

Where's the screen? The paradoxical relationship between mind and world

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In this chapter I will consider recent philosophical proposals about the extended mind, and link them to wider epistemological arguments about extensionism, and boundaries in general. I will argue that evidence from neuropsychology, recent developments in paraconsistent logic, and certain tendencies in the development of technology suggest that the human experience of reality might be regarded as essentially paradoxical. This, I suggest, adds further support for the notion of an extended mind.

One of the most dangerous of ideas for a philosopher is, oddly enough, that we think with our heads or in our heads. The idea of thinking as a process in the head, in a completely enclosed space, gives him something occult.
Ludwig Wittgenstein, Zettel.

Introduction

The recent scientific study of consciousness has been largely driven by the assumption that, whatever it is, consciousness is located in the human head. Some cognitive neuroscientists have claimed that very specific parts of the brain are responsible for certain conscious states, and for many the holy grail of neurological research is to identify the so-called 'neural correlates of consciousness', or those precise biological structures that sustain our lived, aware experience¹. What this amounts to, it could be argued, is a perpetuation of the long-theorized split between thinking substance (internally located) and non-thinking substance (externally located), which has been a perennial problem for the philosophy of mind from at least the time of Descartes. For cognitive neuroscientists, and some philosophers, there is in effect a distinction between the conscious mind located in the brain and the non-conscious objective world in the extended space beyond².

The belief that consciousness, mind and in fact all perceptual and cognitive activity resides in the head — sometimes called ‘internalism’ — has been challenged in recent years. There are growing numbers of philosophers, psychologists and biologists who claim that the conscious mind extends in one way or another beyond the neurological fabric of the brain. They propose ‘distributed’ or ‘externalist’ models of mind that locate consciousness more widely in the body, in environmental objects, and even the far reaches of the cosmos³. Although internalism has dominated contemporary science and humanities, externalist models are increasingly being applied in areas like robotics and cultural anthropology⁴.

The purpose of this chapter is to consider some of the arguments in favour of the internalist and externalist models of mind and to show that while they seem diametrically opposed, in fact, we have good reasons for holding to both. Not only does this obviously make it very hard to choose between them, it may point to a deeper epistemological crisis in which the very assumption that there can be a choice is thrown into doubt.

To help ground the discussion I will consider internalism and externalism with reference to a specific case that exemplifies many of the issues involved, namely the perception of screen-based moving images. Despite the numerous differences between formats (DVD, video, film, etc.), screen-based media have certain attributes in common, not least the capacity to command our visual attention and sustain a compelling illusion. This investigation will focus, therefore, on theories and evidence about visual perception and cognition, which is not to deny the importance of other sensory modalities.

Considering how the mind relates to images on a screen is an unavoidably transdisciplinary undertaking that implicates a range of overlapping fields, some of which will be mentioned here, but none of which can account for the totality of the experience alone. Indeed it is unclear whether even a transdisciplinary approach combining knowledge from the arts, sciences and humanities would be able to fully account for the deepest epistemological and metaphysical problems that a foundational consideration of this perceptual act entails. Even a question that might appear *prima facie* to have a stupendously obvious answer — ‘Where is the screen located in relation to the viewer who perceives it?’ — may turn out to be impossible to resolve unambiguously. Nevertheless, I will refer to this question while sketching a tentative transdisciplinary response, drawing on some recent ideas in

the philosophy of mind, Consciousness Studies and non-classical logic.

Internalism

There is much theoretical and empirical evidence to support a distinction between internal subjective experience and external objective reality, and hence an internalist model of mind. Because this model requires an indirect relationship between mind and reality, where reality is represented rather than directly accessed in the exterior world, it can be understood as a form of 'representationalism'. In representationalism we perceive things differently from what they are. Take a common visual illusion like the Necker cube:

