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Presence and Embodiment in Mobile Phone Communication

Ruth M. Rettie[♠♦]

[♦]Business School,
Kingston University, U.K.

ABSTRACT

This paper explores the temporal and spatial characteristics of mobile phone communication, comparing the experience of presence in phone calls and in virtual reality environments. It is argued that in phone communication interactional affordances create an experience of presence and a degree of embodiment. The theoretical framework adopted combines Goffman's frame analysis with Gibson's affordance theory and a situated cognition perspective. The concept of presence is clarified by an analysis of embodiment. The traditional view of embodiment is criticised as assuming a Cartesian mind/body dualism. An alternative view of embodiment is developed which challenges the dichotomies of virtual and physical embodiment, and of virtual and physical environments.

Keywords: *presence, embodiment, situativity, mobile phone, virtual environment.*

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1. Introduction

Communication is a fundamental aspect of social interaction. The last decade has seen a proliferation of interpersonal communication technologies. These new forms of communication seem to change perceptions of time and place, because they enable people to participate in different interactions at one time, and to take part in interactions at distant places.

The first part of this paper focuses on the spatio-temporal dimensions of mobile phone communication. It begins with some dramatic postmodern concerns about the effects of new communication technologies. This is followed by a review of some of the effects on time and place wrought by mobile communication. Although much of this paper is relevant to all phone communication, mobile phones exacerbate the effects of phone communication because they increase the occurrence of concurrent

[♠] Corresponding Author:
Ruth Rettie
Business School, Kingston University, Kingston Hill, KT2 7LB, UK.
Phone: +44(208)547-2000
E-mail: RM.Rettie@Kingston.ac.uk

interactions. These distribute the experience of presence between parallel interactions, creating absent presence in the face-to-face interaction, as presence is diverted to the phone interaction.

The second part of the paper compares the experience of presence in phone conversation to that experienced in a virtual reality environment. Firstly, the concept of embodiment is explored, as a defining characteristic of the experience of presence in virtual reality (Slater & Usoh, 1994). It is argued that virtual and physical embodiments are complementary, and that both are created by the affordances of an environment. An affordance is the perceived potential for action. Affordances include located perspectives, action with objects and interaction with others. It is argued that the perception of potential action within an environment generates the experience of presence and embodiment in that environment. Consequently, in phone calls interactional affordances create a sense of presence and embodiment in a shared space.

The themes of this paper find resonances with others in this special issue, specifically: on the place-space distinction (Spagnolli & Gamberini); on the relationship between presence and place (Spagnolli & Gamberini; McCall, O'Neill, Carroll, Benyon, & Smyth); on the relevance of responsiveness to the experience of presence (McCall et al.); and on the mutable boundary between physical and virtual embodiment (Gemeinboeck & Blach).

2. Spatio-Temporal Dimensions of Mobile Phone Communication

2.1 Postmodernity

Several writers claim that modernity has radically changed the relationship between time and space. It is argued that the introduction of universal clock-time and modern communications changes the relationship between time and distance (Kern, 1983; Harvey, 1989; Bauman, 2000). Before electronic communication the geographical distance between places was proportional to the time taken to move from one to another; this is undermined by modern communications. Telecommunications alter the relationship between time and space, contributing to the *"death of distance"* (Cairncross, 1997), increasing *"time-space distanciation"* (Giddens, 1990, p. 14) and compressing time (Harvey, 1989). Simultaneity replaces delay, creating *"timeless time"* (Castells, 2000, p. 14) and a *"global present"* (Adam, 1995, p. 112). Urry introduces the term *"instantaneous time"*: the absence of delay increases focus on what is immediate, *"the future increasingly appears to dissolve into an extended present"* (2000, p. 128).

Modernity *"tears space from place"* because it enables interaction without localised presence (Giddens, 1990, p. 18). Space and time are replaced by time at the speed of light; this poses a huge threat to our way of life, *"a shock, a mental concussion"* (Virilio, 1995, Para. 6). The mobile phone accelerates these changes, it is a *"very postmodern phenomenon"* (Roos, 2001, Para. 25) and the *"key device of the postmodern age"* (Kopomaa, 2000, p. 121).

