In Front of Our Eyes:
Presence and the Cognitive Audience
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INTRODUCTION

Despite the growing body of literature on 'presence', there remain relatively few hypotheses that address the central question of what presence is or attempt to account for, and detail, the processes with which presence is associated. Criticism has tended to defer these matters and instead to focus on arguments concerning the significance of presence (Phelan 1993), denials of this significance (Auslander 1999), accounts of presence's fundamental ambiguity (Power 2008) or how the mystery of presence might be articulated through a poetics and reference to concepts such as the *uncanny* (Goodall 2008). In this paper, it is not our intention to take issue with these views, we propose instead to ask what presence is and to consider why its properties so preoccupy theatre practitioners. In doing so, we explore several areas of experience associated with presence that are frequently invoked in theatre studies: unmediated communication, the idea of being in the moment and experiences of the mysterious or ineffable. In exploring the processes that enable, constrain, and thus characterise the communicative circuit between audience and performance, we emphasise an embodied view of the human that locates the mind and its experiences in the processes and purposes of bodily action rather than in perceptual representation or phenomenology, and draw upon views that suggest there is a functional basis for presence and its mysterious phenomenal quality (Gallese 2005; Metzinger 2003). In this, we contend that since the performance-spectator relationship is about minds in the act of producing and receiving information (Bennett 1997), exploring the theatre event via cognitive processes has a significant contribution to make to critical perspectives that locate the performance-audience relationship in social and cultural phenomena. We note in particular that cognitive science complements performance studies through shared concerns with emotion, meaning, memory, perception, attention and consciousness (cf Riva 2006). And that it has a particularly distinctive contribution to make to debate by arguing that the component processes of communication (such as theory of mind, empathy, semantic understanding, perception, and intersubjectivity) are contingent on direct contact with the world and constrained by evolved mechanisms that automatically attune the mind to external events and other people in predetermined ways (Gallese 2001).

COMMUNICATION WITHOUT REPRESENTATION

The question of "perceptual, direct, 'live' communion" (Grotowski 1968, 19) between performer and audience is one of the most contested in twentieth century theatre. In one tradition of analysis, the idea of communion between performers and audience is inflated as a key theatrical concept. Under such analyses, the somatic, the sensory, emotion, aura or the idea of putting nature to work are alleged to hold the key to theatrical and even to spiritual or mystical experiences (Artaud, Kantor, Grotowski, Barba et cetera). Conversely, ideas about the significance of 'liveness' and the 'auratic' are just as often reduced, under-represented or even denied with performance defined as a consciously mediated practice founded on culture, language, logic, conventions, symbolic communication and the manipulation of data (Brecht, Auslander, Fuchs). The dialectic between these positions might be seen to form the core of debate in twentieth century theatrical theory – with the competing claims that privilege either the value of physical or the value of symbolic communication presenting alternative schools of performance that may be deployed in different contexts.

In cognitive science, the issue of whether or not human beings have direct contact with the world has been similarly contested, with Cartesian views that privilege representation in contest with sensorimotor views that suggest that experience and communication are not founded on representation (Dennett 1991; Clark 1997). In an inversion of the critical trend in theatre studies, sensorimotor theories of cognition and experience have become pervasive in cognitive science (Jacob and Jeannerod 2005) with the component processes of communication (such as theory of mind, empathy, semantic understanding, memory, perception, and intersubjectivity) now being widely accepted to be contingent on direct contact with the world and obligatory operations that work at a subpersonal level (for example, Gallese 2001). Under sensorimotor views, evolved processes are seen to attune the human being to the world and to other people in predetermined ways, obviating mind-world dualities that otherwise would make experience into a puzzle (for example, Gallese 2003; Gibson 1979; O'Regan & Noë 2001).

