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Eerie Prostheses and Kinky Strap-Ons:
Mori's uncanny valley and ableist ideology

Abstract

In his paper 'The Uncanny Valley' (1970), Masahiro Mori advises designers to avoid high degrees of human likeness in prosthetic body parts in order not to evoke uncanniness. Building on a discussion of the difference in the commonly experienced uncanniness of 'realistic' looking prosthetic hands and strap-on dildos, this paper argues that Mori's hypothesis and his approach to design are based on an essentialist concept of the human body, which is complicit in the persistence of ableist body ideologies. Reading recent empirical research on the uncanny valley in the context of Jentsch's and Freud's writing, it is suggested that the design of body-related artefacts should promote, rather than avoid, repetitious uncanny experiences. Such a project aims to diminish uncanniness through 'force of habit', thus facilitating the acceptance of a broader variety of bodies as equal.

Introduction

Masahiro Mori's hypothesis of the 'uncanny valley' has been used extensively as an analytical and conceptual tool in new media art, animation and games design (e.g. Beer and Guez 2013; Schneider, Wang and Yang 2007; Tronstad 2008). In 'The Uncanny Valley' (2005 [1970]), Mori reflects on the difference in the way industrial robots, developed with a focus on functionality, and humanoid robots, which are designed with an interest in human likeness, are experienced. Whereas industrial robots bear little resemblance to human bodies and usually do not evoke a sense of 'familiarity', toy robots with limbs and facial traits that resemble the composition of a human body are more frequently experienced as familiar. However, Mori argues that the experience of familiarity of robots and prosthetic limbs does not increase linearly according to their degree of human likeness. If likeness is further increased beyond the example of the humanoid toy robot, as is the case in certain cosmetic artificial limbs and humanoid robots such as Repliee Q1 and Q2[1], the robot or prosthesis is experienced as uncanny[2]. Mori suggests that whereas prosthetic limbs built with a focus on functionality evoke a sense of 'sympathy', a prosthetic hand that shows great likeness in appearance with a 'real' hand is uncanny. The uncanny valley then, is apparent in a graphic representation of different degrees of human likeness in robotics and prosthetics design, set out against the degree of familiarity they are expected to evoke (figure 1). Applying this graph as a guideline in technology design, Mori concludes that designers should avoid the uncanny valley by means of developing technologies with a 'safe familiarity by a nonhumanlike design' (2005 [1970], n.p.).

In this paper, I will suggest that Mori's hypothesis and his call to avoid uncanniness in design practice are based on an essentialist concept of a 'whole' human body, which is complicit in the persistence of ableist body

ideologies[3]. I will consider the commonly experienced heightened degree of uncanniness of a realistic looking prosthetic hand in comparison to another realistic looking prosthesis, which is not usually experienced as uncanny: the strap-on dildo. Contextualizing this difference in recent empirical research into the uncanny valley, I will then suggest that the supposed eeriness of a realistic looking prosthetic hand should be attributed to its perception in relation to a body that is considered 'incomplete', rather than – as Mori's hypothesis suggests – its close likeness to a 'real' human hand. The paper will conclude with a discussion of Ernst Jentsch's and Sigmund Freud's writing on the uncanny as a dynamic phenomenon, which may diminish through repetitious experience or associative working through. Building on this, I will propose that the design of body-related artefacts should promote, rather than avoid, repetitious uncanny experiences, in order to facilitate an acceptance of 'ability diversity' (Wolbring 2008: 257) in our experience of bodies that do not conform to a narrow band of species-typical normative physical characteristics.
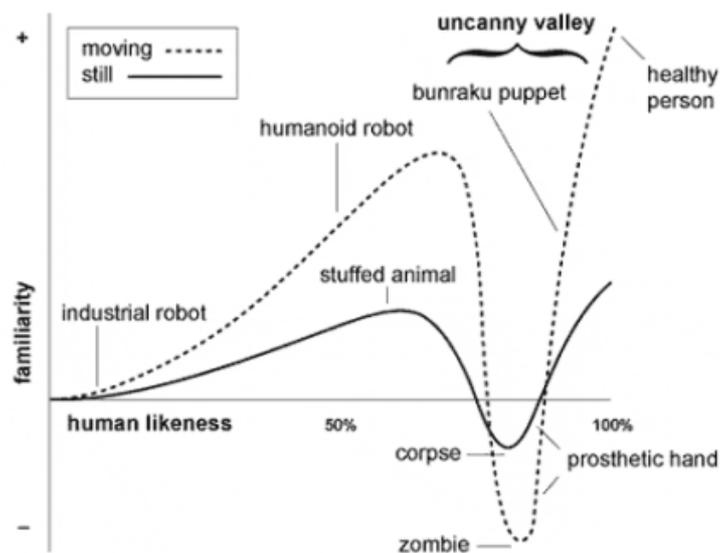

Figure 1: Mori's uncanny valley (Mori 2005 [1970]).

