

## From agency to apperception: through kinaesthesia to cognition and creation

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**Abstract.** My aim in this paper is to go some way towards showing that the maintenance of hard and fast dichotomies, like those between mind and body, and the real and the virtual, is untenable, and that technological advance cannot occur with being cognisant of its reciprocal ethical implications. In their place I will present a softer enactivist ontology through which I examine the nature of our engagement with technology in general and with virtual realities in particular. This softer ontology is one to which I will commit Kant, and from which, I will show, certain critical moral and emotional consequences arise. It is my contention that Kant's logical subject is necessarily embedded in the world and that Kant, himself, would be content with this view as an expression of his inspired response to the "scandal to philosophy... that the existence of things outside us... must be accepted merely on faith" [BxI]. In keeping with his arguments for the a priori framing of intuition, the a priori structuring of experience through the spontaneous application of the categories, the synthesis of the experiential manifold, and the necessity of a unity of apperception, I will present an enactivist account of agency in the world, and argue that it is our embodied and embedded kinaesthetic engagement in our world which makes possible the syntheses of apprehension, reproduction and recognition, and which, in turn, make possible the activity of the reproductive or creative imagination.

**Key words:** adultery suit, enactivism, imagination, Kant, kinaesthesia, technology, virtual reality

### Introduction

Traditionally, and predominantly occidentally, we have attempted to make sense of our world in terms of a series of ontic and epistemic dichotomies that divide the internal from the external, the mind from the body, ethics from science and, with the advent of new experiential technologies, the virtual from the real. But with a greater emphasis now being placed on the dynamic coupling and enactive engagement of the agent with its environment, where agent and environment are experientially inseparable, a reconsideration of these hard distinctions is now essential. Since it is an intentional cognitive process that motivates us to make these distinctions I propose that we carry out our reconsideration of these divisions in terms of the very thing that makes that cognition possible – consciousness – and that we look especially at pre-reflective bodily consciousness and imagination in an effort to develop a softer ontology, one which encompasses our notions of embedded, situational, and extended minds.

With the advent of cyberware and cyber-implants,<sup>1</sup> virtual reality simulators,<sup>2</sup> and mirror boxes<sup>3</sup> – to all of which we will return – our capacity to distinguish the mental from the physical, and our perception of the real from our perception of the illusory or virtual, has been made increasingly problematic. Even the most resolutely common-sensical of philosophers (Reid 1764/1997; Moore 1925) might be forced to admit that distinguishing between mental facts and physical facts is much less straightforward than it may one time have seemed to be.

With a softer ontology, by which I mean a singular experiential system where our phenomenology is primary, our embodied boundaries will be less easily

<sup>1</sup> Hardware implanted in the human body to act as an interface between the central nervous system and a computer or other machinery to which it is connected; see, for example, <http://www.kevinwarwick.com/>.

<sup>2</sup> See, for example, <http://www.vrealities.com/vrsim.html> and <http://www.haptica.com/>.

<sup>3</sup> A device set up to give the perceiver the illusion of visual feedback of an amputated arm; see, for example, [http://en.wikipedia.org/wiki/Mirror\\_box](http://en.wikipedia.org/wiki/Mirror_box).

discernible and the division between inner and outer, self and non-self, natural and artificial, and even the morally- and politically-laden, them and us, will blur. But at first glance, a softer ontology, one which conceives of the agent and environment as a dynamic unity and not individual units, may not seem one into which Kant's metaphysics of 'inner' and 'outer' can easily be placed (Kant 1787/1929). However, if I can show that within Kant's framework the spontaneous application of the categories and the subsequent development of a reproductive imagination require a dynamically active and enactive agent existing as part of a metaphysically singular experiential system, then Kant's 'inner'/'outer' distinction will dissolve. It is also true that, contra Locke (1690/1970), Kant's transcendental ego actively organises and unifies its sensory manifold to produce the world as it appears to it rather than the world as it is, so Kant would, I am sure, be sympathetic to the dissolution of this distinction.<sup>4</sup>

It is a metaphysical shift that has, at least, two significant moral implications. Firstly, if our experience and knowledge are grounded in spontaneous, actively engaged phenomenal enquiry and feeling, and we are – or we will be in the very near future – unable to distinguish virtual from empirical realities, then the sensations and feelings we experience in the fully-immersive virtual world will be every bit as real for us as those we experience in the real world and it is, at least, arguable that, if we cannot tell the difference, then they will have, or even ought to have, the same moral and emotional consequences.<sup>5</sup> Secondly, the conception we might still cling to of an 'external' science as distinct from an 'internal' ethics will prove still less sustainable when our lives and experience are demonstrated to be inseparable from the biological facts about our experience and our living.

### **Enactivism: the softer ontology**

The cognitive view of the mind, the view that the mind is symbolic and representational, and reducible to a set of physical states and processes that

<sup>4</sup> There is no attempt here to deny the distinction that Kant makes between the phenomenal and the noumenal realms, nor, following Langton (1998), is there any attempt to claim that we can be anything other than experientially humble about the noumenal.