The most striking scientific evidence supporting the sensorimotor perspective is provided by the growing literature on mirror neurons (for example, Blakemore, Bristow, Bird et al 2005; Gallese 2001, 2003, 2005). This literature provides an account of how the world of other human beings can be experienced through automatic and unconscious simulation (Gallese 2005) and suggests that neural processes provide a basis for explaining the sharedness of experience between self and other (for example, Gallese 2001). Spectating and performing are thus positioned as equivalent, as a kind of empathetic engagement (Freedberg & Gallese 2007), in that each spectator's mirror neurons parallel the actions and emotions of other people, responding *as if* the spectator were performing the relevant action or emotion herself. Furthermore, the literature on mirror neurons

suggests these automatic and unmediated processes allow not just low-level but complex spectator engagement to go on outside of consciousness. For example, mirror systems offer an explanation of how the intentions that underpin physical activities are contacted (Iacoboni, Molnar-Szakacs, Gallese et al 2005). Thus, the *audience*'s understanding of motivation, the 'why' of an action, may be as directly and immediately available as seeing that action. Crucially, studies of mirror neurons also suggest that the same neural structures are activated not only by direct observation, and personal experience, but also by symbolically-mediated communication about experience (Gallese 2006). Kohler's work demonstrates that verbal descriptions or the sounds associated with events are sufficient to activate neurons responsible for the actions that would be involved, allowing a cognitive simulation of events to occur (for example, Kohler, Keysers, Umiltà, et al 2002). Thus, preconscious mirroring processes accommodate more than the recognition of immediately and visually observable activities, and are responsive to a range of inputs including language. The growing literature about mirror neurons has significant implications for theatre as it provides the development of the basic proposal that spectator response is based on a simulation of a performer (cf Currie 1995) and that empathy is to some extent automatic, sensorimotor, and obligatory. In Gallese's terms, simulation "collapses" another's intentions into our own to produce the "peculiar" quality of familiarity that other individuals' experiences give us (Gallese 2005, 43). If audience experience is indeed built on simulations in which only overt mimicry is off-line, then this predicts that audience members may need only to be in the presence of action to feel part of the action. Emotional and intentional attunement to others means that a bridge to others, a condition for presence, is readily available.

However, although it is tempting to gloss presence as the product of mirroring processes, there are only insights into the 'right kinds' of neural processes that could be candidates for enabling presence; there is a lack of evidence that is directly about the neural basis of presence itself (Metzinger 2003). Theatre audiences thus highlight challenges for the science. For example, it is not fully clear whether opening a direct link between actor and spectator is the same as a convincing experiential insight of another mind; that is, the pain of the actor is never quite our pain. Violent theatricality presents similar critical complexities as the performer's pain threatens to be more real than a mediated sign but simultaneously remote from the audience (Graver 1995). Thus, the embodied process account is relevant to the salience and immediacy of presence, but may not yet match the breadth of the human phenomenon (cf Atran & Medin 2009; Funder 2009). For example, under complex circumstances such as making implicit reference to an unseen other's pain, unity has been shown to partly break down and be replaced by milder emotional associations (for a brief summary, see Gallese 2006). Similarly, if the neural processes that modulate mirroring are impaired

then another's experiences are confused with one's own (Blakemore et al 2005). Thus, although the science readily accommodates the idea of a direct connection between first and third person when events are taking place 'in front of our eyes' on stage, the subtler, modulated states of feeling – those we take for granted as the experiential norm – and variability of experience (through time or between individuals) require extra explanation. Stripped-down notions of communion or presence thus need moderation and fleshing out to accommodate a breadth of influence. The broader sources of present experience for an audience include memory or imaginative abstractions – in particular, to furnish the counterfactual experiences that unfold in a narrative (Oatley 2008, 2009) – rather than immediate all-or-nothing realities.[1] Without this capacity, simulation confines the cognitive account of presence to a latent form of echopraxia (pathological imitation) or stimulus-response equivalence. A level of being-in-the-world in which response is underspecified rather than direct therefore needs to be explained.

THE MYSTERIOUS QUALITIES OF PRESENCE

Subpersonal processes give some insight into the mechanisms of 'presence' and how the experience of presence feels. What, however, of the mysterious quality of presence? This threatens to prove a contentious issue, the presumption being that these mysterious qualities are ineffable and will never be self-apparent. However, it is possible to avoid adopting a "mysterian" stance (Varela 1996) that segregates certain types of experience as something special that is beyond functional analysis. The idea that 'presence' reduces to the mind's processes need not define away the experience of presence. For Metzinger, for example, there is a "functional basis for the mysterious phenomenal quality of presence" (Metzinger 2003, 62). He argues that the functions of consciousness are unlikely to include the ability to introspectively decompose themselves (Metzinger 2003; also Dehaene & Naccache 2001) and that presence is built in a way that cannot be tampered with in order to guarantee a stable foundation for the rest of our experience and thought (Metzinger 2003; cf O'Regan & Noë 2001). For Metzinger, it is thus be expected that some experiences are ineffable or less open to analytical introspection than others. The mysterious phenomenal quality of presence might indeed be attributed to an absence of self-evident explanation – an idea best understood by noting human beings are "neurophenomenological cavemen" (Metzinger 2006, 547) who do complex things with a basic set of tools.

