

THE PARAPSYCHOLOGICAL ASSOCIATION, INC.

48TH ANNUAL CONVENTION

AUGUST 11TH – 14TH, 2005

PROCEEDINGS OF PRESENTED PAPERS

Institute of Noetic Sciences

Louie Savva
Program Chair

THE PARAPSYCHOLOGICAL ASSOCIATION, INC.
48TH ANNUAL CONVENTION

AUGUST 11TH – 14TH, 2005
INSTITUTE OF NOETIC SCIENCES

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Introduction

The 48th Parapsychological Association's Annual Convention is being held at the Institute of Noetic Sciences, Petaluma, California, USA, from August 11 - 15, 2005. This year's submissions represent part of the wide variety of parapsychological research and theory that is being conducted throughout the globe.

Thanks go to the Program Committee for their help in reviewing and advising how to deal with submissions. Specifically I would like to thank, Dean Radin, Dick Bierman, Richard Broughton, Edwin May, John Palmer, Chris Roe, Christine Simmonds, James Spottiswoode, Paul Stevens, Caroline Watt, Carl Williams, Ian Baker, Richard Wiseman, Simon Sherwood and Fiona Steinkemp for their invaluable help preparing this proceedings.

Thanks also go to Nicola Holt and Lisa Lazard, for their help in ensuring that the small details got finished.

Program
48th Annual Convention of the Parapsychological Association
August 11th – 15th

Thursday, August 11th, 2005

13:00 – 21:00 Early Check-In/ Advance Registration (Commons Building)
18:00 – 19:00 Dinner (Commons)
21:00 – 22:00 Informal Reception (Commons)

Friday, August 12th, 2005

8:00 – 8:45 Breakfast (Commons)
9:00 onwards Registration (West Room Building)

9:00 – 9:05 Opening Remarks (All presentations are in the West Room Building)

Research Request

9:05 – 9:15 Edwin May
Prestimulus Response in The Parasympathetic Nervous System: An On-Going Research Project

Panel: Remembering Bob Morris

9:15 – 10:45 Deborah Delanoy, James Carpenter, Hoyt Edge, Edwin May & Caroline Watt

10:45 – 11:15 Coffee Break (West Room)

News from the Ganzfeld

11:15 – 11:45 James Carpenter
Implicit Measures of Participants' Experiences in the Ganzfeld: Confirmation of Previous Relationships in a New Sample.

11:45 – 12:15 Peter Pütz, Matthias Gäbler & Jiri Wackermann
Dyadic Communication in the Ganzfeld: Report on a Pilot Study with a Modified Experimental Procedure

12:15 – 12:30 Research Brief: Fabio Eduardo da Silva, Sibebe Pilato & Reginaldo Hiraoka
Digital and Physiological Ganzfeld: Looking for a More Objective Measure of Psi

12:30 – 14:00 Lunch Break (Commons)

Developments in ESP Research

14:00 – 14:30 Leila Kozak, Leanna J. Standish, Clark Johnson, Todd Richards & Brent K. Stewart
Evidence of Brain Correlations Between Isolated Human Subjects: An EEG Study in a Population of Experienced Meditators

14:30 – 14:45 Research Brief: Chris A. Roe, Simon, J. Sherwood, Louie Savva & Ian Baker
Assessing the Roles of the Sender and Experimenter in Dream ESP Research

14:45 – 15:00 Research Brief: Craig D. Murray, Christine Simmonds and Jezz Fox
Telepresence and Telepathy in Immersive Virtual Reality

15:00 – 15:30 Coffee Break (West Room)

Precognitive Habituation: A Developing Paradigm

15:30 – 16:00 Daryl J. Bem
Precognitive Aversion

16:00 – 16:30 Louie Savva, Chris Roe & Matthew D. Smith
Further Testing of the Precognitive Habituation Effect Using Spider Stimuli

16:30 – 17:00 Free Time

17:00 – 18:00 Dinner (Commons)

18:00 – 19:00 Presidential Address (West Room)

19:00 – Presidential Reception (West Room)

Saturday, August 13th, 2005

8:00 – 8:45 Breakfast (Commons)

9:00 onwards Registration (West Room Building)

Experiences

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Sleep Patterns, Personality and Subjective Paranormal Experiences

9:30 – 10:00 Michael Jawer
Environmental Sensitivity: A Link with Apparitional Experience?

10:00 – 10:15 Research Brief: Christina Schäfer
Exceptional Experiences, Crisis and Transformation of Belief

10:15 - 10:45 Coffee Break (West Room)

- 10:45 – 11:15 Igor Dolgov
Extending the Ecological Psychology Paradigm of Perception: A New Forum for Psi Research
- 11:15 – 11:30 Research Brief: Stephen B. Baumann, William T. Joines, Jeremy Kim, & Jonathan M. Zile
Energy Emissions from and Exceptional Subject
- 11:30 – 11:45 Research Brief: Craig D. Murray and Jezz Fox
Self-Concept and Body Investment in Out-of-Body Experiences
- 11:45 – 12:30 Free Time
12:30 – 13:30 Lunch Break (Commons)
- Long Body Perspectives**
- 14:30 – 15:00 William G. Roll
Psi and the Long Body
- 15:00 – 15:30 Christopher M. Aanstoos
Phenomenology of Embodiment
- 15:30 – 16:00 Bryan J. Williams
Pueblo Parapsychology: Psi and the Long Body from the Southwest Indian Perspective
- 16:00 – 16:30 Coffee Break (West Room)
16:30 – 18:00 Free Time
- Banquet**
- 18:00 – 18:30 Reception (Commons)
18:30 – 19:00 Dinner
19:30 J. B. Rhine Lecture – Loyd Auerbach

Sunday, August 14th, 2005

8:00 – 8:45 Breakfast (Commons)
9:00 onwards Registration (West Room Building)

Developments in PK Research

9:00 – 9:30 Dean Radin
Experiments Testing Models of Mind-Matter Interaction

9:30 – 10:00 Donald Bedford, Herman Kruijse, Will van der Leij, Anita Nel
& Mark Shuttleworth
Chicks and Algae: The Remote Influence of Desire

10:00 – 10:30 John Palmer, Stephen Baumann, & Christine A. Simmonds
*Factors Affecting the Relationship Between Human Intentionality and the
Haemolysis of Red Blood Cells*

10:30 – 11:00 Coffee Break (West Room)

11:00 – 11:30 Herman W. Kruijse, Donald Bedford, Will van der Leij, Anita Nel
& Mark Shuttleworth
Psychokinesis on Single Quantum Events Using False Feedback

11:30 – 12:00 Nicola J. Holt and Chris A. Roe
*The Sender as a PK Agent in ESP Studies: The Effects of Agent and Target
System Liability Upon Performance at a Novel PK Task*

12:00 – 12:15 Research Brief: Matthias Braeunig & Tilmann Faul, Harald Walach
REG-Array with Non-Deterministic Timing Scheme for PK Studies

12:15 – 14:00 Lunch Break (Commons)

14:00 –
Onwards Optional Half-Day Trip or Free Time

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Theoretical Issues

9:00 – 9:30 Stephan A. Schwartz
The Blind Protocol and its Place in Consciousness Research

9:30 – 10:00 Marilyn Schlitz, Richard Wiseman, Dean Radin & Caroline Watt
Of Two Minds: Skeptic-Proponent Collaboration Within Parapsychology

10:30 – 10:45 Research Brief: Caroline Watt, Marilyn Schlitz, Richard Wiseman
& Dean Radin
Experimenter Differences in a Remote Staring Study

10:30 – 11:00 Coffee Break (West Room)

Panel: Parapsychology and Transpersonal Psychology

11:00 – 12:30 Charles T. Tart, Rhea White, Marilyn Schlitz & Stanley Krippner

12:30 Convention Close

12:30 – 14:00 Lunch Break (Commons)

14:00 – 15:30 General Business Meeting of the Parapsychological Association. PA
Members Only.

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PHENOMENOLOGY OF EMBODIMENT

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ABSTRACT

Building on Merleau-Ponty's ontology of the lived body and the author's own previous research on the phenomenology of embodiment, this paper depicts the body as a "long body," that is, as an existential "inhabiting" of the world. This presentation includes two facets: a philosophical reflection on this ontology of the body, followed by an examination of its implications for parapsychology.

OVERTURE: THE TASK AT HAND

Let me begin by invoking an ancient vision of the meaning of our embodiment, from the *Upanishads*, as somewhat loosely translated by Al Lingis (1989, p. 107):

And the light that shines above the heavenly vault, the support of all creation, the support of the universe, in the supreme and highest realms, is none other than the light that dwells in the human body. Its actual manifestation is the warmth that is felt when the flesh is touched.

In this paper, I am hoping to sketch a phenomenological ontology of the body, and to demonstrate its value for the conceptual foundations of parapsychology. I hope to accomplish this goal by finding a way around the critical flaw of modern thought – which I take to be dualism – without falling prey to the usual fate of postmodern thought – which I take to be nihilism. The method by which I hope to accomplish this goal is through an analysis of the phenomenological significance of embodiment, in order to understand embodiment as an existential "inhabiting" of the world, as the human being's fundamental capacity for "dwelling."

A project of such scope is beyond the reach of one presentation to fulfill. But I think it is worth undertaking the challenge of advancing that dialogue for two reasons. First, in terms of western intellectual history, it is time: both phenomenology and postmodernism have now been rumbling around noisily for much of the past century, yet fundamental issues in that triangular relationship of phenomenology—modernity—postmodernity remain to be clarified. It is time we get to that task. And second, it is also time in terms of the more particular theme of this conference: parapsychology's own conceptual foundations could be advanced by a clarification of the ontology of embodiment. Indeed, we imagine this work to be a prolegomena to a much more comprehensive project: to complete a cartography of the lived world of psi.

FIRST MOVEMENT: THE HISTORICAL BACKGROUND

To begin, we'll need to establish some historical background. Phenomenologists and psychologists are familiar with the changes wrought to modern thought by the impact of Husserl and Freud at the beginning of the twentieth century. Specifically, what phenomenology and psychoanalysis did was to effect simultaneous revolutions in philosophy and psychology, respectively. In both cases, the key to the overturning of the old, modernist paradigm was the introduction of lived, experienced meaning as an originary datum. For phenomenology it was the ineluctable meaningfulness of lived experience, as such, identified as the phenomenal. For psychoanalysis, a bit more indirectly, it was the latency of experience,

identified as the unconscious. Though different in basic respects, both aimed at a shared depthfulness, as was so well-shown by Merleau-Ponty (1970), and subsequently by others (c.f., Wertz).

Those familiar with phenomenology or psychoanalysis understand what a revolution this new emphasis wrought. The metaphysical foundations of modernity, which had been set according to the natural sciences ever since Descartes and Newton (c.f., Burt, 1932; Toulmin, 1992), necessarily reduced meaning to epiphenomenal status: a mere “effect” mechanistically caused by some underlying, ultimately physical reality. In contrast, the aim of phenomenology and psychoanalysis was to recover, beneath the buried abstractness of a mathematization of the real, the pulsating meaningfulness of concretely lived experience. While these twin projects certainly shifted the paradigm for their followers, modernity itself for the most part continued to hew to its natural science foundations.

These, however, were soon to be shattered by developments within physics and mathematics itself. In quick order between 1915 and 1925, Einstein’s theory of *general relativity*, Heisenberg’s *uncertainty principle*, and Godel’s *incompleteness theorem* abruptly smashed the old order. Note the shift: in place of the absolutist metaphysics of positivism, there emerged a view of reality as *relative, uncertain, and incomplete*. This view of the physical and mathematical universe re-opened the old humanist zeitgeist of the Renaissance – with its emphasis on the timely, the local, the finite, the situated – that had been supplanted by modern science’s orientation to reality as timeless, universal, infinite and absolute (c.f., Toulmin, 1992). But one of the compelling subtextual reasons for that shift to the modernist viewpoint had been the chaos and destructiveness wrought by the Thirty Years War. A war fought in the name of religion. Religion – Europe’s principle legitimating authority, concerning the true nature of reality. Europe, exhausted by that incarnadine cataclysm, turned to Science as the ultimate legitimating authority, based on its promise to provide the absolute, incorruptible standards. And so, for the next three hundred years, western thought was guided by the metaphysics of naive realism.

Many critics have astutely examined the various costs of its elementistic, mechanistic, positivism. I would say that critique was most radically and effectively accomplished by Husserl, and it was his most important contribution. Trusting that his work in this regard is widely familiar, I will not repeat it here. The consequence of this modernist metaphysics that is of chief concern for me in this presentation is its resultant dualism, championed by Descartes, by which “subject” was split off from “object.” Soon afterward, Newtonian thought would reduce the former to epiphenomenal status, derivative from the latter. As the privileging of the evidently measurable became the criterion for the “really real,” consciousness came to be seen more and more as neural brain functioning, and the body as a physio-chemical entity, and the world as the sum total of all entities. So, the body comes to be seen as a thing, the world as the pile of all things, and consciousness as derivative from the mechanical action of things. Because the physical sciences soon demonstrated the power of their metaphysical and mathematical basis – through such accomplishments as the laws of planetary motion – the price paid for this fundamental dualism was not immediately grasped. That psychology made little progress while belabored by such presuppositions was attributed for a long while to its “youth” or to the “complexity” of its subject matter. But always the hope was held out for an eventual “physiological psychology” that would successfully explain all psychological life in terms of its putative underlying physical mechanisms. Even by the mid-nineteenth century “founding” of psychology as an independent discipline, this assumption was its foundational orientation, as evidenced by Wundt’s book title “*Physiological Psychology*” and by Hemholtz’s quest for the “laws” of sensation. Even the behaviorist paradigm, loudly promulgating a revolution from Wundtian psychology in favor of the analysis of behavior, explicitly understood that “someday” psychology would explain all the laws of behavior in terms of the underlying “biological bases” (Watson, 1930; Skinner, 1974, 1975). And even cognitive psychology, when it asserted its own conceptual revolution in the 1960’s, accepted the same premise: that all its theorized information processing models would “someday” be demonstrated to be “reducible to physiological mechanisms” (Newell & Simon, 1963). And yes, even Freud (1895), on a bad day, fell for that presumptive reductionism.

Of course, today we see this physicalistic assumption rampantly deployed throughout psychology, indeed, enshrined at the pinnacles of the enterprise. Neuropsychology – or more recently simply neuroscience – now commands the “high ground” of status in the field, with its sophisticated machinery

for brain imaging, from EEG's to MRI's, and beyond. And so we must return again to the neglected question: what is the cost of this objectivism? As even the physics and mathematics from which the Newtonian metaphysics was based has been supplanted by non-absolutist ideas in those fields, what binds psychology so tightly to this viewpoint? And what is the cost of its doing so?

Of course the price of any dualism is the foreclosure of holism. When body, mind and world are sundered by being conceived as elemental, separate, and extrinsically related, the cost is the resulting inability to grasp a more holistic, nondual interconnectedness. The schism of body and mind has precluded psychology from comprehending the concept of the "bodymind" as a unified field. This loss is indeed unfortunate, as it is precisely what holistic medicine is groping its way slowly toward (e.g., Chopra, 1989), and psychology, were it able to think holistically would be the most valuable partner to that revolution in the health sciences. It has also had a very deleterious impact on psychology, as it has underlain the conception of psychopathology as "caused by" biochemical imbalances in the brain. A more holistic understanding would recognize that the body's physiological changes are not arbitrary: rather, they are a way of "vibrating" with the phenomenal world (Spilman, 1975; Boss, 1979). But this body/mind dualism has been well analyzed by many others already and so, though I agree there is so much yet to be worked out about its implications, I would instead like to reflect on the other split: that between our bodymind and our world.

SECOND MOVEMENT: A PHENOMENOLOGICAL ONTOLOGY OF EMBODIMENT

To begin this analysis, I must acknowledge the extensive work already done here by philosophical phenomenologists, who have already sketched a phenomenological ontology of embodiment as world-relatedness. The two in particular whose work my own rests upon are Heidegger and Merleau-Ponty. The latter is well-known for his contribution to this theme of the nondual significance of embodiment. But Heidegger is much less recognized for his contribution to this topic. Indeed, most scholars are more likely to think that Heidegger – to the detriment of his thought – neglected the very issue of embodiment. I rather follow Levin's (1985) analysis on this one. He points out that while Heidegger himself felt that the topic was beyond the scope of his analytic, he nevertheless did contribute much to a phenomenology of embodiment through his analysis of Dasein's spatiality. But Heidegger's pre-understanding of the body was incomplete, on account of its subjugation to disembodied thought. And so we must then turn to Merleau-Ponty for a more complete phenomenological ontology of embodiment.

To start first with Heidegger, we should remember his analysis of worldliness as being that which, in everyday concern, is primarily disclosed through its being "ready-to-hand." Already in that initial insight, we can glimpse the role of the body in the presencing of the world. From this simple fact that we humans can, nonreflectively, engage the tasks of everyday relating to the world with skill reveals our embodiment as a sort of "practical knowing" (Polkinghorne, 1998), as an engaged relationship with the world.

But Heidegger gives us much more than this initial clue. He also shows through concrete analyses of lived experience how the body discloses its world. For example, he writes:

When I go toward the door of the lecture hall, I am already there, and I could not go to it at all if I were not such that I am [already] there. I am never here only, as this encapsulated body; rather, I am there, that is, I already pervade the room, and only thus can I move through it. (Heidegger, 1954/1971a, p. 157)

Spatial relations, such as closeness and distance, are grasped primordially in terms of my embodiment of things as near or far, with respect to my concerned involvement with them. Heidegger describes how we even make "the remoteness of something disappear" (Heidegger, 1927/1962, p. 139). But, again, this capacity is not something measurable with objective rulers. As Heidegger noted:

When one is primarily and even exclusively oriented towards remotenesses as measured distances, the primordial spatiality of Being-in is concealed. That which is presumably "closest" is by no means that which is at the smallest distance "from us." (Heidegger, 1927/1962, p. 141)

This “primordial spatiality” is carved out, not by objective rulers, but by our involvement, our interest, our “circumspective concern”:

Circumspective concern decides as to the closeness and farness of what is proximally ready-to-hand environmentally. Whatever this concern dwells alongside beforehand is what is closest. (Heidegger, 1927/1962, p. 142)

Heidegger gives us two examples. He points out that the street we walk upon, seemingly the closest and most real thing of all, is actually much more remote than the friend we encounter twenty yards in front of us. Likewise,

when, for instance, a man wears a pair of spectacles which are so close to him distantly that they are ‘sitting on his nose,’ they are environmentally more remote from him than the picture on the opposite wall. Such equipment has so little closeness that often it is proximally quite impossible to find. (Heidegger, 1927/1962, p. 141)

Indeed, several persons who wear eyeglasses have described to me experiences of searching for them without noticing that they were wearing them at the time.

Let me extend the essential body-world relation implied by these examples in the other direction as well. For it is not only distance that is disclosed by our world-relations, but closeness as well. Note the following example from Heidegger:

When I go toward the door of the lecture hall, I am already there, and I could not go to it at all if I were not such that I am [already] there. I am never here only, as this encapsulated body; rather, I am there, that is, I already pervade the room, and only thus can I move through it. (Heidegger, 1954/1971a, p. 157)

Likewise, Boss has given us this example: “while perceiving the window sill...I extend myself bodily far beyond this fingertip to that window sill” (Boss, 1979, pp. 102 – 103). In this sense, our lives are “ingrained in the things of our existence” (Roll, 1987, p. 17). In other words, even sense perceptions are primordially not objectivistic relationships between extrinsic entities, but that which lies “ready to hand” through our embodied, intrinsic, relationships. It is in that sense that Lingis (1985, p. 52), for instance, can claim that “All sense perception involves something like a carnal embrace.” Such a claim can be more adequately understood by next turning to Merleau-Ponty’s phenomenology of the body.

On the basis of his phenomenological descriptions, we find that “our flesh lines and envelops all the visible and tangible things which nonetheless surround it, the world and I are within one another” (Merleau-Ponty, 1964/1968, p. 123). And therefore, “every perception is a...communion...the complete expression outside ourselves of our perceptual powers and a coition [an intercourse], so to speak, of our body with things” (Merleau-Ponty, 1945/1962, p. 320). As he says:

if the qualities [of the sensible] radiate around them a certain mode of existence, if they have the power to cast a spell... a sacramental value, this is because the sentient subject does not posit them as objects, but enters into a sympathetic relation with them, makes them his own. (Merleau-Ponty, 1945/1962, pp. 213-214)

This does not mean that my body and the world are the same. They are distinguishable, certainly, but not separable. The body-world boundary is a porous one, permitting of unceasing interpenetrability. Lingis amplifies Merleau-Ponty's point by noting that “perception is an inscription of a dynamic version of the outside within and a reflection of oneself on the outside” (Lingis, 1985, p. 51). Or, as Eugene Gendlin (1962), long ago demonstrated, body and world form a “pre-reflective relatedness” (see also Halling & Goldfarb, 1991). But these ontological statements can be best understood by means of concrete exemplars.

THIRD MOVEMENT: PSI AND THE PHENOMENOLOGY OF THE LONG BODY

In this section, I want to demonstrate the applicability of this phenomenology of embodiment to parapsychology. I will do so by using three themes: the spatiality of the long body, the engagement of the long body, and the sociality of the long body. In each, I hope to suggest how psi phenomena otherwise unintelligible by a positivist ontology of the body become conceptually clear in terms of their phenomenology.

Spatiality and The Long Body

Let us examine how the very spatiality of the situation is essentially valorized by our embodied intentionality within it. Our embodiment discloses space in terms of distances and directionalities, lines and fields of force, vectors of possible action. For us, things appear “here” or “there,” “next to,” “in front of,” or “behind” – all relational features of our embodied disclosure of them. Of course, this spatiality could not be detected by the detached rulers of objective measurement. Embodied space is of an altogether different order than the merely external geometric space mapped by Cartesian coordinates. Permeating and subtending this abstract, empty space is the spatiality of the engaged body. Merleau-Ponty has described this difference by noting that embodied “spatiality is not, like that of external objects...a *spatiality of position*, but a *spatiality of situation*” (Merleau-Ponty, 1945/1962, p. 100). Thus, in contrast to merely external space, bodily lived space:

envelops its parts instead of spreading them out.....This occurs by virtue of its being polarized by its tasks, of its existence towards them, in its collecting together of itself in pursuit of its aims. (Merleau-Ponty, 1945/1962, pp. 100-101)

In other words

what counts for the orientation...is not my body as...a thing in objective space, but as a system of possible actions, a virtual body in its phenomenal place defined by its task. My body is wherever there is work to be done. (Merleau-Ponty, 1945/1962, p. 250)

A very compelling set of examples can be seen from athletic performance, that is, from occasions when we embody our world-relatedness most finessefully. McConville (1978, p. 115), for instance, has illustrated the way space is carved out bodily by our concerned projects by describing how his old experience as a running back in football still gives him a sense of near and far in terms of whether it would be short or long yardage for a first down in a football game. It is through his halfback body that he engages and inhabits that spatiality. A more common example is the way that a branch on a tree does not look as far away when we are on the ground as the ground looks when we are on that branch.

But it is not only distances that are so valorized. The very *feel* of the space expresses our embodied relation with it. Van den Berg (1972) has given us many touching examples of the ways the world appears in relation to the person’s embodied relationships with it, from his wine bottle and absent friend to the leaning buildings of the neurotic. But let us return again to the examples that can be seen in cases of skilled performance. For instance, the way a soccer player, moving forward with the ball, valorizes the spatiality of the soccer field around the suddenly unblocked lane that “leads” to the goal. Or the way an ex-baseball player describes his experience, even after retiring from the game: “every day I had the smell of the ball park in my nose, and the cool of the grass in my feet” (from the film *Field of Dreams*). Or the way a musician improvises at the keyboard, described by Sudnow (1978, p. 141) in the following way: “as the time got into the fingers, hands, arms, shoulders, everywhere, altogether new relationships were being fulfilled.” Or, Merleau-Ponty’s example of the organist, of whom he writes: “it is not in objective space that the organist is in fact playing. In reality his movements...are consecratory gestures: they draw affective vectors, discover emotional sources, and create a space of expressiveness” (Merleau-Ponty, 1945/1962, pp. 145-146). His movements are consecratory gestures.

This embodied disclosure of spatiality extends also to our perception of movement. For instance: “sometimes I see the steeple motionless against the sky with clouds floating above it, and sometimes the

clouds appear still and the steeple falls through space” (Merleau-Ponty, 1948/1964, p. 52). A similar example can be experienced when sitting on a dock extending over a body of water. Sometimes the water will appear to be moving rightward under the dock, while at other times the dock will appear to be moving leftward across the water. These differences are neither arbitrary nor intellectually constructed. Rather, as Merleau-Ponty has shown: “movement and rest distribute themselves in our surroundings...according to the way we settle ourselves in the world and the position our bodies assume in it” (Merleau-Ponty, 1948/1964, p. 52).

In other words, movement and rest are disclosed in relation to that place I am embodying, so that “in each instance the one which seems stationary is the one we have chosen as our abode and which, for the time being, is our environment...the looked at object in which I anchor myself will always seem fixed” (Merleau-Ponty, 1948/1964, p. 52). It is a question of whether I am embodying a perspective from the steeple or the clouds, on the dock or in the water.

Merleau-Ponty gives us an example of being seated on a train, stopped next to another one. When one starts, we may be momentarily disoriented as to which is actually moving and which remains stationary. How? If, at the time a train starts moving, you are, say, reading a magazine, or playing cards, then you feel it is the other train that has begun moving. However, if at that moment you are, say, admiring an attractive person aboard the other train, then you would likely feel it was your own train that had begun moving.