These hyperbolic claims are purely theoretical, but their frequency and intensity reflects concern about the effects of modern communication technologies. Their recency is perhaps surprising when the telephone, which enables interaction at a distance, was invented in 1876.

2.2 Time

Harvey (1989) challenges the concept of a single objective sense of either space or time, arguing that different concepts of time and space are developed through social processes. Adam, concurs *"There is no single time, only a multitude of times which interpenetrate and permeate our daily lives"* (1995, p. 12). She argues that the quantification of time, through the introduction of clock-time, has meant that time is treated as a resource, to be saved, spent or exchanged. The mobile phone challenges this linear concept of time, because it acts as a *"Lazarus device"* (Perry et al. 2001, p. 14) resurrecting dead or unproductive time, e.g. travelling time, when calls can be a secondary, supplementary activity. This allows users to fill their time with more activities (Johnsen, 2002).

Mobile phones both conserve and consume time. They improve time management (Townsend, 2000; Laurier, 2001) but they also increase "*presence-availability*" (Giddens, 1984), creating new opportunities for interaction, so that more time is used for communication (Gant & Kiesler, 2001; Ling, Haddon, & Klamer, 2001). Green (2002) suggests that the *"always-availability"* of mobile phones affects the sequencing of tasks, and the cycles of work, leisure and family life, with consequent social implications.

2.3 Place

It is suggested that mobile phones liberate people from place (Wellman, 2001). Mobile communication is compatible with mobility, removing the need to stay by the telephone (Geser, 2004) reducing the role of place and the *"place-centredness of schedules"* (Palen, Salzman, & Youngs, 2001). The sense of belonging to a place "*is*

actually transformed into the sense of belonging to one's communicative network" (Fortunati, 2000, quoted by Geser, 2004, Sect. 5.1).

Several authors have distinguished space from place. Casey (1997, p. xiii) claims that place is overshadowed in modern thought by space; he argues that we live in places not spaces; places are more than geography, they comprise *"identity, character, nuance, history"*. Places are **located** in spaces, but not all spaces are places. Places are imbued with social meanings (Harrison & Dourish, 1996) but "*the concept of space has nothing to do with experience... . Space is a myth, a ghost, a fiction for geometers"* (Gibson, 1979, p. 3). To emphasise the social aspect of place, Giddens (1984) introduces the term *"locale"*, this is the setting for social interaction. Spagnolli and Gamberini (2004, p. 49) distinguish both *"objective space (homogenous and measurable)"* and *"mental space (pure and abstract)"* from place, which is *"recognizably associated to meaning on a psychological and cultural basis"*. In a counterpart to the process by which situated action (Suchman, 1987) is given meaning through place, place acquires meaning through social action.

The differentiation between space and place varies: Harrison and Dourish (op cit.) argue that there are mediated places (e.g. LamdaMoo, an online environment) which do not exist in (geographical) space, i.e. place without space. Conversely, Giddens suggests that electronic mediation enables interaction without being in the same physical place: mediated interaction occurs in space, but not in place. From studies in cultural geography, Brown and Perry (2002, p. 50) abstract general dimensions of the place/space distinction. *"Specifically, to call something a 'place', brings attention to its located, embodied, personal, local, human nature. And to call something 'space' is to bring attention to its abstract, objective, global, general, inhuman qualities."* Space is "*abstract and distributed"*; place is "*local and (the) contingent"*.

Mobile phone communication affects the use of time and the role of place; an important spatio-temporal effect is its distribution of presence in simultaneous interactions.

2.4 Place in Mobile Phone Communication

When people are on the phone, there is a sense in which they are in two places at one time. This is particularly apparent for mobile phone communication, where mobility means that calls are likely to interrupt concurrent copresent interaction. Palen, Salzman and Youngs (2001, p. 121) comment, *"When mobile phone users are on the phone, they are simultaneously in two spaces: the space they physically occupy, and the*

virtual space of the conversation (the conversational space).” Ito and Daisuke (2003, p. 6) claim that *“Mobile phones … create new kinds of bounded places“*. These spaces are particularly valuable to Japanese teenagers who, they suggest, lack private physical places.

