. Even though there was no possibility of engaging with the actual surroundings to induce an emotional state specific to the interaction with that environment, by manipulating the runners into different situations the 'player' was able to probe the city-scape. Thus the physical bodies of the runners became 'prosthetic' for the online players who were physically absent in the actual environment. The following reflection by Matt Adams, one of the creators of *Can You See Me Now?*, exemplifies this:

> I am sat online, playing in my bedroom, 2,500 miles away from where someone is on the streets of a city in the rain in an anorak and trainers, running as it gets dark through rush-hour traffic. And as I exert pressure with my index finger on the left arrow key and turn into the virtual park, this human being is required by the rules of the game to leap the hedge into the muddy grass and run up the steep slope through the park to maintain this game space. (Adams in Benford and Giannachi 2011, 34)

This passage emphasises the detachment of the player from the performer and the fact that this divide can only be 'bridged' (constituting a holistic imaginary *organicity*) by means of rationalisation and a secondary emotive loop resulting from a visual virtual space and the haptic experience of a keyboard. The level of detachment also highlights a discrepancy between virtual reality and the material reality of the game that created a sense of a disorienting, fragmented hybrid presence. However, the bodies of the runners became a technology through which the real city could be perceived by the players. Unlike a mainstream massive multiplayer online role-play game, *Can You See Me Now?* did not emphasise an imaginary embodiment of the avatar but rather a disembodiment and detachment from them, drawing attention to the lack of physical participation in the actual city. The homeostasis of perception was thwarted and deconstructed by the set-up of the pervasive game. This deconstruction created an effect of making explicit the way in which mixed reality environments re-calibrate our sensitivities and modes of engagement with reality by interrogating the place of embodied experience.

The runner perspective

The runners engaged with the online 'virtual city' through the use of their handheld devices and GPS technology. This technology enabled them to have an online presence and appear as virtual avatars on computer screens. At the same time, they

were also physically present in the 'actual city' where the performance was taking place. Unlike the players, the runners' engagement with the city did address the lower levels of perception, since they were physically present and immersed in the environment of the city. All of the runners received substantial training before they performed with the players. They devised performative tactics such as the 'sweep', where they would maintain a line and sweep large portions of a region in the hope of catching players out. There was also a sense of group identity and of being beyond the physical environment created by the costumes and the 'advanced' GPS technology (advanced at the time) that distinguished them from common pedestrians. What also created the group identity were the rehearsed routines of physical movements adopted by the runners. As Damasio suggests, physical interaction with the environment can induce background emotions, alertness and low-level attention, which combine to become essential emotive layers that constitute core consciousness and lie at the basis of constructing a 'behavioural score' (2000, 95) – or what Richard Schechner (2002) terms 'performance flow'. This in turn is an essential component in constructing a sense of self and in turn identity. The physical interaction with the city thus enabled the runners to create a sense of identity and engagement through experiencing core consciousness in ways that the interaction of the individual players behind computer screens did not.

The experience was by no means one that would purport to a sense of cohesive homeostasis of perception. Despite the training and the fact that the runners were accustomed to the technology, the design of the pervasive game purposefully interrupted the correspondence between the virtual and the physical city. This dislocation was very evident in the performance of *Can You See Me Now?* in Rotterdam in 2003, when the buildings and sites in the virtual city did not exist in the real city but were marked by a wire frame mode. As Benford and Giannachi suggest, this was done to create an 'effect of stretching the temporal frame of the game to include future designs of the site' (2011, 33). There were glitches in the way the whole system operated, and as a result there were interruptions in the way the GPS and WIFI updated the information about the positions of players and runners in the game. Online players were mostly unaware of these discrepancies, whilst the runners had the advantage of having access to information without any lag or interruptions in the flow of data. This knowledge enabled them to attempt error management strategies that did not always work, but they were also able to manipulate the game situation to their own advantage. Instead of cohesion and integration of the real and virtual experiences, there was an open manipulation going on between the players and the runners. Runners often cheated or exploited the system, be it through lag or data manipulation, in order to catch the players. Conversely, players shared information amongst themselves in order to outsmart the runners. Much of this manipulation transcended the initial design and architecture of the piece. In that sense, the Rotterdam performance transcended the code ramifications of the project and to an extent its very technological basis. The codified framework of the virtual city was not in control of the physical environment. On the whole, these discrepancies and disorientations exposed and questioned the reliability and transparency of the media being employed, bringing forth the notion that maps never represent reality accurately.