A couple of short, final examples to illustrate this theme. First, my own research has established that, when deposited in woods totally unfamiliar to them and asked to point to their home, most people can do it relatively correctly, with a much higher than chance rate. This capacity was evident in an experience of mine as well. While hiking in the Himalayas without a guide, I found it necessary to often choose when the path forked which side to follow. Having nothing extrinsic to go by, I had to “listen” to and “follow” the path itself.

Engaged Action and The Long Body

But this extension of the body into things should not be taken as unusual. We all do so. For instance, when we write, we may not even feel the pressure of the pen against our fingers, but against the paper, as the tip end of the pen glides across its surface. We have situated our embodied presence *there* – on the paper (McConville, 1978, p. 108). This extended embodiment is possible because our habitual body acquires a carnal knowledge of its things, as the obverse side of its own flesh. For instance, Wertz has described the blind man’s cane in terms very much like I have just done concerning the pen. He indicated that the cane’s way of palpating things is comprehensible only in terms of the body’s involved kinship with the world: “the cane is enveloped and swept up in the unity of a touching intention which can be carried out only by something that can both touch and be touched” (Wertz, 1987, p. 134). As Merleau-Ponty (1945/1962, p. 143) has noted, “to get used to a hat, a car, or a stick is to be transposed into them, or conversely to incorporate them into the bulk of our body. Habit expresses our power of dilating our being-in-the-world.”

This ability to bring to bear that embodied involvement is also the hallmark of musical and athletic performance. The drumsticks, the keyboard, the skis, the baseball bat, the tennis racquet, the golf club, the gun, the sword – all become extensions of the body. But so too does the ball itself, even after it has been thrown or struck. A professional quarterback describes his experience of a pass completion to a receiver as a “connection” with that receiver, despite the fact that an objective measurement shows the two are fifty yards apart at the time.

For example, when the height of the hoop in basketball is off by an inch or two, the player quickly adjusts his shot – i.e., it is not a mechanical action, a way of arcing arms to a certain level learned over years, that accounts for his skill. Rather it is a way of being in synch with the hoop.

Let us consider in some detail another example of this experienced connectedness across a distance (cf. Brown, 1966, pp. 156-157). A golfer putts the ball toward a small hole twenty feet away. As the ball rolls too far toward the right, the golfer leans to the left, to “pull” the ball more in that direction. Just as striking a ball to get it to spin a certain way is called putting “English” on it in many racquet sports, so too is this common experience known as using “body English.” Now, from an objective viewpoint, even the golfer might say there is no such thing as contact across a distance with a moving ball. And, if the golfer is no

longer in contact with the moving ball, then such bodily leaning is completely superfluous. Nevertheless, it is the body of this very golfer which comports itself in terms of just this continuing relationship with the ball. As McConville (1978, p. 108), has shown, the praxic body is already geared to the situation prior to knowledge: a situation in which the body, the ball, and the terrain over which it must roll are all united by the intentional arc of the necessary shot. Hence, in this case of an errant shot, “body english is an act of using the body in order to regain the balance of the body-ball-terrain system which is upset by the errant shot.” That is to say, the leaning movement expresses the golfer's continuing embodiment of that unifying intentional arc.

This embodied organizational unity of person and situation is illuminated most starkly by moments of danger. For instance, while bicycling one day, just as I was losing my balance while going too fast around a curve, I found that my right leg had extended out, and saved my balance. I had not thought to do that, but it was exactly what was needed to prevent a serious injury. My body engaged the operational unity of body-bicycle-terrain, disclosively presencing it as a relational whole. Such is the experience of finesse.

Perhaps Herrigel's (1953) lesson in archery, learned as zen, best exemplifies this ultimately nondual relation of body and world:

One day I asked the Master “How can the shot be loosed if ‘I’ do not do it?” “It shoots,” he replied. “I have heard you say that several times before, so let me put it another way: How can I wait self-obliviously for the shot if ‘I’ am no longer there?” “It waits at the highest tension.” “And who or what is this ‘It’?” “Once you have understood that, you will have no further need of me.” (Pp. 51-52)

Sociality and The Long Body

Next, I will examine the most intimate embrace of all: how our embodiment opens onto, and discloses, other people. The intimacy of this embrace is so deeply embodied. Merleau-Ponty has argued that “the constitution of others does not come after that of the body; others and my body are born together from the original ecstasy” (Merleau-Ponty, 1960/1964c, p. 174). In that sense, he says, “the body proper is a premonition of the other person” (Merleau-Ponty, 1960/1964c, p. 175). Please note the two senses that “premonition” can have here: as a premonition *of* others and as another's premonition. “It is as if the other person's intention inhabited my body and mine his,” adds Merleau-Ponty (1945/1962, p. 185). My body and the other are so expressive of each other there can be no reduction to an extrinsic, causal relationship. So let us reflect on this embodied disclosure of intersubjectivity. I believe it offers us the implicit phenomenology of what psychology has termed “body language” – but failed to understand by presupposing body and other as merely extrinsically related.

Merleau-Ponty's point here is that “it is precisely my body which perceives the body of another person” (Merleau-Ponty, 1945/1962, p. 354). It is my body that inhabits the gestures of the other and so discovers in the other “a miraculous prolongation of my own intentions” (Merleau-Ponty, 1945/1962, p. 354). Consider the following three epigrammatic descriptions of this miracle:

I live in the facial expressions of the other, as I feel him living in mine. (Merleau-Ponty, 1960/1964a, p. 146)

My body and the other's are one whole, two sides of one and the same phenomenon. (Merleau-Ponty, 1945/1962, p. 354)

To begin with [other people] are not there as minds, or even as “psychisms,” but such for example as we face them in anger or love-faces, gestures, spoken words to which our own respond without thoughts intervening, to the point that we sometimes turn their words back upon them even before they have reached us, as surely as, more surely than, if we had understood-each one of us pregnant with the others and confirmed by them in his body. (Merleau-Ponty, 1960/1964, p. 181)

I believe this is also the implicit core of Laing's (1965) understanding of the schizophrenic's experience of being disembodied – of being the one who is not confirmed by others, but who is invalidated and who embodies this feeling of being unreal precisely as being disembodied. Laing (1972) has also shown the ways by which the identified patient in a pathogenic family embodied his other family members. Paul, at twenty-three, experienced his right side as masculine, his left side as feminine, his left

side as younger than the right side, the two sides not meeting, and both as rotting. Paul's mother told him he "took after" his father, and his father told him he "took after" his mother. His father told him his mother was not a "real woman" and his mother told him his father was not a "real man."

His mother thought she could be a better husband and father than his father. And his father thought he could be a better wife and mother than his mother...To summarize: on his right side he takes after father's view of him as taking after his mother, an unreal woman and phoney man. And on his left side he takes after his mother's view of him as taking after his father, an unreal man and phoney woman. (Laing, 1969, pp. 56-57)

Laing concludes his analysis of Paul by stating that "his body was a sort of mausoleum, a haunted graveyard in which the ghosts of several generations still walked, while their physical remains rotted away. The family had buried their dead *in each other*" (Laing, 1972, p. 57).

The reverse is also true: we embody not only the pathogeny of our relatives, but their loving presence as well. Murray (1975) nicely exemplified this by his sense of a habitual gesture of his: a certain way of sweeping his arm while talking that he had incorporated from his brother. As he said, he had embodied his brother's arm, and with it the loving presence of his brother. These familial resemblances are quite common. How often have we remarked that "she has her father's smile" or "her mother's ear for music." Levin quotes a blacksmith, who says "I have...my grandfather's...hands. Hands last a long time, you know. A village sees the same hands century after century" (Levin, 1985, p. 146).

This disclosive embodiment of others is what Husserl called the phenomenon of coupling. It is nowhere more evident than in our embodied relationships with our most intimate others. Our children. Our lovers. When, for example, we say that a man knows a woman "in the biblical sense" – that is to say, in the oldest sense we have – we mean that he has carnal knowledge of her, that is to say, an embodied relation with her.

This embodiment of intimacy is also exemplified perhaps most dramatically by moments of danger. But this time danger to the other. A woman feels pain in her chest, just as her mother is having a heart attack miles away. Another wakes up suddenly, in agony, as her friend is being severely beaten, elsewhere in the city. Roll (1987) discusses a variety of such psychic experiences, and arrives at an understanding of these relationships in terms of the body of memory.

This embodied intimacy is lived not only in moments of danger but also in the most everyday ways. Close women friends will frequently find that their menstrual cycles, which had previously been different, have become synchronized, their bodies expressing the harmonic convergence of their relationship. Also, breast-feeding mothers will begin lactating upon merely hearing their infant cry out for food.

Our embodied relation with each other is intuitively evident in the way that a pregnant woman embodies that relation with her baby. And the way that a father does. For instance, when my wife was pregnant for the first time, I also embodied pregnancy in a way. Like my wife, I had to urinate more often, and I got so tired I eventually had to nap during the day. My body was being pregnant too. And, during the pregnancy with our second child, I felt something else, more subtle, but once felt, unmistakable. A dense heaviness, in my lower abdominal area. And I felt I was weightier. Another description of this phenomenon has recently been offered by Reharick (1987). He focused on his experience of swelling in his hands and feet, which occurred while his wife was in her eighth month of pregnancy.

Primitive people – those without conceptual inhibitions to such experiences – embody this male's experience of pregnancy even into childbirth itself. I have even heard of an island culture whose husbands writhe in pain as their wives give birth. Though there is no sanction in our culture for such male's childbirth experience, men's embodied reactions to their wives pregnancies are now so commonly noted as to have been labeled: "the Couvade syndrome." Of course, we should understand the term "syndrome" here as indicative of a prejudgment of pathology made by an approach whose presuppositions foreclose the possibility of its reality.

Our relationship with our children also offers striking evidence of this embodied intertwining. My experience of my own children has been literally striking. As each of them was learning to walk, they frequently fell forward. Unlike falling backward and landing on a soft diaper, falling forward hits a hard floor, or worse, a hard sidewalk. In such cases, my reaction was to wince. This wince was an unmediated contraction to pain, to the jolt that I experienced directly through my own body. Though it was my child

who landed on the sidewalk, we were both struck by the pain of that fall. I embodied their falling even before they actually hit the sidewalk. As one was falling, I would feel a moment of dizziness, as the sidewalk shifted position, from *beneath* to *ahead*, from perpendicular to parallel. Just as the golfer leans to keep the balance of the body-ball-terrain situation as it is being upset by the errant roll of the putted ball, so too can a parent embody their child's falling as a tipping of the body-sidewalk-other situation.

The parent's embodied empathy may be most visually depicted by the father who grimaces in pain while the baby sitting on his lap receives her inoculation shot. I am convinced that scene is so archetypally recognizable it could have been a Norman Rockwell cover. That empathic embodiment is the miracle of being a parent. That is the miracle of any loving embrace, and the disclosive presencing of our fundamental openness.

This lived bodily rapport with the other's orientation is especially vivid with those we feel closest. With them we feel innumerable pricks and prods, of many kinds. But it can also be discerned in more casual relationships as well, such as a conversation among friends. For example, I was standing in my friend Marc's kitchen, talking with Marc and Phil. Phil was describing a recent event in his own life, which neither Marc nor I had witnessed. Phil described how he had opened up a long shut cast iron stove in his house, only to be surprised by a bat which suddenly flew out of it. As he told the story, we all three simultaneously recoiled involuntarily as the bat "emerged." But what did that recoil mean? For Phil, it might have been a memory of having actually recoiled before the actual bat that had actually surprised him the night before. But Marc and I had not been there to see that bat. We were recoiling along with Phil, in Marc's kitchen, not in Phil's house. Without thinking about what we were doing, we were also ducking to escape Phil's bat. But, in an objective sense, there was no bat in Marc's kitchen. No. But we were embodying an orientation to Phil's cast iron stove, there with him as he opened the door. We had bodily occupied a position there, beside him. We had taken up – indeed we were infected by the contagion of – his orientation. Bodily, we were there with him, as the bat flew out of his stove. We did not "leave" Marc's kitchen, any more than we "leave" our seats as we become immersed in a movie or concert. Rather, the proxemics of our embodied relations are simply not confined by or reducible to impersonally defined space and time. Embodiment is not comprehensible as a location in an objective coordinate system. To be embodied is to be open, to be open onto others, and a world, as the "whither" of our ecstasy.

Examples of the negative sociality of the long body, though beyond the scope of this paper, are also revelatory. To the extent that the body is essentially world-disclosive, torture, for example, becomes the "unmaking of the world" of the victim (Scarry, 1985). This same "unmaking of the world" is also similarly evidenced with deep grief and depression.

ARIA

Alright, it's time now to draw this presentation to its conclusion. I said at the beginning that my project was to chart a way out of the trap of modernism's absolutist metaphysics, without falling prey to the nihilism that lurks in postmodernism's alternative of linguistic relativism. When modernist metaphysics had conceived of the world in terms of objects, governed by mechanistic causality, subjectivity had to remain dualistically split off, or else made into an epiphenomenon of this causal chain. In contrast, I am proposing that our embodiment offers another solution: a "middle way" between the antinomies of abstract objectivity and subjectivity. As Merleau-Ponty (1968), in his last, unfinished manuscript, had noted, as embodied being, we and the world share the same, nondual, ontological status: that of "Flesh." As such, we and the world are indivisibly intertwined.

And what are the implications of this understanding? In every disposition of our embodiment, the existential possibilities in this relationship lay claim to our guardian awareness, and appeal to our capacity for a manifest responsiveness. If every gesture and every movement takes place within the dimensionality of this space,

we are charged at all times with questions of motivation. Regardless of our level of awareness, regardless even of the degree of our caring, our bearing continually bears witness to the enabling presence of a field of Being.

How might we bear this charge with grace and dignity? And what difference would we like our bearing to make in the world of our brief passage? (Levin, 1985, p. 92).

It is up to us to accept this motivational charge and to live it with resolution and authenticity. If our every gesture *can* be a consecratory act of world-disclosure,

what does it take for this possibility to be realized? Mindfulness, care, love, silence, openness: attitudes carried by, and in, the body; attitudes inhabiting the body, shaping and choreographing our gestures and movements: how we point, touch, hold, and handle; how we sit, stand and walk; how we inhabit a space. (Levin, 1988, p. 289)

These are not abstractions, but very concrete, and very consequential ways of being. To really understand our embodied inherence in the world is the deepest basis for deep ecology (Roberts, 1998; Sessions, 1995) – an understanding that has become truly urgent for the world to attain. In coming to it, we should realize that we are simply coming home to what is widely known by most original people. For example, it was Giambattista Vico's insight that primitive people first conceived of the world with their bodies, that the indispensable origins of human order are an embodied logic, that "they first think the world and society as one giant body" (O'Neill, 1985, p. 28). Vico's (1744/1970, p. 88) analysis of the body of the world, manifested in the "mouth" of the river, the "shoulder" of the road, the "bowels" of the earth, and so forth, illustrates well this ultimate openness of the body. This disclosure of the body of the world is no mere anthropomorphic arrogance. Rather, they experienced themselves as being likewise worlded by their bodily inherence in the world (c.f., Yasuo, 1987; Heidegger, 1971b). For example, I spent some time with the Karen tribe, in northern Thailand. Still living largely isolated from the rest of the world, their understanding of their world-relatedness is still intact. As such, they experience themselves as each having come into the world through a particular tree. (After birth, each baby's umbilical cord is each attached to a tree.) And that they will each depart the world via that same tree. (After their death, each person's body is burned and the ashes hung on their particular tree.) This is their way of living daily with the profound recollection of their bodily based nondual interconnectedness with the world. And it allows them to embrace the world, moment by moment, as a whole. I will never forget the village headman's perspective... [go into e.g. of walking through woods, and asking if the trees turn red]

In conclusion, we can rediscover that the ground of our embodied Being is the earth (Levin, 1985, pp. 289 – 291). We discover that

we are ontologically inseparable from the parabolic "body of nature," thus participating in its primordial rhythms by our very embodiment. We are grounded in and of the earth, its rhythmic periodicities, and the...fluctuations of a larger, more subtle Nature" (Davis, 1986, p. 106; also cf. Kohak, 1984).

Distinguishable, certainly. But inseparable. Such a disclosure departs decisively from modernity's metaphysics of Nature in terms of its sciences of nature. Within their technological enframing, the earth is disclosed as a vast storehouse of energy, a "standing reserve" (Heidegger, 1953/1977) of raw materials to be carelessly and ruthlessly exploited for human gratification (Kohak, 1984, p. 4). In contrast, the pre-scientific disclosure of the body of the world opens us to the Being of all beings. It engenders a radically deeper ecology through which we can become "capable of grasping [our] moral place in the order of the cosmos" (Kohak, 1984, p. 118). Freed from dualism by this awakening, we are free at last to engage an appreciative – indeed reverential – nondominating relationship with the world. We can encounter all beings (trees, birds, fire, each other) not as encapsulated, elemental, entities, but rather as the present constellations of appearances, as the impermanent upsurging, swirling presencing of Being, now localized here, now there; self-giving, self-manifesting phenomena, arising simultaneously.

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CHICKS AND ALGAE: THE REMOTE INFLUENCE OF DESIRE

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ABSTRACT

Psychokinesis in humans is the direct, non-local influence of *intentionality* on a physical system. In animals, particularly primitive animals, the notion of intentionality is problematic, and hence we will define animal PK to be the direct, non-local influence of *desire*. An attempt, using a modification of Peoc'h's apparatus, to quasi-replicate his purported demonstration (Peoc'h, 1995) of PK on a randomly controlled robot by 7-day old chicks failed to find any evidence of the phenomenon. An extension of this idea using an ultra-primitive living organism, green algae, and a quantum random event generator also found no evidence of the phenomenon.

GENERAL INTRODUCTION

A key feature of physics since its modern inception by Galileo and others in the 17th Century has been locality: A causal relationship between events concerning two systems is possible if and only if those systems are in physical contact with each other, or, by extension, are each in contact with another system which can mediate the causal relationship. Mediation by material objects (particles, e.g. bullets, or extended objects, e.g. ropes) was extended in the 19th Century, principally by Michael Faraday, to include electric and magnetic fields, and by Albert Einstein in the 20th Century, to include the gravitational space-time field. (This latter finally resolved the dilemma of "action-at-a-distance" introduced reluctantly by Isaac Newton in his theory of universal gravitation.) The theories of the "Standard Model" of late 20th Century high energy physics, and in a sense therefore, the closest thing we have to a "theory of everything" (the electroweak interaction and quantum chromodynamics, whether particles, strings or branes) are local theories. Even the celebrated "non-locality" of quantum theory, as evidenced by Bell's Theorem and the associated experiments, is "non-local" only in a very special sense: it reflects a non-local entanglement which, however, cannot be used to mediate a causal relationship. (Bedford, 1994; Bedford & Stapp, 1995).

It is, then, not surprising that claims that phenomena exist which violate this fundamental principle of physics are greeted with extreme skepticism, particularly from within the physics community.

There have been anecdotal reports over the centuries of phenomena of this type, including telepathy (the non-local influence of one brain (or one mind) on another resulting in the transfer of information by non-physical means), remote viewing (the non-local reception of information), the actions of a "poltergeist", at least when reflective of, for example, the mood of a troubled teen-ager, and psychokinesis (the non-local influence of intention on the behaviour of a physical system.) During the 20th Century there were, for the first time, sustained efforts to demonstrate scientifically the existence of, particularly, telepathy and psychokinesis. In general, the effects, when apparently found to exist, are small: in the case of the PEAR (Princeton Engineering Anomalies Research) studies (Dunne & Jahn, 1992) enormous amounts of data are needed to obtain statistical significance because the apparent effect is at the level of only one part in ten thousand or so.

The studies done with animals, on the other hand, beginning with Helmut Schmidt in the 1960s, claim to show PK at the level of several parts per hundred. Thus, in terms of conducting scientific experiments into the actual nature of this phenomenon, by manipulating parameters and measuring consequences thereof, animal studies should be particularly valuable. We conducted experiments with chicks and algae using two types of random event generators (REGs).

1. EXPERIMENT WITH CHICKS AND ORION REG

INTRODUCTION

Of particular note are the set of experiments done some years ago by Rene Peoc'h (Peoc'h, 1995; Peoc'h 2002, 2003). In the first type, baby chickens (7 days old), having been imprinted with a robot as "mother hen" from the moment of their hatching, were able to influence the movement of a robot whose movement was theoretically governed by a random event generator (REG) based on microelectronic noise. Instead of spending half its time in each half of the enclosure, as it did in control runs, the robot spent some 70% of its time in the half of the enclosure nearest the chicks. In the second type of experiment, no imprinting of the chicks was done, but the instinctive desire of chicks to be in the light rather than in the dark was exploited by placing a lit candle on top of the robot in an otherwise dark enclosure. The results were much the same as before.

For reasons of simplicity, time and expense, and as a first approximation to replicating the second type of Peoc'h experiment, it was decided to use, in place of the robot-with-candle, a pair of 15W light bulbs placed near to (at a distance of 0.5m) and far from (1.5m) the chicks. Which bulb is lit next would be randomly determined by the REG. We hypothesized that, since chicks are attracted to light, if Peoc'h's findings are reproducible the chicks would influence the REG such that the near light would be switched on longer or more often than the far one.

METHODS

Luxaphilia Check

A group of ninety newly hatched chicks was obtained from a commercial supplier. One set of fifteen two-day old chicks was placed in a dark confined space measuring 2.5m x 1.5m. The chicks were supplied with food and water, the containers being located on the centre line of the space. Bulbs were placed at either edge, and lit alternately by the experimenter. The position of the chicks was monitored and recorded on videotape. In all, each bulb was lit up four times, and in every case all of the chicks migrated, within 5 minutes or so, to the half of the enclosure containing the lit bulb. This left no doubt that the expectation that chicks prefer to be in well-lit surroundings is well-founded.

The Random Lighting Procedure

The Orion REG is based on electronic noise. Its output is a random sequence of zeros and ones which is sampled at a rate of 1000 per second. The validity of the binomial distribution ($p = 0.5$) of the output was checked by counting the number of bits in each 200-bit trial over many millions of trials and analysing the resulting distribution.

The switching-time interval, t , was chosen to be one of four possibilities, viz., 0.6s, 2s, 5s, 10s. The decision as to which of the two bulbs, whether the near (0.5m) or far (1.5m), would be lit next in any experimental session was determined by the following algorithm:

Let n be the number of ($b = 200$)-bit trials in one switching-time interval. Count the number of ones in the interval (n trials plus one bit), m .

- If $m > (n \times 200)/2$, switch the near light on during the next interval.
- If not, switch on the far light.

The Experimental Procedure

On each of five successive days a new set of fifteen chicks in a small cage was placed on one side of a dark cubical measuring 2.4m x 3.0m x 2.2m. They were supplied with food and water, and remained in

the ventilated cubical for the duration of the day's experiments. On each successive day the chicks were one day older, and so ranged in age from 4-8 days.

The chicks were given a few minutes to acclimatize to their new darker surroundings before starting the experiment. The experimental sessions lasted 1, 2, or 3 hours (depending on the switching-time interval). m for each trial was recorded continuously. From this data the results for the primary and any other variables could then be extracted.

RESULTS

Data Analysis

The primary dependent variable is the number of times the near bulb is switched on in a given experimental session, N_N , with chosen switching-time interval, t . This is expected to be half the total number of lightings, N , of the near and far bulbs. The difference between these two numbers, D , is then compared with the standard deviation, $s = \sqrt{N}/2$, yielding a z score, $z = D/s$. The results are presented in Table 1. (Exp refers to the observed, experimental results.)

Table 1

t (s)	N	N_N (Exp)	N_N (Theory)	D	s	z
0.6	10970	5490	5485	5	52	0.10
2	17086	8536	8543	-7	65	-0.11
5	5530	2776	2765	11	37	0.30
10	690	359	345	14	13	1.07
Total	34276	17161	17138	23	93	0.23

A secondary dependent variable is the average number, M_{Av} , of ones per 200 bit trial in an experimental session, during those switching-time intervals which determine that in the next interval the near light will be on. This is to be compared with the theoretical value which is calculated by integrating over the half-Gaussian as discussed below. This variable is a useful check on the normality of the distribution. The results are presented in Table 2.

Table 2

t(s)	M_{Av} (Exp)	M_{Av} (Theory)
0.6	103.23	103.15
2	101.55	101.77
5	101.16	101.12
10	100.82	100.79
Dark	100.01	100.01

The derivation of the expectation value of M in the subset of cases where $M > 100$ goes as follows: The binomial distribution at hand here becomes, in the limit of large numbers, a Gaussian distribution in the variable x ($= M$), mean μ , standard deviation σ . In the subset with $x > \mu$, the average value of x may be computed as follows:

$$\text{Put } z = (x - \mu) / \sigma. \text{ Then: } z_{Av} = \frac{2}{\sqrt{2\pi}} \int_0^{\infty} z \exp\left(-\frac{z^2}{2}\right) dz.$$

(The 2 appears in the numerator outside the integral because of the normalization of the half-Gaussian.)

This is immediately integrable to $z_{Av} = \sqrt{2/\pi}$ so that $x_{Av} = \sigma\sqrt{2/\pi} + \mu$. For the four switching-time intervals, t , we used, the appropriate σ in this equation is given by $\sigma = \sigma_w / \sqrt{t/0.2}$, the numerator

being the standard deviation of the 200 bit sample, numerically = 7.07, and the denominator being the square root of the number of 200-bit trials in a switching period, with $\mu = 100$.