<sup>5</sup> It would be less strain logically to go for an indistinguishability claim rather than an identity one, and it has the additional value of not weakening the point being made, but the point is strong enough to stand as it is.

can be fully explained through scientific experiment and analysis, unseated behaviourism and came to prevail as the predominant explanation for the mind in the second half of the twentieth century. It is now, itself, being unseated by enactivist approaches. Enactivism emphasises the agent's situation and embodiment in terms of its active, non-symbolic, non-representationally-based engagement in its world. It is essentially anti-dualistic, but unlike cognitivism's inclination towards a monist materialism, the enactivist ontological commitments are not so straightforward. The agent is embodied and dynamically-coupled to the world in which she is embedded; thus, agent, world and action are necessarily intricately interwoven, and the agent's body, experience, action, and world shape the way in which she deals with her everyday pragmatic concerns. There is an inseparability of mind and world, and it is embodied practice rather than cognitive deliberation that marks the agent's engagement with its world.<sup>6</sup>

The body's enquiry about its world is based on the "history of the variety of actions that a being in the world performs" (Varela et al. 1991, p. 9), and through a sensori-affective, felt dynamics, we build up non-conscious intentional expectations about how our world will continue to be. In agent-directed muscular movement, whether it is taking a step forward, reaching out with a hand, or simply looking around a room, we are asking tacit, non-propositionalized questions about our world and our position in it (Cotterill 1995, 1998). In our perpetually enquiring state we are plenivalent, both inside – proprioceptively and kinaesthetically – and out – visually, auditorially, tactilely, olfactorily, and gustatorily. Our bodies are fully 'switched on' to their world, perceiving, receiving, imagining, expecting and actuating. For example, our fully sentient engagement with our world is expressed through the homeostatic self-regulating system that enables the maintenance of a bodily chemical equilibrium, the activity of the vestibular apparatus in the inner ear in conjunction with the attitude of the body, and the subtle haptic pressure we put on, for example, the black currant – we have first detected and selected with our visual system – when we are checking if it is ripe enough to pick; they are also examples of the pre-reflective questioning that goes on automatically without the necessity for the agent's self-conscious engagement.

<sup>6</sup> Viz. Merleau-Ponty (1962); Johnson (1990); Chiel and Beer (1997); Clark (1997); Damasio (1999); Lakoff and Johnson (1999); Seitz (2000); Dobbyn and Stuart (2003); Gallagher (2005); Legrand (2006); Ziemke (2003, 2007); Stuart (2007a, b); and others to numerous to mention.

Thus it is that the enactive system “[t]hrough a network consisting of multiple levels of interconnected, sensorimotor subnetworks”, possesses a “structural coupling that brings forth a world” (Varela et al. 1991, p. 206).

When this approach is read in conjunction with Gibson’s affordance-based theory (Gibson 1979), we have an agent who is dynamically coupled to her environment in such a way that some things present themselves as having an affordance for her that others do not. For Gibson, these things afford the organism action possibilities: they structure the world for the agent in a particular opportunity-maximising way. If we go further and add, through Norman’s qualification (1988), the explicit inclusion of the mental world for the agent, then we have not just the physical capacity of the agent, but her goals, plans, values, beliefs and interests – all of which play a part in structuring and bringing forth her world.

This presents us with a picture of the agent and her environment as experientially inseparable, and the content of the agent’s experience is the result of her “temporally extended, active, and attentional encounter with the environment” (Noë and Thompson 2004, p. 17), though it might be wise to caution here that ‘attentional’ should be read as ‘aware’ or ‘plenisentient’ and not as fully focused, floodlit conscious experience. It is, as Sheets-Johnstone says, that:

Perceptions are plaited into my here-now flow of movement just as my here-now flow of movement is plaited into my perceptions. Movement and perception are seamlessly interwoven; there is no ‘mind-doing’ that is separate from a ‘body-doing’. (1999, p. 487).

This view means in particular, *contra* the Cartesian mind-body split, that “We are thinking in or maybe even with the body. The psyche and its inner world arise within and between biological systems or bodies” (Brier 2007). So, it is in the tactile-kinaesthetic, even tactile-visual-kinaesthetic, interplay that we ask questions about, that is, actively experience or apprehend our world, reproduce past elements in the creation of a coherent narrative, recognise the answers we have been expecting, and react, in our thrownness,<sup>7</sup> to those we have not. Thus, it is this dynamic sensory-kinaesthetic-proprioceptive engagement that enables conceptualisation and learning, and we will see later how this view might be articulated in Kant’s first *Critique* (Kant 1787/1929).

## Experiential technology and enactivism

If there is one fundamental truth about experience, it is that it will be convincing only if it produces the appropriate visceral, emotional, and cognitive effects in the experiencer. The experience of a photograph of your loved one will not produce the same level of bodily response as the experience of your loved one in the flesh, and it would be unlikely that anyone would confuse the two experiences. But a good three-dimensional holographic simulation of your loved one reproduced in a convincing, that is, not unusual or unexpected, virtual reality scenario might accomplish just that.

We like to feel ourselves pretty adept at distinguishing the real from the unreal but our capacity to do this is diminishing as the deceptive capacity of experiential technologies increases. But, before we move on to new technologies, let’s step back for a moment to an ancient form of technology – the mirror – that has the capacity to produce intended and appropriate visceral, emotional, and cognitive effects.

