

The Intentional Basis of Presence

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Abstract

Presence is the experience of being somewhere arising from the interplay of technological, psychological and bodily factors. Experiences, generally – though there are exceptions¹, are a consequence of interactions with things and events in the world. Thus to experience is to experience something. Ordinarily these somethings are objects and events in the world but in presence research these are presented by way of technology. Either way, to understand an experience is to understand both the psychological and bodily states of the experiencer and the objects and events which give rise to the experience.

Most, if not all, of these psychological and bodily factors are intentional. Intentionality refers to the about-ness or directed-ness of these states rather than the sense of being deliberate. The experience of presence is intentional.

However, intentionality is better thought of as an arc connecting us with the world and consequentially giving rise to a range of experiences including the sense of presence. In order to understand this we must include both the embodied, psychological being at one end of the arc and the things, events and people at the other end. It is proposed that this external aspect of presence can be thought of as a meshwork of affordances. Thus the sense of presence is the product of an intentionality-affordance dynamic.

Keywords--- intentionality, affordance, experience.

1. Introduction

The psychological aspects of presence have been studied, like very many other psychological phenomena, in the laboratory. Indeed historically much of psychology has been studied in there. The reasons for this are simple: human behaviour is so complex that the only practical means by which it can be studied is to isolate the faculty in question and subject it to hypothesis testing and experimentation away from potentially confounding factors. So, for example, the study of memory – a centrally important cognitive faculty – has been concerned with such things as how many items can be remembered or how quickly they are forgotten. (Memory research will now be discussed in a little detail to establish a

*parallel with presence research.) These laboratory-based studies have broadly followed the protocols established by Ebbinghaus [1] that is to say, controlled, context-free experiments that seek to quantify memory. Ebbinghaus famously used nonsense syllables, such as jyd to study “pure memory”. However an earlier, and largely forgotten, experiment was conducted by Galton in 1880 (this work is described by [2: p.23] who invited people to recall the appearance of their breakfast tables (“Galton’s breakfast questionnaire”). In contrast to Ebbinghaus’ studies, Galton was interested in both the functional aspects of memory (i.e. what it is for and how it is used) rather than how it is measured and, importantly for this discussion, what is being remembered (that is, what are memories *about* rather than *pure memory*). However despite this early appearance of an alternate memory paradigm, laboratory based studies have predominated. Then in the late 1970s, Ulric Neisser, a distinguished cognitive psychologist, dismissed the work of the previous 100 years as worthless for failing to answer “the important questions about memory” and called for a shift to the “realistic” study of memory [3]. His criticism focussed on many of the very things which Ebbinghaus had established, namely, context-free, laboratory studies. This criticism also saw a rebirth in interest in everyday memory. Everyday memory research has been characterised by its attempt to understand “the sorts of things people do every day” [4: p.35] and by its choice of topics having “obvious relevance to daily life” [54: p.3] and in particular, by its concern with the practical applications of memory research. This is in contrast to the alleged irrelevance of traditional memory research, which has “chiefly focused on explicit recognition or recall of isolated items from lists” (4: p.35). Thirty years after this outburst, everyday memory research is well established and exists in parallel with the laboratory-based variety still. Similar criticisms have also been made of the laboratory study of other cognitive functions including, visual perception (e.g. [6] [7] [8] [9]); planning and problem solving ([10][11]); and learning (these are almost too numerous to list but notable examples include [12] [13]). In all, as powerful as laboratory studies are, their greatest strength is also their greatest weakness in that they isolate of the very thing they are studying from the context in which it operates.*

In considering these criticism we recognise that they are actually two-fold. The first is methodological – laboratory *versus* real world, which for the moment, is not an issue

¹ These exceptions include such things as anxiety which is a psychological and bodily state which is not directed at anything in the world.

which presence research can address, at least not until “the illusion of non-mediation” becomes very effective indeed. The second aspect concerns the intentionality (also described as *aboutness* or *of-ness*) of these psychological states. Conway [14: p.24], for example, has highlighted the importance of the *aboutness* of real-life memory. He has argued that the study of everyday memory may require a different theory of mind than one which would have us “study human memory as if it were a chemical reaction - like dough rising.” He claims that “one difference between mental and physical states is that mental states have content, whereas physical states do not. Thus, my memory of dough rising is about something, some representation of an event I once experienced.” Most mental states are indeed intentional but, as we shall see, so too are physical states.