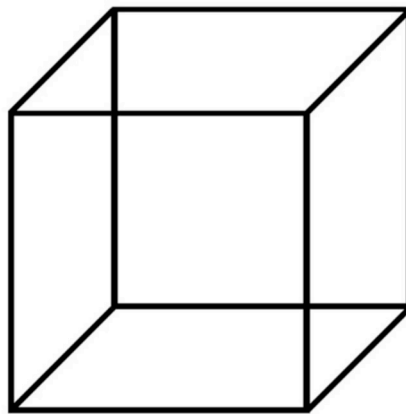


Figure 1. The Necker cube

Figure 1. consists a number of black lines arranged on a white surface. The image is flat, having no three-dimensional attributes; this much is almost too obvious to state. Yet despite being fully aware of these facts, I see a three-dimensional cube where there is none⁵. With some concentration I am able to judge it for what it is: a perspective-less pattern of lines and shapes, interlocking triangles and trapezoids. But it insists on reverting to a depth illusion as soon as my will falters. Moreover, the depth illusion flips between upward and downward orientations, sometimes at my volition, sometimes not. Strange to say, the picture does not change, but what I see changes. True to say, the illusory cube is oriented *both* downward and upward.

In psychology, this effect is often taken as evidence that retinal apprehension is subject to perceptual processing before becoming available to consciousness. In other words, I am seeing with my mind as much as, if not more than with my eyes, where 'seeing' means not just sensing light but interpreting visual data according to memory, experience or imagination. I am bound to cognize the arrangement of lines such that I misrepresent what is there, even when I am aware of the misrepresentation⁶.

The Necker cube illusion illustrates the discrepancy between subjective experience (what is seen) and objective reality (what is there), a distinction that has long been recognised in philosophy, and more recently in psychology. One of the leading figures in early experimental psychophysiology, Hermann von Helmholtz (1821-94), was instrumental in establishing the scientific basis of this distinction, which had previously been maintained on philosophical grounds by figures such as John Locke and Immanuel Kant. Helmholtz (Cahan 1995) argued that we are mistaken when we assume a veridical connection between quantitative physical stimuli, e.g. certain electromagnetic frequencies, and their qualitative apprehension in the mind, e.g. certain colours:

... the objects at hand in space seem to us clothed with the qualities of our sensations. They appear to us as red or green, cold or warm, to have smell or taste, etc., although these qualities of sensation belong to our nervous system alone and do not at all reach beyond into external space. Yet even when we know this, the appearance does not end, because this appearance is, in fact, the *original truth*...(1995: 352, my emphasis)

For Helmholtz, we unconsciously infer a holistic representation of visual reality through fragmentary clues gathered from the external environment by our senses; thus the world we see is not objective or direct, but a subjective and indirect representation constructed internally by the nervous system.

Helmholtz's death at the end of the nineteenth century coincided with the birth of an illusionistic medium that provided an enduring example of this 'original truth' about perception. The technology of cinema requires an involuntary projection of subjective qualities into objective reality in order to sustain what became known as 'motion pictures', an inappropriate term given that the cinema audience sees no images move at all. Each frame is held still in the gate of the projector for a fraction of a second before being blacked out by a shutter as the film reel shunts to the next frame. The oft-cited belief that the

appearance of motion is due to the 'persistence of vision' in the eye is now almost entirely discredited⁷. Instead, it seems that illusory motion in cinema is attributable more to neurology than ocularity. Although the precise psychological and neurological mechanisms at play are still not understood, we do have mounting evidence that given the right cues the brain can perceive motion where none exists objectively.

Work undertaken by neurobiologist Semir Zeki (1993 et al.) shows how even unchanging images (such as Isia Leviant's *Enigma* painting⁸) can give rise to perceptions of movement that can be detected in areas of the brain active during objective, that is, real motion; so the sensation of motion can occur quite independently of whether any actual motion is present before the eyes. This fact, combined with the determination that motion consciousness is most likely consequent on a specific portion of the brain, damage to which can cause a condition known as *akinetopsia* which leaves subjects unable to see things that move (Zihl et al. 1980), implies that whatever may be happening 'out there' the appearance of motion is a construction of the brain 'in here'.