Ramachandran’s mirror box is confusing and intentionally so (Ramachandran and Blakeslee 1998; Ramachandran 2003). The box is designed to alleviate ‘phantom limb’ pain in patients who continue to feel pain or discomfort in a limb that has been amputated. Its success is due to its exploitation of our natural embodied tactile-visual-kinaesthetic engagement with our world. The box has two arm slots and a mirror. The patient’s good arm is put through one of the slots, the stump of the amputated arm through the other. The patient looks into a mirror that has been placed on the side of the good arm so that they can see its reflection; this provides the brain, in the form of visual feedback, with the illusion of the existence of a complete and healthy arm where the amputated arm is in fact. If the amputated hand was clenched and painful, the patient can, by moving the good hand and watching the reflected ‘amputated’ hand, relieve the pain and discomfort they have been feeling. The key to the illusion’s success is that the visual information overrides what the patient actually believes implicitly to be the case; their belief in their limb’s inexistence is temporarily suspended. Years of tactile-visual-kinaesthetic feedback have hard-wired the agent’s felt dynamic experience, so that the visual experience of the illusory hand is enough to trigger the appropriate visceral, emotional, and cognitive effects to such an extent that they believe – though, admittedly, only temporarily – that they have their unamputated limb. The temporary nature of the belief is still long enough to accomplish the desired therapeutic effect and all because the experience feels

<sup>7</sup> Heidegger (1962).

right, which is exactly the intention for if it were not convincing, it would not be successful.

However, since reality has a way of intruding, and the therapeutic effect can be destroyed by something as simple as a lapse in concentration, Murray et al. (2006) have been working on the next generation of fully-immersive virtual reality mirror boxes. With their technology the patient is experientially embedded in their environment and less able to have their attention caught by something irrelevant to the treatment. Murray, et al. like Ramachandran, are exploiting the illusory effects that technology can provide though theirs is much less rudimentary in form, and it is easy to imagine how much more persuasive the illusion will be if the agent is more fully immersed in what now, even more convincingly, seems to them to be the case.

There is no obvious moral implication to be drawn from these particular examples, but they do demonstrate how readily we are inclined to believe our phenomenal input, even in clinical – and thus non-natural – circumstances. The moral implications surface more clearly when we realise that in each case an agent's beliefs are being manipulated and, though it might be with good intent in the mirror box examples presented here, it will not always be so.

I will now outline some relatively benign contexts of virtual medical training environments, for example, in the treatment of phobias (Hodges et al. 1996) and anxiety disorders (Anderson et al. 2003), and then move on to much less benign situations where we are dealing with war and the taking of lives.

The concept of virtual reality is not new (*viz.* Heilig 1955; Sutherland 1963); we have had simulators that enable a golfer to practise her swing, an airline pilot to land safely in inclement conditions, and soldiers to parachute for quite a few years now, and new, small-scale virtual environments are being developed all the time. But these are not the fully immersed, multi-modal environments of the kind with which we are only now becoming familiar. Fully immersed environments are those in which we can feel ourselves walking around and manipulating objects, whilst at the same time feeling the warmth of the sun on our face, smelling the newly mown grass, and hearing the dog next door barking. Our immersion in these virtual environments will be so sensorily complete, the integration of our array of sensory input will be so seamless, that the likelihood is that we will feel as though we are there, that the objects and experiences are real (*viz.* Kurzweil 1999; Hayles 1999). Our making sense of our world isn't simply a matter of relying on our visual sense as we do in the Ramachandran mirror box example. We

are structurally and dynamically coupled to our world and the content of that coupling feeds back into our spontaneous non-cognitive presentient engagement with what we perceive to be our world. It also feed forward so that we can bring about change and, I would argue, not simply appear to bring about change, through our movement and intentional actions.

Just as in the 'real' phenomenal world there is an action-experience interdependence; as the agent engages with her 'virtual' world, asking muscular questions, she builds up kinaesthetic patterns and memories (Sheets-Johnstone 2003) and, through this neuromuscular dynamics, her actions and gestures take on a "melodic character" (Merleau-Ponty 1962, p. 105) and develop into a "melodic flow" (*ibid.*, p. 116). As this fluency of interaction increases, the feeling of telepresence – the sensation of being somewhere other than where one actually, physically is – will intensify, and to such an extent that she is unable to distinguish between the virtual world and the one she once assumed to be physically real and separable from her. This is, of course, the aim of virtual reality simulators.

In the context of a medical training environment Salisbury says:

People will really begin to feel like they're holding the tissue and they're tearing it. And they'll feel bad about it because they squeezed too hard. (Salisbury in Ruvinsky 2003)

And John Hunter, M.D., co-director of the Oregon Health and Science University Digestive Health Center and a pioneer in laparoscopic surgery, adds:

With earlier simulators, you couldn't 'feel' when you were touching something. Now, if your surgical instrument contacts 'virtual' tissue, you will feel it. The instruments give you force feedback in your hands that mimics how tissue and blood vessels feel and behave in real life. That's a great advance in simulators and a tremendous advantage for training our surgeons. (Hunter 2005)

Advances in medical technology are often the result, directly or indirectly, of military investment and funding, but military funding is also behind the development of computer games that are designed to enhance military skills and provide the possibility of combat training without the risk to personnel.

The soldiers of the 276th Engineer Battalion of the U.S. Army are not unusual. In their spare time they play computer games on their PlayStations and Xboxes. Perhaps not at all strangely the games of choice are Halo 2 and Full Spectrum Warrior™ each

of which simulates battle scenarios.<sup>8</sup> The interesting thing about these computer games is that they do not offer a fully-immersive environment, indeed at first glance they seem only to be visual and tactile, but the game-play is so absolutely demanding that it absorbs the player's attention to such an extent that their involvement becomes bodily and emotional,<sup>9</sup> and the neuromuscular dynamics of the experience-action interplay quickly develop into enactive kinaesthetic rhythms and patterns evolving into muscular expectations and melodies.