Yet Conway’s observation about the content of human memory appears to isolated as, in reviewing the treatment of intentionality in psychology, it tends to be limited to social psychological phenomena appearing as “theory of mind”.

2. Intentionality

It was Franz Brentano (1838-1917) who revived interest in intentionality, St. Thomas Aquinas having introduced the concept in the 13th century, by recognising that most of our mental states (including attitudes, affective states and so forth) are directed towards things and events in the world [15]. Brentano defined intentionality as the main characteristic of mental phenomena, by which they could be distinguished from physical phenomena. The word itself is derived from the Latin *intentio*, from *intendere*, meaning being directed towards some goal or some thing. The everyday use of the term intentionality meaning intending, intentions or motivations such as the intention to drink a cup of tea should be distinguished from the concept’s philosophical sense. The mental state – “I must remember to go to the dentist” refers to the everyday intention of keeping an appointment and is directed to something in the world, an appointment at a particular, time and place with an individual and his hygienist. In much the same vein but more recently Searle also writes, “Intentionality is that property of many mental states and events by which they are directed at or about or of objects and states of affairs in the world” [16: p.1). Thus “I love my Mac”, “I don’t trust this website”, “I must remember to correct the proofs” all refer to intentional states. Searle includes beliefs, desires, fears and hopes but excludes states such as undirected anxiety, elation and forms of nervousness. Beliefs, hopes and fears are about something while elation and nervousness are not. Since Brentano’s time the concept has been developed by a succession of phenomenological philosophers principally Martin Heidegger, Maurice Merleau-Ponty, though two notable philosophers of mind John Seale and Daniel Dennett have also written at length on the subject. Philosophers typically treat intentionality as though it were a unitary phenomenon (unfortunately none of them agree as to which particular

unitary phenomenon). In the next two sections we consider two well established aspects of intentionality.

2.1 Corporeal intentionality

Merleau-Ponty developed the concept of intentionality to include what we would now describe as embodiment. He argued that it is only through our lived bodies that we have access to what he described as the ‘primary world’. Without our bodies there could be no world thus the concept of the lived body is central to his account of corporeal intentionality replaces the usual Cartesian mind-body distinction. The world and the lived body together form what Merleau-Ponty calls an *intentional arc* which binds the body to the world. For example, the movement of the lived body actually creates (produces) existential space. It is not, however, the ‘objective’ movement of the body as such, instead it is the experience of this movement, “Far from my body’s being for me no more than a fragment of space, there would be no space at all for me if I had no body”. To feel our body (kinaesthesia) feeling its surroundings is not merely an exercise in self-reflection but the means by which we ‘prehend’ the world [17]. This kinaesthetic feedback is the means by which we both objectify the world and orient ourselves within it. To orientate ourselves is to adopt an external point or frame of reference. However, Merleau-Ponty also recognised the role of the world (environment) when he wrote, “To move one’s body is to aim at things through it; it is to allow oneself to respond to their call” . (The idea of things calling to us or inviting us, will be developed in section 7.)

This *intentional arc* is then the knowledge of how to act in a way that ‘coheres’ with one’s environment bringing body and world together. But this is more than just being physically present in the world: “the life of consciousness - cognitive life, the life of desire or perceptual life - is subtended by an ‘intentional arc’ which projects round about us our past, our future, our human setting, our physical, ideological and moral situation”. For example, the *intentional arc* can be seen in action with the maximal or maximum grip. According to Merleau-Ponty, higher animals and human beings are always trying to get a maximal grip on their situation. When we are looking at something, we tend, without thinking about it, to find the best distance for taking in both the thing as a whole and its different parts. When grasping something, we tend to grab it in such a way as to get the best grip on it.

“For each object, as for each picture in an art gallery, there is an optimum distance from which it requires to be seen, a direction viewed from which it vouchsafes most of itself: at a shorter or greater distance we have merely a perception blurred through excess or deficiency. We therefore tend towards the maximum of visibility, and seek a better focus as with a microscope.”

Merleau-Ponty [17: p.352]

So it is corporeal intentionality which allows us to orient ourselves in world and underpins much of our interaction with it.

2.2 Social intentionality

Social intentionality (also known as “theory of mind”) is the ability to “to attribute the full range of mental states (both goal states and epistemic states) to ourselves and to others, and to use such attributions to make sense of and predict behaviour” [18]. Theory of mind or social intentionality has been the subject of research by philosophers such as Dennett and a raft of other researchers interested in things as diverse as autism (*ibid*); social presence [19]; and cultural psychology [20]. This ability has allowed us to create complex social relations and to cooperate.