The standard deviation of the mean number of 1s in all T trials, s_M , is obtained from the standard deviation over a trial, $s_{tr} = \sqrt{p(p-1)b} = (200)^{1/2}/2 = 7.07$, using $s_M = s_{tr}/T^{1/2}$. In our case, $T = 380\ 160$, and so $s_M = 0.011$. Our result for the mean number of ones is 100.006.

The behaviour of the Orion REG in the absence of the chicks, but with light-switching nominally taking place, with and without light bulbs, was monitored. It behaved normally.

Conclusion

The two-light system in the presence of the chicks showed no significant deviation from a binomial distribution with $p = 0.5$ for any of the four choices of light-switching time interval. The REG output of ones per 200 bit trial also showed no significant deviation from a binomial distribution with $p = 0.5$.

2. EXPERIMENT WITH ALGAE AND ORION REG

INTRODUCTION

During the evolution of life on earth, animal PK (as we have defined it) would have been strongly selected for, as it would give obvious survival advantage to organisms which possessed such a capability. In particular, in the very early and very long (3 billion years) period when green algae in one form or another was all the life there was, an ability to maximize the amount of light received by an alga's phototrophic body by, for example, reducing the amount of sun shadow cast by intervening material (including other algae) would have been advantageous. It seems reasonable to us that if chicks "want" to maximise their illumination, then so might algae.

So, we replaced the chicks by a jar of swimming pool algae, and ran the PK experiment again using the Orion REG.

METHODS

The general procedure, including the light switching process, was identical to that in the experiment with chicks, except that the chicks were replaced by a glass jar with about one-half a liter of algae infested swimming pool water. Again there were two light bulbs, at 0.5m and 1.5m from the jar, which illuminated the algae more or less brightly, respectively, with the decision as to which bulb was lit being controlled by the Orion REG in the same way as before. In addition, it was decided to also run the experiment with a more extreme difference in brightness by removing the far bulb from its holder; thus bright light and darkness were the two conditions in this alternate mode.

RESULTS

Data Analysis

In Table 3, t is the switching time interval, N is the total number of trials, N_N is the number of times the near light comes on, D is the difference between the experimental and theoretical values, s is the standard deviation = $\sqrt{Np(p-1)} = \sqrt{N}/2$, and z is D/s .

Table 3: Both lights operational

t(s)	N	$N_N(Exp)$	$N_N(Theory)$	D	s	z
2	720	366	360	6	13.4	0.45
5	720	372	360	12	13.4	0.89
10	360	168	180	-12	9.5	-1.26
30	240	119	120	-1	7.7	-0.13
Total	2040	1025	1020	5	22.6	0.22

Table 4: One light operational

t(s)	N	$N_N(Exp)$	$N_N(Theory)$	D	s	z
2	720	339	360	-21	13.4	-1.57
5	720	336	360	-24	13.4	-1.79
10	360	182	180	2	9.5	0.21
30	240	118	120	-2	7.7	-0.26
Total	2040	1025	1020	-45	22.6	-1.99

Conclusion

No evidence of PK ability in algae was found for any of the conditions imposed.

3. EXPERIMENT WITH ALGAE AND QUANTUM REG

INTRODUCTION

The qREG

As we have argued elsewhere (Kruijse et al, 2005) the phenomenon of PK would almost certainly have a basis in quantum processes. Furthermore, the most likely place for intervention by mind/brain/living organism is not in the deterministic evolution of the wave function of a system governed by the Schrödinger equation but in the non-deterministic collapse of the wave function associated with measurement. Thus, if a quantum system is put into a superposition of states, it is possible that the time of collapse could come under intentional influence and this without interfering with overall probability distributions and so on: quantum theory would not be violated, nor would any other laws of physics except those associated with chance. It is also reasonable to suppose that reducing the number of independent quantum events per unit time might enhance the effect.

Suppose we have a radioactive isotope which decays by emitting an electron. We place one such atom near an electron detector. When an unstable atomic nucleus is observed at time $t = 0$ to have not yet decayed, it is in its initial state, I . As time passes, the unobserved nucleus evolves deterministically into a superposition of this state with the final state, F , $a(t)I + b(t)F$, where $a(t)$ is an exponentially decreasing function of time, and $b(t)$ is an exponentially increasing function of time, the rate of increase and decrease being a characteristic of the nuclear species related to the half-life. The detector evolves correspondingly into the state of “Not having detected” AND “Having detected”. If the detector is observed, it will be found either to have detected or not. If not, its state and the state of the nucleus revert to their initial condition and the process begins again. At some time the detector will be observed to have detected. We hypothesise that the time of this chance event can be intentionally influenced.

We chose as our radioactive source a Welsbach gas mantle, which is a nylon mesh which has been impregnated with ^{232}Th (Thorium) which decays via ^{228}Ra (Radon) to ^{228}Ac (Actinium) with the emission of an electron, half-life 5.76 years. The source and Geiger-Müller (GM) detector were positioned such that the average count rate was around 20 counts per second. The number of counts in a fixed time

interval follows a Poisson distribution, so we chose as our threshold for “zero” or “one” the median of the distribution. A non-integral value for the median was found by taking the mean of the medians in a large set of control runs. Then the criterion is: if the number of counts in the time interval (either 5s or 10s) is less than the median, “zero”; if greater, “one”.

METHODS

The experiment was run exactly as the previous algae experiment except for the use of the quantum event based qREG instead of the Orion. Again the experiment was done in the two modes: the first with both near and far light operational, giving more or less illumination respectively; the second with only the near light operational, giving bright illumination and darkness as the two possibilities.

RESULTS

Data Analysis

Table 5: Both lights operational

t(s)	N	$N_M(Exp)$	$N_M(Theory)$	D	s	z
5	2000	1001	1000	1	22.4	0.04
10	860	436	430	6	14.7	0.41
Total	2860	1437	1430	7	26.8	0.26

Table 6: One light operational

t(s)	N	$N_M(Exp)$	$N_M(Theory)$	D	s	z
5	2000	1007	1000	7	22.4	0.31
10	860	425	430	-5	14.7	-0.34
Total	2860	1432	1430	2	26.8	0.007

Conclusion

No evidence of PK ability in algae was found for any of the conditions imposed

GENERAL CONCLUSION

We found no evidence of animal psychokinesis with either chicks or algae using an Orion REG, or with algae and a quantum REG.

DISCUSSION

If we assume, firstly, the validity of Peoc’h’s results, then our failure to reproduce them using our modified apparatus could be, of course, a direct result of those modifications. Had we built an actual robot like Peoc’h’s, rather than simulating one with near and far light bulbs, perhaps the outcome would have been different. On the other hand, it is possible that the large deviations from chance in many animal experiments are in fact examples of the so-called “experimenter effect”: some experimenters are better at getting positive results than others, possibly due to the fact that the PK being observed has more to do with the experimenter than with the animals. In our case, we tried to minimize any experimenter influence by running all of the experiments in an insulated cubicle which acted as a Faraday cage, and effectively

isolated the animals from any obvious outside influence. Indeed, many of the sessions were conducted overnight, when there was no one even in the building.

A word about the use of algae: Most of us, at the outset, did not expect positive results in the algae experiment (they are [probably] not sentient beings, on the face of it they don't really "do" anything, and so on.) On the other hand nobody knows how PK works, algae did evolve into things which evolved into us, and given that the set-up for the chicks already existed, it was an easy experiment to do. Furthermore, considering the enormous scientific value positive results in such an experiment would have, in going at least some way towards clarifying the "mechanism" involved in PK, we considered the experiment well worth doing.

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PRECOGNITIVE AVERSION

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ABSTRACT

At an earlier PA Convention, I reported on a phenomenon called “Precognitive Habituation” (PH) (Bem, 2003). The PH effect is a psi variation of a well-known psychological phenomenon, the habituation of arousal to an affectively arousing stimulus that occurs after repeated exposures to that stimulus. For example, in one habituation experiment, participants subliminally exposed to extremely positive and extremely negative words subsequently rated those words as less extreme than words to which they had not been exposed: Negative words were rated less negatively and positive words were rated less positively (Dijksterhuis & Smith, 2002). The PH procedure tests for precognition by, in effect, running a standard habituation procedure in reverse. Instead of exposing a participant to repeated exposures of a stimulus and then assessing his or her liking for it, the PH procedure reverses the sequence: On each trial the participant is first shown a pair of negatively arousing or positively arousing (erotic) photographs on a computer screen and asked to indicate which picture of the pair he or she prefers. The computer then randomly selects one of the two pictures to serve as the “habituation target” and displays it subliminally several times. If the participant prefers the picture subsequently designated as the target, the trial is defined as a “hit.” Accordingly, the hit rate expected by chance is 50%. The PH hypothesis is that the repeated exposures of the target can reach back in time to diminish the arousal it would otherwise produce, rendering negatively arousing targets less negative and erotic targets less positive. (This latter effect on erotic targets can be conceptualized as precognitive boredom.) Operationally, participants are predicted to prefer the target-to-be on negative trials and the non-target-to-be on erotic trials. Across several studies, these predictions were confirmed: The hit rate was significantly above 50% on negative trials (52.6%, $t(259) = 3.17, p = .0008$) and significantly below 50% on erotic trials (48.0%, $t(149) = -1.88, p = .031$). Unexpectedly, when the number of target exposures exceeded 8, a precognitive boredom effect also occurred on low-arousal, “control” pictures. The current experiment was designed to explore this effect further across a range of low-arousal pictures, both positive and negative (where it is probably more accurate to conceptualize it as precognitive *aversion*). Two hundred participants, 140 women and 60 men, participated in a 24-trial session that presented 10 supraliminal exposures (750 ms) of the target picture after each preference judgment. Overall, the hit rate did not differ from chance, but participants low in arousability or boredom tolerance achieved an overall hit rate of 47.3% ($p = .006$). Consistent with the reasoning behind the protocol, participants who were low in Arousability displayed significant precognitive aversion on trials with negative targets (46.9%, $p = .036$) and participants low in Boredom Tolerance displayed precognitive boredom on trials with positive targets (44.4%, $p = .005$).

INTRODUCTION

At the 2003 PA convention, I reported on a phenomenon called “Precognitive Habituation” (PH; Bem, 2003). The effect is a psi variation of a well-known psychological phenomenon, the habituation of arousal to an affectively arousing stimulus that occurs after repeated exposures to that stimulus. For example, in a recent habituation experiment, participants subliminally exposed to extremely positive and extremely negative words subsequently rated those words as less extreme than words to which they had not been exposed: Negative words were rated less negatively and positive words were rated less positively (Dijksterhuis & Smith, 2002).

The PH procedure tests for precognition by, in effect, running a standard habituation procedure in reverse. Instead of exposing a participant to repeated exposures of a stimulus and then assessing his or her liking for it, the PH procedure reverses the sequence: On each trial of the PH procedure, the participant is first shown a pair of negatively arousing or positively arousing (erotic) photographs on a computer screen

and asked to indicate which picture of the pair he or she prefers. The computer then randomly selects one of the two pictures to serve as the “habituation target” and displays it subliminally several times. If the participant prefers the picture subsequently designated as the target, the trial is defined as a “hit.” Accordingly, the hit rate expected by chance is 50%.

The PH hypothesis is that the repeated exposures of the target can reach back in time to habituate the participant’s arousal to it, that is, to diminish the arousal it would otherwise produce, thereby rendering negatively arousing targets less negative and erotic targets less positive. This latter effect on erotic targets can be conceptualized as precognitive boredom. Because the two pictures in each pair are matched for valence and arousal, participants are predicted to prefer the target-to-be on trials with negatively arousing pictures and the non-target-to-be on trials with erotic pictures. Preferences on trials with low-arousal control pictures were not expected to differ from chance.

In my own laboratory, more than 300 men and women participated in several variations of the PH protocol. Collectively these studies provided strong support for the two predicted effects. Across the six basic studies, the hit rate was significantly above 50% on negative trials (52.6%, $t(259) = 3.17, p = .0008$) and significantly below 50% on erotic trials (48.0%, $t(149) = -1.88, p = .031$).

The Role of Arousal

In the first experimental series, PH effects were shown only by women participants; hit rates for the men were at chance levels for both the negative and erotic trials. Because the psi literature does not reveal any systematic sex differences in psi ability, it seemed likely that this occurred because the men were less aroused by both the negative and erotic pictures than the women.

Most of the pictures used in the PH studies were selected from the International Affective Picture System (IAPS; Lang & Greenwald, 1993), a set of 820 digitized photographs that have been rated on 9-point scales for valence and arousal by both male and female raters. Male raters rate every one of the negative pictures in the set as less negative and less arousing than do female raters. An fMRI study using IAPS pictures found that men had significantly fewer brain regions than women where activation correlated with concurrent ratings of their emotional experience, and men later recalled which pictures they had seen less accurately than did women (Canli, Desmond, Zhao, & Gabrieli, 2002).

The clinching argument for the arousal interpretation, however, came from a 5-point Arousalability scale administered to participants prior to their experimental session (“In general, how intense are your emotional reactions to movies, videos, or photographs that are violent, scary, or gruesome?”). For both men and women, those who rated themselves above the midpoint on this scale showed a significant PH effect on the negative trials. All others scored at chance level. Correspondingly, those who rated themselves above the midpoint on a parallel Erotic Reactivity scale showed a significant PH effect on the erotic trials.

Precognitive Aversion on Low-Arousal Pictures: A Serendipitous Finding

The earliest studies of the PH effect used only 4 subliminal exposures on each trial. In an attempt to strengthen the effect, I kept increasing the number of exposures, moving from 4 to 6, 8, 10, and 12 across the successive experiments. The hit rate on the low-arousal control trials remained essentially at chance until the number of exposures reached 10, at which point the hit rate on these trials dropped to 46.8% ($t(39) = -2.12, p = .04$, two-tailed). In other words, with very frequent exposures, the low-arousal pictures behaved like the erotic pictures, showing a precognitive boredom effect. Like a too frequent TV commercial, the many repeated exposures (precognitively) rendered the target picture boring, or even aversive, and hence less attractive than its matched non-target.

This serendipitous finding suggested that it might be possible to design a protocol deliberately constructed to produce precognitive aversion as the central phenomenon. This would be desirable for two reasons. First, there are large sex, cultural, and individual differences in arousal to the gruesome and the erotic pictures used in the PH protocol, making successful replication across different populations more

difficult. Moreover, the proportion of men scoring high on the Arousability scale in the university populations studied so far is quite low. This means that successful replication requires either extensive pre-screening or running many more male participants to get an adequate sample. In contrast, it seemed likely that precognitive aversion would be most likely to occur among participants who are low in Arousability and/or Boredom Tolerance. If true, a potentially larger pool of successful male participants would be available in a university population.

Second, several psi investigators (or their Institutional Review Boards) have been hesitant to conduct a study using gruesome and erotic pictures. A precognitive aversion experiment would not need such pictures, however, because, just as the precognitive aversion effect is expected to be shown by participants low in arousal, it is expected to be shown with stimuli low in arousal value.

METHOD

Participants

Two hundred Cornell undergraduates, 140 women and 60 men, were recruited through the Psychology Department's automated on-line sign-up system to serve as participants in a "15-20 minute study of Precognitive Imagery." They either received one point of experimental credit in a psychology course offering that option or were paid \$5 for their participation.

Stimulus Pictures

As noted above, the pictures used in the studies were selected from the International Affective Picture System (IAPS; Lang & Greenwald, 1993), a set of 820 digitized photographs that have been rated on 9-point scales for valence and arousal by both male and female raters. For purposes of this research, I have constructed an index of picture affect that combines both the valence and the arousal ratings: The 1-to-9 valence scale is shifted downward so that it ranges from -4 to +4, with 0 as the neutral point. Each valence rating is then multiplied by the corresponding 1-to-9 arousal rating, yielding an affect rating scale that ranges from -36 to +36, with scores below 0 characterizing negatively valenced pictures and scores above 0 characterizing positively valenced pictures.

Using this index, the 820 pictures in the IAPS set range from -22 and -29 for men and women, respectively (for a picture of a bloody mutilated face) to +20 for both men and women (for a picture of a skier on a snowy mountain).

The negative pictures used in the PH studies have a mean affect rating of approximately -12 and -18 for men and women, respectively. The negative pictures used in the present study have a much milder affect rating of approximately -7 and -12 for men and women, respectively.

Experimental Procedure

Upon entering the laboratory, the participant was told:

In this experiment, we are interested in measuring your reactions to a wide variety of visual images in a procedure that tests for ESP (Extrasensory Perception). The experiment is run completely by a computer and takes about 15-20 minutes.

First you will be asked to answer some questions describing ways in which you react to different situations. Then, on each trial, you will be shown a pair of pictures and asked to click on the one you like better. You will then be asked to watch passively as one of the two pictures is flashed repeatedly on the screen. This will be repeated for 24 trials.

At the end of the session, I will explain to you how this procedure tests for ESP.

The participant then signed a consent form and was seated in front of a computer housed in an open cubicle. The cubicle was dimly lit by a floor lamp positioned so that there were no reflections on the computer screen. Overhead fluorescent lights were turned off.

The PA procedure is similar to the one used in the PH studies: First, the program administers a set of screening items to which the participant responds on 5-point scales. Then, on each of 24 trials, the participant is shown two matched pictures and asked to click on the picture he or she prefers. Half the picture pairs have positive affect ratings and half have negative affect ratings. The program then randomly selects one of the two pictures to serve as the target and flashes it on the screen 10 times. Unlike most of the PH studies, however, the exposures are enlarged to fill the entire screen and are supraliminal in duration (750 ms followed by a blank screen for 250 ms). The shift to supraliminal exposures was designed to maximize the probability that participants would find the negative targets increasingly aversive and the positive targets increasingly boring.

In addition to the random selection of the target on each trial, the sequence of pairs across trials and the left/right placement of the two pictures in each pair are also randomized (as is, consequently, the left/right placement of the target). Randomizing is done by a pseudo random number generator (PRNG) using an algorithm by Marsaglia (1997) which passes his well known “Die-Hard Battery” of tests for randomization.

RESULTS AND DISCUSSION

It will be recalled that the PA effect is expected to be shown by participants low in Arousalability and Boredom Tolerance. To identify participants who were low in Arousalability, I used the same question used in the PH experiments to identify participants who were high in Arousalability (“In general, how intense are your emotional reactions to movies, videos, or photographs that are violent, scary, or gruesome?”). Those who scored below 3 on the 5-point scale were defined as low in Arousalability. To identify participants who were low in their tolerance for boredom responses to two questions were averaged: “I get bored easily” [scored in the reverse direction] and “I often enjoy seeing movies that I’ve seen before.” Those who scored below 3 on the combined scale were defined as low in Boredom Tolerance.

Operationally, the PA hypothesis is that participants low in Arousalability and Boredom Tolerance will select the target picture on significantly fewer than 50% of the trials. Over all 200 experimental sessions, the hit rate did not differ from chance (49.1%); but, as predicted, participants low in Arousalability and Boredom Tolerance obtained a hit rate significantly below chance (47.3%, $p = .006$). Consistent with the reasoning behind the protocol, participants who were low in Arousalability displayed significant precognitive aversion on trials with negative targets (46.9%, $p = .036$) and participants low in Boredom Tolerance displayed precognitive boredom on trials with positive targets (44.4%, $p = .005$).

As noted in the Method section, the algorithm used for randomizing the several events in this study has passed rigorous tests of randomness. Nevertheless, there is always a concern (especially among critics of psi research) that a flawed PRNG might produce nonrandom patterns within a short run of trials. This could, for example, create patterns in the left/right placement of the target that might coincide with a participant’s pre-existing biases (e.g., excessive left/right alternations). This problem is avoided in the present study because successive decisions of the same kind are not made by successive calls to the PRNG. For example, between successive selections of a target or left/right picture placement, the PRNG is called upon to select the picture pair for the trial. Because it does this by repeatedly generating random integers between 1 and 24 until an unused pair is located, the number of intervening calls to the PRNG varies from trial to trial, thereby destroying any systematic patterns that might be generated by the PRNG itself.

To guard even further against potential bias problems in the randomization, two Monte-Carlo-like analyses were performed. The first analysis matched each participant’s sequence of left/right preference judgments against 1000 randomly generated left/right target sequences. These “virtual” sessions provide an empirical chance baseline for each participant against which his or her actual hit rate can be

compared—rather than comparing it to the theoretical chance baseline of 50%. Across all 200 participants, the mean Monte Carlo baseline was 49.966%, and the analyses yielded the same statistical conclusions as reported above.

The second analysis matched each participant's sequence of left/right preference judgments against each of the actual target sequences generated in the other 199 sessions of the experiment, thereby controlling for possible target-placement biases during the actual experiment. The mean empirical chance baseline hit rate was 50.010% and, again, the statistical conclusions were the same as reported above.

In sum, the PH studies previously reported demonstrated that participants high in Arousalability show precognitive habituation on high-arousal pictures. The study reported here demonstrates that participants low in Arousalability or Boredom Tolerance show precognitive aversion on low-arousal pictures. Perhaps everyone can display psi when the task matches his or her personality.

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IMPLICIT MEASURES OF PARTICIPANTS' EXPERIENCES IN THE GANZFELD: CONFIRMATION OF PREVIOUS RELATIONSHIPS IN A NEW SAMPLE

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ABSTRACT

This study is a follow-up to an earlier report (Carpenter, 2001) in which transcripts of 364 ganzfeld sessions that had been collected previously in several laboratories were analyzed using a set of 36 rating scales developed to implicitly assess the approach and quality of experience of the percipient in the situation. A number of significant, apparently meaningful, and somewhat internally consistent relationships were observed in that sample. Multiple regression analysis was applied to the data in order to generate a cluster of items, which if pooled, might be expected to be a useful predictor of ESP success in a new sample. An additional, independent sample of 251 ganzfeld sessions drawn from 3 previously conducted studies is analyzed here in terms of this predictive cluster, and a significant discrimination of hitting and missing sessions is found. All data were then pooled and subjected to correlation and regression analyses. A significant portion ($N = 241$) of the sample was contributed by persons active in the arts who scored more highly than the non-artists. The 2 groups are analyzed separately, as well as pooled. Hitting was predicted primarily by neutral or positive physical/emotional experiences in the session and by imagery suggestive of a capacity for self-transcendence, emotional closeness and deep trust. Missing was predicted mainly by excessive verbosity, an overly cognitive, intellectualized approach to the task, anxiety and attendant defenses against anxiety, and (for persons in the arts) by more indirect indications of an unhappy adjustment to the situation. Ways in which such findings may guide future research are mentioned.

INTRODUCTION

The use of the ganzfeld by parapsychologists began with the presumption that the state of mind of the percipient was an important consideration in successfully demonstrating the acquisition of extrasensory information. The experiential evocativeness of the situation was first noticed by psychologists who borrowed it from early gestalt studies of perception and adopted it, along with other varieties of sensory deprivation procedures, because of its capacity to induce hypnogogic experiences in participants (e.g. Bexton, Heron & Scott, 1954; Murphy & Myers, 1962). For this reason the ganzfeld also appealed to parapsychologists who had been finding extrasensory effects in other altered states, such as dreaming sleep (Child, 1985), and hypnosis (Stanford, 1992), under the assumption that it might similarly "reduce the noise" of waking consciousness and allow more access to pre-conscious and potentially extrasensory material. Enough studies on the procedure have accumulated that it may be said to have a certain capacity to elicit ESP effects recurrently, although the size of the expected effect and the degree of its reliability are still matters of debate (Bem & Honorton, 1994; Hyman & Honorton, 1986; Milton and Wiseman, 1999; Storm and Ertel, 2002). Because of this widespread interest, it has come to be a stable platform for a comparative research program across laboratories much as card-guessing was in earlier decades (Mauskopf & McVaugh, 1980).

Since parapsychologists have assumed that the ganzfeld effects the experience of the percipient, it is perhaps surprising that relatively little research has systematically investigated the state of the percipient while in the ganzfeld situation. In one interesting series of experiments, Stanford and his colleagues (e.g. Stanford & Frank, 1991), studied the effects of varying aspects of the procedure, such as the type of auditory or visual stimulation, and found meaningful results in terms of indirect measures of arousal and cognitive lability or spontaneity. The latter was psi-conducive in certain conditions. The illusion of time contraction while in the session was used as an indirect indication of "alteration of state" in several studies

(e.g. Sargent, 1980). It has tended to be associated with greater ESP success, sometimes significantly and sometimes not. Post-session questionnaires asking the percipient about the experience that had just transpired in the session have been used in several studies. Perhaps the most interesting correlates have been with responses to the questions as to what degree they found their state was "shifted" from the norm (e.g. Harley & Sargent, 1980), or how much they thought their imagery had been "dreamlike" (Palmer et al, 1979). The relative lack of replicability of these post-session inquiries may be because the measures are informal and unstandardized, and because self-reports after the fact about an unusual experience may intrinsically lack validity.

Carpenter (2001, 2003) developed an approach to studying what might be termed the *implicit experiential approach* of the percipient to the ganzfeld task, as this might be measured by an intensive analysis of the transcripts of "mentation" produced in the session. A set of 36 rating scales was defined and manualized with extensive instructions and examples, such that transcripts can be reliably rated on each dimension. These dimensions, largely modeled after scales in the projective testing literature, provide implicit measures of aspects of unconscious or semi-conscious functioning that might be expected to be more reliably related to the unconscious processes that presumably mediate extrasensory response. In general, evidence has accrued that implicit measures are superior to self-report measures when trying to predict aspects of behavior that do not represent conscious self-presentation (McClelland et al, 1989).