Schegloff (2002, p. 286-7) repeats an anecdote where one passenger listens in, rather obviously, to a mobile phone conversation. This outrages the mobile user who protests, “*Do you mind!? This is a private conversation!”* Schegloff writes, *“She is almost literally in two places at the same time … The other place that she is is ‘on the telephone’. And she may well understand that to be a private place. … (she) is not in the same ‘there’ as the rest of us are; there are two ‘theres’ there”*.

Being in two different places at one time is problematic. One way out of this is to use the distinction drawn in Section 2.3 between spaces and places. The participants are ‘on the phone’, the meeting is real, but there is no meeting place or location; the phone call occurs in space but not place. The shared space is an abstract logical consequence of copresence. The shared space has no dimensions and the participants do not occupy relative positions within it; people can be in two spaces at one time.

Actually it is more complicated. Phone conversation occurs simultaneously and remotely in two physical places, both people are heard at each location. In addition, there is the shared space, where the participants meet ‘on the phone’. There are therefore three spaces/places, the place where each participant takes the call and the phone space.

The next section explores the notion of presence and uses Goffman’s frameworks to clarify the concept. The distinction between place and space is then used to compare presence in mobile phone conversation to presence in virtual reality environments.

3. Embodiment and Presence in Mobile Phone Communication

3.1 Presence

The concept of presence as used in the HCI literature is the phenomenological experience of being present, of being *in* a situation or environment, the sensation of *"being there"* (Ijsselsteijn, de Ridder, Freeman, & Avons, 2000, p. 3959). Blascovich (2002, p. 129) defines presence as “*a psychological state in which the individual perceives himself or herself as existing within an environment”*.

Presence in the phone space reduces presence in concurrent copresent interaction, “as someone talks on the phone, one is in her or his own private space. Talking on the

mobile phone in the presence of others lends itself to a certain social absence where there is little room for other social contacts. The speaker may be physically present, but his or her mental orientation is towards someone who is unseen" (Puro, 2002, p. 23). Gergen introduces the term "absent presence"; the mobile phone "extends the domain of absent presence" (2002, p. 227) because it increases conflicting concurrent interactions.

The concepts of presence and place are related (Spagnolli & Gamberini, 2004): presence is about 'being there' (Ijsselsteijn et al., 2000) where 'there' denotes a place or space. The mode of presence depends on the nature of the mediated place (Spagnolli & Gamberini, 2005), or on the frame (Rettie, 2004).

Spagnolli and Gamberini (2005, p. 10) claim that there can be no presence without place. They allow that there is presence in mobile phone communication, but claim that this is because there is a shared *"communicative place"*; however, it is not clear that a phone 'communicative place' includes the psychological and cultural meanings essential to their definition of place. Most presence definitions include a sense of *physical* space (Freeman, 2003; Freeman, 2004) yet mobile phone behaviour suggests that presence can occur without a sense of physical location; in phone calls people feel that they are together, 'on the phone'.

3.1.1 Goffman's Frameworks

Goffman's concept of frames helps to clarify the concept of presence (Rettie, 2004). Goffman (1974, p. 21) introduces the concept of frames as follows: *"When an individual in our Western society recognizes a particular event, he tends, whatever else he does, to imply in this response (and in effect employ) one or more frameworks or schemata of interpretation …[which] is seen as rendering what would otherwise be a meaningless aspect of the scene into something that is meaningful."* In other words, we use frames to interpret our experience. Frames answer the question*, "What is going on here?"* [p. 46]. Frames are social, and usually shared by the participants of a situation.

Frames shape what is perceived; frames can break due to inconsistency of frame and content, changing what is perceived to have 'gone on'. Visual gestalt switches (see Figure 1) and the placebo effect are just two examples of the way frames affect perception. In psychology there is considerable empirical evidence for the related phenomena of priming, conditioning, scripts, schema and personal constructs. However, these tend to be applied only to representational or symbolic cognition, whereas the concept of frames can be extended to direct perception. For example the

frame ‘being in love’ affects the sensory perception of touch, the frame ‘riding a bicycle’ affects the body’s automatic responses to changes in the environment. In the field of AI, the use of frames is reflected in the idea of perception-conception coupling (Clancey, 1997). Frames also have the advantage of encompassing the whole situation, including the self, rather than just 'external' objects. This avoids the imposition of a dualist stance and makes frame analysis relevant even within the situativity perspective discussed below.