Helmholtz's views and the evidence from neurobiology tend to support a 'representationalist' approach to human consciousness and perception. Put very simply, this means that what we know of the world is not garnered directly from external stimuli but construed from internal representations of reality in our minds⁹. For the representationalist and the internalist, the screen we see is not the 'real' screen but an internal representation of a screen. The degree to which the internal representation coincides with external reality is, as one would expect, the subject of vigorous debate; but they are nevertheless regarded as distinct. This of course connotes a tension between what we see and what is there — that what appears to us in our conscious mind is to some degree independent from what exists in the world.

Externalism

Despite the predominance of internalist models there is also strong evidence to suggest a contrary view: that the development and operation of perception, at least in the case of visual cognition, is entirely dependent on direct engagement with the external world¹⁰.

In his book on art and the brain, *Inner Vision*, Semir Zeki (1999) cites the work of an early twentieth-century French surgeon, Moreau, who perfected a technique for removing congenital cataracts in children. Since the late-seventeenth century, philosophers like John Locke

had speculated as to how a person blind from birth would see the world if their sight could be repaired. Rather than the glorious revelation of an elaborate spectacle, as Biblical miracles might lead us to expect, Moreau's patients reported extreme difficulty in making out anything at all, and he concluded:

It would be an error to suppose that a patient whose sight has been restored to him by surgical intervention can thereafter see the external world (Zeki 1999: 92).

Moreau concluded, and more recent evidence has confirmed, that without appropriate sensory stimulation the visual components of the brain fail to develop the capacity for instantaneous object recognition that sighted people take for granted. In cases where sight has been repaired, it usually takes years for the necessary adaptations to occur in the patient's perceptual system before visual data can become a useful source of information about the world, and even then most prefer to trust the tactile cues they have been most familiar with since birth.

In fact there are numerous sad reports of once confident and assured individuals becoming deeply depressed and insecure shortly after having acquired vision. In a seminal study, the psychologist Richard Gregory (1963), working with Jean Wallace, wrote of the case of S.B., a middle-aged man whose vision was restored after nearly a lifetime of almost complete blindness. The subject had been a cheerful and dominant person before the operations through which his sight was restored.

But talking to him now he seemed dispirited, and we formed a strong impression that his sight was to him almost entirely disappointing... He described the world as rather drab; he still to a great extent lived the life of a blind man, sometimes not bothering to put on the light at night, and he still made little of the normal visual occupations of the cinema or television (Gregory & Wallace 1963: 33).

Without early and continual stimulation from the world, the capacity for visual perception is severely impoverished, even obliterated, although alternative modes of perception can develop to compensate. Despite his lifelong handicap and the deficiencies of his post-operative vision, S.B. showed a remarkably immediate grasp of certain visual forms after the restoration of sight. According to Gregory, this was because he was able to translate across modalities, that is, to project his tactile knowledge into the visual world.

Perhaps the most important outcome of our study is the evidence it provides for transfer from early touch experience to vision many years later. The fact that our patient was able, certainly with a minimum of training — and perhaps with none at all — to recognise by vision upper case letters which he had learned by touch, and that he was unable to recognise by vision lower case letters which he had not learned by touch, provides strong evidence for cross-modal transfer (Gregory & Wallace 1963: 37).

The case of S.B. confirms that we need direct contact with reality to build up any cognitive map of our environment. But it also demonstrates that the information we gather through each different sense need not necessarily be restricted to that specific modality. Through the process of physically exploring the world during early development we synthesise all our senses — sight, smell, touch, etc.; building up a 'cross-modal' account of our environment that allows us, for example, to 'see' roughness from a visible texture, 'feel' shininess by the gloss of a material or 'hear' different kinds of space. It is this capacity that enables people deficient in one sense to develop compensatory abilities in others¹¹.

Gathering information about the world by a combination of sensations and bodily actions requires co-ordinated 'sensorimotor' activity — integrating sensory data with bodily and spatial awareness — and is of fundamental importance to the way we interact with the environment. Although psychologists generally recognise this, it is given differing weight according to the model of perception that is favoured. One model that strongly emphasises sensorimotor integration is the so-called 'enactive' approach to visual cognition.