No matter how accurate and immersive technology becomes, there is always a spatial gap and a temporal lag between the simulation and the real world. In *Can*

You See Me Now? the virtual city had a somewhat flexible relationship to the real city. At times the match between the two cities was almost identical; the virtual and the real pavements matched and appeared to be perfectly synchronised. At other times there was divergence between the two cities and they appeared to be distant from one another. For example, traffic was not present in the virtual city but also at times the runners' and players' positions were not updating properly. Thus *Can You See Me Now?* engendered an asynchronous gap between time and space. This gap exposed the difference between the aforementioned two modes of engagement; one that emphasised the processes of core consciousness pertaining to the runners' perspectives and one that emphasised the extended consciousness that was experienced from the players' perspectives.

By exposing the discrepancies between virtual and the physical engagement, *Can You See Me Now?* deconstructed in a philosophical sense the homeostasis of perception that is often elicited by mainstream mixed reality environments. This was done by making explicit the ways in which mixed reality performances such as *Can You See Me Now?* re-calibrate the sensitivities of physical engagement. Unlike many products of contemporary cybernetic culture (such as immersive computer games) that emphasise the experience of extended consciousness in the virtual sphere, *Can You See Me Now?* addressed many layers of the sensory movie-in-the-brain, thus reflecting on the cultural impact of this re-calibration through new media technologies.

Finally, I would like to look at how *Can You See Me Now?* addresses some of the ethical implications inherent in the aforementioned cultural shift towards the virtual. The game has been criticised for inducing a sense of military manipulation, due to its use of surveillance and the possibility of manipulating runners into risky situations (Benford and Giannachi 2011). At one stage in the game, some of the players reported feeling concerned for the runners. After all, their actions were potentially placing the runners in situations of considerable physical danger, since the performances took place in the middle of busy cities. This notion again emphasises a discrepancy between a virtual non-consequential simulation and the real world, with the position of a potentially irresponsible voyeur on one side and that of a real witness implicated in an event. But there is more at stake here since an ethical engagement with an Other may require a direct, immediate experience of reality. Emmanuel Lévinas' concept of the face-to-face encounter with the Other may shed some light on this relationship.

Edith Wyschogrod in her discussion of Lévinas' ethics in art argues that for Lévinas 'ethics is an unmediated relation to the *Other*' (Wyschogrod in Peperzak 1995, 137; emphasis added) because it essentially transcends linguistic and conceptual structures by means of a non-linguistic access to the Other. For Lévinas, the routes of access or 'interfaces' with the Other are essentially non-linguistic. They include 'the human face, an idea of the infinite that exceeds any description of it, sensation as a non-cognitive relation of sensing and sensed' (Wyschogrod in Peperzak 1995, 137). Drawing on the face-to-face relationship with the Other in Lévinas, I will analyse the context of the discrepancy between the physical and the virtual in *Can You See Me Now?* where the gallery participants did not have face-to-face contact with the players in the city.

According to Lévinas, the face is more than just a sign or a symbol and perception of someone's face in 'reality'. I would add that the face offers exclusive

cognitive stimuli that cannot be experienced in a virtual environment, which in turn is essential for a fully fledged ethical engagement with the Other. Andrew Tallon elaborates on how we might approach the concept of the face-to-face relationship with the Other: 'the reason why the face communicates more meaning than itself is that there is an affective co-naturality not between my knowing and the other but between my being and the other' (Tallon in Peperzak 1995, 111).

What Tallon is arguing is that a face-to-face encounter privileges affective responses. This resonates with Damasio's model where the face-to-face encounter would address the layers of core consciousness in which affective responses can be directly induced. If we were to apply this concept to the experience of *Can You See Me Now?* by considering the two polar experiences of the physical realm, on the one hand, and the virtual realm, on the other, then one could argue that the virtual experience will not satisfy the necessary conditions for an unmediated face-to-face encounter with the Other and thus compromise the possibility of developing a fully ethical dynamic between the players in the gallery and the runners in the city. This is because the experience of the performance through the virtual environment is predominantly based on semiotic readings of avatars that are signs and symbols on a computer screen. There is no direct engagement with the living human beings they represent. The affect, emotions and excitement resulting from the game viewed on screen are thus first mediated through the intentional (semiotic) aspect of avatars; hence, any affect towards the Other arises from intentional sign systems. Obviously there is a physical dimension to the gallery experience as well but that is not directly related to the runners and nor does it comprise a face-to-face encounter with them.