Fig. 1: Old/young woman.

Presence can be analyzed as engrossing involvement in a frame (Rettie, 2004). If presence is ‘being there’, involvement relates to ‘being’ and the frame explains what is meant by ‘there’, it defines the situation or environment. The term ‘involvement’ here does not describe interest in the content of an experience, but the allocation of attention to the framed situation as a whole. Goffman suggests that attention is a limited resource, which is allocated between different frames, and that one may focus attention on a particular framed experience, becoming engrossed. His theory can be extended to presence. Presence is the feeling of engrossment in a framed experience; the frame defines the nature of the presence. Under this analysis, as we become engrossed in the phone call, we experience presence. This frame analysis of presence can be mapped onto the three presence factors highlighted by Freeman (2004); a sense of spatial presence is created by the frame, engagement corresponds to

involvement, and realism relates to the consistency between frame and contents, which helps to sustain the frame and to maintain the experience of presence.

Frame analysis helps to explain presence in mediated environments; the frame provides the context, it both constructs and makes sense of the experience. A mediated environment may be framed as a space or a place. In virtual reality there is often a virtual place. Participants on the phone behave as if their interaction occurs in a separate, shared, private space but, it is argued, not in a location or place. In phone presence, a sense of place is replaced by copresence and intersubjectivity; social interaction constitutes *"successfully supported action in the environment "* (Zahoric & Jenison, 1998, p. 87). Phone conversation, in fact, provides the three elements which Mantovani and Riva (2000) claim facilitate a sense of presence: a cultural framework, the possibility of negotiation, both of actions and of their meaning (in this case turn taking) and the possibility of action. In the absence of place, interaction is essential; there is no sense of presence when talking to an answering machine.

Phone conversation is an example of presence without place; it is not clear whether presence in the phone space is the same as presence in a physical place. One issue is the role of the body, which is central to physical presence, but more problematic in the phone space. The rest of this paper explores the concept of embodiment. In order to illuminate presence and embodiment in a phone call, it is compared to that experienced in a virtual reality environment. The theories of Merleau-Ponty and Gibson are used to explore embodiment, which, research suggests, is a key determinant of the experience of presence in a virtual environment. Using the concept of affordances, it is suggested that both presence and embodiment are created by the affordances of an environment.

3.2 Embodiment

"In a sense, all reality is virtual. It is constructed through our sense organs and cognitive apparatus. Reality is not 'out there', it is what we take to be 'out there'" (Ijsselsteijn, 2002, p. 245). This quotation suggests a constructionist stance that is consistent with frame theory. However, it raises two important questions: the distinction between virtual and physical reality, and the distinction between 'out there' and 'in here'. This section explores the second question, focussing on the concept of embodiment; the following section focuses on the relationship between virtual and physical environments.

The dichotomy that contrasts 'in here' with 'out there' raises the question of whether the body is 'in here' or 'out there'. To assume the latter is to adopt a Cartesian dualist

approach that complicates mind body interaction. In fact, the distinction is misleading and can be avoided by the situated perceptual perspective proposed by many authors including Dewey, Merleau-Ponty, Vygotsky, and Gibson (Greeno, 1994; 1998).

3.2.1 Merleau- Ponty and the Corporeal Schema

Merleau-Ponty (1962) disputes the body-subject dichotomy; there is no duality between consciousness and body or between the body and the external world. He claims that consciousness implies embodiment, and is primarily perceptual rather than linguistic and reflective; one *is* one's body (Crossley, 2001). The body is therefore not 'out there': "…*consciousness is inseparable from perception, and in turn perception is inseparable from the particularities of one's body"* (Richardson & Harper, 2002). For Merleau-Ponty direct perception applies not only to one's body, but to the external world as well. In other words, there is no 'in here' and 'out there', just a holistic sense of the body-subject within the world, the 'corporeal schema'. *"The corporeal schema is an incorporated bodily know-how and practical sense; a perspectival grasp upon the world from the 'point of view' of the body"* (Crossley, 2001, p. 123). The corporeal schema extends to social interaction, where our embodiment enables us to instinctively and unreflectively interpret social context and norms. The corporeal schema *"may be enlarged or diminished, moreover, through the incorporation of alien elements"* (Crossley, op cit.) The blind man's stick ceases to be an external object for him and becomes an *"area of sensitivity"* (Merleau-Ponty, 1962, p. 143), an extension of his perception. Adopting the alternative phenomenalist view expounded here, virtual reality technology extends the field of action and embodiment is **extended** to the virtual environment.