There is a broad consensus that being able to anticipate the behaviour and intentions of others is a necessary condition for social relations to exist. This ability has a number of different names – social intentionality, being used here to underline the link with its other forms. However, probably the most common name is ‘theory of mind’ a term coined by Premack and Woodruff [21] though Dennett [22] calls it the ‘intentional stance’ while Wellman [23], perhaps recalling Wundt’s *Volkerpsychologie*.

Baron-Cohen [18] has argued that the acquisition of a theory of mind is more important in evolutionary terms than the development of bipedalism and language as without it, being able to produce and understand speech would have not been possible. We need a theory of mind to communicate and cooperate with each other. More explicitly, Baron-Cohen (*ibid*) identifies eight different behaviours which depend on a theory of mind, these are reproduced here (in a highly edited form) to underline their importance:

- Intentional communication are those “communicative acts that are produced in order to change the knowledge state of the listener”. If I were to tell someone that tea contains anti-oxidants, I am doing so in order to give you new information that (a) I believe you do not have; (b) that you might be interested in (c) that this is information you might want.
- Repairing failed communication with others is indicative of the belief that the listener has not understood the intended message.
- Teaching is concerned with “changing the knowledge state of the less knowledgeable listener”.
- Persuasion is an aspect of intentional communication but it is produced with the specific intention of changing someone else’s belief about the value of something.
- Intentional deception occurs when “one animal attempts to place false information in the mind of another, or attempts to withhold true information from the mind of another”.
- Building shared plans and goals Sharing a plan or goal with another animal requires a “meeting of minds”.

- Shared attention requires that both animals must be aware of the other animal being aware of looking at the same target at they are.
- Pretending is different from intentional deception in that the intention is not to mislead or plant a false belief in an audience, but simply to pretend.

A theory of mind has also been identified as a necessary condition for, and the basis of, no less a construct than culture itself. Bruner, for example, believes that culture comprises inter-personally negotiated symbolic meanings. He writes “Social realities are not bricks that we trip over or bruise ourselves on when we kick at them, but the meanings that we achieve by the sharing of human cognitions” [24: p.837]. Similarly, in his essay on Agency and Culture, Ratner [25] notes that “social intentionality is necessary if social life is to occur. Agency must adapt to and promulgate social patterns. Otherwise, there would be no common, stable, or predictable social life.”

As for the origins of social intentionality, Tomasello [20: p.23] writes “In terms of evolution, then, the hypothesis is that human beings built directly on the uniquely primate cognitive adaptation for understanding external relational categories, they just added a small but important twist in terms of mediating forces such as causes and intentions”.

2.3 Affective Intentionality

It has long been recognized that the body, our corporeality, is intimately connected to the emotional states we experience. The James-Lange theory of emotion, developed originally by William James [26] took the view that emotion was the result of (not the cause of) bodily changes. So, we wander down a dark alley and encounter a man with an axe, our first reaction is to run away and it is the consequences of our racing heart, breathlessness and other bodily changes which are interpreted as *fear*. Though superseded, there is, surprisingly, some experimental evidence in support of this position [27]. Damasio [28] has also argued that emotions offer a means by which the brain to monitor the body’s past and hypothetical responses, both in the autonomic and the voluntary systems, in terms of “somatic markers”. The association of characteristic bodily states with past and hypothetical experiences and responses establishes a connection between the emotion and the world (that was or might have been). Hohmann [29] has also show that we need an intact autonomic nervous system (ANS) to be able to experience ‘real’ emotions. Hohmann studied 25 men with spinal cord injuries (with corresponding ANS damage) who reported significant changes in their emotional responses both in terms of intensity and character.

For Goldie [30] emotions involve two kinds of feeling: “bodily feeling and feeling towards. Both are intentional, in the sense of being directed towards an object”. Bodily feelings are directed towards the condition of one’s body, although they can reveal details about the world beyond one’s body. He also notes that “Feelings are directed towards the

object of the emotion – a thing or a person, a state of affairs, an action or an event; such emotional feelings involve a special way of thinking of the object of the emotion”.