An excellent, though very unsettling, example of just this is presented in the case of Sgt. Sinque Swales, soldier in the aforementioned 276th Engineer Battalion of the U.S. Army:

One blistering afternoon in Iraq, while fighting insurgents in the northern town of Mosul, Sgt. Sinque Swales opened fire with his .50-cal. That was only the second time, he says, that he ever shot an enemy. A human enemy.

"It felt like I was in a big video game. It didn't even faze me, shooting back. It was just natural instinct. Boom! Boom! Boom! Boom!" remembers Swales, a fast-talking, deep-voiced, barrel-chested 29-year-old from Chesterfield, Va. (Vargas 2006)

And, he continues:

The insurgents were firing from the other side of the bridge.... We called in a helicopter for an air-strike.... I couldn't believe I was seeing this. It was like 'Halo.' It didn't even seem real, but it was real.

The difficulty here is not that it didn't seem real; the difficulty is that it was real and that the games that Sgt. Swales and his colleagues had played and enjoyed, and on which they had honed their skills and sharpened their reaction times, had made the real too familiar, too experientially automatic, and as the capacity to differentiate experientially between game and reality is obscured the act of killing is normalised. In the experientially undifferentiated worlds of war games and war-games the act of killing has become part of everyday reality.

It is clear that these circumstances are ethically problematic. If all our experience and knowledge is grounded in spontaneous phenomenal enquiry and feeling, and we are already, in some circumstances,

unable to distinguish virtual from empirical realities, then the emotions, feelings, and thoughts experienced in the fully-immersive virtual world will be every bit as palpable as those experienced in the real world (viz. Powers 2003). The consequences of our actions in the virtual world might be distinguishable from the real world; when someone is killed in the real world they stay dead. But that's a matter of their conforming to a set of contingent physical biological laws which could easily be built in to a virtual reality environment; and should that environment be one from which the agent is unable to remove herself of her own volition, then the implications must certainly be grave, not least because the capacity to distinguish the virtual from the real in terms of their consequences would also be lost. It is this loss which is most likely with the virtual reality body suit, the next extension of fully-immersive virtual reality.

Full body suits are being designed to enable fighter pilots to fly planes remotely but in so doing still be able to experience everything they would be experiencing when flying the plane for real. Thus they will have the visual and haptic sensations of crosswinds and of turbulence just as though they were in the cockpit flying above Iraq or Afghanistan (viz. Brickman et al. 1996; Repperger 2004). It is certainly one way to fight a war, and it has the distinct advantage that there are fewer soldiers to bring home in body-bags. But the great disadvantage is that it distances the pilot, the fighter, still further from the battleground and transforms the brutality of what they do into nothing more morally consequential than a virtual reality war game. Dead bodies recorded only as numbers can begin to sound like a computer game score, and it's hard to feel guilty when you've achieved a high score.

Medical and therapeutic uses of full body suits or their individual haptic components are also big business for, for example, the massage treatment of some sports injuries and, of course, in experiential technology the sex industry is never far behind.

Dundon's suit, with its wonderful 'adult entertainment attachments' euphemism,

consists of an interactive body suit that covers the torso. Peripheral gloves, socks, and adult entertainment attachments for men and women attach to the interactive body suit in appropriate locations. Small oscillating motors embedded in the garment and the peripherals produce a vibrating touch sensation when activated. (Dundon 2006)

So, just to blur our boundaries a little more, let's move towards a thought experiment: the virtual reality adultery suit. A full body virtual reality suit is created that can reproduce the haptic, olfactory,

<sup>8</sup> Full Spectrum Warrior™ was developed by Pandemic as a serious training aid, in the form of a real-time game, for the United States Army.

<sup>9</sup> Emotions are defined here in Damasio's sense, as spontaneous neural and chemical responses to changes in the agent's physiological state (Damasio et al. 2000).

gustatory, visual, aural, and even proprioceptive – for without it you’d be disorientated – experience of having sex with someone who is not your spouse or partner. The suits are created in a range of styles and for a range of pockets. So, the ‘person’ with whom you have your sexual experience might be an ‘off-the-peg’ standard model in the lowest price range, or for a little more money the ‘person’ might be a composite of those features you find sexually attractive which you yourself program or have programmed, or for a lot more money, at the top end of the market – for their bodies will be copyrighted – your ‘person’ might be a celebrity like Gregory Peck, Angelina Jolie, or William H. Macy.

Now, the question is, if you choose to pay your money, don the suit, and run one of its programs, are you being unfaithful to your partner or spouse? Are you being actively deceptive and having sex with someone else? Is it a matter of your intention or a matter of the consequences that ensue? If the experience is, as far as it can be imagined, indistinguishable from the real thing, even down to the subterfuge of not revealing it to your loved one, then it smacks of infidelity. The least we must do is ask ourselves whether or not the moral and emotional consequences of such an action are the same in the virtual environment as they would be in the real one.<sup>10</sup> The morality of the one is not easily separable from the other as we understand from the fact that – with an every increasing frequency – action in the virtual world spills over and affects our lives in the real world (viz. “Virtual Adultery and Cyberspace Love” 2008).