Merleau-Ponty describes Wertheimer's experiment which uses a mirror to create a virtual room at 45˚ to the vertical. At first the subject sees the room *"slantwise"* but *"after a few minutes a sudden change occurs"*, the reflected room is perceived as vertical and *"the reflected room miraculously calls up a subject capable of living in it. This virtual room outs the real one to such an extent that the subject no longer has the feeling of being in the world where he actually is. …What counts for the orientation of the spectacle is not my body as it in fact is, as a thing in objective space, but as a system of possible actions, a virtual body with its phenomenal 'place' defined by its task and situation. My body is wherever there is something to be done."* (Merleau-Ponty, 1962, p. 248-250). Although this report includes the sudden change of gestalt or break in presence reported by modern researchers of virtual environments (e.g. Slater

& Steed, 2000), Merleau-Ponty does not interpret this simply as a switch between two alternative environments, rather in his holistic approach, alternative virtual and physical 'selves' are constructed as actors within their perceived environments.

3.2.2 Gibson's Ecological Psychology

Gibson's ecological psychology (1979) also challenges the assumption of internal mental versus external physical processes, an offers an interactional view of perception and action. This perspective has been developed into situativity or situated cognition theory in which *"cognitive processes are analyzed as relations between agents and other systems"* (Greeno, 1994, p. 337). The level of analysis shifts from individual cognitive states to interactive processes, either with other agents or with the environment. In this theory the environment is not an independent factor; the emphasis moves from a focus on the mental representations of the participants to a focus on the interactive system as a whole. The situativity perspective also challenges the boundary between the environment and the body; Gibson notes that tools, when used, become an extension of the body, but when detached they are part of the environment.

Ecological psychology moves from an internal versus external perspective to a holistic self-environment relationship. For Gibson, we do not perceive the properties of objects, per se, but their properties in relation to ourselves, i.e. in terms of what they afford us, or their affordances. Affordances are properties of the environment in relation to an agent and in support of an activity, for example, sitting is an affordance of a chair. Affordances are directly perceived, although they may be learned. Gibson's theory of affordances can be used to explain embodiment: the environment is not perceived as something 'out there' and independent of ourselves, but directly and relative to our selves. It is the relational properties or affordances of an environment which enable us to construct our embodiment '**in there'** i.e. within the environment. As Gibson points out, in visual perception the *"ambient optical array"* simultaneously specifies the environment and our embodiment and motion within that environment. Gibson's optical array creates the subjective view: a cone shaped, forward directed window on the world. Visual perception is always relative to the position of the body and includes propriosensitive information about the observer (Gibson, 1979); this simultaneously locates us within the environment and constructs embodiment. This is very similar to Merleau-Ponty's *"orientation of the spectacle of (my) body"* which depends "*on the 'system of possible actions"* (1962, p.249- 250).

3.2.3 Embodiment in a Virtual Reality Environment

Embodiment enhances the experience of presence in a virtual reality environment (Slater & Usoh, 1994); embodiment, and consequently presence, can be enhanced by relating visual projection to the position of the head. *"The way the world responds to our actions can be conceived of as a reality test. If the world transforms in a way that is consistent with our perceptual representations of the invariants of the physical environment, for example exhibiting appropriate motion parallax as we move our heads, we are more likely to accept the world at face value. …In this way, the participant will become aware that he or she is an actor within the environment … and [this]will greatly enhance the feeling of being there within the mediated environment – the sense of presence."* (Ijsselsteijn, 2002, p. 249-251). In some virtual reality environments, stereoscopic glasses or head-mounted display enable viewpoint dependent changes; perception is coupled to observer movement, in real-time. This creates a situated perceptual perspective and affordances in the virtual environment, inducing embodiment and increasing presence. The mirror in Wertheimer's experiment is also viewpoint dependent, perception will vary with head movement, encouraging virtual embodiment. Similarly, interaction with other participants in an environment is responsive and action-dependent, creating a sense of embodiment.