Transcripts of ganzfeld sessions that had been collected in studies at several different laboratories were collected and analyzed in the prior study (Carpenter, 2001), with independent and reliable raters who were blind as to the content of each session's target, and to the ESP score of the session. Using these ratings, relationships were found between scores and ESP performance which generally conformed to expectations and appeared to be meaningful. However, in order to affirm such relationships with confidence, it is necessary to confirm them on a new sample. This confirmatory step is the work of the current project.

METHODS

The Rating Scales

Once a transcript is broken into *Idea Units* using standard rules, it is scored independently by 3 trained raters. The first four scales are not actually used in other analyses, but are scored because these scores are necessary for the definitions of some other scales. They represent types of idea-units. They are

1. IMAGE (Some imagery content is being described)
2. MEMORY (The imagery or other information has the form of a personal memory)
3. REPORT (Some non-imagery material is being described, often about some sort of physical/emotional experience, or some response to the situation)
4. REMARK (The idea unit cannot be classified into one of the other categories. These are often in the form of remarks to the experimenter or the sender)

There are three measures of physical experience that are applied to most REPORTS. These are:

1. POSITIVE/NEUTRAL EXPERIENCE (Some physical or emotional experience is given that is pleasant or emotionally neutral)
2. DISCOMFORT (An uncomfortable experience is reported)
3. ODD BODILY EXPERIENCE (An "altered" or unusual experience is reported)

Five scales measure different cognitive aspects of imagery:

1. INTEGRATION (An image is composed of more than one element, and the elements are combined in some way)
2. FLUID DEVELOPMENT (The content or activity of the image develops in time)
3. CONTRIVED IMAGERY (The percipient describes attempting to consciously construct or direct an image)
4. REGRESSED REASONING (An image has unrealistic characteristics)

5. DETERIORATED REASONING (The description of an image is so peculiar or cryptic that it cannot be clearly understood)

Six scales measure ways in which imagery may be enlivened:

1. AUTONOMY (An image has an autonomous power or will of its own, sometimes in defiance of the percipient's wishes)
2. PERSONAL INVOLVEMENT (The percipient is experientially involved in the image. It is actually scored as three sub-categories: PERSONAL INVOLVEMENT POSITIVE, PERSONAL INVOLVEMENT NEGATIVE, and PERSONAL INVOLVEMENT NEUTRAL, depending on the emotional quality of the experience)
3. HUMAN MOVEMENT (The image contains human figures in motion)
4. ANIMAL MOVEMENT (Animal figures in motion)
5. INANIMATE MOVEMENT (Inanimate objects in motion)
6. COOPERATIVE MOVEMENT (Images show humans in action with one another in a non-conflictful fashion)

Ten scales indicate emotional arousal, defenses against emotions, or expresses other emotional implications:

1. ANXIETY (An image has fearful or distressing aspects)
2. HOSTILITY (An image has angry or destructive aspects)
3. ORAL PRIMARY PROCESS (Food or other oral material is involved)
4. OTHER PRIMARY PROCESS (Oral-aggressive, sexual or anal connotations are present)
5. DENIAL (Negative connotations of imagery are being minimized or denied)
6. DISTANCING (An emotional detachment is implied in the image)
7. INTELLECTUALIZATION (Qualities of the image suggest an intellectualized approach to the task)
8. BARRIER (An image has clearly defined, relatively impenetrable outer surfaces)
9. PENETRATION (An image has poorly defined, easily penetrated or violated outer surfaces)
10. MERGER/HARMONY (An image has connotations of positive merger, love or self-transcendence)

Six scales measure the use of color or "achromatic color" (lightness/darkness and luminosity)

1. PURE COLOR (Color is described with no form or clear object)
2. COLOR WITH SECONDARY FORM (Color is described and some vague elements of form are added)
3. FORM WITH SECONDARY COLOR (Some clearly delineated object is mentioned which also has an attribute of color)
4. PURE ACHROMATIC COLOR (As color)
5. ACHROMATIC COLOR WITH SECONDARY FORM (As color)
6. FORM WITH SECONDARY COLOR (As color)

The Prior Study

In the study reported previously (Carpenter, 2001), five data sets contributed a total of 364 sessions to the analysis. An early study at the FRNM contributed 47 cases (Zingrone, 1985), the autoganzfeld study at the Psychophysical Research Laboratory 62 cases (Honorton et al, 1990), two studies from the Rhine Research Center (Alexander & Broughton, 2001; Broughton & Alexander, 1997) contributed a total of 198 cases, and a subset of Dalton's study of creative subjects (Dalton, 1997) gave 35 cases. These samples are not homogeneous in terms of psi scoring ($F = 5.20, p = .0016$). The early FRNM data was almost significantly negative, while the PRL data set contained the highly positive performance of a group of Juilliard artists (Schlitz & Honorton, 1992), which was almost equaled by the high performance of

Dalton's sample. A wide range of psi performance was deliberately sought in this data-set in hopes that results might generalize widely to subsequent samples.

This data-set was analyzed by subjecting all cases to a step-wise multiple regression analysis of the 29 major scales against the criterion of the Z-score of the session's ESP response. A cluster of items was identified which is suitable for testing against a subsequent sample. This cluster, with weights for calculating one composite measure, is given in Table One. The multiple regression score against the criterion of ESP scoring is .306. No significance level is cited for this, since this sort of analysis almost certainly overestimates the true size of the relationship, and shrinkage is expected on cross-validation.

TABLE 1:
VARIABLES COMPRISING PREDICTIVE SCALE TAKEN FROM ORIGINAL SAMPLE

<i>Variable</i>	<i>Weight</i>
Positive/Neutral Experience	.0983
Fluid Development	.0260
Form with Achromatic Color	.0701
Autonomy	.0788
Cooperative Movement	.1885
Merger/Harmony	.2419
Integration	-.0196
Anxiety	-.0374
Intellectualization	-.0372

Note that six scales predict psi-hitting (Positive/Neutral Experience, Fluid Development, Form with Achromatic Color, Autonomy, Cooperative Movement and Merger/Harmony), while 3 predict missing (Integration, Anxiety and Intellectualization). One must ask, given 29 potential predictor variables, whether or not this set represents a reliable effect. Stepwise multiple regression is a powerful procedure for generating candidates for predictive purposes, but its results are difficult to test for significance in a meaningful manner (Wilkinson, 1979, 1990). Because of this, the prior study incorporated a split-sample, internal cross-validation procedure, the results of which were reassuring about the reliability of the relationships obtained. The cluster of items in Table 1 were then nominated by stepwise multiple regression on the *entire* data sample which was at hand at the time. This cluster must itself be tested by cross-validation in an independent sample. This cross-validation is the purpose of the current project.

A New Sample

A new set of 251 transcripts of ganzfeld sessions was secured from three studies representing two different laboratories. An unpublished study from Cornell University contributed 61 cases, the remainder of Dalton's sample contributed 93 cases, and the "Sender/No Sender" study of Edinburgh University (Morris et al, 1995) contributed 97 cases. This population was also non-homogenous in terms of ESP performance ($F = 6.69, p = .0015$). The Cornell data was non-significantly negative, the Dalton data was quite positive, and the Sender/No Sender data was non-significantly positive.

All transcripts were rated independently on all scales by 3 trained raters who had previously demonstrated high levels of inter-rater reliability on all dimensions. Ratings were averaged for a single score on each dimension for each transcript.

A composite score called *Ganzpred* was calculated for each transcript by summing the weighted scores on each of the 9 contributing scales. This score was then correlated with the observed ESP Z scores for the sessions as a test of the predictive power of the score in this new sample. Then cases were divided into 3 groups according to the observed quartiles of *Ganzpred* (high quarter, middle half, low quarter) and the ESP rank scores were observed in terms of this breakdown, in order to see how much practical predictability is afforded by the use of this score.

Finally, both the originating and the confirming data sets were merged for overall correlational and multiple regression analyses, looking at the contributions of artists, non-artists, and both combined.

RESULTS

Analyses of Confirmatory Sample

Ganzpred significantly predicted performance in this new sample as evidenced by the correlation coefficient of .199, $p = .0018$. Although significant, the amount of variance accounted for by the composite measure is small. In order to assess its practical significance, the data were broken down into three subsets according to quartiles. The results are given in Table 2.

TABLE 2:
PREDICTION OF ESP RANK SCORES BY *GANZPRED* GROUP

	<i>HIGH</i>	<i>MIDDLE</i>	<i>LOW</i>	<i>TOTAL</i>
1	25	47	16	88
2	17	22	14	53
3	12	31	15	58
4	8	26	18	52
	62	126	63	251

Altogether, this data set yielded a total of 88 1st rank hits (35%). In this sense, it is fairly representative of the ganzfeld database as a whole (Bem & Honorton, 1994). The high-quartile group on *Ganzpred* yielded a slightly improved proportion of 40%. The low-quartile group yielded only 25% rate of 1st rank hits (exactly the level of chance expectation). Fourth-rank misses are present in the whole sample at a 21% rate. In the high-quartile sub-group, there are only 13% fourth-rank misses. Collapsing the data further into binary hits and misses (1st and 2nd ranks combined, and 3rd and 4th combined) yields a simpler picture of the range of discrimination provided by the levels of the score. See Table 3.

TABLE 3:
PREDICTION OF BINARY HITS/MISSES BY *GANZPRED* GROUP

	<i>HIGH</i>	<i>MIDDLE</i>	<i>LOW</i>	<i>TOTAL</i>
HIT	42	69	30	141
MISS	20	57	33	110
TOTAL	62	126	63	251

While the whole set yields a 56% rate of binary hits, this is improved to a 68% rate for the high *Ganzpred* group, and reduced to a 48% rate in the low quartile group. If one were attempting to predict the performance of ganzfeld sessions for some practical purpose (for example, the acquisition of some coded information as in Carpenter, 1991, or Ryzl, 1966), it does appear that the use of this sort of predictor could be of some utility. It also suggests that if means could be found for independently heightening the aspects of experience represented by these scores, the yield of ganzfeld sessions could be increased.

Analyses of Combined Samples (Prior and Current Data)

Data from all sets were combined to yield the best overall estimates that can be obtained of the relationships between these scales and ESP performance in the ganzfeld. Two measures of verbal productivity: total words, and total number of idea units in a transcript, were also included as additional indirect measures of the percipient's approach to the task. Since artists and non-artists have been found in this sample to perform so differently in terms of ESP scores, they were considered separately. Correlations of scores with ESP Z scores for Artists, Non-Artists and the total sample are given in Table 4.¹ The scale Deteriorated Reasoning is excluded since it was very seldom scored at all.

TABLE 4:
PREDICTOR VARIABLES AND CORRELATIONS FOR COMBINED SAMPLES

<i>VARIABLE CLUSTER</i>	<i>VARIABLE</i>	<i>NON-ARTISTS</i> <i>N= 342</i>	<i>ARTISTS</i> <i>N=241</i>	<i>BOTH</i>
Verbal Production	Words	-.04	-.19***	-.10**
	Idea Units	-.09 ^a	-.15**	-.07
Physical Experience	Positive/Neutral	.15***	.11*	.14***
	Discomfort	.07	-.04	.03
	Odd Bodily Exp.	.02	-.04	.01
Cognitive Aspects	Integration	-.05 ^a	-.17***	-.08*
	Fluid Development	-.03	-.16**	-.06
	Contrived Imagery	-.03	-.07	-.05
Imagery Enlivenment	Regressed Reasoning	-.06	-.16**	-.08*
	Autonomy	.06 ^a	-.02 ^a	.03
	Personal Involve. Pos.	.07 ^a	-.02	.04
	Personal Involve. Neg	-.09 ^a	-.06	-.04
	Pers. Involve Neutral	-.03	-.09	-.04
	Human Movement	-.03	-.10*	-.04
	Animal Movement	-.04 ^b	-.08	-.04
	Inanimate Movement	-.08	-.14**	-.06
Emotional Aspects	Cooperative Move.	-.02	.02	.00
	Anxiety	-.16***	-.09	-.10***
	Hostility	-.14***	-.10	-.09**
	Oral Primary Process	-.08	-.07	-.06
	Other Prim. Process	-.03	-.03 ^b	-.00
	Denial	-.08	-.11*	-.09**
	Distancing	-.08	-.17***	-.10**
	Intellectualization	-.07 ^a	-.07	-.09**
	Barrier	-.09	-.12*	-.08**
	Penetration	-.13**	-.13**	-.10***
Color	Merger/Harmony	.16***	.05 ^a	.12***
	Color	.03	-.06 ^a	-.01
	Color/Form	-.01	-.02	-.01
	Form/Color	-.03	-.02 ^a	-.03
	Achromatic Color	-.02	-.13**	-.04
	Ach. Color/Form	.01	-.14**	.01
	Form/ Achrom. Color	.02 ^a	-.03	.01

* $p < .10$; ** $p < .05$; *** $p < .01$

^a significant by multiple regression analysis

^b significant in a positive direction by multiple regression analysis

¹ "Artists" are percipients in the Juilliard study, the Dalton study, and the Sender/No Sender Study. "Non-artists" are all other percipients.

If one were to attempt to predict performance of a new sample of ganzfeld data using these scales, it would be best to use another composite predictor generated by multiple regression on these combined data sets. Such an analysis takes proper account of the intercorrelations among variables to generate an optimal predictor. The results of this analysis of both artists and non-artists combined are presented in Table 5.

TABLE 5:
NEW COMPOSITE PREDICTIVE SCALE

<i>VARIABLES</i>	<i>WEIGHT</i>
Positive/Neutral Experience	.066
Integration	-.007
Form/Achromatic Color	.058
Anxiety	-.033
Intellectualization	-.045
Merger/Harmony	.219

Psi-hitting is predicted by three variables: Positive/Neutral Experience, Form/Achromatic Color, and Merger/Harmony. Missing performance is predicted by Integration, Anxiety and Intellectualization.

DISCUSSION

The current study demonstrates that implicit psychological predictors drawn from one dataset of ganzfeld sessions may successfully be used to predict the performance of other subjects. This collection of rating scales designed to reflect different aspects of the percipient's implicit experiential approach to the ganzfeld situation and task appears to have some utility in discriminating sessions which result in hitting or missing performance.

The meaning of the relationships found in all data pooled may be assessed by examining the variables that demonstrate stronger relationships. Psi-hitting is facilitated by physical/emotional experiences in the situation that are of a positive or emotionally neutral sort, but not by experiences which are uncomfortable or peculiarly "altered." This was true for both artists and non-artists. This suggests that the situation is psi-facilitative for persons who respond to it by developing and noting experiences that are beyond the purely cognitive aspect of the task. Honorton (1977) has argued that the ganzfeld is useful in part because it permits a relaxed, undistracted, internally-focused state of mind in which the "small voice" of subtle, internal experience may be heard. It appears that persons who do well in the situation do tend to have experiences there that are notable and not distractingly uncomfortable or odd. Many of the utterances that yield scores on this dimension are simple reports of being relaxed, enjoying the experience, feeling comfortable, pleasantly drifting, etc. Persons who do not make such reports may either be understanding the situation in such cognitive terms that they are not attending to these things and do not think of them as noteworthy, or they may be failing to achieve the pleasant, relaxed, inwardly-focused state that Honorton prescribed.

Psi hitting in these data is also facilitated by imagery that has connotations of merger and harmony. This is a rather complex scale which was not frequently expressed (the observed range was from 0 to 11, with a mean of .30). The simple linear relationship was significant for non-artists, and also appeared as a positive predictor for artists in multiple regression analysis. Utterances which conveyed a sense of positive parent-child interaction, some other loving personal relationship, or experiences of positive self-transcendence, bliss or merger, all yielded points on this dimension. The presumed state of closeness of the early mother-child relationship was the touchstone for this scale, and it was designed with an eye to finding spontaneous expressions of a capacity for symbiotic connection of the sort studied by Silverman and his colleagues (Silverman et al 1982). Persons who produce such utterances are responding implicitly to the situation in a very positive way, expressing a happy sense of connection with others, or even traces

of what might be considered “mystical union” while in the experiment. This would seem to reflect a well-adjusted relaxation of personal boundaries in the situation, as well as a deep optimism about one’s connection with others and the world. Perhaps it is not surprising that positive access to extrasensory material is facilitated by such a posture.

Many more negative than positive relationships are found with these scales. This is probably due in part to the fact that sheer verbal productivity is negatively related to extrasensory success (particularly for the artists), and most of the other scales are positively correlated with verbal productivity. It may be that a more rapt absorption with relatively less verbal production of any sort is generally associated with a more psi-conducive state, while too much focus on the “task” of producing verbal material produces an inadvertent, unconscious movement away from the psi target. The possibility that such verbal work is counter-productive in this context is also suggested by negative relationships found with Integration, Fluid Development and Barrier, all scales which correlate highly with verbal productivity, and which load strongly on a factor heavily determined by verbal production when all these dimensions are factor analyzed. Responses displaying high levels of these dimensions all represent the production of relatively elaborate and highly articulated images, with many aspects and developments. The person who produces a great deal of material of this sort seems to be seeing the situation as one which is requiring verbiage and cognitive work. The stronger negative relationship is with Words than with number of Idea Units (when both are tested in multiple regression, the independent contribution of number of Idea Units becomes insignificant). It may also be instructive that artists produced insignificantly fewer words per average transcript, but many more independent idea units per transcript ($t = 5.56, p < .000001$).² All of this suggests that some persons with fewer creative inner resources in this situation may compensate for this by producing extra verbiage and the complex elaboration of relatively few ideas; and when they do this it is apt to be associated with psi-missing. The negative relationship with Intellectualization (significant for both types of percipient pooled, and for non-artists by multiple regression) is generally congruent with this interpretation. Points for Intellectualization are primarily given for obsessively over-elaborated ideas, for excessive self-analysis, and for themes of school-like or examination-like situations. It appears that persons who implicitly understand the situation as examination-like, requiring verbal performance and cognitive complexity, inadvertently tend to veer themselves away from the actual targets toward misleading associations.

It appears that persons who become anxious in the situation, and express this either by imagery that is fearful (Anxious), angry (Hostility) or highly vulnerable (Penetration), are also likely to miss the correct target, while persons relatively free of this emotional response are likely to hit it. Anxiety, Hostility and Penetration are highly intercorrelated scales, and the relationship with this cluster remains significant in multiple regression, when the variance due to verbosity is removed. This relationship with anxiety is congruent with previous findings of a negative relationship between anxiety and psi success (Palmer, 1978, 1982).

Finally, the negative association between images expressing Achromatic Color with little form (AC and ACF) with ESP success for the artists was not expected but may be meaningful. Artists produced much more of these dimensions than the non-artists did (for AC: $t = 3.51, p = .0005$; for ACF: $t = 5.25, p < .000001$). In the generally livelier, more unusual and more emotional material of the artists, when lightness, darkness and greys were mentioned this often appeared to have connotations of dysphoric, sometimes disturbing themes. Perhaps for this highly expressive group, the ones who were responding to the situation in a less sanguine way would sometimes express that with such imagery, and also inadvertently produce material which avoided the correct target.

These results may be used to instruct further research with the ganzfeld. As an example of this, a study currently ongoing at the Rhine Center features two conditions. In one, what we take to be a normative ganzfeld situation is presented. In the other condition, some manipulations intended to heighten the experience of merger/harmony and lessen an aspiration toward verbal production or cognitive analysis are woven into the orientation material, the instructions, and a subliminal prime. We are exploring whether

² This is in tune with those theorists of the creative process, such as Torrance (1981) and Guilford (1967) who stress the capacity of creative persons to generate many unique ideas or associations.

certain apparently important dimensions of implicit experiential approach can be altered by such means, and also examining the effect of this alteration (if successful) on the ESP performance of the percipient.

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EXTENDING THE ECOLOGICAL PSYCHOLOGY PARADIGM OF PERCEPTION: A NEW FORUM FOR PSI RESEARCH

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ABSTRACT

Ecological Psychology takes the position that perception is direct and immediate rather than being cognitively constructed from impoverished sensory stimuli. These basic assumptions, as well as other principles of the ecologically-motivated perceptual paradigm make it appealing to research classically done in the fields of Parapsychology and Engineering Anomalies. Yet, typically followers of the Ecological Psychology position only consider perception of information that is utilized in a narrow range of basic activities, such as navigation and locomotion. The ecological assumption is that the typical non-shifted state of the perceptual mechanism as optimized for action is the state in which the perception-action remains. I proposed that for instances of behaviors that are more complex, the ecological assumption of an optimal non-shifted perceptual state may be somewhat shortsighted. In this paper, I review the basic principles of Ecological Psychology and point out the fact that these principles are also prevalent in some animist, pagan, and eastern cultures. I then discuss how these cultures offer a different perspective on perception in complex behaviors, in which practitioners take advantage of intentional, functional alterations of their consciousness in order to gain access to typically unavailable sources of veridical information. This implies that in some instances, perception in altered states of consciousness should be viewed as shifted or even improved, rather than distorted or impaired, as proposed by the current ecological model. I note that awareness of the utility of functional altered states for enhanced perception in other cultures can illuminate and refine the ecological model of perception to encompass more, complex, real-world phenomena. I conclude by elaborating on the observation that the ecologically motivated paradigm provides an exciting opportunity to extend Psi research into an emergent, prudent branch of psychology and obtain additional popular and academic exposure that such work deserves.

INTRODUCTION

The question of whether perception of the physical world is direct or indirect has been widely debated in the field of philosophy of mind. While philosophers have yet to agree on a definitive answer, the discipline of psychology has traditionally operated on the reductionist assumption that perception is indirect and the result of various cognitive processes which allow us to reconstruct the physical world from impoverished sensory data. In his seminal works, *The Senses Considered as Perceptual Systems* and *The Ecological Approach to Visual Perception*, James Gibson challenged this accepted paradigm by proposing and formalizing a radical, ecologically motivated paradigm of perception. The central notion of Gibson's theory is that perception of the world is rich, immediate, informative and most importantly, direct.

While Gibson's perceptual paradigm may have been a novel and controversial idea for mainstream psychology in the 1960s and 1970s, many principles of his theory have existed as universal truths among a variety of animist, pagan, and eastern traditions for several millennia. The established beliefs and practices of these cultures embody a collection of valuable insights for any theory of perception, but especially one that is based in ecology and espouses a mechanism of direct perception. One defining characteristic of animist, pagan, and eastern traditions is a long history of appeal to altered states of consciousness (ASCs) for guidance and assistance in various aspects of everyday life. The types of ASCs that are utilized by such cultures are generally not pathologic, but rather benign, intentional and purposeful. For the remainder of the paper, I will refer to this subgroup of ASCs, characterized above, as *functional altered states of consciousness* (fASCs).

Although Gibson's theory of perception is well developed, it does not discuss perception as it occurs in an altered state of consciousness. Gibson does, however, make an attempt to examine the nature of perception during hallucinations and related phenomena, but after much frustration, abandons it with the comment, "I remain dubious." (1966, p.257-261) It is, however, important to point out that by examining the information available in fASCs, perceptual theorists can construct a more complete understanding of the *types* and *range* of information that can be perceived; as well as obtaining some insight into the underlying mechanism(s) of information pickup.

I begin this paper by summarizing the basic principles of Gibson's theory and establishing that the same principles are shared by a number of animist, pagan, and eastern cultures. I provide a brief general characterization of fASCs states and discuss the functional role in said cultures. I review how these states are achieved in practice, as well as many of the different effects such states have on subjective experience, with a focus on perceptual effects. I continue by examining the reliability and ontological validity of the information available in fASCs, as well as the resultant implications for understanding perception. I then list some possible positions that Ecological Psychology could adapt to address the challenge posed by fASCs. I go on to suggest a simple possible modification to the ecologically-motivated paradigm that would allow it to account for the types of perceptual phenomena that occur in fASCs. I conclude by pointing out some aspects of the ecologically motivated perceptual paradigm and the proposed extension that make it a potentially fruitful vehicle for extending Psi research.

BASIC PRINCIPLES OF THE ECOLOGICALLY MOTIVATED PERCEPTUAL PARADIGM

Gibson (1966, 1979) begins his theory of perception by defining the subjects and objects of perception. For Gibson, only those organisms that are endowed with a sensory-motor system are capable of perception. The objects of perception are those that are contained within the ecological niche of animals; essentially, the environment as comprised by "...the surroundings of those organisms that perceive and behave, that is to say, animals." (Gibson, 1979, p.7) Gibson is careful to point out that the animal and the environment are interdependent, he states, "the words *animal* and *environment* make an inseparable pair. Each term implies the other." (1979, p.8) This relationship entails that ecological properties are relational in nature, a fact that has several implications for the kinds of things that are perceived. Gibson goes on to state that perception is *immediate* and *direct*, and that what is perceived is meaningful *information* about the observer's environment. In ecological jargon, the environment *affords* the organism information that is encoded within the ambient stimulus array.

An important difference between the mainstream and ecological psychology paradigms is illustrated via their respective treatment of the relationship between perception and action. Mainstream psychology appeals to the behaviorist-inspired Stimulus-Response paradigm that assumes perception and action to be distinct, individual processes that interact to produce behavior. Ecological theory believes this approach to be misguided because it fails to account for the highly interdependent nature of perception and action, a fact that was brilliantly pointed out by Dewey (1898) and supported numerous times by experimental data (e.g., Turvey, Shockley, & Carello, 1999). Gibson observes that perceptual systems are constantly *active*, the process of perception requires action, and the perceived information is practical, tangible and affords the organism an opportunity to behave in the environment. When information is perceived it is immediately and automatically incorporated by the perceiver through the perceptual system *resonating* with the ambient stimulus array. For Gibson, perception and action are really two aspects of a single dynamic perception-action mechanism. An animal learns appropriate behavior via successive adjustments of the aggregate perception-action mechanism to resonate more closely with the corresponding environment, a learning mechanism not unlike the one currently being employed in *backpropagation* artificial neural networks.