Understanding of the mysterious nature of presence can also be advanced by drawing on much earlier ideas – notably William James' account of "pure experience." James ([1892] 1985) suggests that feelings of presence and the

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1 Emotional memory, a sense of supernatural presence or of a character who is not on stage are obvious examples of presence that cognition can furnish in the absence of an immediate external stimulus.

conditions that elicit them will correspond to their evolved sources. In James' account, there is no division between conscious and unconscious processing. Human beings by their nature are immersed in the world, and experiences therefore proceed from the biology that unites us with this world rather than from conscious representations. In James' metaphor, making sense of experience is thus like trying to capture the flow of a stream in buckets and pails. Under such an account, mystery does not emerge but is arguably where the human begins. From pure experience, a limited reduction to order may follow. Under this view, assuming that there is "a sharp edge of a perceiving consciousness" is problematic (Zarilli, 15) and feelings of 'vague', or less describable fluid qualities of experience, are predictable. Mystery is thus rendered an inevitable consequence of the direct contact between body and world.

Clinical evidence supports the view that unusual sensations of presence might be attributed to interrupting the flow of experience rather than expanding it as the brain works to refine rather than augment the flow of impressions. For example, Geyer and Vollenweider have shown the drug LSD, which is associated with expanding consciousness and eliciting mystical experiences (and which has notoriously been employed by theatre groups such as the Living Theatre and the Wooster Group exactly for this purpose), actually works by preventing the regulation of processing capacities that high-level cognition requires, degrading rather than expanding the mind's processing (Geyer & Vollenweider 2008). Similarly, though often celebrated, synaesthesia or sensory combination (such as perceiving sounds as colours) is not a special integration of sensations but normal for all people and suppressed by the brain for the sake of stability (Cohen-Kadosh, Henik, Catena et al 2009). Clinical evidence thus provides redress to over-regard for mysterious experience by locating this in the body, and also confirms the limits of presence and the violations that the brain refuses to us in order to provide stability (Metzinger 2003). Metzinger also demonstrates that even the most extreme experiences of otherness are never finally detached from the real in a free-floating 'pure being'. The real world and the body provide a strong constraint on presence. For example, hallucinations have been shown to remain proximate to real-world experiences and retain a narrative quality; that is they are nearly always visual hallucinations, and very rarely kinaesthetic (for example, Wackermann, Pütza & Allefelda 2008). Out of body experiences are also regular in that they occur in a present time and, at any moment, from a single point of view. And, similarly, negation delusions such as Cotard's syndrome in which people deny that they or the world exist are based on doing so from an autobiographical perspective. In all cases, abnormal experiences are contiguous with the existing biases and constraints of the body and world. The reliable presence of a body and the physical world that it is adapted to are thus crucial for normal cognition

(Metzinger 2003; O'Regan & Noë 2001). Consequently, although presence might be shown to be open to accentuation, it is not open to transformation.

BEING IN THE MOMENT: INTEGRATING MIND, BODY AND WORLD

A further imperative for an account of presence is the experience of being in the moment. Under one account, this might be characterised as the condition of being embedded in one's surroundings and in a state of action to the extent that one experiences a feeling of "flow" that exceeds verbal analysis (Csikszentmihalyi 1990). The features of this condition entail a heightened involvement with one's surroundings, high levels of attentional engagement, an optimised level of awareness, and rapid unconscious access to procedural skills and memories. For many theatre practitioners (Grotowski, Barba), being at one with the world in this way constitutes an ideal state of being to be celebrated. If, however, we position the mind-body as a sensory and motor exploratory tool, there is no reason to over-regard the feeling of a sense of concordance or oneness with one's environment. The experience of being in the moment simply reminds us how the mind is in the world all the time.