Greeno (1994; 1998) discusses the affordances of interpersonal interaction and suggests that in face-to-face conversation we directly perceive affordances in pauses, facial expressions and other gestures. Conversation analysis using recorded telephone calls (Sacks, Schegloff, & Jefferson, 1974) shows how phone conversations are governed by numerous subtle cues, for instance, changes in intonation; these also appear to be directly perceived. These cues indicate conversational opportunities or affordances such as turn-taking, topic introduction and repairs. In phone communication, these affordances and the potential to act and interact create a sense of embodiment, creating subjects that perceive themselves to be copresent. Phone communication extends the subjective view defined by the ambient optical array.

The situativity perspective explored in this section moves away from the concept of the body as separate from the mind to a holistic perspective in which self, body and environment are conceived as a single system. Affordances consist of interaction with the environment as a whole (located perceptual experience), interaction with objects in the environment and interaction with others in the environment; this interaction creates the experience of embodiment and a sense of presence. The theory blurs the distinction between virtual and physical environment. This is explored in the next

section, where it is argued that virtual and physical embodiment are complementary, rather than mutually exclusive alternatives.

3.3 The Relationship between Virtual and Physical Environments

The concept of presence as 'being there' creates a paradox under ingenuous realism (Mantovani & Riva, 1999); presence in a physical environment is seen as conflicting with presence in a virtual environment. This is conventionally resolved by defining presence in the virtual environment as an illusion (Lombard & Ditton, 1997). However, this misconstrues the experience; except in the most extreme cases there is residual awareness at some level of mediation (ISPR, 2004). Despite awareness of mediation there is an experience of embodiment in the virtual environment: the illusion of non-mediation is not necessary for the experience of presence and embodiment. Embodiment is a response to the affordances of an environment: the experience of being **in** a virtual environment is not an illusion.

Hayles (1996) reminds us that the body, through which we perceive the virtual environment, actually plays a crucial role in the construction of the virtual reality experience. In a virtual environment one does not experience the dissolution of ones' physical senses, nor does one construe the eyes that see the virtual world as virtual eyes; rather ones' embodiment seamlessly spans the physical and virtual worlds. The proprioception neuron sensors continue to relate to the physical body, there is no feeling of disembodiment, such as that experienced by some brain damaged patients (Sacks, 1985). Richardson and Harper (2002) argue that virtual reality does not offer disembodied reality, but rather a different facet of embodiment *"the virtual becomes an aspect of our embodiment".* See also Gemeinboeck and Blach, this issue, on the porous boundary between the real and the virtual. The assumption of a categorical distinction between virtual and physical is founded in the Cartesian distinction between mental and physical.

In an ecological psychology perspective of virtual reality, the embodied self is situated in **both** the virtual and physical worlds, without distinct boundaries between the mind, the body, the stereoscopic glasses (which become invisible as they are subsumed into our perceptual apparatus) and the virtual environment in which we perceive ourselves to act. This is consistent with experience: as I type, I am not aware of boundaries and interfaces between my mind, my fingers, the keys, the virtual text on the screen and the meaning I create. Rather, I perceive myself as actor within a continuous physical-virtual environment. In this analysis, virtual reality complicates reality, but it does not create

the multiple realities described by Poster (1995, p. 40) and other postmodernists. Although the self is constructed as actor within both physical and virtual environments, and embodiment may be experienced in both spaces, these are not separate realities.

The temptation to conceive of virtual and physical embodiment as conflicting realities arises in three ways. Firstly, the concept of embodiment in the virtual environment conflicts with our Cartesian concept of the body as an external **physical** object. However, the experience of embodiment in virtual reality environments is reported in numerous empirical studies and can be reproduced consistently and easily; this experience shows that the traditional Cartesian concept of embodiment is an over simplification.