Another divergence of the mainstream and ecological approaches can be seen via the difference in their interpretation of the chain of events that underlie the perceptual process itself. The mainstream paradigm defines sensation, perception, and cognition as parts of a serial perceptual process that is initiated by a passive sensory¹ response to physical stimuli, and proceeds by constructing conscious experience from

meaningless, impoverished, sensory data. Meaning is then assigned to this information through a variety of higher cognitive mechanisms. While this is the current accepted paradigm of perception, it has been known for over a century that it is seriously flawed at its core. (Dewey, 1898) On the other hand, the ecological approach asserts that the functional role of the perceptual mechanism is not to detect and decode patterns of various physical stimuli, but rather, to perceive the *meaning* encoded in the structure of the available and pertinent information contained in the environment. (Gibson, 1966; Gibson, 1979) Gibson considers perception to be primary in the process and treats sensory response as being incidental to perception, a principle that is appealing to Psi researchers. In fact, Gibson states that perception can often be sensation-less, he presents an example: “[a] blind man [perceives] the wall in front of him, without realizing what sense has been stimulated.” (1966, p.2)

Information is available to the animal in the structured ambient stimulus array; what is perceived depends on the specific biological perception-action systems with which the organism is equipped. For Gibson, the mechanisms via which perception takes place can be described as an aggregate of various active perceptual systems² resonating to (or with) the information available in the environment. In terms of their physical response to stimuli, the sensory organs remain mostly unchanged throughout the lifespan of an organism; therefore, “... no new sensations can be learned. The information that is picked up, on the other hand, becomes more and more subtle, elaborate, and precise with practice. One can keep learning as long as life goes on.” (Gibson, 1979, p. 245)

To determine the nature of information that is directly perceived, Gibson again addresses the question in terms of an organism’s ecology. The information that is perceived is that which is required for action and behavior in the organism’s environment. For example, to ensure survival, all organisms need to perceive tangible and pragmatic information to fulfill certain biological requirements, such as procuring food and water and avoiding predation. In the visual case, the animal perceives the structured layout of surfaces in the environment, which in turn affords the animal various possible actions. Gibson states:

The activity of an observer that is afforded depends on the layout, that is, on the solid geometry of the arrangement. The same layout will have different affordances for different animals, of course, insofar as each animal has a different repertory of acts. Different animals will perceive different sets of affordances. Therefore, the perception is of *practical* layout, not *theoretical* layout, but it is nonetheless geometrical for all that. (Gibson, 1972, p. 37)

While the above quote only addresses the visual perceptual system, the ecological paradigm generalizes the concept of affordances to include other modalities as well. Of course, in non-visual modalities solid geometry no longer applies and one needs to apply the pertinent structural paradigm. Gibson states, “An affordance is an invariant combination of variables,” (1979, p.134) with which the perception-action system resonates. Although Gibson stressed the invariant aspect of affordances, there has been recent support that has favored a definition of affordances as *regularly co-occurring*, rather than invariant, combinations of variable. By perceiving both the changing and locally permanent properties of the environment, the animal’s sensory systems are able to pick out those regularities in the ambient stimulus flux that encompass the environment’s affordances.

In Ecological Psychology, the units of perception are quantifiable, relational in nature, and are on the scale of the perceiver. Standardized, abstract, and non-relational units of measurement which are based on conceptual and computational convenience are not considered relevant to explaining a general ecological theory of perception³. Gibson states, “The sense organs of animals, the perceptual systems, are not capable of detecting atoms or galaxies. Within their limits, however, these perceptual systems are still capable of detecting a certain range of things and events.” (1979, p.10) The perception of the environment has a certain quality of stability even though it is constantly changing, “The permanency underlies the change... some properties are conserved and others are not... The point to be noted is that for persistence and change, for invariant and variant, each term of the pair is reciprocal to the other.” (Gibson, 1979, p.13) In fact, persistence and change embody events which are the basic units of the temporal flow of perception. Gibson states, “The flow of abstract time, however useful this concept may be to the

physicist, has no reality for an [non-human] animal. We perceive not time but [nested] processes, changes, sequences, or so I shall assume.” (1979, p.12)

An essential point of Gibson’s theory is that the units of the environment are not independent, but rather structured so that smaller units are embedded in larger units, by a process Gibson calls *nesting*. He goes on to say, “There are no atomic units of the world considered as the environment. Instead, there are subordinate and superordinate units. The unit you choose for describing the environment depends on the level of the environment you choose to describe.” (1979, p.9) Events and animals in the environment obey certain natural, ecological laws rather than the abstract laws espoused by physics & mathematics.

The above serves as a brief introduction to a brilliant theory of perception that has so far proven to be the most accurate in describing the role of perception in natural animal behavior. After examining the fundamental principles of the ecologically motivated paradigm, an interesting observation arises: the above mentioned principles find numerous counterparts in the cultural practices & beliefs of many animist, pagan, indigenous, and eastern cultures.

SHARED PRINCIPLES: ECOLOGICAL PSYCHOLOGY AND CULTURAL PRACTICES AND BELIEFS

When Gibson proposed his ecological approach to perception in 1966, it was a radical theory which contradicted many aspects of the popular psychological paradigm (at the time, behaviorism). However, Gibson’s work does find support in research experimental data, as well as some substantial, yet indirect, support in the beliefs and practices of a number of cultures which include the animist, pagan, and indigenous cultures, as well as eastern religions such as Hinduism, Buddhism and Taoism. Below is a list of some of principles that are shared by ecological psychology and some of the above mentioned cultures.

- a. The animal and its environment are interdependent, the observer and the environment are complimentary.
- b. Sentient organisms can directly perceive meaningful information from the environment.
- c. Perception is immediate and direct.⁴
- d. The information that is perceived is tangible and practical rather than theoretical.
- e. The environment is structured. A sentient observer can perceive this structure.
- f. Abstract notions of space, time and energy do not apply to perception of the environment. Rather, the environment can be perceived as being subdivided into natural relational units. Units of the environment are nested, each unit is both subordinate and superordinate to other units
- g. (Almost) Nothing is permanent. The world both remains constant and changes simultaneously. The only permanence that is possible is local permanence.
- h. The environment is governed by natural laws.

In addition to the fact that these principles are scientifically substantiated by Ecological Psychology, they are part of a long history of observations about the nature of life itself. It would, therefore, be quite advantageous for ecological psychologists to examine what insights such cultures can bring to the study of perception. In this paper, I focus on one important shared aspect of these cultures – their common appeal to functional altered states of consciousness as a valuable source of information that is typically unavailable in normal consciousness states.

CULTURAL COMMON GROUND: FUNCTIONAL ALTERED STATES OF CONSCIOUSNESS

Various animist, pagan and indigenous cultures employ rituals in which practitioners enter a sacred mystical trance, an fASC, by consuming some form of hallucinogenic preparation or participating in some physically demanding rite. (Harner, 1973; Devereux, 1997) Most eastern traditions, on the other hand, appeal to various mental control techniques, such as meditation, to reach functional altered states of

consciousness. (Robinson & Johnson, 1997; Shulka, 1999). The characteristics and production of fASCs vary tremendously among and within cultures. However, there is a highly salient common factor that is made evident in their purpose: in fASCs, practitioners are (said to be) able to perceive information that is typically inaccessible otherwise.

A Characterization of Functional Altered States of Consciousness

Ludwig suggests that an ASC can be defined as:

[A]ny mental state(s) induced by various physiological, psychological, or pharmacological maneuvers or agents, which can be recognized subjectively by the individual himself (or by an observer of the individual) as representing a sufficient deviation in subjective experience or psychological functioning from certain general norms for that individual during alert, waking consciousness. (Ludwig, 1960, p.9)

Functional ASCs represent a subset that only includes states that satisfy the above definition as well as being benign, intentional and purposeful. The following is an ecologically-appropriate description of the production, characteristics and functions of fASCs that is based on the schema laid out by Ludwig (1966) in Charles Tart's (1969) famous compilation, *Altered States of Consciousness*.

Production of fASCs

Altered States of Consciousness may be produced "in any setting by a wide variety of agents or maneuvers which interfere with the normal inflow of [exteroceptive] or proprioceptive [information], or the normal outflow of motor [processes], the normal 'emotional tone,' or the normal flow and organization of [perceptual and] cognitive processes." (Ludwig, p.10) Specifically, fASCs can be produced via:

a. A significant increase/reduction of exteroceptive and proprioceptive information and/or motor activity. This production method includes mental states resulting primarily from a significant increase or reduction of available stimulation and activity. In some animist and pagan cultures, fASCs are achieved via a dance ritual that increase levels of stimulation and activity to produce a trance. (Devereux, 1997) On the other hand, Buddhist monks achieve fASCs through passive meditation, a process that reduces both stimulation and activity. (Robinson & Johnson, 1997)

b. A significant increase/decrease in alertness or mental involvement. This production method includes mental states result from focused or selective hyper-alertness, such as states of intense concentration utilized in Zen Buddhist meditation (Badiner, 2002) and the Hindu practice of Samadhi (Shulka, 1999). On the other hand, states of hypo-alertness brought about by long periods of sensory deprivation are utilized by some animist cultures. (Devereux, 1997)

c. Produced via the presence of somato-psychological factors. This production method includes those mental states that are a result of alterations in body chemistry or neurophysiology. In many animist, indigenous, and eastern rituals, fASCs are typically observed in the practice of purposeful administration of variety psychoactive preparations. (Harner, 1973; Devereux, 1997; Badiner, 2002) There are also examples of such fASCs in phenomena such as kundalini which are only achieved by long-time practitioners of mind and body control. (Robinson & Johnson, 1997)

General Characteristics of fASCs

An interesting observation about fASCs is that they tend to exhibit many similar effects across states and subjects, yet are profoundly experientially different for each individual. The following is a list of some of the more common phenomena observed in fASCs.

a. Alterations in the perceived sensory information. The most evident subjective changes are in the perception of the external environment, which is an aspect of fASCs that is extremely relevant to our discussion. Mainstream psychology treats these perceptual phenomena as instances of delusory, non-veridical perception. In contrast, cultures that adhere to fASC practices treat the information that is

perceived in such states as veridical and, moreover, generally place great value on information obtained as such. The issue of whether the perceptual phenomena experienced in fASCs are truly cases of impoverished, shifted, or enhanced perception will be addressed in a later section.

b. Alterations in thinking. This category encompasses a variety of subjective changes in conscious processes; profound changes in concentration, attention memory and judgment are typically observed. The rules of rational logic are typically loosened or abandoned, resulting in certain abstract cognitive tasks being very difficult.

c. Alterations in the perception of time. Perception of the flow of time is often altered in a profound way, and the notion of abstract time often becomes meaningless.

d. Alterations in emotional state. Throughout the fASC, emotional experiences are typically amplified, with emotions being more primitive and intense than in an unaltered state.

e. Alterations in meaning or significance. One of the most common and interesting aspects of a fASC is a sense of increased meaning and significance to events and realizations that occur in fASCs. Of course, it is important to remember that this increased significance may or may not reflect the objective truth of the experience.

f. Sense of the ineffable. The qualitative experience of an fASC seems to be unique and profoundly different from anything experienced in typical state of consciousness, thereby being very difficult to relate to others that have not had a similar experience.

Functions of fASCs

There are myriad functions that fASCs serve in animist, pagan, and eastern cultures. As mentioned before, fASCs are benign, intentional and purposeful, and therefore serve many practical roles, such as:

a. Enhanced perception and understanding. Arguably, the most valuable contribution of fASCs is the ability to expand one's consciousness and achieve enlightened states within which one can gain new knowledge and understanding of oneself and the underlying nature of reality, among answers to other important questions. (Huxley, 1954; Devereux, 1997; Shulgin & Shulgin, 1991; Strassman, 2001) In fact, there is ample evidence that fASCs have served as catalysts in the foundation most prevalent religious and spiritual movements. (Merkur 2001; Badiner, 2002) As well as an improved understanding of the self, fASCs have been employed for acquiring more tangible information, such as the medicinal properties of certain plants or the location of nearby sources of water. (McKenna, 1992; McKenna, 1993; McKenna & McKenna, 1994; Devereux, 1997; Narby, 1998; Schultz, Hoffman, & Ratsch, 2001)

b. Healing. Throughout human history, fASCs have played an important medicinal role. This can be seen in the abundant use of fASCs for purposes of spiritual and physical healing by a variety of religious and spiritual figures as well as some modern-day psychotherapists. Shamans are known to enter fASCs in order to diagnose the cause of the ailment and to learn remedies and healing practices. In fact, there is abundant anecdotal evidence of scientifically unexplainable recoveries of ill individuals that were healed by in the field by medicine-men (e.g., Devereux, 1997; Narby, 1998; Schultz, Hoffman, & Ratsch, 2001; Shmicker, 2001) or in research labs by a researcher administering a traditional hallucinogenic compound (Strassman, 2001).

c. Survival. The hunters of many indigenous tribes utilized hallucinogenic plants, such as peyote or yaje, to induce fASCs that are characterized by enhancement of the perception-action mechanism, which aided them in capturing their prey. (Devereux, 1997) Australian aborigines have shown an uncanny ability to locate hidden sources of water in a desert environment. Indigenous agricultural practices are also often based on information obtained while in fASCs. In fact, the net yield of many gardens planted based on fASC information produce greater yields than are achieved by modern agricultural techniques. (Narby, 1998) Hindu yogi and Tibetan Buddhist monks are known to have control over various body processes such as heart rate, metabolism, respiration and body temperature. This control allows them to survive in extreme conditions, where death would be imminent for a normal person. (Shmicker, 2001)

d. Reconnecting with the environment. As Gibson points out, most of the people who live in the civilized world are almost consistently separated from the environment. One aspect of fASCs is that they often endow the practitioner with a sense of communing with nature. An experience of an fASC often

results in an increased appreciation for other people, animals and the environment itself. (e.g., Huxley, 1954; Shulgin & Shulgin, 1991; McKenna, 1992)

e. Social benefits. Certain fASCs seem to facilitate the process of social bonding and communication in many cultures. (Devereux, 1997; Narby, 1998)

The above in-depth characterization of functional altered states provides a general idea of the great benefits that they provide to those that can attain those states properly. There are, no doubt, other, non-functional ASCs which are maladaptive to both the individual and society. I now go on to examine the veridical validity and ontology of the information that is acquired in fASCs.

VALIDITY & ONTOLOGY OF INFORMATION PERCEIVED IN FUNCTIONAL ASCS

The mainstream psychology and popular view is perception in altered states of consciousness is an instance of non-veridical perception and is essentially delusional or illusory in nature. There is no doubt that perception in certain maladaptive ASCs is indeed non-veridical; however the appeal to functional ASCs for guiding information is almost universal. We must, therefore, at least, consider the possibility that some instances of perception in fASCs are indeed veridical in nature. The founder of the American psychological & psychical research movements, William James firmly believed in the validity and profound value of mystical altered states of consciousness. In his *Lectures XVI & XVII: Mysticism*, James states:

Our normal waking consciousness... is but one special type of consciousness, whilst all about it, parted from it by the filmiest of screens, there lie potential forms of consciousness entirely different. We may go through life without suspecting their existence; but apply the requisite stimulus, and at a touch they are all there in their completeness, definite types of mentality which probably somewhere have their field of application and adaptation. No account of the universe in its totality can be final which leaves these other forms of consciousness quite disregarded. How to regard them is the question – for they are so discontinuous with ordinary consciousness. Yet they may determine attitudes though they cannot furnish formulas, and open a region though they fail to give a map. At any rate, they forbid a premature closing of our accounts of reality. (1929, p.357-358)

The above quote reflects the opinion of a number of the modern era's most influential philosophers, scientists, writers, artists & religious leaders. (Huxley, 1954; Jahn & Dunne, 1987; Dali, 1991; Gyatso-The Dalai Lama, 1994) The importance of perceptual phenomena observed in fASCs is clearly evident in the numerous experiments studying Psi-related phenomena in humans (e.g., White, 1976; Tart, 1977; Jahn & Dunne, 1987; Radin, 1997; Cardeña, Lynn, & Krippner, 2000) and non-human animals (e.g., Bardens, 1987) that have shown anomalous perception of information that was in no known way available to the sensory systems of the organism in question. Although there will always be cynics who deny existence of any instances of anomalous phenomena, it should be difficult for any principled, open-minded, scientist or skeptic to deny, in totality, the volumes of compiled experimental and anecdotal evidence that suggests that Psi-related phenomena do exist and play a role in our every-day life.

Now we need to consider the significance of anomalous perception phenomena occurring in fASCs within the context of the ecologically motivated perceptual paradigm. The popular modern psychology paradigm rejects the possibility of veridical perception in altered states, but rather explains what is perceived as a delusional reconstruction of impoverished sensory stimuli. This strategy is not available to the ecological psychologist, who must hold to the principle that perception is immediate and direct, rather than constructed. Functional ASCs present a challenge to the ecologically motivated paradigm, and several strategies could be employed in its solution. In the following, I will address some possible strategies and will argue that a simple modification of the ecologically-motivated paradigm is the most tenable strategy.

MODIFYING THE ECOLOGICALLY MOTIVATED PERCEPTUAL PARADIGM

To explain the existence of the types of anomalous veridical perceptual phenomena that occur in fASCs, ecological theory will need to adopt one of the following positions: In fASCs, perception:

- a. is shifted and/or enhanced.
- b. is impoverished and/or degraded.
- c. happens via an indirect perceptual process or operates via an altogether different, non-perceptually based mechanism, such as cognitive inference.

Before we proceed with the analysis, let's consider whether ecological psychology allows for intentional, self-induced variations in perceptual experience. Gibson states that perception could potentially be enhanced through a process of adaptive learning, which occurs as a result of the perceptual sensory systems gradually adjusting themselves in order to better resonate with the most pertinent information in environment. (1979, p.245) Although Gibson admits that perception can be enhanced through learning, he does not specify whether learning is the only process via which an enhancement of perception is possible. Modern psychological literature has also pointed out the fact that common profound individual differences in consciousness and perception do exist. (Kunzendorf & Wallace, 1999)

Another interesting phenomenon that occurs in fASCs is a subjective awareness of an enhanced ability to perceive structure in the ambient stimulus array. (Huxley, 1954; Shulgin & Shulgin, 1991; McKenna, 1993; McKenna & McKenna, 1994) Ecological psychology emphasizes the fact that the available ambient information is structured. Therefore, a perceptual system that has a (temporary) improved ability to detect, or resonate with, the structured ambient stimulus array, should be able to perceive: (i) greater amount of information about familiar units of the environment, and/or (ii) totally novel information types and sources that were unavailable in unaltered states. The mechanism for this sudden perceptual shift is can be posited as an expedited version of Gibson's account of enhancing perception via graduate adaptive learning. The only other difference is the period of time for which enhanced perception persists. In Gibson's adaptive learning, the process is dynamic and the perceptual system is being improved steadily with exposure to novel environments, the system can only decline through injury or age. In the fASC case, the perceptual system is suddenly and significantly shifted and/or improved, although the duration of this shift is typically limited by the duration of the fASC. Given that temporal limitation, some residual benefits do still seem to remain. (Huxley, 1954; Shulgin & Shulgin, 1991; McKenna, 1993; McKenna & McKenna, 1994) The fairly-convincing evidence that some fASCs do allow enhanced or shifted veridical perception to take place taken along with Gibson's learning framework suggest that it would seem logical for Ecological theory to adopt strategy (a) and integrate enhanced perception phenomena in fASCs as possible veridical cases of perception as a basic characteristic of perception in the ecologically-motivated paradigm.

The cynics and orthodox-theorists in the Ecological Psychology camp will most likely adopt strategy (b) as an answer to the fASC challenge. However, I do not believe that this strategy is viable for a principled, scientific-method oriented, open-minded, adherent of ecological theory. If ecological psychologists adopt Gibson's original position, (b), treating fASC perceptual phenomena as degraded or illusory perception, they are entirely disregarding evidence from Psi-related research and the multitude of anecdotal accounts from respected scientists and writers of the existence of improved or shifted perceptual states. It seems that if this position is adopted, it is one that is intentionally ignorant and promotes an incomplete theory of perception.

If the ecological theorist adopts strategy (c), in which perception in fASC is actually an indirect process, they will be undermining the basic foundation of ecological paradigm which states that perception is direct or immediate. Even if they appeal to the argument that information perceived in fASCs is not perceived at all, but rather a result of constructivist and cognitive processes, they run into a major challenge. Cognitive and constructivist approaches to sensation & perception rely on inferences made from impoverished sensory data and previous experience to account for the information that is perceived. However, in instances of anomalous veridical perception in fASCs, the needed sensory stimuli

and past experiences are often not present, or entirely irrelevant to what has been perceived. This observation makes it very difficult to use strategy (c) to explain every instance of anomalous veridical perception in fASCs.

I believe that taking either the (b) or (c) strategies would prove disadvantageous for Ecological Psychology theorists, but in no way have I exhausted the possible strategies that ecological theory could apply to explain anomalous veridical perception phenomena in fASCs, and I welcome any future well-natured attempts. I maintain that currently, the only tenable strategy requires a simple extension of the fundamental principles of the ecologically motivated paradigm to treat anomalous enhanced and/or shifted perceptual phenomena in fASCs as possible instances of veridical information perception. For a possible mechanism of anomalous veridical perception in fASCs, see discussion below.

EXTENDING THE ECOLOGICALLY MOTIVATED PARADIGM: A FERTILE LANDSCAPE FOR PSI RESEARCH

James Gibson brilliantly designed his theory to be malleable and capable of revision in light of emergent experimental evidence. The basic adjustment of the ecological perceptual paradigm to accommodate for the above evidence is to allow for enhanced or shifted veridical perception in functional altered states of consciousness. Thankfully, the perceptual paradigm created by Gibson is incredibly well-suited to accommodating new evidence coming from many lines of research in Psi, and engineering-related phenomena for the following reasons:

a. *Perception is direct and immediate, and sensation is incidental to the process of perception.* Many anomalous perceptual phenomena involve the perception of information that is not immediately available to the sensory systems. But since sensation only plays an incidental role in the ecological theory, anomalously perceived information that is lacking an obvious sensory correlate can still be veridical in nature and involve a transfer mechanism that has not yet been fully understood.

b. *Resonance is the process via which an organism perceives the information afforded by the environment.* Many current models of anomalous phenomena appeal to the concept of resonance as a possible underlying driving mechanism of information perception/transfer. (White 1976; Jahn & Dunne, 1987; Radin, 1987, McKenna & McKenna, 1994; Jahn & Dunne, 2001) Even if a theory does not appeal to the concept of resonance per-se, Gibson's concept of resonance is defined in such a way as to be a general overriding term which could accommodate many similar processes.

c. *Amount of perceived information depends on an organism's ability to perceive structure.* There is some evidence to suggest that people in fASCs have an improved ability to detect structure in the ambient stimulus array. (McKenna & McKenna, 1994; Strassman, 2001) This improvement in structure detection is an ecologically consistent and acceptable explanation of heightened perception. As well as in fASCs, an improved the ability to detect some sort of regularity or structure is evident in other branches of Psi-research, for which the ecological perceptual paradigm is, again, well-suited.

d. *Reality is governed by natural laws.* Simply stated, many Psi-researchers believe the phenomena they have found are, in fact, natural laws which currently have no scientific explanation. Since the ecological paradigm does not require validity in abstract physical laws, a natural law of Psi, once discovered, would be consistent with the model.

e. *Time is not abstract and not linear, but rather expressed as nested structure of events.* Many Psi-related phenomena are often inconsistent with the concept of an abstract concept of a linear time course for events. While a linear model of time is a crucial assumption in most current theories of social sciences, our best knowledge of the nature of time comes from the fields of relativity theory and quantum physics which predict that time is certainly not as simple as most people believe. In fact, effects such as backward causation and time stretching and bending are very real. Given the evidence about unusual time phenomena, supported Psi-related phenomena with similar effects can find a comfortable home in the ecological paradigm. To accommodate for unusual time effects, the ecological paradigm will simply have to change the nature of the nesting process to allow for the kinds of effects evident in relativity theory, quantum physics, and Psi-related research.

The above is, by no means, an exhaustive account of why the ecologically motivated paradigm of perception and action is well suited to Psi research. However, the above points should peak the interest of almost any Psi researcher and Ecological Psychologist. Having said that, I believe a bit of caution must be employed in approaching doing Psi research in this new forum. As is well known, old notions of ‘what is real’ die hard, and we must remember that we are approaching a theory founded by James Gibson, whose final words on anomalous perception were, “I remain dubious.” (1979, p.261)

CONCLUSION

Thus far, I have reviewed the basic principles of the ecologically motivated paradigm of perception which is founded on the idea that perception is a direct and immediate process. I have shown that the stated principles are supported directly by experimental evidence but are also indirectly supported in the practices and beliefs of some animist, pagan, and eastern cultures. I have also discussed the importance and functional role of altered states of consciousness in these cultures, specifically as a reliable source of otherwise unobtainable information. I then supported the existence of these phenomena via evidence available in Psi-related research and proposed an effective realistic modification to the ecologically-motivated paradigm which would enrich both the Ecological Psychology and Psi-related branches of research. Ecological Psychology should stand to gain a deeper understanding of the types of and range of information that is afforded by the environment through which a more robust and comprehensive model of perception would be built. In fact, with accruing supporting evidence for anomalous perception phenomena, this model’s accounting for a greater range of perceptual phenomena should make it the most complete, and hopefully prevalent, model of natural animal perception and behavior. For Psi researchers, the ecologically motivated paradigm represents an entirely new and respectable forum for extending Psi research and theory, thereby resulting in greater popular and academic exposure to past and current work. And I am sure we can all agree that it would be a step in the right direction.