Let me briefly recap the implications as I see them:

(i) if our experience is grounded in spontaneous, actively engaged phenomenal enquiry and feeling, and we are unable to distinguish virtual from empirical realities, then the sensations and feelings we experience in the fully-immersive virtual world will be every bit as real to us as those we experience in the real world and–though there are likely to be exceptions<sup>11</sup> – it is possible that they will have very

<sup>10</sup> One of the things I haven’t mentioned here is how these fully-immersive technologies, perhaps especially the body suits, could be used to inflict pain, to abuse or torture. Isolation, sleep deprivation, and submersion in water have all been used as ways to disrupt, even disintegrate, an individual’s awareness of themselves and their surroundings; but it should be a cause of some great concern to us that our science, which cannot be divorced from ethics in these matters, is creating something with much greater potential for unpleasantness.

<sup>11</sup> A very insightful referee has suggested that in the case of virtual adultery disease and impregnation are excluded, so, it is unlikely that virtual adultery will have the same moral and emotional consequences.

similar moral and emotional consequences; and (ii) if our lives and experience are acknowledged to be inseparable from the biological facts about our living, our conception of ‘external’ science as distinct from ‘internal’ ethics will be unsustainable and we will be obliged to think a whole lot more carefully about the science that we do and the kinds of technology we create.

### Kantian enactivism

The capacities for perceptual, sensory, or phenomenal consciousness and conceptual thought are, I will argue, inextricably bound together in Kant’s account of the mind. It is certainly true that Kant’s approach to establishing his descriptive metaphysics<sup>12</sup> begins by breaking experience down into its constituent parts: the forms of intuition in the Faculty of Sensibility, the ordering and unifying categories in the Faculty of Understanding, the transcendental unity of apperception, the power of the productive imagination, and the external world (Kant 1787/1929, B1–B2).<sup>13</sup> At A50/B74 he says

Our knowledge springs from two fundamental sources of the mind; the first is the capacity of receiving representations (receptivity of impressions), the second is the power of knowing an object through these representations (spontaneity [in the production] of concepts). Through the first an object is given to us, through the second the object is thought...

But these are necessary preconditions for experience and, whilst they might be dissected and analysed separately (A65-6/B89-91), they cannot operate in the absence of one another if the subject is to have coherent – temporally organised – contentful experience to which it would be possible to attach an “I think” (B132).

Nowhere is this clearer than when Kant states that “thoughts without content are empty, intuitions without concepts are blind” (A52/B76). Without content, that is, with no phenomenal or sensory input, our thoughts would not be thoughts at all; they

<sup>12</sup> P.F. Strawson (1959) contrasts descriptive metaphysics with revisionary metaphysics, the former addresses itself to ‘the actual structure of our thought about the world’ rather than projecting an alternative and, in some sense, preferential version of the world itself.

<sup>13</sup> All subsequent bracketed A and B numbers are to Norman Kemp Smith’s 1929 translation of *Kritik der reinen Vernunft* (1787).

would be nothing, mere impossibilities (B291).<sup>14</sup> Similarly we would be as good as blind if we had perceptual content without any a priori concepts to organise and unify it so that it becomes something we can understand and put to use. Without a priori concepts our experience would be chaotic, but with concepts we can synthesise our experience, drawing together the unity of self-consciousness and the unity of objective experience by producing thoughts to which we can add the prefix ‘I think’ (B132). This requirement is a bi-directional logical requirement, an interdependence claim, not a contingent relation, and its nomological force clears the path for claiming that, because we have sensory awareness that is framed by a priori spatial and temporal forms of intuition, ordered and unified by a priori concepts, and synthesised by the productive imagination, it is possible to recognise our thoughts as our own. In its turn all of this is made possible only because there is an external world with which we must engage if we are to have, even an illusory, sense of a continuing self (Hume<sup>15</sup> 1739/1978; Brook 1994; Strawson 1997, 1999).

Kant is providing a notion of a sensorimotorily enmeshed, dynamically coupled, agent that interacts with its, necessarily changing, world (Dobbyn and Stuart 2003; Stuart 2002, 2007b), and an interdependence of this kind softens the hard distinctions between subject and object, between mind and world, moving us to something more akin to a process ontology (Whitehead 1929/1978). Indeed evidence of this softening is available at A358 when Kant says “bodies are mere appearances of our outer sense”, and even though Kant hints at a kind of dualism:

<sup>14</sup> There can be no doubt that thoughts are conceptual things for Kant, but their underpinning is very definitely the proper working of the senses, and for sensory input that can be ordered and unified in such a way that makes possible the formation of a posteriori concepts, the agent will need to be dynamically coupled to her environment.

<sup>15</sup> Hume begins Book I, Part IV, Sect. 6 “On Personal Identity” of *A Treatise of Human Nature* by saying “There are some philosophers who imagine we are every moment intimately conscious of what we call our SELF”, and two paragraphs further he continues: “For my part, when I enter most intimately into what I call myself, I always stumble on some particular perception or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never can catch myself at any time without a perception, and never can observe any thing but the perception. When my perceptions are removed for any time, as by sound sleep; so long am I insensible of myself, and may truly be said not to exist. ...If any one, upon serious and unprejudiced reflection thinks he has a different notion of himself, I must confess I call reason no longer with him.”

The transcendental idealist... may admit the existence of matter without going outside his mere self-consciousness ... [yet still he admits that] Matter is with him... only as a species of representations (intuition)... because they relate perceptions to the space in which all things are external to one another, while yet the space itself is in us. (A370)

Finally at A372 the hard dualist distinctions are gone:

The transcendental idealist is, therefore, an empirical realist, and allows to matter, as appearance, a reality which does not permit of being inferred, but is immediately perceived.