In an important and controversial paper, *A sensorimotor account of vision and visual consciousness*, experimental psychologist Kevin O'Regan and philosopher Alva Noë (2001) argue that the world we see is really 'out there' and not 'in here', drawing on empirical evidence from perceptual phenomena like change blindness to support their case. Change blindness¹² is a remarkable phenomenon, discovered by O'Regan and colleagues, in which quite large changes between images will usually not be perceived if there is a brief interruption, like a blank or a flash, between one image and the next. O'Regan claims that we do not hold a detailed representation of the visual world in our brain, but continually access the real detail 'out there' through active engagement with the world. One way of demonstrating what O'Regan and Noë call 'the world as an outside memory' is to look at any scene for a few seconds, then close your eyes, and try to visualise it in as much detail as you can. Unless you have a photo-

graphic memory, it is very likely you will have only the haziest picture of what was in front of your eyes but a few seconds ago.

Unlike the internalists, O'Regan and Noë's approach stresses the externality of perception as conditioned by the active engagement of the body and senses with the world.

... seeing is a way of acting. It is a particular way of exploring the environment. Activity in internal representations does not generate the experience of seeing. The outside world serves as its own, external, representation. The experience of seeing occurs when the organism masters what we call the governing laws of sensorimotor contingency (O'Regan & Noë 2001: 939).

For the enactive theorist the screen and the viewer's perception of it are (at least in part) 'out there', an external presence sustaining our memory and cognition. The technical apparatus and the objects it represents are yoked, as it were, to the sensory apparatus of the viewer in a way that extends the perceptual domain far beyond the immediate locality of the brain and its store of memories and experiences.

Double reality

The ideas and evidence presented so far paint a rather two-sided picture of the relationship between mind and world. One might call it, to borrow a phrase from Richard Gregory, a 'double reality'. First, it seems the subjective operation of visual perception is to a great extent independent of what exists objectively; the mind operates internally within the confines of a 'sensory horizon'. One might also refer to dreams and vivid hallucinations as examples of veridical perceptual experiences that (as far as we know) are internally generated rather than derived from direct sensory data. Second, it seems that without early and continuous sensory contact with the external world, visual perception can barely develop at all. And even then, according to the enactivists, we need to actively maintain direct continuity between mind and world if we are to enjoy rich, detailed knowledge of what is around us.

This leaves us with opposing responses to the question of where the screen might be located, and how it relates to the mind that perceives it. Put bluntly, for those defending internalism the screen is perceived in the mind, and for the externalists the screen is perceived in the world. Hence, we are faced not just with a technical contradiction about the location of the screen, but a metaphysical contradiction about the relationship between mind and world.

Contradiction, paradox and circularity in mind-world relations

The question of how a perceiving subject relates to a perceived object is inextricably bound to the more general question of how the mind relates to the world. Is the mind an independent realm that remains distinct from external reality; or is the mental realm an extension or continuation of reality? Without an adequate response we can never definitely choose between internalism and externalism, and will never know exactly how the screen stands in relation to the viewer.

The uncertain relationship between mind and world has of course generated countless finely nuanced philosophical arguments. But, put starkly, it seems there are three options:

- That the mind and world are distinct.
- That the mind and world are unified.
- That the mind and world are both distinct and unified¹³.

Depending on which of these mutually inconsistent claims one holds, one will arrive at a different solution to the question of where the screen is located. While there are many powerful arguments in favour of the first two options, it is the third I will explore here, and the one I will suggest is most plausible. It seems sensible to embark on the discussion by reference to the thinker who inaugurated the modern philosophical debate on the relationship between mind and world.

René Descartes (1596-1650) is often credited with formalising the dualist distinction between thinking substance (*res cogitans*) and material substance (*res extensa*); that is, between ideas attributable to the mind on the one hand and the material world of bodies and objects on the other¹⁴. He made some very elegant arguments in favour of this distinction, one of the most famous is found in Meditation VI of his *Meditations on First Philosophy*:

... there is a vast difference between mind and body, in respect that body, from its nature, is always divisible, and that mind is entirely indivisible. For in truth, when I consider the mind, that is, when I consider myself in so far only as I am a thinking thing, I can distinguish in myself no parts, but I very clearly discern that I am somewhat absolutely one and entire... But quite the opposite holds in corporeal or extended things; for I cannot imagine any one of them (how small so ever it may be), which I cannot easily sunder in thought, and which, therefore, I do not know to be divisible (1912: 139).