Robotic prosthetics have been explored by artists and cyberneticists such as Stelarc and Kevin Warwick. Stelarc has developed a robotic hand (*Third Hand*, 1976-1981; figure 2) and work that extends the artist's body with larger robotic structures (*Exoskeleton*, 1998; *Movatar*, 2000). Similarly, Kevin Warwick's *Project Cyborg 1.0* (1998) involved an artificial hand controlled through signals emitted by implanted microchips. Indeed, when we compare these industrial-looking artificial limbs with the 1970s realistic-looking prosthetic hands Mori refers to (figure 3), the uncanny valley hypothesis appears to be sustained: Stelarc's and Warwick's prostheses evoke a certain familiarity in that their shape and movement show a degree of resemblance to those of human limbs, yet they do not have the eerie quality that we may attribute to the prosthetic hand or other artificial limbs that show greater visual likeness to human body parts.
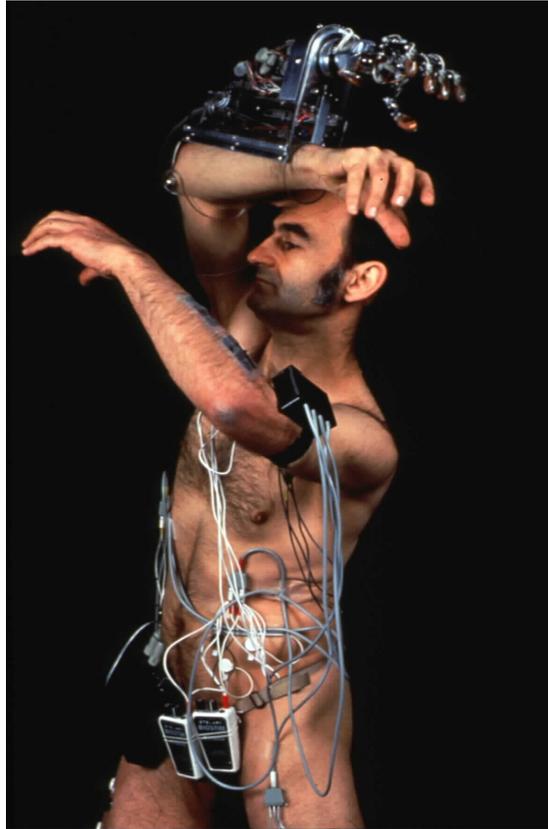
Figure 2: Stelarc – Third Hand (1976-1981). Photo by Simon Hunter.

Figure 3: Latex prosthetic hand, 1970s. Smithsonian National Museum of
American History
(http://invention.smithsonian.org/centerpieces/inventingourselves/pop-ups/01-
03.htm [accessed 2/11/2013]) © The Smithsonian Institute

There are other kinds of prosthetic body parts where Mori's model does not
seem to apply so neatly though. An example of a prosthetic device that hardly
ever evokes a sense of uncanniness is the strap-on dildo (figure 4).
Regardless of how detailed the manufacturers simulate veins and skin
pigmentation, this artefact seems far less likely to be associated with the
uncanny than the prosthetic hands Mori alludes to. The quite 'realistic' looking
example here more probably affords a sensation of kinkiness than it is

considered eerie[4]. Does this suggest that the uncanny valley hypothesis is false or inaccurate?

Figure 4: Strap-on dildo

In a recent study, psychologists Burleigh, Schoenherr, and Lacroix (2013) presented experimental subjects with a range of computer-generated representations of human faces. They performed two experiments. In the first experiment, subjects were presented with a continuum of facial representations with increased geometric realism and prototypicality (i.e. adherence of the face's shape to normative expectations of human appearance). Participants were asked to rate the degree of human likeness, as well as the degree of 'eeriness'[5] they experienced for each of the generated facial representations. The outcome of this experiment showed that human likeness and perceived degrees of eeriness are linearly correlated; the more human like the image, the less eerie (or more 'familiar') it was experienced. In other words, the experiment suggested that Mori's uncanny valley hypothesis does not hold true.