Since it is the process of synthesis that unites the experiencer, the experience, and the experienced, let us turn our attention to this synthesis, to the ordering and unification of experience, which Kant defines as

the mere result of the power of imagination, a blind but indispensable function of the soul, without which we should have no knowledge whatsoever, but of which we are scarcely ever conscious. (A77–A78/B104)

In ordinary cognitive judgement, the (sensory) manifold of intuitions is ‘synthesised’ which involves it being brought under concepts enabling the experiencer to produce judgements. Synthesis occurs through the activity of the productive or cognitive imagination – *Einbildungskraft* – which has three modes: apprehension, reproduction, and recognition. The synthesis of apprehension refers to sense impression “as modifications of the mind in intuition”; the synthesis of reproduction, the “merely empirical law, that representations which have often followed or accompanied one another finally become associated”,<sup>16</sup> refers to the conjunction of contiguous sense impressions which makes possible the performance of, for example, inductive reasoning; and the synthesis of recognition which is characterised by our being “conscious that what we think is the same as what we thought a moment before (without which) all reproduction in the series of representations would be useless. For it would in its present state be a new representation” and we would be where we were for Hume, the subject of discrete, synchronic experiences with no means of justifying a claim to the continued

<sup>16</sup> Since Kant uses a fairly broad brush with his use of the term ‘representation’ (*Vorstellung*), we might be permitted some latitude in even thinking of representations as not strictly representational. In this vein it’s worth noting that Pluhar (1996) translate *Vorstellung* as ‘presentation’ which would accord with kinaesthetic and other non-conceptualised sensory experience.

and distinct existence of the experienced objects (A98–A106). Hence ordinary cognition is a product of interaction between the senses, the understanding, and the imagination. The experiential integration emphasized here may be conceptual or cognitive, but its very possibility depends on a tactile-kinaesthetic synthesis that operates at a pre-reflective bodily level.

The commonplace conception of the imagination is as that which creates and manipulates mental imagery, bringing to mind absent objects, putting items into novel juxtapositions, or recalling past events. In unpacking the Kantian picture we identify two kinds of imagination, the reproductive or creative imagination and the productive or cognitive imagination. It is my contention, though I believe it to be a matter of no great controversy, that it is only through the proper functioning of the cognitive imagination that the creative imagination, the novel juxtapositions of items and the recollection of events, is made possible. In support of this claim we can show that the productive imagination plays an essential functional role in the conceptual organisation of our sensory input that the creative imagination does not. Indeed, it is only when that sensory input has been synthesised that it can become the subject of the activity of the creative imagination.

But imagination in the Kantian framework can also be interpreted as playing a significant role in the non-intellectual grasping, the pre-reflective self-awareness, and the orientation of our bodily selves in our world. It is an imagination that enables us to make both conscious and reflective predictions about the future that our experience is likely to take and, possibly more importantly, it enables us to build up pre-reflective bodily expectations about how our experiential world will continue to be. So, we are able to reach forward and grasp the handle of a water jug whilst simultaneously keeping up our end of a demanding conversation, and we can do so even though we have not encountered that particular jug before. It might be that the productive imagination does this through the manipulation of some kind of conscious representational mental imagery, but it makes more sense, from the point of view of the agent's conscious resources that a bodily or muscular imagination acts in an pre-reflective sensory, that is, visual, olfactory, audial, gustatory, tactile, and kinaesthetic manner. It is an imagination that makes our bodily consciousness possible because it facilitates the experiential interdependence between our thoughts – unity of consciousness – and our world – consciousness of unity, and it is the perceiving and reacting body, the enactive system, which occupies this illusory position being both subject and object of consciousness.

It will be clear that I am proposing a third kind of imagination, bodily, muscular or kinaesthetic imagination, as a necessary precondition for enactive agency, for the formation of concepts, and for the agent's subsequent capacity to utilise those concepts in creative endeavours. It should also be clear that I am committing Kant to a form of sensorimotor enactivism where the agent and her world are dynamically coupled in an ontological unity and an experiential inseparability. But there are ethical implications for this complex of views, some of which we have seen to have particular purchase in the realms of new experiential technologies.

### **Kant's reaction**

In this presentation of a softening of the familiar embodied ontological distinctions, Kant's active account of the mind's engagement with its world has been interpreted as a form of enactivism within a metaphysically singular experiential system. The rapidly developing area of virtual technologies reveals this softening, even breakdown, to take place in fact, sometimes with benign consequences and sometimes not, and this has been shown to present us with some profound ethical problems.

From a Kantian perspective, someone might object that Kant would not need to accept this irreparable breakdown of the inner/outer distinction, of the real from the purely imaginary. To support this claim they might appeal to Note 3 at B279 where Kant refers to 'special determinations' by which we are able to utilise these distinctions.

From the fact that the existence of outer things is required for the possibility of a determinate consciousness of the self, it does not follow that every intuitive representation of outer things involves the existence of these things, for their representation can very well be the product merely of the imagination (as in dreams and delusions). Such representation is merely the reproduction of previous outer perceptions, which, as has been shown, are possible only through the reality of outer objects. All that we have here sought to prove is that inner experience in general is possible only through outer experience in general. Whether this or that supposed experience be not purely imaginary, must be ascertained from its special determinations, and through its congruence with the criteria of all real experience. (B279)

Of course, Kant is right: there are ways in which we are able – should we feel the urge – to pull ourselves back from the Ramachandran mirror box or *Halo 2* and see them for the illusions that they are. But the

more immersive the technology, the more convincing the scenario, and the more intense the experience, the less able we are, will be, or will want, to do this in practice. We might find that, contra Nozick's anti hedonistic claims about the experience machine, people don't unplug; that for some the experiencing will be every bit as satisfying as the doing (Nozick 1974, viz. p. 43). Nozick owns that in his experience machine we would not know that our experiences were not veridical, but given the inability to judge the veridicality of our experience in a fully-immersive environment, from phobia treatment to war-gaming, we must ask if the choice to unplug or pull back will remain a viable option.