For Descartes, the indivisible conscious mind has the unique quality of being certain — we can't be deceived into believing we have a

mind without first having a mind to be deceived. The divisible material world, by contrast, might be entirely illusory, or put another way, what we know about the physical world may not in fact accord with what is *really* there, since our senses are imperfect and prone to deceive us¹⁵. The force and simplicity of Descartes' arguments are such that they are difficult to overturn to this day, and remain the subject of voluminous scholarship.

Descartes' reputation as the prototypical dualist, however, does not fairly convey the complexity, some say confusion, of his view on the distinction between mind and world. In the synopsis of the *Meditations*, we read:

... the human mind is shown to be really distinct from the body, and, nevertheless, to be so closely conjoined therewith, as together to form, as it were, a unity (1912: 78).

And again in Meditation VI itself:

Nature teaches me... that I am not only lodged in my body as a pilot in a vessel, but that I am besides so intimately conjoined, as it were intermixed with it, that my mind and body compose a certain unity (1912: 135).

Despite the hint of qualification, Descartes is quite explicit: The mind and body are *both* 'really distinct' *and* united — they are two and one. Indeed, his later writings confirm an increasing commitment to the 'substantial union' of mind and body, while at the same time never retracting his belief in their distinctiveness. In his last book, *The Passions of the Soul* (1649), Descartes argues that the union of mind and body is an empirical fact deducible from lived experience. This appeared self-contradictory to those who regarded him as the most prominent advocate of dualism¹⁶.

On the face of it, Descartes' position is not only inconsistent but potentially paradoxical and circular. One of the main pillars of his argument for the distinction between mind and material bodies is that the mind, unlike the body, is indivisible — whatever is in thought consists in one entity. But, in order to claim my mind is (in Descartes' words) 'really distinct' from my body I have to think about two conceptual categories, namely 'mind' and 'body'. Since both these categories are bound together in a single thought concerning the relation between the two, they are both part of my mind and so not really divisible or distinct. The notion of 'body', then, is ultimately mental.

We are indeed faced with paradox and circularity: First, to make the distinction between mind and body Descartes has to deny the possibility of making the distinction; the body cannot be conceived separately from the mind that conceives it. Second, if the notion of 'mind' is a conceptual category attributable to the mind, how can it be a distinction of itself?¹⁷

True contradictions

Like many before who have considered how mind and world relate, we are being sucked into the jaws of contradiction, paradox and circularity. And the natural temptation is to kick and fight our way out.

Philosophers are sometimes led by the force of argument to contradictory and paradoxical conclusions and, finding themselves staring at these vicious teeth, look for another way out. For instance, discussing the existence or non-existence of mind-independent reality in *Realism and Antirealism* (Alston 2002), Mark S. McLeod recognises that the compelling nature of the arguments on both sides suggests each might be equally valid. That is, the 'realist' view that there is a world which exists irrespective of whether we are there to think about it is just as compelling as the 'anti-realist' view that the world is dependent on our minds for its existence. Hence, a contradiction: realism is true and anti-realism is true. But he rules out this conclusion on the grounds that "there is no pair of contradictory statements both of which we *must* admit is true" (Alston 2002: 29). And so McLeod's interim solution is to posit two worlds, one in which the realist position holds and one in which the antirealist position holds. This is his way out.

Whether the 'two worlds' solution is any less fantastical or illogical than the one it seeks to avoid should be judged by the reader after having consulted McLeod's argument in full. It is mentioned here only to illustrate the reluctance on the part of some contemporary philosophers to countenance the possibility of contradictory conclusions. As the rather cruel jibe attributed to Kierkegaard has it, "Take away paradox from the thinker and you have a professor."