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Endnotes:

¹ Gibson (1966, p.1) points out the fact that the verb *sense* has two common meanings: (1) to detect something (2) to have a sensation. In the ecological case, the first meaning is reserved for perception; therefore the second meaning will be used in this text.

² For a full discussion of perceptual/sensory systems, see Gibson 1966, 1979.

³ Human perception may be a special case where abstract units may come in to play.

⁴ Note: Although in some cultures perception occurs on various levels, the perceptual process as involving mental representations, and can therefore be understood as direct and in accordance with Gibsonian theory.

THE SENDER AS A PK AGENT IN ESP STUDIES: THE EFFECTS OF AGENT AND TARGET SYSTEM LABILITY UPON PERFORMANCE AT A NOVEL PK TASK¹

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ABSTRACT

Recent work has been concerned to evaluate whether the sender plays any active role in successful ganzfeld GESP experiments (e.g., Roe, Holt & Simmonds, 2003; Roe & Holt, in press). Roe, Holt & Simmonds (2003) used a random number generator (RNG) as a 'virtual receiver' in a ganzfeld, in an attempt to detect any sender effect. During the sending period descriptive statements were 'selected' from among a pool of 768 to give a 20-item 'RNG mentation' that may represent a more direct measure of any sender influence than the mentation of the 'human receiver'. A suggestive effect was obtained, with a 32.5% hit rate, when an independent judge (JW) used the 'virtual mentations' to select the target clip from three decoys ($Z = 1.48$, $p = .069$, 1-t). Roe and Holt (in press) sought to replicate this effect and further, compared ganzfeld trials with no sender and standard ganzfeld trials. Support for the hypothesis that senders exerted some influence on the virtual receiver was obtained, psi success across two independent judges being higher in ganzfeld trials with a sender. JW obtained 42.1% hits in trials with a sender (SOR = 43, $Z = .821$, $p = .412$, 2-t) and 17.6% hits in trials with no sender (SOR = 47, $Z = -.868$, $p = .384$, 2-t), while RD (a newly recruited judge) obtained 26.3% hits in trials with a sender (SOR = 44, $Z = .616$, $p = .535$, 2-t) and 5.9% hits in trials with no sender (SOR = 46, $Z = -.651$, $p = .516$, 2-t). A third experiment in this series is presented here. The protocol was adapted in order to obviate the need for a human receiver. The focus for senders hence became the 'virtual receiver'. This displayed the statements to the sender as they were selected, as an analogue to hearing feedback from a human receiver in the ganzfeld. Senders could rate how well each statement corresponded with their sending experience. The lability of the target was manipulated (following Braud, 1981, 1994). Twenty-four statements were selected for each trial, from a pool of 416, eight by each of the following processes, which increased in lability: a random number table; a pseudo random process; and a live RNG. It was hypothesised that the greatest psi effect would be found with the most labile target. Further, drawing upon Stanford's conformance behaviour model (1978) it was hypothesised that senders with the most 'stable' trait characteristics would achieve higher psi hitting. Forty trials were conducted, the virtual mentations of which were rated by two independent judges. Significant psi hitting was not obtained in any of the randomness conditions, although there was a trend towards psi missing in the live condition for JW ($Z = -1.485$, $p = .069$, 1-t, $r = .235$) and a trend towards psi hitting in the pseudo condition for a newly recruited independent judge LS ($Z = 1.485$, $p = .069$, 1-t, $r = .235$). However, there was a significant interaction effect between target and sender lability, across both independent judges ($F_{4,74} = 4.959$, $p = .001$). The hypothesis that 'stable' senders would demonstrate higher psi hitting with the most labile target system was confirmed. Further, senders with high trait lability performed best with the most stable target system. This was interpreted as indicative of a reciprocal influence between labile and stable aspects of systems. Explanations for the overall lower psi outcome of this study were addressed in terms of the feedback potentially hindering motivation and the implications of direct rather than indirect intention, which was introduced in this study.

INTRODUCTION

It is not straightforward to determine whether a sender makes an active contribution to the success of ESP experiments. Although there does seem to be a subtle advantage for telepathy experiments over equivalent clairvoyant studies (see, e.g., Honorton, 1995, Ullman & Krippner with Vaughan, 1973), this might be explainable in simple psychological terms, such as the sharing of responsibility for failures (and

¹ We would like to gratefully acknowledge the financial support of the Bial Foundation which enabled us to conduct this study.

successes) at a psi task and the calming effects of having a friend accompany one to an unusual and potentially anxiety provoking situation (Morris, Dalton, Delanoy & Watt, 1995). In earlier papers we described a novel method that promised to provide a more direct assessment of any sender contribution (Roe & Holt, in press; Roe, Holt & Simmonds, 2003) by introducing a 'virtual receiver' in the form of a random number generator (RNG) whose output was associated with a collection of 768 statements that had been coined to describe the clips in the target pool. During the normal sending period the RNG was continually sampled and a 'virtual mentation' produced that consisted of the 20 statements whose numbers had been selected most often. Independent judges then used the virtual mentations to rank order four video clips (the target clip and three decoys) in much the same way as the sender typically does in a conventional free response ESP study. The participants did not see the virtual mentation at any point.

In the first such study (Roe, Holt & Simmonds, 2003) the RNG was run in the receiver's room in an otherwise standard ganzfeld study. The sender was not asked to influence the RNG in any way, but to send information to their partner undergoing ganzfeld stimulation. An independent judge rated the virtual mentations according to their similarity to the target video clip and three decoys, as the 'human receiver' had done with their own personal mentation. The 'human receivers' rated the target clip most highly in 35% of the trials (where the MCE is 25%), a sum-of-ranks analysis for which was statistically significant ($Z = 1.77, p = .038, 1-t$). More relevant here, the statements selected by the 'virtual receiver' enabled the independent judge to correctly identify the target clip in 32.5% of the trials. While in the expected 'psi-hitting' direction, this was not statistically significant ($Z = 1.48, p = .069, 1-t$). This outcome was, however, considered to be encouraging and worthy of further investigation. Roe and Holt (in press) note that at $r = .234$, the effect size for the virtual receiver SOR analysis is comparable to previous work that used an RNG as a proxy receiver, where $r = .257$ (Roe, 1996). These effect sizes may be more comparable to those of DMILS studies, estimated at $r = .33$ (Braud & Schlitz, 1991) than that typically reported in REG-based psi research, which are estimated to be much lower at $r = .00006$ (Steinkamp, Boller & Bösch, 2002).

In a subsequent study, Roe and Holt (in press) attempted to replicate this finding and also compared the performance of the 'virtual receiver' in two conditions: ganzfeld trials with a sender and without a sender². It was considered that the 'no sender' condition would act as a control against which to evaluate performance in the experimental condition. Two independent judges were also used in this replication. This was prompted by a concern raised by Roe, Holt and Simmonds (2003) that the selected statements could have been sufficiently flexible in how they might be interpreted by the independent judge to allow any above-chance scoring to be due to the judge's own psi, as they perhaps unconsciously selected the target and then contrived an interpretation of the statements after the fact that allowed it to be ranked first. The inter-rater reliability between the two judges employed by Roe and Holt (in press) was poor, with a Cohen's kappa of .202, suggesting that the mentations were indeed open to a range of interpretations. Across both the sender and no sender conditions the independent judge JW correctly selected the target in 30.6% of the trials, while a newly recruited judge had a below MCE hit rate of 16.7%. This appears to lend some support to the judge-ESP hypothesis. However, for both judges, performance was better in the experimental condition than the control condition. JW obtained 42.1% hits in trials with a sender (SOR = 43, $Z = .821, p = .412, 2-t$) and 17.6% hits in trials with no sender (SOR = 47, $Z = -.868, p = .384, 2-t$). While RD (a newly recruited judge) obtained 26.3% hits in trials with a sender (SOR = 44, $Z = .616, p = .535, 2-t$) and 5.9% hits in trials with no sender (SOR = 46, $Z = -.651, p = .516, 2-t$). The effect sizes for the sender trials were positive in this study, at $r = .188$ (JW) and $r = .141$ (RD), but smaller than found in earlier research. However, these results were considered of sufficient interest to warrant further study, being suggestive of a sender effect on the virtual receiver across both independent judges (although the differences between conditions were non-significant at $Z = 1.11, p = .134$ for JW and $Z = .824, p = .206$ for RD, this may be due in part to the low power of the study).

In planning the current replication, however, we were aware of the practical difficulties we had encountered in recruiting and scheduling sender-receiver pairs in these previous studies, and speculated

² Aspects of this study focusing on the human receivers' performance in these conditions were reported by Roe, Sherwood & Holt (2003)

that it might be worthwhile to brief participants more thoroughly about the RNG as virtual receiver and thereby obviate the need for a human receiver. We hoped that participants would be more focused on the nature of the psi task and that this might improve performance, particularly since by changing the participant's primary focus from a human sender to the RNG we were able to offer them statement by statement feedback. Following Roe (1996), the statements appeared as if somebody was typing them, even generating and correcting typing errors. It was envisioned that this would give the virtual receiver a 'human quality', and to enhance this impression the feedback was described to senders as analogous to hearing the mentation of the receiver in a standard ganzfeld experiment. Senders were able to rate these statements according to how closely they corresponded to their experience of sending. It was hoped that this level of involvement in the feedback process would outweigh any increase in skepticism on the part of participants at the idea of interacting with a computer rather than a human.

In addition to these alterations in protocol, the present study manipulated the source of randomness by which mentation statements were selected in order to explore the effects of target lability, following Braud (e.g. 1981, 1994) who has talked at length and persuasively about its importance in the action of PK (e.g. Braud, 1981, 1994). Braud & Schroeter (1983) have demonstrated how this can be manipulated practically by modifying the method by which random numbers are generated. They found that more labile selection methods (such as radioactivity-based random number generators) produced larger effect sizes than less labile ones (such as pseudorandom sources and random number tables), although this trend failed to achieve significance. One of us (Roe, 1996) attempted a simplified replication of this effect using a pseudopsychic paradigm in which participants rated the accuracy of statements generated by two methods that differed in lability. It was found that ratings for statements generated using an RNG source were higher (i.e. were considered more accurate) than those generated using random number tables, suggestively so by one measure and significantly so by another. Given the relative success of our previous studies in the current series, which had been derived in part from Braud and Schroeter (1983) and Roe (1996), we felt it worthwhile to extend the design to attempt to replicate this lability effect.

These lability effects might best be understood in terms of Stanford's conformance behaviour model (Stanford, 1978), which makes no distinction between ESP and PK but rather conceptualises psi as the 'conformance behaviour' of one system (e.g. an RNG or a human brain) to the needs of a 'disposed system' (e.g. a 'sender' in a psi experiment or a target image). The latter is characterised as a relatively ordered and stable system which is thus not predisposed to vary, whereas the conforming system is characterised as a relatively disordered or unconstrained system which is free to vary and thus may be able to change in ways that more closely conform to the disposed system. In terms of classical PK studies, Braud (1980, 1981) predicted that the likelihood of / and or magnitude of a conformance behaviour effect would be proportional to the degree of lability, 'free variability' or 'capability for change' of the 'target system' and the degree of constraint, 'inertia' or structure of the PK agent. In this study we would therefore expect the greatest conformance behaviour with the most labile 'virtual receiver', but also with senders who present as most stable on personality and attitude measures. Braud, Shafer & Mulgrew (1983) defined cognitive lability as the degree of free variability in the mental processes of percipients. They assessed the cognitive lability of receivers by fluency of word associations and by 'perceptual lability' (the frequency of alternations between perceptual representations of a Necker cube), finding that only 'word fluency' was significantly correlated with subsequent psi scores ($r = .39, p < .05, 2-t$). In the present study, it was decided to widen the construct of lability/stability by considering lability of cognition, affect, experience and behaviour – trait factors tapping into the constraint/rigidity versus spontaneity that Stanford (1990) argued moderate psi outcome.

Interacting with motivation and other cognitive and situational variables (e.g. belief in psi or reaction to the target clip), trait lability may lead to degrees of state lability of the PK agent while 'sending'. Braud (1981) stresses several state variables pertaining to structure that may impact on conformance behaviour: the degree of concentration, intention, analytical activity, effort or egocentric striving; and the relevance of thoughts/imagery to the task at hand. We should expect 'stable state' senders whose attention is focused on the target video clip, with clear, persistent and undistorted representations of it, to show a greater PK effect. Such aspects of the sender's state were to be assessed in a post experimental interview.

Study aims

Four predictions were hypothesised using sum-of-target-ranks as the primary outcome measure. Predictions given below are directional but alpha levels for other, exploratory, analyses were conservatively kept as two-tailed.

1. RNG mentations will allow each independent judge to identify the target clip to a greater degree than expected by chance for each randomness condition.
2. Each independent judge's sum-of-ranks for live RNG statements (Live condition) will be lower than for pseudo random statements (Pseudo condition), which will be lower than for random number table statements (Table condition).
3. The participants' subjective ratings of the degree of correspondence between the mentation and their experiences and thoughts while sending information about the target video clip will be higher for live RNG statements than for pseudo random statements, which will be higher than for random number table statements
4. Less labile ('stable') individuals will demonstrate higher psi performance (Z-scores) on more labile systems.

Exploratory analyses were planned in order to consider the covariation between the independent judges' ratings (across the target lability conditions) and sender personality and attitude measures. Exploratory correlations were also planned between the participants' subjective correspondence ratings (across the target lability conditions) and the independent judges' ratings.

Further, a thematic analysis based on transcripts of post-trial interviews with the sender was planned in order to explore the nature of the sender's experience.

METHOD

Design

The present study is the third of a series that is intended to systematically explore the utility of using an RNG as a proxy receiver within a ganzfeld GESP protocol. However, in this study a simplified protocol obviated the need for a 'receiver', and there was a comparison of three target systems, which randomly selected descriptive statements with processes that differed in lability: live RNG; pseudo random; and random number table. The dependent variable for planned analyses is the sum-of-target-ranks awarded by independent judges; the dependent variable for exploratory analyses is the Z-score of target ratings.

Participants

An opportunity sampling method was used to draw 40 participants (mean age = 33.05 [range = 17 – 84], 18 males and 22 females). These consisted of friends and colleagues of the experimenter (N=12), students at UCN (N=10) and participants recruited from the wider community using posters and media appeals (N=18). 15 participants had participated in formal parapsychological experiments before, while 25 were novices. Lab personnel did not serve as participants. Nicola Holt conducted all trials in this study.

Participants may have had above average trait lability, scoring higher on openness-to-experience and neuroticism and lower on conscientiousness than the norm.

Apparatus and Materials

Details of the experimental suite have been described previously (Roe, Sherwood & Holt, 2003). In this study only one experimental room was required – the 'senders' room'. This study used an automated ganzfeld computer system developed by Dr Paul Stevens and written in Microsoft Visual Basic v5 that

presented video material via the API for Media Player v7. Video clips are stored digitally as MPEG files, labelled 1a, 1b, 1c etc.

Part of the UCN target pool used in the last study was used for this study, consisting of 52 minute-long digital video clips that were drawn from commercial films to reflect a range of emotions and themes. Clips were arranged in 13 sets of 4 so that members of a set were as distinct as possible. Copies of the target pool are available on CD or DVD from the first author on request. Randomisation is achieved using the Visual Basic pseudo-random algorithm (rnd), seeded using the timer at the start of the program (RANDOMIZE TIMER). Once the 'Start' button has been pressed, the computer first selects a target set, then selects one of the four clips within that set.

The descriptor pool from which the RNG draws was different from the original study (Roe, Holt & Simmonds, 2003), as a different target pool was used. This consisted of eight statements for each of the 52 clips to give a total pool of 416. These statements were coined by the authors to describe the target set, but were intended to be essentially accurate yet not overly-specific (e.g., "I feel dreamy and trancelike" rather than "someone is hypnotising me") so that they were more characteristic of the kinds of descriptions given during ganzfeld stimulation, and also so that they could in principle help identify targets from other sets.

The mentation-generating program was written in QuickBasic v.1, and ran on an ACER Extensa 503T laptop running under Windows 98. The program was adapted from versions used in previous studies so as to be able to compare three different statements selection methods, using data generation methods as follows:

Random number table statements (the Table condition) for each participant were selected prior to commencement of the study using random number tables (Clark-Carter, 1997, Table X). An entry point to the list was determined using the RND function of a Casio fx-100 scientific calculator to give the row and the item along that row at which to begin the series. Reading from that entry point digits were considered in sets of threes and each value in the range 001 to 416 was taken to generate a single data file that was sufficiently long to cover all participants in the study. These data were arranged in a 24x40 array, with each row containing the pre-selected statement numbers for a single participant. The program checked whether a statement had already been selected for that participant for that condition, and where this was the case the next value in the series was used.

Statements using pseudorandom data (the Pseudo condition) were generated in real time using the INT(RND) command of Visual Basic to produce a value between 1 and 416. As for Table data, the program checked whether a statement had already been selected for that participant for that condition, and where this was the case a new value was generated.

For RNG data (the Live condition), the program sampled an Orion RNG v1.1 attached to a serial port. We required the RNG to generate numbers in the range 1-416, but this exceeds the 'natural' range of RNG outputs that runs from 0-255. Because of difficulties in combining more than one sample in a manner that ensured that all the possible outcomes were equally probable, we adopted a method in which for each selection the RNG was sampled 416 times, corresponding to the 416 statements. The iteration that generated the highest value became the selected statement (e.g., if only sample 117 returned the value 255 then statement 177 was selected). In the event of a tie, then the first sample to generate the joint-highest value was selected. Again the program checked whether a statement had already been selected for that participant for that condition, and where this was the case the process was repeated.

It was possible for the same statement to be selected and presented for more than one condition.

Materials

The standard UCN Participant Information Form (PIF) was adapted in this study. The resulting 15-item measure included questions concerning biographical and contact details (6-items); belief in PK (3-items); previous participation in parapsychological studies (2-items); practice of mental/physical disciplines (1-item); creativity (2-items); and self-perceived happiness (1-item). Copies of all in-house measures are available from the first author on request. Participants also completed a number of other measures pertaining to liability.

In study one (Roe, Holt & Simmonds, 2003) openness-to-experience was negatively correlated with psi-success ($\rho = -.266, p = .097, 2-t$) and conscientiousness was positively associated with psi-success ($\rho = .212, p = .189, 2-t$). Individuals who are open-to-experience are described as curious about both inner and outer worlds, and willing to entertain novel ideas and values, while conscientious individuals are conceived as ‘directed’, competent and striving towards achievement (Costa & McCrae, 1992). These trends were deemed of interest to the ‘lability hypothesis’. Hence we used the NEO Five-Factor Inventory (NEO-FFI) (Costa & McCrae, 1992), a 60-item questionnaire with five subscales assessing: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Each subscale has 12 items with a five-point Likert scale response format. As a measure of emotional instability and poor impulse control, neuroticism was included in the lability construct.

Persinger (1983) argues that all humans can be placed on a continuum of temporal lobe stability and that increased electrical lability of the temporal lobes may facilitate psi experiences (Persinger, 1989). He describes the person with temporal lobe lability as more likely to be impulsive, versatile, imaginative, emotionally sensitive, verbal, interested in philosophical questions and aesthetics and suggestible. The complex partial epileptic signs subscale of The Personal Philosophy Inventory (Persinger & Makarec, 1987) was used in this study, which consists of 16-items pertaining to temporal lobe lability (e.g. visions, hearing inner voices, intense sensations of smells without an obvious source, sense of noesis, perceptual aberrations, bodily vibrations, and dissociation from ‘reality’) with a dichotomous (‘yes’/‘no’) response scale.

A measure of mood lability was also used, which was developed to screen for bipolar disorders (Akiskal et al. 1995). This consisted of 2-items with a 7-point Likert response scale ranging from ‘not at all’ to ‘very much so’: “My mood often changes from happiness to sadness, without knowing why” and “I have frequent ups and downs in mood, with and without apparent cause”.

Braud (1981) equates the ‘novelty generation’ involved in the creative process with lability. Hence, aspects of creativity were included in the lability construct. Holt, Delanoy and Roe (2004) found that rather than cognitive, personality or domain based components of creativity, only one creativity component, termed ‘intrapersonal awareness’ was significantly correlated with the incidence of spontaneous parapsychological experiences ($r = .45, p = .000001$). This component may be considered in terms of emotional and cognitive lability and was composed of scores on two measures:

The Emotional Creativity Inventory (Averill, 1999), a 30-item scale with a 5-point Likert response scale that measures three facets of emotional experience: preparedness; novelty; authenticity and effectiveness.

The Creative Cognition Inventory (unpublished measure by Holt), a 29-item scale with a 5-point Likert response scale, assessing the use of different cognitive styles in the creative process, with seven sub-scales: heightened internal awareness; intuition and inspiration; linear, goal-directed cognition; playful, absorbed cognition; the use of analogy; and oneiric cognition (e.g. ideas arising in dreams).

Each trial was followed by a semi-structured interview in which participants were asked about their subjective impressions of the success of the trial, their experience of participating and the type of sending strategies used.

Procedure

Potential participants were sent an information sheet illustrated with photographs that described most aspects of the study. This provided a rationale for the ‘sender as PK agent’ paradigm, and outlined the stages of the experimental procedure. Prior to the trial, participants completed a battery of measures. Participants were greeted on arrival and escorted to a reception room that had been specially prepared with comfortable chairs, a coffee table, rugs, paintings and curtains so as to make participants feel as comfortable and relaxed as possible prior to the trial. The experimenter encouraged an informal and positive atmosphere, discussing the procedure and answering any questions that arose while sharing refreshments. Participants were informed of previous ganzfeld studies that had used an RNG as a proxy receiver. They were told that this study was an extension of this research, without the added complications of a ‘human receiver’, and were encouraged to focus on enjoying and getting involved in the task. Participants were not initially aware of the different target lability conditions in this study. Participants

were then shown the 'sender's room' and their role was explained again and they were made familiar with the setting and equipment.

The sender was seated in a comfortable office chair. They were shown the laptop computer and made aware that randomly-selected statements would appear on this screen. They were shown a number keyboard with which they were to rate each statement after it had appeared. The sender typed in their name and date into the laptop, after which a set of instructions appeared for them to read. These informed the sender that when they were ready to begin the experiment, they should press the space bar on the keyboard. The sender was shown an adjacent computer monitor on which the target video clip would be displayed. They were shown how to adjust the volume of the video clip on the speakers, and how to pause the video clip if they wished. They were also asked if the lighting was at a comfortable level and shown the dimmer switch for the room's lighting in case they wished to alter it during the trial. When the sender was ready to begin and had no more questions, the experimenter initiated the programme that selected the video clip to begin playing in one minute's time, wished the sender good luck and waited in the adjacent reception room for the trial to finish. Any information that the sender might need during the trial was clearly presented on posters on the wall of the sender's room in case they felt anxiety about remembering any of it.

The trial commenced with the randomly-selected video clip being played to the sender. This one-minute long clip was set to play 14 times, with a five second pause between each repetition. The sender was advised to watch the clip once in order to become familiar with it, and then to initiate the selection of random statements on the laptop. When they did this, a statement would appear on the screen, letter by letter, as if being typed, during which process it would sometimes make a typing error and go back to correct it. Once the statement was complete a question mark would appear at the bottom of the screen to cue the sender to rate how similar the statement was to their experience (using a 9-point scale, where 1 = not at all similar and 9 = highly similar). When participants had typed in a correspondence rating, another statement would begin to appear after a delay of a few seconds. The sender was encouraged to rate the statements according to the entire content of their experience rather than just literal associations with the target clip, for example feelings of tiredness, seemingly tangential thoughts, etc. In total twenty-four statements were rated by each sender, eight of each target system. For each participant the statements were drawn in a consistent sequence from the three target liability systems, and this order was counterbalanced across participants. When all 24 statements had been presented and rated a message was displayed, stating that the trial had been completed and thanking the sender for taking part in the study and asking them to inform the experimenter in the adjacent room that they had finished.

The experimenter and the sender chatted informally and then the sender's permission was asked to record the subsequent discussion. All participants agreed to this. Together the sender and experimenter reviewed the statements that had been selected during the trial, looking at a list of these and their correspondence ratings that constituted the saved record of the trial. They discussed any correspondences that seemed of interest to the sender and their experiences of sending, which led on to a semi-structured interview focusing on the sending strategies that they used. The participant then had the opportunity to ask the experimenter any questions about the study and was asked if they would like to know more about the aims of the study, in which case they were told about the randomness conditions and the liability hypotheses.

After completion of all trials in the series, two judges who were otherwise uninvolved with the study³ independently rated the four clips in each set according to the degree to which they reflected the content of the mentation. This was done separately for each of the target liability conditions: RNG, Pseudo and Table. The independent judges were blind to this manipulation and were simply asked to perform the judging for 120 trials, each based on 8 mentation statements. Each trial was given a new and independent code so that it was not possible to identify the sequence in which the trials occurred or any pattern between them without cross-referencing.

³ We are grateful to Jacqui Wilson and Louie Savva for serving as independent judges.

RESULTS

The source of randomness and senders' subjective correspondence ratings

The feedback of statements meant that the sender could evaluate the degree of correspondence between each statement and their own experience. It was expected that statements in the Live condition, as the most labile source, would receive higher correspondence ratings from senders, however this was not the case. Table 1 shows the mean scores for each target lability condition. Since correspondence ratings were on a 9-point scale, with 8 statements in each condition, this gives total correspondence scores in the range 9-72. The values in Table 1 equate to an average rating per statement of only 3.5. The subjective correspondence ratings are marginally higher for the Table condition and lowest for the Live condition. A Friedman test (a non-parametric omnibus test of within-participant differences) showed that there was no significant difference between the subjective correspondence ratings of statements generated by the three target systems ($\chi^2 = .517$, 2df, $p = .772$).