In order to explain how previous empirical research outcomes by other psychologists could have been interpreted in support of the hypothesis (MacDorman & Ishiguro, 2006; Mitchell et al., 2011; Saygin et al., 2011; Seyama & Nagayama, 2007) Burleigh et al. conducted a second experiment. For this experiment two continua of human likeness were generated. The first was limited to what the researchers describe as the 'ontological category of humans' (2013: 761), whilst atypical human features were introduced along the continuum ('unnatural' skin colour and an enlarged eye). The second continuum merged human and non-human categories and featured hybrids of human faces with those of a goat-like creature. Responses to the first continuum were comparable to those in the first experiment, i.e. perceived degrees of human-likeness and eeriness were linearly correlated. However, the continuum introducing non-human features showed a heightened level of eeriness and lower level of pleasantness around the mid-point of human likeness. Based on these findings, Burleigh et al. suggest that the uncanny valley is not directly related to the degree of human likeness. Instead, the valley seems to occur where stimuli located at a mid-point between two ontological categories elicit a negative affect due to ambiguous and conflicting

interpretations; uncanniness results from a 'category conflict' where the subject is unsure whether what is perceived is human or non-human.

Now, let's return to the strap-on dildo and the realistic-looking prosthetic hand. Why is the prosthetic hand more likely to evoke a sense of uncanniness than the realistic looking dildo? Following Burleigh et al., the hand may be more likely to evoke a 'category conflict' because the beholder is unsure whether the hand is an actual human body part, or a non-human substitute for a missing 'real' hand. The strap-on does not pose this difficulty; it is usually perceived as an addition to an 'able', whole body. Regardless of the degree of human likeness of its appearance, there is no doubt about the non-humanness (or 'unnaturalness') of the artefact, and accordingly it is unlikely to evoke an uncanny experience.

As I mentioned above, in the conclusion of his paper, Mori calls for designers to steer away from high degrees of human likeness in their artefacts, in order to avoid the uncanny. Pointing to their finding that the uncanny valley is not a result of a higher human likeness of features, but of ontological category conflicts, Burleigh et al. recommend that there is no reason for digital designers not to aim for high degrees of human likeness in terms of graphical texture resolution and polygon count of computer-generated models. However, they recommend avoidance of the combination of human and non-human features. This may sound like a sensible suggestion if we accept that categories of the uncanny are stable and a confrontation with something we experience as uncanny is per definition negative. However, on paying closer attention to the concept of the uncanny this position is less self-evident: if we consider Jentsch's and Freud's original accounts of the concept it becomes apparent that the nature of the uncanny should not necessarily be conceived in ontological terms.

In what is generally regarded as the first publication on the concept of the uncanny, psychologist Ernst Jentsch (1997 [1906]) argues that experiences of the uncanny are triggered by an uncertainty concerning the animatedness of an object. Referring to a human skeleton, he suggests that uncanny objects evoke 'thoughts of latent animatedness' (1997: 15). Thus, in a somewhat similar vein to Mori, Jentsch attributes the experience of the uncanny to the closeness in appearance of the skeleton to aspects of a living human body; the skeleton looks as if it *could* be animate. In response to Jentsch, Freud (1919) suggests that instead of a 'latent animatedness', the uncanny is evoked by the revival of either 'primitive beliefs' or 'infantile complexes'. The former concerns experiences where rejected and/or repressed beliefs about the animatedness of the environment appear to be confirmed by a certain experience. For example, the occurrence of nocturnal noises in a derelict building may suggest to a subject that ghosts exist, despite her or his conscious rejection of this notion. The latter involves experiences where the subject is confronted with infantile desires that have been repressed since childhood. As an example, Freud mentions the uncanniness of things that remind us of our inner 'compulsion to repeat' (1919: 237) – a tendency which threatens to overrule the pleasure principle – such as the encounter of a

'double', or the repetition of the same character-traits or events in seemingly unrelated persons or situations.