But there have been a number of recent thinkers willing to countenance contradictory solutions and construct plausible logical and philosophical systems to accommodate them. Prominent among these are Stéphane Lupasco (1987), George Melhuish (1973), and more recently, Graham Priest, whose book *Beyond the Limits of Thought* (2002) rigorously sets out arguments in favour of what he calls 'diale-

thic' logic (literally — 'two truths') in which 'true contradictions' become unavoidable when we contemplate the ultimate limits of thought and reality.

I claim that reality is, in a certain sense, contradictory... What I mean is that there are certain contradictory statements (propositions, sentences — take your pick) about limits that are true (2002: 295).

For example, when we try to conceive the limits of thought and what might lie beyond, we encounter the following: The unknowable is precisely that which we can know nothing about, and in knowing we can know nothing about it we know something about it, which is contradictory, not to say paradoxical.

For Priest, such contradictions are not logical aberrations, nor the result of fundamental errors of conception; they are a part of the fabric of human experience. Even the doctrine of dialethism itself is not immune to the same conclusion. He says: "... it may... be rational to accept that dialetheism is both true and false. In a sense, this is what I do accept" (Priest 2002: 275). A visual case of dialethia occurs in the shape of the Necker cube discussed earlier, for which it is just as true to say it appears oriented upwards as downwards.

Since, as Priest shows, certain aspects of our conception of reality and existence are inherently contradictory, there are valid logical precedents for making the following claims: that mind and world are *both* distinct and unified; that visual perception occurs *both* internally and externally.

This is bad news for those seeking a clear-cut answer to the question of where the screen is located and where it is perceived. Were the mind and world distinct we could more justifiably defend the internalist view that the screen is perceived somewhere inside the perceptual apparatus of the brain. Were the mind and world unified we would tend towards the externalist position that the perception of the screen occurs as much in the world as it does inside the mind, since the two are continuous. But on the third count, that of simultaneous distinction and unity, we encounter a dialethic state — the screen is perceived 'in here' and 'out there' *at the same time*.

A dialethic model of the viewer-screen relationship

The case put so far is this: both internalist and externalist models of mind are plausible that leads to a contradiction. But as I have suggested, attempts to rationalise the relationship between mind and

world seem bound to lead to contradiction, not to say paradox and circularity. This does not necessarily negate the possibility of knowing how mind and world relate, although it may expose what Graham Priest calls the 'limits of thought'. Consequently, questions such as 'Where is the screen located in relation to the viewer?', cannot be answered in any non-contradictory sense; the best that can be said is that the screen exists in some Schrödingerian state of indeterminacy, being both distinct from and unified with the audience, experienced both inside the viewer's head and outside it. What might the implications be for our understanding of the viewer-screen relationship?

First, when considering the relationship of mind to screen, we can no longer conceive of two distinct sets of apparatus, one sentient and the other insentient, one internal and the other external to the viewer. Further theoretical and practical investigations of how mind and screen relate may need to take this into account. Second, the peculiarly compelling nature of the illusion of moving images and the oft-drawn analogies between film and mind, have tempted us to think of either 'the screen in the mind' or the 'mind on the screen'; that is to say, either phenomenal experience is played out through some internal projection — a Cartesian theatre of the kind critiqued by Dennett (1991) — or the screen stands as a prosthetic mind-extension which displaces our mental experience into the technological world. Given the present considerations, neither of these can be complete as a self-standing model, although a combination of both may be viable. Third, the dialectic logic applied here may help to account for the efficacy of the illusion in which we simultaneously believe in and do not believe in what the screen affords — the so-called 'Paradox of Fiction'. For the characters, objects and events that appear neither in the mind nor on the screen alone are, being representations, *simultaneously* present and absent. As viewers we are trapped in a perceptual vice between opposing forces, transfixed (in the sense of both pierced and fastened) by the pincers of an immaculate contradiction between two sets of belief. Finally, the possibility of a 'conscious cinema' — an enhanced cinema that deploys prospective artificially conscious technology — cannot be discounted. Given the increasing proximity of artificial intelligence and interactive entertainment, we can expect a great deal of theorisation to emerge on the subject of mind-technology integration in the field of sentient entertainment systems, with an extension of current debates in AI about the degree to which cognition can be understood as an internalised or an externalised process¹⁸. It is precisely here that a dialectic model offers a way of managing these

divergent tendencies, although clearly not to the satisfaction of those wedded to a purely classical logic.