The intention of the creators of compelling virtual realities is to establish their "congruence with the criteria of all real experience"; without this Sgt. Swales and his fellows would not find the transition from Full Spectrum Warrior™ to real battle so seamless, and the golfer's swing would not improve. Virtual realities are experiential, they are not phantasmagorical or dream-like. The experience is phenomenal, being both plenisentient and muscular, enabling us to establish a deep pre-cognitive kinaesthetic engagement with our world from which our conceptualisation of that world is made possible. Currently it is only the context and rough granularity that make some virtual environments distinguishable from the real. But the aim of virtual reality engineers is to reduce the granularity and render the contexts delicately familiar and identifiable. Ultimately our transition into them will become effortless and any perceived incongruence between the real and the virtual will vanish. When all of this is achieved the special determinations we can employ to discover an inconsonance with real experience will be minimised until they are no more. We will remain in Nozick's experience machine because we will forget that that is where we are. But it is not at that stage that we should begin to consider the implications of our actions, it is now.

## References

- P. Anderson, B.O. Rothbaum and L.F. Hodges. Virtual Reality Exposure in the Treatment of Social Anxiety: Two Case Reports. *Cognitive and Behavioral Practice*, 10: 240–247, 2003.
- B.J. Brickman, L.J. Hettinger, M.M. Roe, L. Lu, D.W. Repperger and M.W. Haas. Haptic Specification of Environmental Events: Implications for the Design of Adaptive, Virtual Interfaces. In *Proceedings of the 1996 Virtual Reality Annual International Symposium (VRAIS 96)*, pp. 147–155, 1996.
- S. Brier. The Cybersemiotic Framework as a Means to Conceptualizing the Difference between Computing and Semiosis. In *Computing, Information and Cognition: The Nexus in The Liminal*. Cambridge Scholars Publishing, England, 2007.
- A. Brook, *Kant and the Mind*. Cambridge University Press, United Kingdom, 1994.
- H.J. Chiel and R.D. Beer. The Brain has a Body: Adaptive Behavior Emerges From Interactions of Nervous System, Body and Environment. *Trends in Neurosciences*, 20: 553–557, 1997.
- A. Clark, *Being There: Putting Brain, Body, and World Together Again*. MIT Press, Cambridge, Mass., London, 1997.
- R.M.J. Cotterill. On the Unity of Conscious Experience. *Journal of Consciousness Studies*, 2(4): 290–311, 1995 (Imprint Academic).
- R.M.J. Cotterill, *Enchanted Looms: Conscious Networks in Brains and Computers*. Cambridge University Press, Cambridge, UK, 1998.
- A.R. Damasio, T.J. Grabowski, A. Bechara, H. Damasio, L.L.B. Ponto, J. Parvizi and R.D. Hichwa. Subcortical and Cortical Brain Activity During the Feeling of Self-Generated Emotions. *Nature Neuroscience*, 3(10): 1049–1056, 2000.
- C. Dobbyn and S.A.J. Stuart. The Self as an Embedded Agent. *Minds and Machines*, 13(2): 187–201, 2003.
- M. Dundon. *Interactive Body Suit and Interactive Limb Covers*. US Patent Issued on May 16, 2006 (<http://www.patentstorm.us/patents/7046151.html>). Accessed August 10, 2007.
- S. Gallagher, *How the Body Shapes the Mind*. Oxford University Press, Oxford, 2005.
- J.J. Gibson, *The Ecological Approach to Visual Perception*. Houghton Mifflin, Boston, 1979.
- N.K. Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. University of Chicago, Chicago, 1999.
- M. Heidegger, *Being and Time*, translated by John Macquarrie and Edward Robinson. Basil Blackwell, Oxford, 1962.
- M. Heilig. The Cinema of the Future. In A. Utterson, editor, *Technology and Culture: The Film Reader*, pp. 17–25. Routledge (2005), USA, 1955.
- L.F. Hodges, B.O. Rothbaum, B.A. Watson, G.D. Kessler and D. Opdyke. Virtually Conquering Fear of Flying. *IEEE Computer Graphics & Applications*, 16(6): 42–49, 1996.
- D. Hume, *A Treatise of Human Nature*. Edited, with an analytical index by L.A. Selby-Bigge. Clarendon Press, Oxford, 1739/1978.
- J. Hunter, *New Virtual Reality Surgery Simulator Hones Surgeons' Skills, Improves Patient Safety*, 2005 (<http://www.ohsu.edu/ohsuedu/newspub/releases/062005virtual.cfm>). Accessed August 9, 2007.
- M. Johnson, *The Body in the Mind: The Bodily Basis of Meaning, Imagination, and Reason*. University of Chicago Press, Chicago, London, 1990.