Secondly, a sudden switch is sometimes experienced as the dominant awareness of embodiment moves from the physical to the virtual environment. This perceptual switch, so clearly described by Merleau-Ponty (1962) is similar to that which occurs in Figure 1. Even though one is aware throughout that there are two alternative perceptions, the change from young woman to old woman, or vice versa, involves conscious effort and is experienced as sudden and exclusive. Garau et al. (2004, p. 237) describe the active effort participants make to "*get back"* into the virtual environment after a break in presence; as one respondent commented: *"I had to focus … to bring it back to life. It was an effort"*. This is similar to concentrating on the old woman's chin or nose to switch perception, this work corresponds to the application of the specific frame. This gestalt switch does not imply that there are really two pictures; similarly there is no need to postulate multiple external realities corresponding to the different forms of embodiment. The alternative frames 'young woman' and 'old woman' create two conflicting perceptions of Figure 1; similarly there may be conflicting perceptions of embodiment, which depend on the frame employed. The sudden switch is a frame break as attention switches from one frame to another.

Thirdly, there is the somewhat disconcerting realization that one perceives oneself to be embodied in what is framed as unreal; hence embodiment in a virtual environment seems to be a contradiction in terms. For Goffman (1974) virtual reality would involve a transformed frame, signalling unreality; but this does not mean that it is not a genuine experience, only it is not what it appears to be, i.e. an experience of a physical environment.

Although these conflicts between virtual and physical environments can be resolved, they are avoided altogether in phone calls because they are framed as occurring in virtual spaces. The use of the 'space' frame allows for some sense of embodiment, but

avoids the need for a sudden frame switch, such as that experienced when the dominant experience of embodiment changes from a physical to a virtual **place**. On the phone there are no directional cues and one cannot move relative to the environment; the body is not located within the phone space and this reduces the experience of embodiment and presence.

4. Conclusions

The mobility of the mobile phone exacerbates the effects of phone communication, changing the use of time and altering the relevance of place. Mobile phones increase the occurrence of concurrent interactions, creating absent presence in face-to-face interaction as presence is diverted to phone interaction. Distinguishing between places and spaces helps to resolve the paradox of conflicting phone places.

Author	Theory	Theoretical Implications for Presence
Goffman	Frame Theory	Presence as engrossment within a frame. The frame relates to activity or 'what is going on'. Sudden breaks in frames create breaks in presence.
Merleau-Ponty	Corporeal Schema	Subject summoned by the environment. Presence is a response to our perception of ourselves as active within an environment. Sudden change as orientation switches from the physical to the virtual environment.
Gibson	Ecological Psychology	Self-body-environment is a holistic system. Embodiment and presence are created by affordances and agency within the environment.

Table 1: Implications for Presence Theory.

This paper highlights the similarities between the work of Goffman, Merleau-Ponty and Gibson, despite their being active in the diverse disciplines of sociology, philosophy and psychology. The parallels drawn between the work of these authors, and their implications for the theory of presence, are summarised in Table 1.

This theory has significant implications for the design of communication interfaces because presence seems to mediate other factors such as attention, liking, persuasion, illusions of reality, and learning. These design implications are briefly described in Table 2.

Author	Theory	Design Implications
Goffman	Frame Theory	Cue relevant frame – for instance, make it clear that it is as a virtual environment. Increase involvement in frame through allocation of attention: experience should be involving and demanding. Maintain consistency of transformed frame, for instance, through accurate 3D visual and audio cues and interaction with other actors.
Merleau-Ponty	Corporeal Schema	Maximise agency through real time interactivity between users and the environment, and between users.
Gibson	Ecological Psychology	Recognise that artefacts become transparent and an extension of the body. This is facilitated where use can be habitual and seamless, without the need for visual reference to an interface. It also means that the perception of the interface changes over time with consequent implications for interface research.

Table 2: Design Implications.

The situativity perspective challenges the dualist distinctions between 'in here' and 'out there', between self and body, between body and environment and between virtual and physical reality. Embodiment is conceptualised as a corollary to the perception of affordances in an environment, we are '**in there'**. The affordances of action and interaction create a sense of embodiment and the experience of presence. In phone communication a sense of presence and embodiment in the phone space is induced by conversational affordances; it is a similar (if somewhat diluted) experience to that in a virtual reality environment.

The ecological psychology approach to mediated presence undermines the distinction between virtual and physical embodiment. Virtual embodiment does not exclude physical embodiment; even in virtual embodiment the body is not conceived as virtual, but merely as located within a virtual environment. This implies that modernity does not constitute a radical change and the concerns of postmodernists are unfounded.

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