Transdisciplinary approaches

A dialectic model of the viewer-screen relationship, which condones contradiction, paradox and circularity, and renders the relationship between viewer and screen with a high degree of indeterminacy, may prove useful in subsequent analyses, if only because it offers hope of a reconciliation between internalism and externalism without neutralising either. The dominance of internalism has receded in recent years as scholars pay greater heed to notions of the world as extended mind or external memory and explore alternative models of ecological cognition, intersubjective relations and distributed consciousness¹⁹. Some examples are presented in this volume. But the model offered here could be regarded as creating more problems than it resolves. It may, for instance, lead to doubt about the validity of 'internal' and 'external' as epistemological descriptors, that the distinction itself is invalid, or at least unhelpful.

The question of how mind and world relate is ultimately a metaphysical one that may never be definitively resolved. But it is a question that nevertheless remains central to all epistemological and ontological debates, and upon which all solutions will finally depend. In our quest to respond productively to these debates we will turn increasingly, I believe, to transdisciplinary modes of inquiry, seeking insights from all branches of the humanities, sciences and arts, and perhaps more esoteric forms of knowledge that are as yet to be academically sanctioned. In seeking to orchestrate knowledge from across several disciplinary fields this chapter is a microscopically small contribution to this larger project.

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Notes

¹ For an important contribution to this work see Crick and Koch (1998).

² The philosopher John Searle (1983), for example, claims; "the brain is all we have for the purpose of representing the world to ourselves and everything we can use must be inside the brain." David Houghton (1997) makes an interesting counter argument.

³ See for examples the work of Putnam (1975), Clark (1997) and Sheldrake (2003).

⁴ See Clark (2004) and Gell (1998).

⁵ I refer to my own perceptual experience here in order to avoid making assumptions about what others might experience. See note 6.

⁶ Spatial readings of this kind are, however, not necessarily universal. In Jan Deregowski's (1980) studies on cross-cultural perception of illusions, for example, certain African subjects failed to see perspectival drawings as representations of depth.

⁷ For an authoritative survey of the issue of persistence of vision in film theory see Anderson (1993).

⁸ The image can be seen at

http://www.michaelbach.de/ot/mot_enigma/enigma780.gif

⁹ For an overview of representationalist thought see Watson (1995).

¹⁰ There are now many strands of externalist thought, some in disagreement with others. In addition to those already mentioned is the important paper by Chalmers and Clark (1998), which contributed to the wider discussion of the notion of 'extended mind' in recent philosophical debate.

¹¹ See, for example, the extraordinary capacity some blind people have for 'facial vision', the ability to detect objects by their proximity to the face (O'Regan and Noë 2001: 959).

¹² See O'Regan et al. (1999) and numerous examples on line, e.g. <http://eyelab.msu.edu/VisualCognition/flicker.html>.

¹³ There is another — that the mind and world are neither distinct nor unified — but since it is a variation on the third, we will not consider it here.

¹⁴ While not its originator, in *A History of Western Philosophy* Bertrand Russell says Descartes; "brought to completion, or very near completion, the dualism of mind and matter which began with Plato..." (1987: 550)

¹⁵ This is not to say that Descartes disputes the existence of the physical world, but he believes it to be of a different substance than the mental, which is what makes him, in the philosophical jargon, a dualist rather than an idealist.

¹⁶ For a discussion see Garber (2003).

¹⁷ The point here is not to undermine Descartes, or engage in detailed rebuttal and counter-rebuttal of the multiple interpretations of his philosophy. Rather it is to demonstrate that such considerations of the mind-body problem quickly test the bounds of rational thought.

¹⁸ For a discussion on internal vs. external theories of mind in contemporary AI, see Clark (2004).

¹⁹ See, for example, Anderson (1993) and Sobchack (1991).