2.4 Cognitive / Perceptual Intentionality

Our cognitive and perceptual systems did not evolve to allow us to enjoy a colourful sunset, the smell of a rose or the taste of a good pint of English bitter merely for the sake of such (though Benjamin Franklin famously cited the existence of beer as evidence of a benevolent god). We perceive – irrespective of modality – so that we can find mates, avoid predators, locate food and drink. Our perceptual systems have developed to allow us to collect and process relevant information from the environment. They are directed at the world, the information they collect is about things and events in the world. Indeed recent years has produced evidence that it is meaningful to couple action and perception. Research in cognitive science [31], robotics [32], the study of skilled behaviour [33] and developmental psychology ([34][35]) suggests that there is close coupling between perception and action.

For example, Bertenthal *et al.* [35] have noted that action and perception are being increasingly treated as being closely coupled in the regulation of coordinated movements. This

coupling, they continue, is necessary to ensure stable and environmentally appropriate action patterns are produced in response to demands of the situation. So, for example, in moving from one location to another, we could not expect to be able to control our motor systems action effectively if they did not respond to incoming perceptual information. And Thelen and Smith have suggested that the interplay between thought and action may be so ubiquitous and so fundamental that all of our early knowledge is built “though the time-locked interactions of perceiving and acting in particular contexts” [34: p. 217].

There is also substantial evidence from studies of the neural basis of perception and action. For example, Grèzes and Decety [36] using positron emission tomography have shown that those parts of the brain responsible for motor representation are activated in response to the perception of the affordances of objects. They conclude that “perception of objects automatically affords actions that can be made towards them” (*ibid*: 212). (Interestingly in reviewing the literature on the neural basis of affordance they note an earlier study by Jeannerod *et al.*, [37] who found the actions elicited by affordance were affected by the familiarity one had with objects.)

In all, intentionality is a recurrent theme when we consider the role of the body, social cognition, affect and

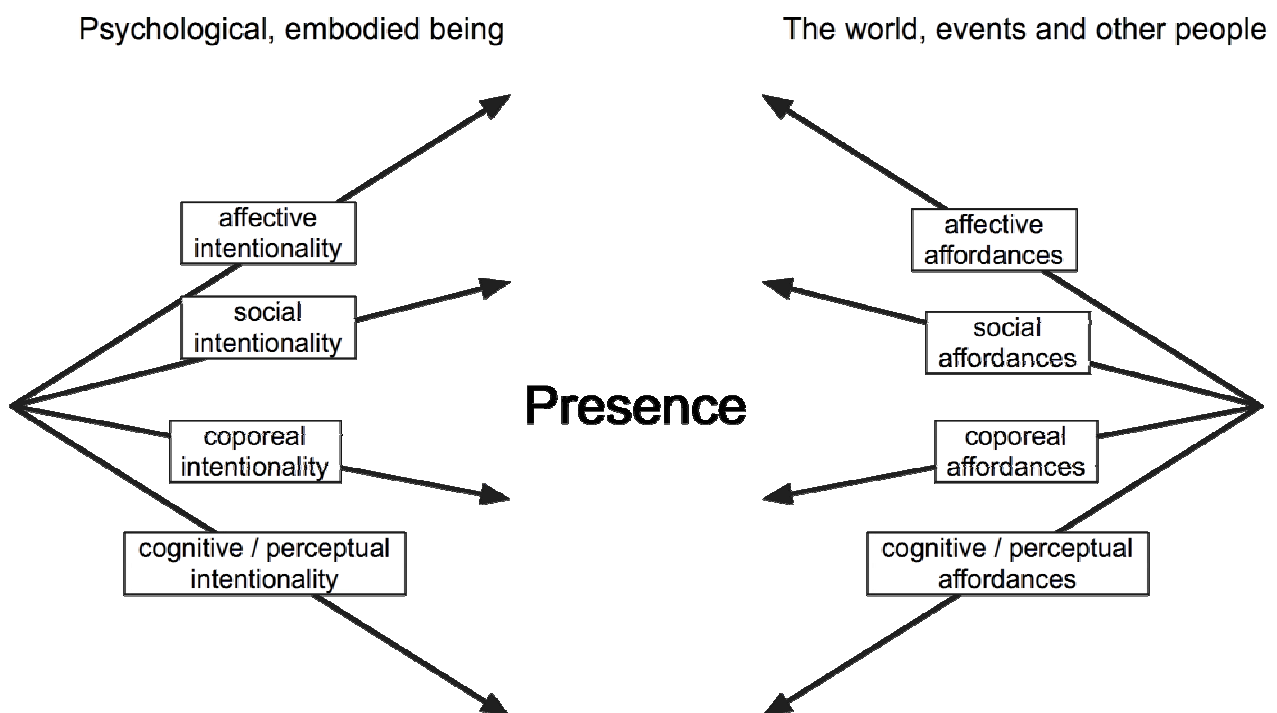


Figure 1: The Intentional Arc

cognition-perception in our dealings with the world, events and other people. But intentionality of these faculties is only half the story or more correctly, half of the arc.