Furthermore, on these terms, it follows that the felt nature or "hedonic value" of presence and a compelling experience of 'being there' in external reality will arise whenever useful. Applying James' logic we will have an accentuated sense of presence when it is biologically and cognitively appropriate to have one. Accentuated or heightened experiences are thus an indication of the regular psychological processes. When a stimulus requires priority of response or a particular degree of alertness, evolutionary purpose predicts it is reasonable to expect heightened intensity of sensation in relation to this stimulus, characterised by things such as increases in sensitivity to sound and visual image, slowing down of regular time or greater awareness of the body and its capacities and possibilities. Laughlin (1968) reminds us that handling information in this way in a present moment was a regular rather than a special circumstance in human evolution, and would have supported the integration of efficient sensory, perceptual, and motor response capacities suitable to close-up encounters (for example, maintaining a heightened sensitivity to the signs of an animal's intentions, such as the flick of a tail or monitoring changes in breathing). The processing and selection of information coordinates with, and is enhanced by, feelings relevant to response (such as anticipation or a felt sense of significance). Thus the mind will prioritise the most biologically salient events and provide an increased sense of awareness of these events. For example, social stimuli such as emotionally positive or threatening expressions, and abrupt or potentially harmful items, will automatically and immediately be selected from a scene (Lundqvist & Öhman 2005; Veuilleumier 2000; Yantis 1993). Similarly, circumstances involving heightened experiences, violence, extremity and mood (which are often exploited by theatre practitioners who champion presence) are

particularly likely to induce heightened sensitivity; that is, these things create a sense of felt significance and increased alertness to the world. Furthermore, such processes are open to manipulation. In nature, the intensity of sensation, such as sound or size, normally increases as the stimulus approaches. Approach is salient as it foreshadows a need for response. Thus, performance can ratchet up presence, and make increases in stimulation seem more significant to an audience than equally sized decreases.

As will be evident the cognitive account of the experience of being in the 'live' moment places a significant emphasis on emotion and the "feeling of what happens" (Damasio 1999). Emotion might indeed be considered the key to the question of the audience's being-there. The basic presence of the world in front of our eyes is primed to have an emotional significance as emotion is evolved to register the significance of present events. Emotion thus puts mind, world, and experience together and it might even be argued that cognition cannot proceed effectively without it. An emotional sense of confidence in presence is crucial for a spectator's further cognitive engagement with events (Metzinger 2003). This highlights the unity of affect and cognition, and there are strong reciprocal connections between recently evolved frontal lobe systems in the brain – which are crucially involved in attention and consciousness – and ancient emotional areas such as the amygdala and limbic system (Damasio 1994, 1999). The relationship between affect and cognition is also confirmed by clinical cases in which conscious awareness and experience all but disappear as a result of emotional disablement that leaves motor and cognitive brain areas intact (Damasio 1999). Such cases suggest that when emotion is deficient, the ability to have either self-presence or involvement in one's surroundings is stripped away.

PRESENCE AND THRESHOLD

For some authors, all-or-nothing instantaneity is the mark of presence – at least, of basic visual, perceptual experience which is so often the scope of the cognitive scientist's interest. Under such views, the functioning of the system is so well-evolved that as soon as presence is not needed, it is simply turned off (Metzinger 2003). This follows from the idea that evolution attunes us to a rich source of information, offloading the task of perception onto the environmental context. In other words, that which is in front of our eyes, rather than representation, is the source of cognition. For example, without an external reality to anchor it, the perceiving mind is insufficient to provide the stability that our interaction with the world requires (O'Regan & Noë 2001). This immediately constrains the idea that the audience is the site of perceptual construction. For theorists of embodied cognition, the subjective impression of the richness and presence of the visual world that nevertheless occurs is then marginalised as "an illusion" (O'Regan 1992, 484). In other words, the mind is not up to the job of constructing what we