TABLE 1

SENDER'S SUBJECTIVE RATINGS OF THE DEGREE OF CORRESPONDANCE BETWEEN THEIR EXPERIENCE AND THE RANDOM STATEMENTS GENERATED BY THE THREE TARGET SYSTEMS

	Table	Pseudo	Live
<i>M</i>	29.70	29.03	28.20
<i>SD</i>	11.84	10.87	11.67
<i>N</i>	40	40	40

Inter-rater reliability in ranking clips of the independent judges

For each condition, of each trial, the independent judges compared the 8 statements to the four video clips for that trial, giving each clip a confidence rating (based on similarity between the clip and the mentation) between 0 and 99%. These were converted into target rankings, from '1' if they rated the target clip highest to 4 if they rated it lowest. We were concerned to assess the degree to which the independent judges' ratings would be determined by the mentation, with the alternative being that there was sufficient scope for 'interpretation' that judging may reduce to an elaborate forced choice ESP task for the independent judge. The target rankings of the two independent judges were calculated for each target lability condition, with Cohen's Kappas that were considered poor in each case: $\kappa = .299$ ($p = .001$) for the Table condition; $\kappa = .096$ ($p = .287$) for the Pseudo condition; and $\kappa = .036$ ($p = .688$) for the Live condition. As a consequence of this low inter-judge reliability it was decided not to combine their rankings but to consider them separately.

Target lability and psi performance

The ranks allocated to target clips by the independent judges based on the three randomly generated mentations (Live, Pseudo and Table) are reported in Table 2.

For the ratings by JW the direct hit rates for all target systems are below mean chance expectation (MCE = 25%). For both the mentations generated by the random number table and by the pseudo random process the direct hit rate is 22.5% and for the live RNG the direct hit rate is 12.5%. The sum-of-ranks do not differ significantly from chance expectation for any of the target lability conditions. JW worked on our two previous studies, giving above MCE direct hit rates of 42.1% ($Z = .821$, $p = .412$, 2-t, $r = .188$) and

32.5% ($Z = 1.485$, $p = .069$, 1-t, $r = .235$) in ganzfeld conditions with a sender, where statements were generated by a live RNG in the receiver's room. In this study, for the live RNG condition there is a trend towards psi missing, with an effect size comparable to that of the earlier studies ($Z = 1.485$, $p = .138$, 2-t, $r = .235$). In the other conditions however, the effect sizes are not comparable, being $r = .011$ in the pseudo condition, and $r = .034$ in the table condition.

For the ratings by LS, a new independent judge, the direct hit rates for all target systems are above mean chance expectation. For both the mentations generated by the random number table and by the live random process the direct hit rate is 27.5% ($r = .012$) and for the pseudo random process the direct hit rate is 32.5%. The sum-of-ranks does not differ significantly from chance expectation for the latter, but again has an effect size commensurate with the above ($Z = -1.485$, $p = .138$, 2-t, $r = .235$).

TABLE 2

A COMPARISON OF TARGET RANK FREQUENCIES FOR MENTATIONS BY TARGET SYSTEM

	Target System	Rank					SOR	Z	p (2-tail)
		N	1	2	3	4			
	Table	40	9 (22.5%)	11 (27.5%)	9 (22.5%)	11 (27.5%)	102	.212	.832
Independent Judge JW	Pseudo	40	9 (22.5%)	12 (30%)	10 (25%)	9 (22.5%)	99	-.071	.943
	Live	40	5 (12.5%)	12 (30%)	10 (25%)	13 (32.5%)	111	1.485	.138
	Table	40	11 (27.5%)	11 (27.5%)	8 (20%)	10 (25%)	97	-.076	.940
Independent Judge LS	Pseudo	40	13 (32.5%)	13 (32.5%)	6 (15%)	8 (20%)	89	-1.485	.138
	Live	40	11 (27.5%)	11 (27.5%)	8 (20%)	10 (25%)	97	-.076	.940

The ratings for the independent judges have different outcomes, with a trend towards psi missing (12.5% hit rate) in the live condition for JW, and a trend towards psi hitting in the pseudo random condition for LS (32.5% hit rate). Both JW and LS have ratings close to MCE for the Table condition, and it was in this condition that they had the greatest agreement ($\kappa = .299$, $p = .001$). It may be that the independent judges are picking up on different information in the mentations based on individual differences in judging strategy or conditions of judging.

Covariation of psi performance in each target lability condition with the senders' subjective correspondence ratings

For each lability condition, the ratings of the independent judges were converted into Z-scores, a standardised measure of distance and direction of the target rating from the mean rating for the four targets in each trial. This was deemed preferable to using the simple rank, since it is more sensitive and allows for greater variance across participants, which is essential when considering covariation.

These were compared to the participants' correspondence ratings for each condition, i.e. the cumulative ratings (0-9) for all 8 statements for that condition. In addition to a lack of difference in senders' subjective impressions of accuracy of each statement across the target lability conditions, there was no significant correlation between senders' correspondence ratings and the independent judges' ratings in

each condition. Table 3 shows that these all have effect sizes below $\rho = .151$. It appears that the senders and judges saw different links and associations between the statements and the target clip.

TABLE 3

SPEARMAN RHO CORRELATIONS BETWEEN THE SENDER’S SUBJECTIVE CORRESPONDENCE RATINGS AND PSI PERFORMANCE BASED ON THE INDEPENDENT JUDGE’S RATINGS FOR EACH TARGET SYSTEM (AND 2-TAILED PROBABILITIES)

		Independent Judge JW			Independent Judge LS		
		Table	Pseudo	Live	Table	Pseudo	Live
Participant’s correspondence ratings	Table	.063 (.698)	-	-	.098 (.549)		
	Pseudo	-	-.061 (.708)	-		.151 (.386)	
	Live	-	-	.131 (.421)			-.087 (.592)

Interaction between lability of the sender and lability of the target system

A composite score of sender lability was created, by summing scores on all the trait lability measures that were selected on a theoretical basis in order to cover lability of behaviour, emotions, cognition and experience. These components all formed significant correlations with the composite measure in the expected direction, as follows: the use of non-linear forms of cognition ($\rho = .828, p = .0000001, 1-t$); emotional creativity ($\rho = .743, p = .0000001, 1-t$); temporal lobe lability ($\rho = .647, p = .00003, 1-t$); openness-to experience ($\rho = .436, p = .0001$); neuroticism ($\rho = .306, p = .028, 1-t$); the use of linear cognition ($\rho = -.331, p = .018, 1-t$); and conscientiousness ($\rho = -.296, p = .032, 1-t$). This composite lability variable had a Kaiser-Meyer-Olkin statistic of .737 suggesting that its components shared sufficient variance to represent an underlying construct. Scores on the composite lability measure approximated the normal curve (Kolmogorov-Smirnov statistic = .113, $df = 40, p = .200$), ranging between 121 and 270, with a mean score of 211.5.

A mixed 3x3x2 ANOVA was conducted, with psi performance (*Z-scores*) as the dependent variable. Factor 1 was ‘target system lability’, within-subjects with three levels: Table, Pseudo and Live. Factor 2 was ‘sender lability’, and was a between-subjects measure with three levels: low ($N = 13$); medium ($N = 14$); and high ($N = 13$) scores on the composite lability measure (based on a 3-way split). Factor 3 was ‘judge’, between-subjects, level one being JW and level 2 being LS.

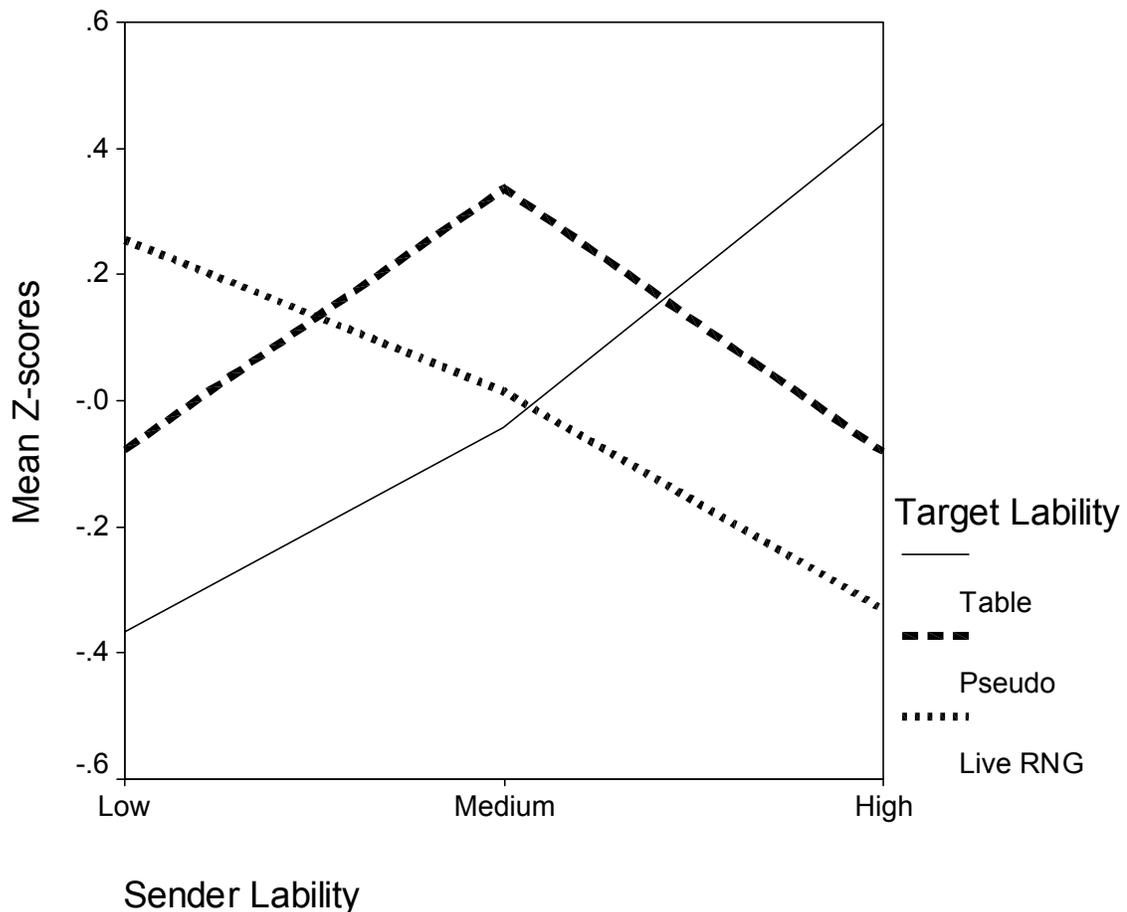
There were no significant main effects, neither the degree of target lability ($F_{2,74} = .169, p = .845$), nor the lability of the sender ($F_{2,37} = .559, p = .651$) significantly impacted upon psi-success. Neither was there a significant difference in overall scoring between the independent judges, although there was a trend for LS to obtain higher *Z-scores* overall ($F_{1,37} = 2.056, p = .160$). The independent judges appeared to obtain a similar pattern of scoring, in that there was no difference between their ratings across either the three target lability conditions ($F_{2,74} = .690, p = .418$) or the three sender lability conditions ($F_{2,74} = .894, p = .418$). However, there was a significant interaction effect between the lability of the target system and the lability of the sender ($F_{4,74} = 4.959, p = .001$)⁴. Further, a similar pattern appeared to emerge for both independent judges, there being no significant difference between the target and sender lability interactions of JW and LS ($F_{4,74} = 1.227, p = .307$). The form of the target x sender lability interaction is displayed in Figure 1.

⁴ This is significant when corrected for multiple analyses with the Bonferroni method where the criterion level for significance is .003 (.05/18).

As hypothesized, stable (low lability) senders performed at the highest level with statements generated by the most labile system (the live RNG) (with hit rates of 23% [JW] and 46% [LS]), while highly labile senders performed at the lowest level with statements generated by the live RNG (with hit rates of just 8% for both JW and LS). Conversely, highly labile senders performed at the highest level with statements generated by the most stable system (the random number table) (with hit rates of 46% [JW] and 54% [LS]), while 'stable' senders performed at the lowest level in this condition (with hit rates of 0% [JW] and 8% [LS]). It appears that 'medium labiles' had more psi hitting in the pseudo random condition (the 'medium' labile system), with hit rates of 36% (JW) and 50% (LS).

FIGURE 1

INTERACTION BETWEEN TARGET AND SENDER LABILITY ON PSI PERFORMANCE



Conducting post-hoc tests revealed that the interaction effect consisted of the following significant differences: high lability senders had significantly higher Z-scores in the Table condition than the Live condition ($t[12] = 3.056, p = .010, 2-t$) and stable senders had significantly higher Z-scores in the live RNG condition than the table condition ($t[12] = -2.495, p = .028, 2-t$).

Interpreting these data in consideration of earlier sum-of-ranks analyses reminds us that there was a trend towards psi hitting in the pseudo condition in LS's judging. This appears to be accounted for by medium labiles performing well. Indeed, a sum-of-ranks analysis for medium labiles in the Pseudo condition alone is significant ($Z = -2.512, p = .012, 2-t, r = .671$). The earlier sum-of-ranks analyses also suggested a trend towards psi missing in the Live condition for JW. This seems to be accounted for by both medium ($Z = 1.794, p = .073, 2-t, r = .479$) and high labiles ($Z = 1.240, p = .215, 2-t, r = .343$) psi missing.

Thematic analysis of sender strategy

A thematic analysis was conducted on the post-experimental interviews. As this has led to a wealth of data, this will be considered in more detail in a subsequent paper. The main distinction that emerged concerning sender strategy concerned intention – ‘consciously willing’. 32% of participants described consciously attempting to influence the random process at some point during the trial, focusing on particular ideas/words or emotions and ‘willing’ them to appear within the statements, e.g. “I actually thought about it ... pull pull pull... erm, so yes, I was literally going please say something ... yes I was telling the computer to do something!”. 68% of participants described their activity as ‘just doing’, simply watching the clip and rating the statements, often with a range of embedded techniques, such as trying to notice something different in the clip each time, free associating or focusing on memories and emotional reactions to the clip, for example: “I totally forgot I was supposed to be sending ... I forgot I was a sender, I was just sitting here wondering whether they would be the same ... that was it, I wasn’t actually trying to send whatsoever r... I forgot”.

All participants reported taking part in the study to be a positive experience. However, motivation to do well in the sending task was low, with only 28% of participants affirming this. Others either were simply ‘curious’ or ‘just seeing what would happen’, or deliberately stepped back from ‘trying too hard’ as a strategy. Participants reported varying degrees of absorption versus distraction during the PK task. 63% found the video clip engaging and easy to get involved with, for example “yes, you do get so absorbed that you don’t actually realising you are doing it”. Others had difficulties paying attention to the video clip. For 21% this was because they found the dual nature of the task difficult, switching between the screen playing the video clip and the screen showing the statements, sometimes to the extent that the content of the statements themselves were influencing their thoughts, rather than the video clip. For example: “I did feel sometimes that I was looking at the screen here with the writing on instead of looking at the picture... and sometimes that was manipulating what I was thinking”. 21% found the statements not only distracting but frustrating or demotivating, for example: “I got a bit downcast, thinking, this is not working”.

DISCUSSION

Contrary to expectation this study did not find that the virtual mentations enabled independent judges to identify the target clip at a level significantly greater than chance expectation in any of the randomness conditions. This may be interpreted as an indication that no psi was involved in the processes studied, or that any psi effects are small and emerge in a complex system. There was insufficient agreement in terms of target ranking by the independent judges to consider their ratings collectively (Cohen’s Kappas being considered poor in each case: $\kappa = .299, .096, \text{ and } .036$). Effect sizes ranged from $r = .011$ to $.235$, with the latter being commensurate with those from previous studies (Roe, Holt & Simmonds, 2003; Roe & Holt, in press), although not all were in the predicted direction. There was a trend towards psi missing in the live condition for JW ($Z = -1.485, p = .069, 1-t, r = .235$) and a trend towards psi hitting in the pseudo condition for LS ($Z = 1.485, p = .069, 1-t, r = .235$). This suggests that the judges saw different points of similarity between the mentations and the target and decoy clips. It may be that the statements are too ambiguous, allowing much freedom of interpretation. It would be interesting to compare agreement ratings here with other studies that have used more than one independent judge.

The senders’ own ratings of correspondences between the statements and their experience of sending, however idiosyncratic, were not significantly different across the three randomness conditions ($\chi^2 = .517, 2df, p = .772$). Following on from the work of Fox (2000) which considered the thought processes of senders in a ganzfeld study, it is intended to study these ratings further, in order to explore factors pertaining to lability, such as the types of associations made (e.g. literal or metaphorical) and the extent to which they deviated from the content of the target clip. For example, the following link between falling bottles (target clip) and blood (a statement) seemed highly relevant to one participant, an association that would be easily missed by an independent judge: “I really agreed with [that statement] because ... you know that bit where all the bottles fall ... I thought they were like little molecules ... and it was really

weird, it just felt like little ... like haemoglobin.” Clearly, then, senders may be impressed with correspondences that arise from personal associations that a receiver is typically going to be unaware of. When the associations, rather than direct references to the target clip, predominate (as suggested by Fox’s innovative analysis) then it clearly makes the independent judge’s (and receiver’s) task all the more difficult even where psi might have occurred.

It was not found that psi-success increased as lability of the randomness condition increased (Table; Pseudo; Live RNG). ANOVAs reiterated this, with no main effect for target lability on psi outcome. Neither was there a main effect for trait lability of the sender. However, there was a significant interaction between senders’ trait lability and target lability ($F_{74,4} = 4.959, p = .001$). The hypothesis that ‘stable’ senders would demonstrate higher psi hitting with the most labile target system was confirmed. However, the interaction appeared to be complex, confirming a speculated prediction of a ‘mirror’ effect, where senders with high trait lability performed best with the most stable target system. Also contributing to the interaction was a non-significant ‘intermediary effect’ where medium labile senders performed best in the pseudo random condition. These results concur with Braud’s lability hypotheses and his extension of Stanford’s conformance behaviour model, suggesting that in a PK task ‘order’ may be introduced into randomness under certain optimal conditions. However, these findings emphasise a bi-directional process between the labile and stable aspects of a system.

Proceeding with caution, these results must be interpreted with the trend towards psi-missing of high labiles with the most labile target in mind – any possible psi effect in this interaction may arise in this condition. Braud (1981) suggests that two labile systems may both conform to a more stable influence, which may be for example, an experimenter. Such situational variables may have contributed to shifting the direction of the effect compared to earlier studies.

Overall poorer psi performance compared with the previous studies (Roe, Holt & Simmonds, 2003; Roe & Holt, in press) may be explained by participants having been more labile than the norm, with high mean scores on openness-to-experience and neuroticism and low mean scores on conscientiousness, making it more difficult for the live condition to succeed. Further, it may be that lability of the independent judges interacts with this process, noticing some associations and not others.

The trend towards psi-missing rather than psi-hitting (in the live RNG condition) may also have been a product of the overt nature of this task, which differed in nature from the covert nature of previous studies, where a live RNG ran in the background of a ganzfeld study. Here, the intention was direct (i.e. to influence the statements) rather than indirect (i.e. to influence a human receiver).

The lability interactions uncovered in this study are considered to be of sufficient interest to warrant further exploration. In the next planned study we intend to explore the lability hypothesis further, and to select participants with this in mind, in order to represent a wide range of lability. Further, due to comments from participants about distractibility on the task and frustration or demotivation due to lack of perceived correspondences between the statements and their experience, we will investigate more directly the effects of having direct feedback, by manipulating this variable. In the next study a 2x2 design may help understand the effects of having participants know about the virtual receiver (direct versus indirect strategies) and comparing end-of-session feedback with statement-by-statement ‘real time’ feedback, while revisiting this study’s interesting findings by keeping the three data generation methods.

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ENVIRONMENTAL SENSITIVITY: A LINK WITH APPARITIONAL EXPERIENCE?

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ABSTRACT

Psi researchers often use the term ‘sensitivity’ when theorizing that certain persons may be more apt to register anomalous influences than others. Through a review of the literature, it is argued that some individuals are predisposed toward a range of innate sensitivities that, in novelty as well as intensity, distinguish them from the general population. It is hypothesized that such persons will exhibit greater susceptibility to a range of environmental factors including allergies, migraine headache, chronic pain and fatigue. Furthermore, it is suggested that sensitive individuals will report a higher than average degree of psi perception as well as electromagnetic influence. Through a 54-item survey designed by the author, the following issues are evaluated: the extent to which persons who describe themselves as ‘sensitive’ appear to be affected by such factors; whether their immediate family members may be similarly affected; to what extent environmental sensitivity parallels apparitional experience; and how such findings compare or contrast with questions asked of a control group. Based on both the literature and the survey results, the author argues that sensitivity is a bona fide neurobiological phenomenon. While no single factor in a person's background is likely to distinguish him/her as ‘sensitive,’ eight demographic or personality factors are found to be statistically significant. If further studies were to document similar results, a more tangible basis would be provided for the study of apparitional experience than has been possible to date.

INTRODUCTION

Psi researchers often use the word “sensitivity” when theorizing that certain persons may be more apt to register anomalous influences than others. But what does it mean to be sensitive? The dictionary offers a four-part definition: 1) Capable of perceiving with a sense or senses; 2) Responsive to external conditions or stimulation; 3) Susceptible to the attitudes, feelings, or circumstances of others; and 4) Registering very slight differences or changes of condition. (*American Heritage Dictionary of the English Language*, p. 1180)

Evidence points to a wide variability of sensitivity, both *among* individuals and *within* the different stages of a person's life. The differences between individuals are well known. To begin with, women exhibit markedly greater sensitivity across all five senses (Velle 1987). The perception of pain varies considerably from person to person (Coghlan 2003), as does acuity in taste, smell and color perception (Hollingham 2004). Changes within a given person's lifespan are equally noteworthy, with sensitivity fluctuating due to the influence of hormones (e.g., a woman during ovulation), personal circumstances (an injury sustained or a disease suffered), pre-programmed genetic conditions (the onset of nearsightedness, for instance), and age (the acuity of smell declines as both women and men get older). (Smith 1989, Watson 2001) Additionally, it is well known that individuals who are disadvantaged in one sense often enjoy greater sensitivity in another. (Khamsi, 2005)

In recent years, researchers have begun to focus on the idea that certain types of people are seemingly predisposed toward extraordinary sensitivity – and to try to explain why. This body of research regards sensitivity from two equally valid perspectives: as a responsiveness to changing conditions *outside* of the individual; and as a reaction to minute changes in his/her *internal state*. (Palmer, personal correspondence, March 11, 2003) Aron, for instance, has coined the term Highly Sensitive Persons (HSP), describing such individuals as prone, from birth, to be easily overwhelmed by sensory stimuli, deeply reflective, and unusually empathetic. (Aron 1996) Heller proposes the term ‘sensory defensiveness’ to describe individuals who demonstrate a notable inclination toward fearfulness, shyness,

stress, and withdrawal. She notes that sensory defensiveness is often evident in infancy but that it can be brought on at virtually any age through severe trauma. (Heller, 2002)

These observations echo earlier work by Bergman and Escalona, who noted that certain children – ranging in age from 3 months to 7 years – were extraordinarily sensitive to stimulation (odors, sounds, colors, textures, temperatures) while their feelings were also easily hurt. Such children were observed rhythmically rocking themselves or covering their eyes and ears from unwelcome stimuli. (Bergman & Escalona 1949)

Recent findings have uncovered overlaps between four types of conditions that seem related to heightened sensitivity: migraine headache, chronic pain (clinically termed fibromyalgia), chronic fatigue syndrome, and depression. In each case, women are disproportionately affected (Center for the Advancement of Health, “Fibromyalgia Syndrome” and “Migraine”). Persons with fibromyalgia often experience moderate to severe fatigue (“Fibromyalgia Syndrome”), people who suffer from depression are more likely to get migraine headaches – and vice versa (“Migraine”), and both fibromyalgia and migraine appear to run in families (“Fibromyalgia Syndrome”), suggesting a genetic predisposition may be present. Such overlaps lead researchers to suspect that the above conditions have a similar neurobiological basis. Hypersensitivity of various stripes may be the result. (“Fibromyalgia Syndrome”)

Hartmann (1991) has attempted to explain a broad range of sensitivities (emotional as well as environmental) through the organizing principle of ‘boundaries.’ He proposes a spectrum of personality types from thick boundary to thin. Persons with thick boundaries are “solid,” “thick skinned” or even “rigid” whereas thin boundary individuals are “open,” “vulnerable” and “sensitive.” A strong ability to immerse oneself in something (whether a personal relationship, a memory or a daydream) also characterizes the thin boundary person, according to Hartmann.