3. The Neuro-dynamics of the Intentional Arc

Freeman has created a schematic flow diagram of the main components of the intentional arc in the mammalian forebrain. Summarising his work - purposive behavior arises from the interaction among the motor, sensory and associational areas [38] – see figure 2. This pattern of interaction also requires the participation of the hippocampus. The hippocampus is thought to be the site of the *cognitive map* (cf. [39]). The term “cognitive map” is usually attributed to Tolman [40] who reported that he saw a rat's initial set of stimulus - stimulus (S-S) expectancies concerning an environment as becoming integrated, with experience, into a map-like representation including distance and direction information, writing, ‘...information impinging on the brain, worked over and elaborated ... into a tentative cognitive-like map of the environment indicating routes and paths and environmental relationships.’

This pattern of interaction is transmitted to the brain as such constitutes a control loop. A complementary patterns of energy released by our senses, as a consequence of our bodily engagement with the environment - the motor loop. Together the action-perception cycle is completed.

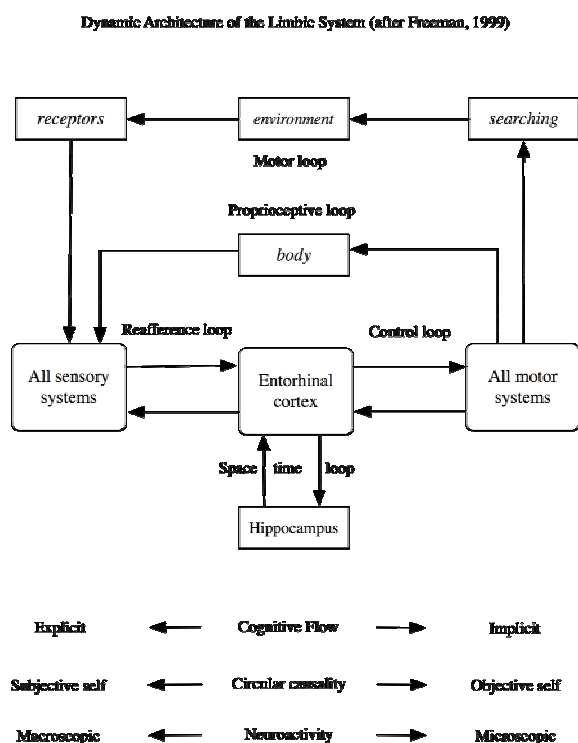


Figure 2: The dynamic architecture of the limbic system – redrawn after Freeman, 1999: 150.

4. Completing the Arc

As Heidegger observes “the usual conception of intentionality misunderstands that toward which - in the case of perception - the perceiving directs itself. Accordingly it also misconstrues the structure of the self-directedness-toward, the *intentio*. This misinterpretation lies in an erroneous subjectivization of intentionality”. Thus for Heidegger intentionality is neither objective nor subjective but in some sense both. [41: p.63-65] reminding us, of course, of Gibson’s definition of affordance. Gibson was in complete accord with the argument outlined here when he recognised that “An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behaviour. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer” [8: p.129]. This, in clearer language, is Heidegger’s definition of intentionality. Thus it is will be argued that intentionality is one end of the intentionality arc which connects us to the world, to other people and to tool. Affordance providing the other end of the arc. The environment, other people and tools are engaged with by way of the affordances they offer. There is a “structural coupling” between intentionality and affordance – see figure 1.

Gibson wrote, “An elongated object, especially, if weighted at one end and graspable at the other, affords hitting or hammering (a club). A graspable object with a rigid sharp edge affords cutting and scraping (a knife)”. Further examples of affordances include surfaces that provide support, objects that can be manipulated, substances that can be eaten and other animals that afford interactions of all kinds. The properties of these affordances for animals are specified in stimulus information. Even if an animal possesses the appropriate attributes and senses, it may need to learn to detect this information. An affordance, once detected, is meaningful and has value for the animal. It is nevertheless objective, inasmuch as it refers to the physical properties of the animal’s ecological niche and the constraints of the animal’s body. An affordance thus exists, whether it is perceived or used or not, furthermore it may be detected and used without explicit awareness of doing so. This description was revised in 1986 when Gibson wrote, “An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behaviour. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer” [8:129]. Thus affordances hover uncomfortably in a dualistic nether-land between the world and the observer. Yet this was not how they were originally conceived. The concept of affordance has its origins with the Gestalt School of psychology. The Gestaltists working in Europe in the 1920’s and 1930’s argued that we perceive the function of a thing as quickly as its colour or shape. Gibson quotes Koffka, who publishing in 1935, makes the following point, “Each thing