see, but, being evolved to be attuned to the world as well as being a cognitive miser, uses the world as an external repository of information. This line of functionalist thinking may further resolve oppositions concerning the significance and ambiguity of presence. If presence is rich and convincing, that is mainly because the world itself is stable and rich in stimuli, and our perception continually samples this world. Without reference to an external source, an audience's experience would no longer be a successful 'as if' experience but would either lack coherence and intensity (cf O'Regan & Noë 2001) or be pathologically compelling (Metzinger 2003). Although the conscious world seems continuous and stable, it is in fact full of gaps and surprisingly large changes fail to come under scrutiny (Simons & Chabris 1999). The limited access of active sampling (or spectating) to consciousness (for example, Simons & Chabris 1999) is pragmatic as the cognitive *unconscious* is able to handle complexity and meaning (Lakoff & Johnson 1999). Thus, immersion in the flow of events on stage is predictable.

THEATRE AND COGNITIVE SCIENCE IN PARTNERSHIP

Examination of the nature of cognitive processes indicates that presence does not need to be puzzled out of representation. Equally, presence does not need to be explained in terms of the mystery often invoked by theatre practitioners. However, in considering the basic question of presence, the difference between the complexity of the psychological account and that afforded by performance studies (and practitioners' manipulations) becomes particularly clear. In the rest of the paper, we will consider some issues of method and perspective, and some areas where further work on the embodied audience may make progress in bridging, or collapsing, this difference.

Thus far, sensorimotor process resolves the otherwise mysterious link between spectator/audience and performance (such as the motor, intentional, and emotional equivalence exemplified by mirror neurons), but the explanatory power of a shared neural state in separate bodies has limits. The contrary ability to have experiences that are not confined to rehearsing the activities of the observed is needed whenever another person's intentions interact with one's own beliefs and desires (such as understanding dramatic deceptions, pretence, or predicting others' mental states, either as a performer or as an audience member). An account of audience experience thus requires some release from the narrowness of simulating what is in front of our eyes. The ability to abstract and configure experience demands to be accommodated (for example, to contextualise performance). For Clark (1997) the concern here is the shift of emphasis in theory, such that the mind is still best thought of as an exploratory tool that contacts external reality as a reference rather than inventing this itself, and any use of representation is the exception rather than the rule. Representation-hungry functions stand in for the real only when required (Clark 1997) but presumably these may be

required by an active audience contextualising performance very frequently. The importance of the 'unreal' in this respect can be compared with the view of Metz (1974) that the actor's bodily presence is too real and enfeebles fictional reality, or that fiction is twice as true as reality (Oatley 1999). It may then be questioned whether the spectator realises her situation only by matching perceived activities against her own behavioural repertoire. A litmus test for a cognitive account of the audience is whether it can operate or presents dualist difficulty at this margin between denial and acceptance of representation (a margin where theatrical manipulation of presence, the real and pretence may offer particularly pertinent psychological evidence). Clark's view is not a barrier to what has been described as an incursion into structuralist territory (Livingstone 1998). The embodied principle that cognition is evolved, constrained and characterised by mechanisms that are attuned to – and built to interact with – the social and physical world will continue to apply when the 'real' is manipulated, such as in imagination or counterfactual situations. Thus it is that accounts of the active spectator or literary and dramatic representation can be accommodated by a functionalist, evolutionary account (Carroll 2007). The thinking here inverts a common axiom: audiences are fundamentally so by nature rather than by culture (cf Nightingale 1996, 147).

This, however, is not to imply a panacea for all problems in audience reception. For example, contrary to the simple implication that the spectator's emotional interpretation directly mirrors the emotional state of a viewed person, perceptions of an actor's emotional expressions turn out to be skewed by context such as the content of an accompanying verbal discourse (Halberstadt 2003). A highly reduced notion of direct or pure communion, as being simulative and emotive without the space for abstraction, thus falls short. Additionally, a self-other distinction is needed to provide a sense of participating as a self-presence or a spectator, whereas unmitigated mirroring would reflect neural abnormality (Blakemore et al 2005). As noted, even clinical patients with profound disorders of identity (including denial of their own existence) or uncanny experiences such as out-of-body states maintain a single, biographical point of view at any moment (Metzinger 2003). It may be noted that the ability to enter another's intentions and have a theory of mind emerges in child development synchronously with the ability to suppress spontaneous actions (Perner & Lang 1999) – to this extent, the performance-spectator relationship may be well-served (paradoxically for some practitioners) by an audience continuing to sit relatively motionless in their seats.