A detailed discussion of the differences between Freud's and Jentsch's positions on the nature of the uncanny is beyond the scope of this paper, but what is of interest here are the perspectives of both psychoanalysts on the dependency of the uncanny on a degree of coherence and consistency in the subject's experience. Freud suggests that uncanny experiences, particularly those related to a revival of primitive beliefs, are not necessarily triggered by an actual encounter with an object or event, but may also occur in fiction, on the condition that 'the setting is one of material reality' (1919: 250). When we read a work of fiction that establishes a world that we believe to be 'real' or 'realistic', occurrences that suggest the existence of super- or outer-natural phenomena within that world are likely to be experienced as uncanny. Thus, instead of resulting from a certain relation to a stable ontological realm, the uncanny should be seen in the context of a symbolic system, which needs to be *believed* true or realistic by the subject.

Jentsch also refers to the instability of the uncanny and its dependency on the subject's belief with a certain coherence of experience. Drawing from his experiences with patients he states that:

> Apart from the force of habit, the associative working through of the awkward affect that mostly occurs in [a repetitious uncanny experience] plays a very significant part in the affect's disappearance. *Whether this working through is factual or not is of no great importance*, as long as its final result is accepted by the individual (1997: 15; emphasis added).

Thus, Jentsch's perspective also suggests that the uncanny should be seen in relation to a symbolic system. Through a repetitious associative process the phenomenon in question can be incorporated into this structure and will lose its uncanniness as a consequence.

If the uncanny is an affect that is dependent on a subject's belief in a certain constitution of the 'real' world, and may disappear either through habit or an associative working through, the 'category conflict' Burleigh et al. refer to should not necessarily be considered of ontological nature. Indeed, when approached from the perspective of theories in posthumanism (e.g. Hayles 1999; Wolfe 2010), the categorization of what is 'human' is neither universal nor stable.

The difference between the prosthetic hand and the strap-on dildo is that the former is perceived as a substitute for something believed to be *missing* from an 'incomplete' human body, whilst the latter is more likely to be regarded as a kinky addition to an 'able' body that is 'whole'. In other words, the uncanniness of the realistic looking prosthetic hand lies in its function as an indexical signifier for bodies that are considered incomplete. If we adopt a psychoanalytical perspective, we could argue that the hand functions in terms of Freud's second category of uncanniness, in that it evokes an infantile

complex: the prosthetic hand can be regarded as a referent for the *corps morcelé*, a fear of the fragmented body which has been repressed since the mirror stage (Lacan 1949). However, what I am interested in here is not so much the relevance of psychoanalytical theorizations of the mirror stage as the humanist concept of the 'whole' human body, which arguably underpins the notion of this supposed fear of a 'body in pieces'. Cary Wolfe has rightly argued that despite humanism's intention to promote the treatment of people with disabilities with equality and respect, humanism reproduces 'the very kind of normative subjectivity – a specific concept of the human – that grounds discrimination against […] the disabled in the first place' (2010: xvii). The fact that an essentialist, unchangeable concept of the human body is at the very centre of humanist thought means that bodies that do not correspond to this model are per definition classified as different and unequal. In this context, the uncanniness of the prosthetic hand can be seen as a manifestation of an essentialist and ableist idea of 'the' human body, which is narrowly defined in terms of a stable set of characteristics.

Following Jentsch and in accordance with posthumanist critiques of essentialist concepts of the human body, a repetitious experience of – or conscious engagement with – the uncanniness of the prosthetic hand would facilitate the integration of the prosthetic hand in the symbolic system of our concept of the human body. It would no longer act as a signifier for a lack of 'normal' humanness in the context of a fixed idea of a 'whole' body with two hands. Thus, just like a body without a strap-on is not commonly perceived as incomplete or disabled (*pace* dubious psychoanalytic suggestions of female bodies 'lacking' a penis), the 'un-uncannying' of the prosthetic hand could play a role in the acceptance of a body with one or no hands as a normal human body.

Mori's and Burleigh et al.'s advice to designers to avoid the uncanny in their work may be sensible from the perspective of product sales optimization in the current market economy. However, as I have argued in this paper, this approach eventually reinforces the narrow set of cultural beliefs of what constitutes a 'whole', 'healthy' human body, which is central to the discrimination of bodies that fall outside this constructed category of the normal and the natural. Instead, wouldn't it be preferable for artists and designers to aim for the uncanny, and stubbornly forge 'category conflicts' where commonplace ideas of 'the' human body are merged with cultural categories of the abnormal, unnatural and unhealthy? Let us produce so many uncanny artefacts that the 'force of habit' will teach us to experience an infinite variety of bodies as equal!