says what it is ... a fruit says eat me, water says drink me”, Gibson [8:138]. Koffka used the term demand characteristic to describe these (directly perceived) properties of objects, while Lewin, again quoted by Gibson, preferred the term Aufforderung-scharakter (invitation character) – cf. Merleau-Ponty. These properties were seen as being phenomenal in nature and not the physical properties of objects – that is, we see directly what these objects are for and how to use them – no one taught us to drink water.

This simple account of affordance has, of course, been significantly extended in recent years – see [42] for a review. For example, Hartson [43] has proposed a four-fold division of affordance for the purposes of designing for interaction. These four categories are (a) cognitive affordance; (b) physical affordance; (c) sensory affordance and finally, (d) functional affordance. This four-fold classification maps onto corresponding functions: for example, physical affordance is synonymous with utility, while sensory affordances include such things as noticeability, colour, contrast and so forth.

In contrast [42] has proposed a binary division of affordances into simple and complex. Simple affordances are identical to Gibson’s original formulation while complex affordances are culturally determined. Cole [44], for example, identifies a range of affordance offered by a variety of mediating artefacts including the life stories of recovering alcoholics in AA meeting (affording rehabilitation), patients’ charts in a hospital setting (affording access to a patient’s medical history), poker chips (affording gambling) and “sexy” clothing (affording gender stereotyping). Cole notes that mediating artefacts embody their own “developmental histories” which is a reflection of their use. That is, these artefacts have been manufactured or produced and continue to be used as part of, and in relation to, intentional human actions.

Gross *et al.*, ([45], [46]) have pursued an affordance-based approach to the design of virtual environments. Their reasoning being that as artefacts afford a range of utility and function in the real world, this should correspondingly the case in synthetic environments. Their analysis, based on the Gibson’s direct perception account of affordance, has led them to conclude that their key functions should be: (to allow users to) orient, identify, select, access, organize and integrate. They then go some way to consider the practical issues in designing virtual environments with these characteristics. However their conceptual model (p.485) seems incomplete and reflects quite a narrow readings of Gibson.

However in recognising that the various expressions of intentionality are bound to (or are the other end of an *intentional arc*) we can quite reasonably proposed that corporeal, social, affective and cognitive affordances do be designed into synthetic environments.

5. Connecting this to presence research

This discussion began by arguing that presence is intentional, that it is about something, that it points at the world. Four forms of intentionality have been briefly discussed and that intentionality itself cannot be considered in isolation but must be seen as one ‘end’ of an intentional arc (or dialectic) with various forms of affordance providing the other thus linking us to the world. So what does this all mean:

- (1) In adopting this argument, presence is better thought of as an arc connecting embodied, psychological beings to places, spaces, people and events;
- (2) Breaks in presence (BiPs) can then be seen to occur when there is a failure or break in an arc, e.g. an affordance is not available.
- (3) From this intentional arc perspective, the two broad varieties of presence, social presence and tele-presence may be seen as a continuum linked and differentiated by the types of intentionality and affordances involved.
- (4) Treating intentionality as a significant property of presence directs us to consider it as being more than a psychological (and physiological) state.

This is clearly preliminary treatment of a complex philosophical, psychological and neurological argument and does not neatly map onto a set of design recommendations. Nor should it necessarily. Dourish [47] in a recent discussion of this very point objected to the instrumental, piecemeal and subordinate use to which theoretical positions were put in the service of design. Writing primarily from the perspective of the usefulness of ethnographical approaches in HCI, he observes, “In reducing ethnography to a toolbox of methods for extracting data from settings, however, the methodological view marginalizes or obscures the theoretical and analytic components of ethnographic analysis.” (*ibid*: 543). But more importantly, he continues, “implications for design,” is based upon the notion of user requirements as it appears in software engineering. In essence, a statement of “implications for design” is a request for facts – which can be translated into technological design features. But can this be true of the experience presence? However while we cannot design experiences such as presence as such we can facilitate them by ensuring that our synthetic environments have been designed with the range of affordances identified earlier.

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