The players in the gallery therefore have to use their imagination in order to contextualise a set of circumstances that would enable them to develop a fuller ethical stance towards the runners; however, such imaginations often prove far too limited. In contradistinction to this, a face-to-face encounter in the physical realm engenders the possibility of immediate response, one where an unmediated relationship with the Other may be induced. As Tallon suggested, the ethical dimension of the face-to-face encounter is not predicated on the 'knowing' of the Others 'real' circumstances, but rather on the 'being' present within the same set of circumstances as the Other. Thus, by being denied such an encounter with the runners, the players in the gallery were divested of that 'unmediated' level of engagement which would have enabled them to develop a fuller ethical stance. Lévinas' theory helps to understand how different ontological modes of encountering the Other carry different possibilities of ethical engagement. This further expands on the implications of the discrepancies between the physical and the virtual in *Can You See Me Now?* and the implications of the cultural shift towards digital social interaction that, as I have argued, the piece negotiates.

Conclusion: the post-virtual age

In this article, neuroscientific theory was used as part of a hybrid methodology for performance analysis in order to argue how mixed reality performance questions the role of physical participation in the new media landscape in terms of cultural and ethical implications. This approach also enabled me to consider cognitive and

neuroscientific theories as ways of understanding subjectivity and participation in technologically driven and scientifically inspired new media performance. These theoretical approaches prove insightful and appropriate as a means of exploring subjectivity in a progressively technologically laden culture since they are often based on scientific developments that are technologically driven themselves. Technological development thus becomes a discursive context that informs both the analysis of the works in question and the theory of the mind that supports it.

Finally, in a speculative bent, I would like to reflect on the future implications of some of the issues raised in this article. Even though performances such as *Can You See Me Now?* seem to imply a somewhat sceptical, deconstructive stance, it is worthwhile to consider the fact that digital culture has and is still undergoing radical changes that will impact the way in which we engage and perceive reality. With the advent of ubiquitous computing there is an ever-increasing tendency to perceive technology as a transparent, integrated component of everyday life. One example would be Google's 'experiment': Google Glass, a post-PC device in the form of glasses that overlays an augmented reality directly onto the user's field of vision in real time. Ironically, such attempts at integrating the virtual and the real render the virtual an invisible backbone of daily experiences. A more extreme example of the emergent post-virtual technology would be the creation of an artificial retina. An artificial retina would create a virtual image of the world, allowing, for example, a portion of blind people to regain sight. In the case of this integration, from the perspective of the user's daily experience there would no longer be an immediate empirical way of making a distinction between the virtual and the real image. Such devices would herald the coming of a post-virtual age, where virtual media would no longer strive for transparency but would replace the immediacy of the real by replacing the medium of the user's brain itself.

In many ways, mixed reality performances ask whether it is important to draw and consider these distinctions. Are mixed reality performances a sight of resistance towards these shifts in digital culture advocating for the value and importance of physical participation in everyday life? Or is the craving for 'natural perception', physical experiences and corporeal perceptions a somewhat outdated, romanticised tendency in contemporary arts and criticism? Perhaps such arguments are reflective of an ecological turn and are expressive of a romanticised fear of losing one's physical, material 'origins' – a particular form of philosophical disavowal. Perhaps a more radical direction can be taken, as suggested by the concept of the posthuman put forward by Hayles, in which the human and the technological become coupled together and it is 'no longer possible to distinguish meaningfully between the biological organism and the informational circuits in which it is enmeshed' (1999, 35). In order to embrace such a posthuman condition, it may be necessary to think outside culturally established binary oppositions such as body/technology and materiality/virtuality, and accept the concept of the posthuman as one that is essentially hybrid and in a constant process of evolution. Perhaps contemporary performance art and the theories of the mind that are driven by technological and scientific development will have a future purchase in furthering our understanding of the posthuman condition and informing new ways of 'becoming' posthuman in a progressively digital age.

Note

1. See http://www.blasttheory.co.uk/projects/can-you-see-me-now/ Accessed July 7, 2014.

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