Part of the difference between science and theatrical intuitions about presence lies, of course, in methodological mismatch. Whereas theatre intricately reflects on manipulations of experience, or has practical programmes of actor training, psychology lacks a means for ascertaining experientially rich or salient situations on which to focus (Funder 2009). The applicability of its conclusions is then

limited. Contrary to the interests of an account of human behaviour, important behaviours are not observed in interesting and important situations, and theory drives data rather than the other way around (Funder 2009). This means that significant human experiences and behaviours may be missed. Evolutionary psychology partly addresses this by assuming that a high frequency of a behaviour, particularly if it has emotional significance, suggests the presence of evolved cognitive adaptations (and humans spend a lot of time spectating). Very simply, if presence or other theatre phenomena are central to audience experience and its manipulation, then they should be well-represented or accounted for by a psychology of the mind.

Notably, studies that bear on the psychological account of experience contain particular dramaturgical qualities. For example, a seminal paradigm, stages a relatively complex scene (for psychology) in which two interweaving groups of people play ball. Spectators monitoring the unfolding pattern of play often fail to notice an intruder in a gorilla costume at the centre of activity (Simons & Chabris 1999). This study overturns laboratory-based conclusions (according to which events in a central 'spotlight' area, biological motion, and especially novelty obligatorily capture attention) thus questioning some of the fundamentals of psychology that would apply to audience attention. The power of studies such as this may be due to their distance from informationally impoverished studies of timed responses to the occurrence of shapes on screen, or the neuroimaging of brain activity that manipulates data in ways that are suitable to current reductive preferences (Vul, Harris, Winkielman & Pashler 2009). Just as the social distribution of cognition has been avoided (the mention of a 'collective mind' may make traditional psychologists uneasy), so mass activation inside the brain has been avoided in favour of a view of separate mechanisms. This doubly binds generalisation and segregation: "If cognitive psychology has laws and generalisations to offer about how the mind works [...] it has so far shown little interest in putting them to the test of whether they fit humanity" (Atran & Medin 2009, 5).

A contrasting paradigm to the Simons and Chabris study employs a method that strips away mimetic qualities by deliberately using the observation and performance of meaningless movements not involving real objects (Lingnau, Gesierich & Caramazza 2009). Notably, this controversial study contends that human perceptions do not mirror actions, which would question the simulative basis of the audience-performance circuit. The association between choosing whether to increase or strip away content and the experiential result may be due to pragmatism by the psychologist, but begs the depth of consideration given by practitioners. Given Funder's (2009) observation that theory-driven psychological designs narrow data such that human behaviour gets missed, the need for guidance by assessment of experiential conditions becomes clear. For example, it may be

wondered how mirror systems operate when the audience is bored. Understanding the manipulations of experience under cognitive study would require comparison with those investigated elsewhere in performance-audience studies. A precursor is the study of the experiment as social phenomenon (Danziger 1990). Otherwise, importing fragments of detail from cognitive science without the promise of reciprocation and further development is problematic. Even the basic issue of presence suggests that a full account of process requires the cognitive science to partner with, rather than ignore, the humanities.

Crucially, the logic of embodied cognition means that audiences (rather than only individuals) should be studied, but science has shied away from any reference to the group mind. An additional problem for the claim that the audience is amenable to cognitive study is that in the performing arts, cognitive processes are accessed in ways that exceed traditional laboratory study. This difference has dissatisfied theorists of audience reception, encouraging them not to locate the audience-performance interaction in cognitive processes (see Bennett 1997; Livingstone 1998).[2] By contrast, the difference between the arts and laboratory is now seen as an opportunity for cognitive science (Zeki 1999). Some of this is metaphorical: for Zeki, artists are engaged in a form of cognitive neuroscience. However, the reverse is also true and methodological partnership is needed as applicable knowledge of cognition remains uneven (much method is about response times or loci of visual sensations but little is known about many rich and complex human experiences such as the manipulation of reality for an audience by performers). Cobbling up from simple cognitive phenomena often establishes only a very general principle that embodied cognition distributes or that there is a social component in even the most basic responses, such as walking in unison, or the fact that being in the presence of someone whose hand is restrained inhibits one's own hand movements (Liepelt, Ullsperger, Obst et al 2009). As Bennett notes, although it is surely the case that the theatre audience is a collective consciousness, experience still varies according to the *individual* (Bennett 1997, 154). Shared sensorimotor mechanisms may provide a starting point for thinking about this cognitive collectivity, but direct applications to the audience and individual differences in processing (for many people do notice the gorilla) still need to be accounted for. Finally, the recent finding that the unconscious determination of response precedes associated conscious reflections or decisions by several seconds only emphasises the need to look at a stream of experiential data rather than basing studies on questionnaires and reports (Soon, Brass, Heinze & Haynes 2008). How might the methodological gap between science and audience be bridged? One attempt to address this is the development of microtechnology that can be distributed among