- I. Kant, *The Critique of Pure Reason*, translated by Norman Kemp Smith. Macmillan Press, 1787/1929 (A edition 1781 + B edition 1787).
- R. Kurzweil, *The Age of Spiritual Machines: When Computers Exceed Human Intelligence*. Penguin, New York, 1999.
- G. Lakoff and M. Johnson, *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*. Basic, New York, 1999.
- R. Langton, *Kantian Humility: Our Ignorance of Things in Themselves*. Clarendon, Oxford, 1998.
- D. Legrand. The Bodily Self: The Sensori-Motor Roots of Pre-Reflexive Self-Consciousness. *Phenomenology and the Cognitive Sciences*, 5(1): 89–118, 2006.
- J. Locke, *An Essay Concerning Human Understanding*. Scolar Press, Menston, 1690/1970.
- M. Merleau-Ponty. *Phenomenology of Perception*, translated by Colin Smith. Routledge & Kegan Paul, London; The Humanities Press, New York, 1962.
- G.E. Moore. A Defence of Common Sense. In J.H. Muirhead, editor, *Contemporary British Philosophy: Personal Statements (2nd series)*. Allen & Unwin, London, 1925.
- C.D. Murray, E. Patchick, S. Pettifer, and T.L.J. Howard. Investigating the Efficacy of a Virtual Mirror Box in Treating Phantom Limb Pain in a Sample of Chronic Sufferers. In P. Sharkey, T. Brooks, and S. Cobb, editors, *Proceedings of The 6th International Conference on Disability, Virtual Reality and Associated Technologies*, pp. 167–174. Esbjerg, Denmark, 2006.
- A. Noë and E. Thompson. Are There Neural Correlates of Consciousness? *Journal of Consciousness Studies*, 11(1): 3–28, 2004.
- D. Norman, *The Design of Everyday Things*. Basic Books, New York, 1988.
- R. Nozick, *Anarchy, State and Utopia*. Basil Blackwell, Oxford, 1974.
- T. Powers. Real Wrongs in Virtual Communities. *Ethics and Information Technology*, 5: 191–198, 2003.
- W. S. Pluhar. Translation: *Critique of Pure Reason*, Introduction by Patricia Kitcher, Hackett Publishing Company, 1996.
- V.S. Ramachandran, *The Emerging Mind*. BBC in association with Profile Books Ltd, London, 2003.
- V.S. Ramachandran and S. Blakeslee, *Phantoms in the Brain: Probing the Mysteries of the Human Mind*. William Morrow, New York, 1998.
- T. Reid. In Derek Brookes, editor, *Inquiry into the Human Mind: On the Principles of Common Sense: A Critical Edition*. Edinburgh University Press, Edinburgh, 1764/1997.
- D.W. Repperger. Adaptive Displays and Controllers Using Alternative Feedback. *CyberPsychology & Behavior*, 7(6): 645–652, 2004.
- J. Ruvinsky, *Haptic Technology Simulates the Sense of Touch via Computer*, 2003 (<http://news-service.stanford.edu/news/2003/april2/haptics-42.html>). Accessed July 22, 2007).
- J.A. Seitz. The Bodily Basis of Thought. *New Ideas in Psychology: An International Journal of Innovative Theory in Psychology*, 18(1): 23–40, 2000.
- M. Sheets-Johnstone, *The Primacy of Movement*. John Benjamins, Amsterdam, 1999.
- M. Sheets-Johnstone. Kinesthetic Memory. *Theoria et Historia Scientiarum*, 7: 69–92, 2003.
- P.F. Strawson, *Individuals: An Essay in Descriptive Metaphysics*. Methuen, London, 1959.
- G. Strawson. The Self. *Journal of Consciousness Studies*, 4(5/6): 405–428, 1997.
- G. Strawson. The Self and the SESMET. *Journal of Consciousness Studies*, 6(4): 99–135, 1999.
- S.A.J. Stuart. A Radical Notion of Embeddedness: A Logically Necessary Precondition for Agency and Self-Awareness. *The Journal of Metaphilosophy*, 33(1/2): 98–109, 2002.
- S.A.J. Stuart. Machine Consciousness: Cognitive and Kinaesthetic Imagination. *Journal of Consciousness Studies*, 14(7): 141–153, 2007a.
- S.A.J. Stuart. Unifying Experience: Imagination and Self-Consciousness. In Wallace Brendan, editor, *The Mind, The Body and The World*. Imprint Academic, Exeter, 2007b.
- I.E. Sutherland. Sketchpad-A Man-Machine Graphical Communication System. In *Proceedings of the Spring Joint Computer Conference*, Detroit, Michigan, May 1963; Spartan, 1964; Washington, D.C., 1963.
- F. Varela, E. Thompson and E. Rosch, *The Embodied Mind: Cognitive Science and Human Experience*. MIT Press, Cambridge, MA, 1991.
- J.A. Vargas. *Virtual Reality Prepares Soldiers for Real War: Young Warriors Say Video Shooter Games Helped Hone Their Skills*. Washington Post, Tuesday 14 February 2006, 2006.
- “Virtual Adultery and Cyberspace Love”, a Wonderland documentary for the BBC, first broadcast on the 29 January 2008. <http://www.bbc.co.uk/programmes/b008vrht>.
- A.N. Whitehead. In David Ray Griffin and Donald W. Sherburne, editors, *Process and Reality, Corrected Edition*. Free Press, New York, 1929/1978.
- T. Ziemke. What’s That Thing Called Embodiment? In *Proceedings of the 25th Annual Meeting of the Cognitive Science Society*, Lawrence Erlbaum, 2003.
- T. Ziemke. What’s life got to do with it? In A. Chella and R. Manzotti, editor, *Artificial Consciousness*, pp. 48–66. Imprint Academic, Exeter, 2007.