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1 Repliee Q1 and Repliee Q2 are so called Actroids, sophisticated humanoid robots that have been developed at Osaka University, Japan, in collaboration with Kokoro Company Ltd. from 2002.
2 Mori does not define the term 'uncanny' in his paper. Throughout the present paper, I use the term in accordance with Oxford Dictionary of

English's (2010) broad definition as 'strange or mysterious, especially in an unsettling way'.

3 Ableism is the cultural practice of labelling 'real or perceived deviations from or lack of "essential" abilities' of a body as 'a diminished state of being' (Wolbring 2008: 253).

4 Needless to say, the strap-on dildo is a culturally loaded artefact that touches on interesting debates on the performativity of gender and sexuality. However, these aspects are not of key relevance for the purposes of the present paper. Here, I focus on the characteristics of this artefact in terms of the perception of its connection to the user's body.

5 Burleigh et al. use the more colloquial term 'eerie' to describe the uncanny in their experimental questions.

References

Beer, S., Guez, J. (2013), 'Ideas about VR&AR as a new genre in fine arts'. VRIC '13 Proceedings of the Virtual Reality International Conference: Laval Virtual, Article No. 16.

Burleigh, T.J., Schoenherr, J. R., Lacroix, G. L. (2013). 'Does the uncanny valley exist? An empirical test of the relationship between eeriness and the human likeness of digitally created faces', Computers in Human Behavior, 29, pp. 759–771.

Freud, S. (1919), The 'Uncanny'. In: *The Complete Psychological Works of Sigmund Freud*, vol. 17, ed. and tr. James Strachey et al. (London: Hogarth. 1955), pp. 217-56.

Hayles, N. Katherine (1999). *How We Became Posthuman, Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago, IL: University of Chicago Press.

Jentsch, E. (1997 [1906]), 'On the psychology of the uncanny', Angelaki: Journal of the Theoretical Humanities, 2 (1), pp. 7-16.

MacDorman, K. F., & Ishiguro, H. (2006). The uncanny advantage of using androids in cognitive and social science research. Interaction Studies, 7(3), 297–337.

Mitchell, W. J., Szerszen, K., Sr., Lu, A. S., Schermerhorn, P. W., Scheutz, M., & MacDorman, K. F. (2011). A mismatch in the human realism of face and voice produces an uncanny valley. i-Perception, 2(1), 10–12.

Mori, M. (2005 [1970]), 'The Uncanny Valley', tr. Karl F. MacDorman and Takashi Minato. [online]. Available at: http://www.movingimages.info/digitalmedia/wp-content/uploads/2010/06/MorUnc.pdf (accessed 23/4/2013).

Oxford Dictionary of English (2010). 3rd ed. Oxford: Oxford University Press.

Saygin, A. P., Chaminade, T., Ishiguro, H., Driver, J., & Frith, C. (2011). The thing that should not be: Predictive coding and the uncanny valley in perceiving human and humanoid robot actions. Social Cognitive and Affective Neuroscience, 7(4), 413-22.

Schneider, E., Wang, Y., Yang, S. (2007), 'Exploring the Uncanny Valley with Japanese Video Game Characters', Situated Play, Proceedings of DiGRA 2007 Conference.

Seyama, J., & Nagayama, R. S. (2007). The uncanny valley: Effect of realism on the impression of artificial human faces. Presence: Teleoperators and Virtual Environments, 16(4), 337–351.

Tronstad, R. (2008), 'The Uncanny Valley in New Media Art', Leonardo Electronic Almanac, 16(2-3).

Wolbring, G. (2008). The Politics of Ableism. Development, 51(2), 252–258.

Wolfe, C. (2010). *What is Posthumanism?* Minneapolis, MN: University of Minnesota Press.

Biography

Dani Ploeger is an artist and theorist, working in Brighton and London. His performance installations involve consumer technologies and readily available medical devices and explore themes around the technologized body, sexuality and vanity. His artwork has been featured in museums and galleries in Europe, the United States and China and his writing has been published in academic journals in the field of cultural studies and digital arts. Dani holds a Ph.D. from the University of Sussex and lectures and researches at The Royal Central School of Speech and Drama, University of London. www.daniploeger.org