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2   The key paradigm for the social psychology experiment that involves an 'audience' is one in which an individual's reactions and judgments are compared between occasions when the individual is in and not in the presence of a group of people (usually the experimenter's stooges). In other words, there is an audience (or group of spectators) in the experiment but none in the study.

audience members (Stevens, Schubert, Morris et al 2009). Portable electronic data collection devices can capture responses to live performance in real time. Crucially, this method addresses multiple methodological concerns: the capture of concurrent responses, the unfolding of experience through time (Oatley 2009), and the fundamental question of the extent to which audience reactions diverge and converge (Bennett 1997). For example, Stevens et al collected consciously-mediated feelings. Changes in emotion and the degree of variance in the responses could then be traced through time and referenced to events on stage. Given the fact of the cognitive unconscious, an ideal may be to incorporate data from biosignals. Continuous response is one way forward; meanwhile, embodiment also informs study via perspective on events during performance and suggested foci of research such as emotion.

THE AUDIENCE AS A COGNITIVE-EMOTIONAL COLLECTIVE

Another area of study that may be particularly revealing is the impact of humour on audiences. Laughing and frequent smiling provide observable, meaningful behaviours that can be measured. Furthermore, audience laughter perhaps best exemplifies the audience as a cognitive-emotional collective, physically and intellectually in communion with performance. As Mukarovsky pointed out, when a co-actor laughs during performance, "the boundary between the stage and the auditorium runs across the stage itself: the laughing actors are on the audience's side" (Mukarovsky 1977, 218-9). Laughter is loud and physical, but despite its clear biological quality, it is noticeable that the audience's laughter can be produced by the 'high end' of cognition, such as the manipulation of counterfactual ideas and language. Moreover, laughter can be shared or individual. Laughter thus extends from top to bottom of cognition, spanning the mind-body connection so broadly as to be inconvenient. Like the audience in general, humour's evolved functions remain hard to frame, and its collective nature antithetical to standard methods and prejudices (Martin 2007). However, it provides a key area of study for those interested in mind-body and emotion-cognition connections as humour and light-hearted interaction are prevalently and fundamentally part of communication (Martin 2007). One obvious phenomenon is the ability of an audience (or substantial part thereof) to cognise and respond to a joke together – hence the skill of timing. Standard psychological theories of communication remain fixed on the idea that comprehensibility is finally about exchanging valid information, but humorous intersubjectivity requires that the performer must intimately know to what extent misinformation can be processed. Without embodied principles there can be no humour, only strain for an information processor that, to contextualise manipulations of truth-value and nuance, must retrieve prior knowledge while keeping sufficient working memory capacity for nimble combinations of ideas in the present moment. Following embodied

principles, such demands do not necessarily burden the mind with complexity, but facilitate cognitive engagement with the world by increasing the scope for evolved mechanisms to engage. Similarly, indirect metaphor and nonliteral statements are readily processed, emphasising an evolved way of thinking that is attuned to physical impressions and continuous human experience, rather than a symbol-manipulating top-down mechanism prone to error (Lakoff & Johnson 1999; Ortony 1975). The unfolding emotion-cognition pattern for the humorous audience remains to be understood, but Damasio (1994) shows that high-level intellection requires emotion to proceed effectively. It is difficult to think of anything that is at once so markedly biological, intellectual, immediately shared, and individually differing. Solving humour thus may be key to understanding the cognitively embodied audience.

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