This ability to *immerse* oneself, occasioning the loss of one’s normal sense of time and space, is termed ‘absorption.’ Tellegen and Atkinson found that absorption is closely related to both hypnotic susceptibility and dissociation. (Tellegen & Atkinson 1974) Along parallel lines, Wilson and Barber explored the phenomenon of fantasy proneness, sounding out individuals who, from an early age, immersed themselves in such vivid fantasy that the products of their imagination are experienced as “real as real.” (Wilson & Barber 1983) Just as Tellegen and Atkinson note that the experience of deep absorption can be perceived as mystical or transcendent, Wilson and Barber’s study subjects tend to view themselves as psychically sensitive, reporting perceptions such as telepathy, precognition, being out-of-body, and seeing or hearing apparitions. Neither Wilson and Barber nor later researchers view these traits as pathological. (Lynn and Rhue)

Thalbourne’s concept of ‘transliminality’ relies implicitly on sensitivity, as he defines transliminality as the “tendency for psychological material to cross thresholds in or out of consciousness.” Highly transliminal persons are those who are unusually affected by highly-charged material emanating from the subconscious. (Thalbourne 2000) His research, too, shows an association with paranormal perception, absorption, fantasy proneness, and a heightened sensitivity to environmental stimuli.

Recent studies of migraine headache indicate that people who suffer from this condition have a more sensitive nervous system than most. (Lance 1998; Schauffhausen 2004) Any number of outside factors can trigger a headache: noise, glare, certain odors or foods, even the weather – particularly changes in humidity and barometric pressure. (Lambert-Nehr 2003)

Some people even appear to be especially sensitive to the aurora borealis (the northern lights). These persons may harbor a form of electromagnetic sensitivity. (Byrd 2002) Shallis investigated this subject, finding that 80% of his survey population of self-described ‘electrical sensitives’ were women, 70% reported that they had allergies, 70% said that they were susceptible to environmental stimuli (loud sounds and bright lights), and 69% claimed to have had at least one psychic experience. (Shallis 1988) Persinger has attempted an explanation, theorizing that persons whose temporal lobes are subject to electromagnetic activity are more prone to a variety of odd experiences, including paranormal perceptions. (Leone 1997)

A variety of neuroimaging data support the proposition that persons who are sensitive in one way or another display a unique pattern of neural activity. Individuals with Irritable Bowel Syndrome, for instance (a dysfunction often linked to Chronic Fatigue Syndrome and fibromyalgia) demonstrate greater activation of a particular region of their brain than control subjects. (“Regional Cerebral Activation in

Irritable Bowel Syndrome.” In *Gastroenterology* Vol. 118 No 5, May 2000, pp. 842-848; authors Howard Mertz, et al). Persons who are highly hypnotizable evidence a more extensive pattern of blood flow in the brain following a hypnotic suggestion, versus when these same subjects were not hypnotized. (Cocke 2001) People who are depressed or fearful show greater activity on the right (behavior inhibiting) side of the brain than more cheerful, outgoing individuals. (Mlot 1998) Even synesthesia – the blending of senses that are usually separate and distinct – is demonstrable. Individuals who routinely ‘hear’ words in color, for instance, reveal activity in the language and visual areas of the brain concurrently, whereas activity registers solely in the brain’s language area for ‘normal’ individuals. (Hornik 2001) It bears noting here that synesthesia has an overt association with environmental sensitivity (Thalbourne et al 2001, National Public Radio 2000, CBS News 2002), while a link with paranormal perception has also been identified. (Cytowic 1995)

Taken together, the evidence points to sensitivity as a bona fide neurobiological phenomenon. It seems quite possible that certain individuals are, from birth onward, disposed to a number of conditions, illnesses, and perceptions that, in novelty as well as intensity, distinguish them from the general population. The author theorizes that sensitivity goes to the very heart of the dictionary definition: “capable of registering very slight differences or changes of condition.” Persons who are extraordinarily sensitive *should* exhibit greater susceptibility to allergies, chronic pain and fatigue, migraine headache, and environmental stimuli ranging from sights, sounds and smells to farther flung electromagnetic influences. Such persons would also be expected to indicate a high degree of *emotional* sensitivity. It would be illuminating, too, if these individuals reported a high incidence of psi perceptions. Such experiences could represent yet another facet of an underlying neurobiological dynamic.

This paper’s aim is four-fold: 1) to gauge the extent to which persons who describe themselves as ‘sensitive’ appear to be affected by the factors mentioned above; 2) to gather whether their *immediate family members* may have been similarly affected; 3) to determine the extent to which environmental sensitivity parallels apparitional psi perception; and 4) to compare and contrast these findings with similar questions asked of a sample of persons who do *not* describe themselves as innately sensitive.

METHODS

Questionnaire

In conjunction with several reputable psi researchers and physicians familiar with environmental hypersensitivity, the author developed a wide-ranging survey encompassing 54 items. The survey can be found in its entirety in the appendix. (Note: as a newly constructed measure, the survey has not yet been the subject of psychometric assessment.)

The majority of questions (1 through 43) aim at gathering a composite picture of the individual's medical, emotional, and family history. Items asked about include:

- Gender, age, right or left-handedness.
- Weight and perception of body shape (these items were included based on the anecdotal observation that many notable mediums – especially those who were female – have been heavy.)
- Marital status, number of children, highest educational level attained.
- Self-assessment of temperament and tendency toward imagination.
- Birth order within the family, early or late arrival if known.
- Self-assessment of childhood happiness, incidence of remembered trauma.
- Whether the person ever smoked or grew up in a smoking household (based on the possibility that environmental tobacco smoke might be a factor in the respondent’s health later in life).
- Satisfaction with level of physical/sexual contact in one’s life.

- Medical conditions such as asthma, allergies, migraines, sleep disorder or nightmares, depression or mood imbalance, eating disorder, exhaustion or chronic fatigue, schizophrenia, epilepsy, alcoholism, dyslexia.
- Perceived conditions such as electrical or chemical sensitivity, unusual sensitivity to sound and light, and synesthesia (overlapping senses, such as hearing colors or tasting shapes). The last two items were added midway through the project.
- Severity and duration of any of the above conditions.
- Incidence of the above conditions in the person's immediate family.
- Trigger event, if any, that might be connected with the condition(s) noted.
- Whether the person has ever received a strong electric shock.
- Any seeming effect on electrical or mechanical devices.
- Medications taken and psychotherapy engaged in (questions aimed at ferreting out a person's experience of physical and emotional difficulties).

Two notes are in order. First, the author judged an event as 'traumatic' if it concerned a severe or protracted illness, a serious accident, major surgery, familial abuse, or shock (e.g., witnessing a serious accident or being suddenly dislocated from one's home). These categories were meant to exclude as 'traumatic' the more common and less severe ups and downs of childhood, such as schoolyard taunting, being stuck in a tree, and having one's tonsils removed -- all of which were mentioned by some respondents but excluded as traumatic by this researcher.

A second point concerns the author's rationale for asking about medications taken and psychotherapy engaged in. If emotional issues cause a person to enter into therapy, those same issues might make him/her more susceptible to environmental stressors and/or illness. Similarly, based on an individual's reliance on medications, one might infer such possibilities as: the presence of significant emotional issues; diminished physical resistance to illness; influence of said medications on a person's perceptions and behavior. (In tallying the results, the less noteworthy medications, such as acne treatments, herbal remedies, etc., were excluded.)

The remainder of the survey (questions 44-54) asks whether the respondent has had an apparitional experience, i.e., the feeling or perception of something he/she could not verify was physically present. These questions do *not* inquire after the whole of psi phenomena; instead, they focus on a particular type of perception, i.e., apparitions. The author's supposition is that this class of experience may, at least in some cases, pertain to anomalous stimuli actually present in the external environment.

These final questions are intentionally open-ended, as contrasted to questions 1-43 that offer yes/no, multiple choice, and 1-5 scales for responding. The idea was to avoid leading the respondent through terms such as 'ghost,' 'poltergeist,' 'presence' or 'energy' and, instead, allow the individual to describe, in his/her own words, what was remembered about the experience. It should be noted that some respondents indicated a paranormal experience that was *not* apparitional (e.g., objects moving, precognition or telepathy). Rather than exclude these mentions arbitrarily, they were included in the tally.

Procedure

The survey was distributed to people who consider themselves highly sensitive. Three avenues were used to identify candidates and get the survey into their hands: 1) promoting the project in newsletters or journals read by those with a likely interest in such matters; 2) requesting that environmental physicians and others with whom the author had contact circulate the survey to their patients and colleagues; and 3) referencing the survey in online forums devoted to environmental illness or psi phenomena.

Publications that noted the project in their pages include the following:

- *Journal of Parapsychology*
- *Journal of the Society for Psychological Research*
- *Journal of the Society for Scientific Exploration*

- *Frontier Perspectives* (Journal of the Society for Scientific Exploration)
- Newsletter of the American Psychosomatic Society
- Newsletter of the Bioelectromagnetics Society
- Newsletter of the American Academy of Environmental Medicine
- *Fate* magazine.

The project was also publicized via an electronic listserv run by paranormal investigator Dennis William Hauck, author of *Haunted Places: The National Directory* (Hauck 1996).

Participants

The total number of completed surveys was 112. Within this “N,” 62 were received from individuals who were classified, based upon their responses, as ‘sensitive,’ and 50 from a control group of persons who did not identify themselves as sensitive. Responses from controls were solicited via friends, family, and associates. The overwhelming majority of these control surveys (all but five) were completed by third parties who did not know the author personally. Care was also taken to ensure that control group respondents would be geographically dispersed, diverse in age, and predominantly female (matching, to the extent possible, the gender composition of the ‘sensitive’ survey population).

RESULTS

Base Demographics

Out of the 62 ‘sensitive’ respondents, 44 were women and 18 were men (a ratio of 2.3 to 1). The average age of this group was 41.4 years. The control group encompassed 50 individuals: 33 women and 17 men (a ratio of 1.9-1). Their average age was 43.4 years.

A large proportion (62%) of the sensitives stated they were first-born or only children, this figure being higher for the women (66%) than the men (53%). Among the control group, 52% indicated they were first-born or only children. This number was the same for the women and the men.

With regard to marital status, 40% of sensitives reported that they were single, 37% that they were married, and 18% divorced. Among the control group, a much higher proportion -- 62% -- said they were married, 18% that they were single, and 6% divorced.

Nearly all of the sensitive respondents (93%) said that they have taken some college, graduated college, or gone on to post-graduate work. The figure is slightly lower for controls (88%).

Chi-square correlations for these demographic results follow:

Gender	Age	Birth Order	Marital Status	Education
.0218	.0068	.0779	.0764	.3672

Other Characteristics and Experiences

With regard to handedness, 73% of the sensitive group said they are right-handed, with no major difference between the sexes. 21% indicated they are ambidextrous (this figure is slightly higher for the women than the men). Among the control group, 88% said they are right-handed, with only one respondent (2%) saying she is ambidextrous.

24% of the sensitive respondents indicated they were born prematurely or were a late arrival, and 10% said they were adopted. This compares with 18% of the control group who said they had been born prematurely or were a late arrival, and 3% who were adopted.

26% of the sensitive group indicated that they had smoked at one time, with 35% saying that smoking was commonplace in their homes growing up. The percentages were higher among controls, with 40% saying they had smoked at one time and 48% noting tobacco smoke as prevalent in their households growing up.

When asked about psychotherapy, 45% of the sensitives reported that they had been in therapy at some point in their lives (50% of the women and 33% of the men). This contrasted with just 26% of the control group who said they had ever been in therapy (33% of the women and 12% of the men). Less contrast was evident in responses to the question, “Have you ever taken any type of medication for more than six months?” Here, 62% of the sensitive group said yes (73% of the women and 44% of the men), along with 60% of the control group (70% of the women and 47% of the men).

Chi-square correlations for these self-reports are as follows:

Handedness	Premature or Late Arrival	Smoking	Psychotherapy	Medication
.0099	.4666	.7882	.0771	.7616

Individuals’ Self-Assessment

Concerning self-assessment of imagination, 53% of the sensitive group (58% of the women and 47% of the men) described themselves as highly imaginative. This contrasts with 38% of the controls (42% of the women and 29% of the men).

The item on self-assessment of temperament (introversion/extroversion) yielded several differences. Among sensitive respondents, the men were more likely – by a factor of 3.5 to 1 – to characterize themselves as ‘introverted or restrained,’ whereas no such difference was apparent for the women. Among controls, the men similarly described themselves as ‘introverted or restrained’ but by a much larger margin (8-1). Women in the control group, on the other hand, were more inclined to see themselves as ‘extroverted/emotive’ (by a 5-1 margin).

On self-assessment of body type, sensitives of both genders were more apt to perceive themselves as thin, this being more true for the men (who indicated ‘thin’ 3 times as often as ‘wide’) than the women (who were only twice as prone to indicate ‘thin’). Among controls, this trend was reversed among men (who saw themselves as ‘wide’ 1.5 times more frequently than ‘thin’) but not among women (who were still twice as prone to indicate ‘thin’).

The survey also inquired into satisfaction with the level of physical/sexual contact in one’s life, with controls rating slightly higher satisfaction than the sensitive group. 37% of the sensitives (38% of the women and 33% of the men) rated their satisfaction high, whereas 25% rated their satisfaction low (24% of the women and 28% of the men). This compares with 51% of the control group who rated their satisfaction high (53% of the women and 47% of the men) and 23% who rated their satisfaction low (22% of the women and 27% of the men). Looked at on a 1-5 scale (1 equating to ‘unsatisfactory’ and 5 to ‘ideal’), female sensitives scored 3.5 as against female controls at 3.6; male sensitives scored a relatively low 3.0 as against male controls at 3.4.

Female controls were more likely than their sensitive counterparts to remember their childhood as happy. Among the control group, 54% (56% of the women and 53% of the men) said their childhoods were ‘wonderful,’ with just 10% rating their childhoods as ‘unhappy’ (6% of the women and 18% of the men). In contrast, 23% of the sensitives (19% of the women and 33% of the men) reported that their childhoods were ‘wonderful’ while 35% rated them as ‘unhappy’ (40% of the women and 22% of the men). Evaluated on a 1-5 scale (1 equating to ‘wonderful’ and 5 to ‘extremely unhappy’), female controls scored 2.0 as against female sensitives at 3.5; male controls scored 2.5 as against male sensitives at 2.4.

Sensitives were also more apt to note a traumatic event in their childhood, by 55% to 18% for the control group. Among female sensitives, 57% recalled a traumatic event, versus 18% of female controls.

The difference was similarly pronounced among men, with 50% of men in the sensitive group recalling a traumatic childhood event, contrasted with 18% in the control group.

Chi-square correlations for these self-assessments follow:

Imagination	Temperament	Body Type	Physical/Sexual Satisfaction	Childhood Happiness	Childhood Trauma
.5763	.4388	.0877	.0308	.0250	.00003

Environmental Sensitivity/Medical Conditions - Individual

Below are the percentages, among persons characterizing themselves as sensitive, who checked off a medical item – and the percentages indicating that their condition is or was severe:

Condition	Checked	Self-Rating as Severe
Allergies	63%	23% (** allergies and asthma combined)
Depression	57%	20%
Migraine headaches	45%	17%
Exhaustion/chronic fatigue	43%	12%
Chemical sensitivity	40%	13%
Sleep disorder	40%	7%
Electrical sensitivity	30%	13%
Asthma	27%	**
Mood imbalance	25%	3%
Eating disorder	18%	7%
Dyslexia	15%	2%
Alcoholism	7%	3%

The results contrast with responses from the control group:

Condition	Checked	Self-Rating as Severe
Allergies	34%	8% (** allergies and asthma combined)
Depression	20%	4%
Migraine headaches	14%	4%
Exhaustion/chronic fatigue	4%	4%
Chemical sensitivity	0%	0%
Sleep disorder	6%	0%
Electrical sensitivity	0%	0%
Asthma	17%	**
Mood imbalance	2%	0%
Eating disorder	2%	0%
Dyslexia	0%	0%
Alcoholism	0%	0%

One of the items added midway through the survey project – ‘Unusual sensitivity to light or sound’ – was checked frequently, to the point where it would have ranked near the top had the item been included

in the survey from the beginning. 26% of the sensitive group marked this line, versus just 2% of the controls.

Two other items added midway were nightmares and synesthesia (a scientifically recognized condition where separate senses co-mingle, causing the person to hear colors, taste shapes, etc). ‘Nightmares’ was checked by 11% of the sensitive group and 6% of the control group. ‘Synesthesia’ was checked by 6% of the sensitive group and 0% of the control group. Again, extrapolation suggests that nightmares could be experienced by one-fifth of self-described sensitives, and synesthesia by upwards of 10%.

The chi-square correlation for the *sum* of these environmental/medical items was .0013.

Environmental Sensitivity/Medical Conditions - Family

Below is the total number of close relatives (i.e., parents, children, siblings, grandparents, aunts and uncles) who the 62 sensitive respondents believed were affected by each condition:

Condition	# Relatives	Female	Male
Alcoholism	42	14	28
Depression/mood imbalance	42	24	18
Allergies	31	20	11
Migraine headaches	25	22	3
Asthma	15	8	7
Sleep disorder/nightmares	9	4	5
Chemical sensitivity	7	4	3
Electrical sensitivity	7	5	2
Schizophrenia	5	4	1
Dyslexia	5	1	4
Exhaustion/chronic fatigue	3	3	0

These numbers contrast with responses from the control group:

Condition	# Relatives	Female	Male
Alcoholism	10	1	11
Depression/mood imbalance	19	16	1
Allergies	8	4	4
Migraine headaches	10	5	5
Asthma	7	6	1
Sleep disorder/nightmares	3	2	1
Chemical sensitivity	0	-	-
Electrical sensitivity	0	-	-
Schizophrenia	1	1	0
Dyslexia	1	0	1
Exhaustion/chronic fatigue	1	1	0

The chi-square correlation for the *sum* of these family history items was .6003.

Unusual Experiences

14% of the sensitive respondents indicated that they had been struck by lightning or otherwise suffered a severe electric shock. This item was checked by a higher ratio of women than men (by 2-1). In contrast, none of the controls indicated that they had ever been struck by lightning. (Fact: the approximate chance

of being struck by lightning in a given year in the United States is estimated at 1 in 700,000.) (O'Neill 2003)

A much higher number – 37% of the sensitive group (42% of the women, 29% of the men) – claimed that their presence affects computers, lights or appliances in an unusual way. Only 6% of the controls (evenly divided among men and women) checked this item. When asked if the presumed electrical effect might have been triggered by any identifiable event, condition or circumstance, most sensitive respondents were unsure.

The final section of the survey asked about experiences where the respondent might have perceived something that could not be verified as being physically present through normal means. Nearly three-quarters (74%) of the sensitive respondents said they had had such an experience (82% of the women and 55% of the men). Virtually no one said they were unsure. This result contrasts with 16% of the controls who said they had had an apparitional experience (21% of the women and 6% of the men). However, another 14% of the control group indicated they were unsure as to whether they had ever had such an experience.

When asked to briefly describe these experiences, sensitives checked the following perceptual modes (with multiple categories being more the rule than the exception):

Perception	Women	Men	Overall # of Mentions
Visual	28%	59%	23
General "presence"	35%	29%	21
Auditory	30%	12%	15
Olfactory	28%	12%	15
Lights/energy	21%	18%	12
Objects moving	19%	6%	9
Emotional	12%	18%	8
Tactile	14%	6%	7
Precognition	9%	18%	7
Telepathy	5%	12%	5

The percentages were quite different for the control group:

Perception	Women	Men	Overall # of Mentions
Visual	-	-	-
General "presence"	21%	6%	8
Auditory	9%	0%	3
Olfactory	6%	0%	2
Lights/energy	3%	0%	1
Objects moving	-	-	-
Emotional	-	-	-
Tactile	-	-	-
Precognition	3%	0%	1
Telepathy	-	-	-

Little indication was provided that apparitional experiences are apt to take place at any particular time of the day or season of the year. Of sensitive respondents volunteering such information, 37% indicated that the perceptions took place during evening hours or overnight, 28% recalled they had taken place during daylight hours, and the other 35% noted no discernable trend. Among the handful of controls who responded to this item, half said the experience had taken place during evening hours or overnight, and the other half noted no discernable trend. Neither was there any pattern to the season of the year when respondents said their perceptions had occurred.

Finally, 59% of the sensitive group (53% of the women and 80% of the men) indicated that someone they knew – even a pet – had reacted similarly to the alleged occurrence. Among controls, 88% said someone they knew had reacted similarly. Sensitive respondents (though not controls) mentioned pets as often as they did immediate family members as having shared these experiences.

The chi-square correlations for these ‘unusual experience’ reports follow:

Struck by Lightning	Affect Appliances	Apparitional Experience	Time of Day	Time of Year	Person or Pet Reacting
.0062	.0002	.0000003	.7862	.2703	.1173

DISCUSSION

Major Conclusions

The survey results support the hypothesis that certain people – perhaps due to their innate neurobiology – are much more susceptible to allergies, illness, depression, migraine headaches, nightmares, etc., than the general population. The same is evidently true of their immediate families.

The findings also support the contention that hypersensitivity may encompass a psi aspect, as the respondents are much more likely than controls to have had one or more apparitional experiences. That this link should appear is not surprising in view of the fact that, in order to gain participation, the survey was presented as examining both environmental *and* psi sensitivity. Additional investigation is needed to determine precisely what overlap, if any, exists between persons who consider themselves to have (or better yet, are actually *diagnosed* as having) some form of environmental illness versus those who consider themselves psychically sensitive.

While no single factor in a person's background is likely to distinguish him/her as ‘sensitive,’ eight demographic or personality factors are statistically significant:

1. Being female;
2. Being a first-born or only child;
3. Being single;
4. Being ambidextrous;
5. Appraising oneself as an imaginative thinker;
6. Appraising oneself as introverted;
7. Recalling a plainly traumatic event - or series of events - in childhood;
8. Asserting that one's presence causes televisions, lights, computers, etc. to malfunction.

These factors are assessed individually in the following section.

If additional surveys, carried out by other researchers, were to document similar results, the concept of sensitivity might be documented as having a genuine neurobiological basis. It might follow that persons having a certain degree or configuration of sensitivity could register (either consciously or unconsciously) anomalous influences in the environment that bypass most other people.

Assessment of Significant Findings

Gender Differences

While it is possible that women may simply be more interested than men to respond to a survey concerning subject matter of this kind, it is more likely that the high percentage of women among the sensitive group indicates a bona fide neurobiological difference. Indeed, females are significantly more

sensitive than males in almost every sense modality. (Velle 1987) Furthermore, in humans and other species, the female is vastly more susceptible than the male to a range of autoimmune diseases. (Martin 1997). The effect appears to owe, at least in part, to the activity of sex hormones. (Velle 1987) This effect is evident with migraine headache as well as fibromyalgia (“Migraine,” “Fibromyalgia Syndrome,” Custred 2002).

First-Born or Only Child

Given that first-borns represent just 35% of all children (Connellan 2003), the tilt toward respondents (both sensitives and controls) who are first-born or only children may owe to these individuals being more conscientious than later-borns and hence more likely to respond to surveys. However, some recent evidence suggests that first-borns are more likely to suffer from asthma, eczema and various allergies because they have a greater susceptibility determined *in utero*. (Karmaus et al 2001).

Being Single

A possible read on the higher proportion of sensitives who are single is that they have personal issues that make marriage more problematic. Alternatively, since the average age of the control group was slightly higher, it could be that some of the ‘sensitive’ respondents are *approaching* an age where they will get married, rather than an age at which they *are* married.

Being Ambidextrous

One especially interesting finding is that the ability to use either hand – and not left-handedness per se – occurs significantly more often among persons who consider themselves sensitive. A possibility worth exploring is that, in these individuals, a higher degree of interchange exists between the brain hemispheres that control the body's two sides. It is intriguing that the corpus callosum – an elongated bundle of nerve fibers that carries information between the hemispheres – is wider in women than in men. This difference has been found *in utero* (Durden-Smith and deSimone 1983) Perhaps it explains two of the survey findings: why women are disproportionately sensitive, and the greater extent to which self-described sensitives are also ambidextrous.

Self-Assessment as Imaginative

The fact that the sensitives (both men and women) rate themselves significantly higher on imagination than the controls suggests to the author that such individuals are more inclined to equate their ‘sensitivity’ with imagination, i.e., a penchant for perceiving the world differently. It is equally possible, of course, that the equation runs the other way ‘round – that fantasy proneness and being on the high end of absorption, suggestibility and transliminality scales tends to prompt individuals to view themselves as different, sensitive, or psychically attuned. (Thalbourne 2000, Houran and Lange 1996a & 1996b, Wilson and Barber 1983)

Self-Assessment as Introverted

The survey item on self-assessment of temperament (introversion/extroversion) yielded an interesting gender difference. Self-perception of sensitivity is evidently conducive to the self-perception of introversion – but only for women. Men – especially among the control group – appear to consistently consider themselves introverted or restrained in emotional style and temperament. This discrepancy, the author would venture, has at least as much to do with learned cultural style as with biology.

Recall of Traumatic Events

A distinction between sensitives and controls is especially pronounced when it comes to noting a traumatic event in childhood, as well as a family history of alcoholism, depression, etc. Sensitivity appears to correlate with (though not necessarily be caused by) trauma. Several researchers have sought to establish that psi perceptions are indeed *conditioned* by trauma, especially chronic childhood abuse. (Ross and Joshi 1992, Irwin 1992 and 1996) Irwin and Terr, for example, argues that personality traits

such as dissociation, fantasy-proneness, absorption, and belief in the paranormal all develop in childhood as an escape mechanism from an especially stressful environment. (Irwin 1992, Terr 1991)

The author posits, however, that children who are *born* sensitive may be prone toward these same personality characteristics. Very young children have been observed reacting intensely to certain sounds, colors, aromas, textures, or temperatures. (Aron 1996, Heller 2002, Bergman and Escalona 1949) If the given stimulus were pleasing to such children, they would delve into it (absorption); if it were noxious, they would seek an escape route. In a poignant evocation of some of these early defense mechanisms, Bergman and Escalona describe children rhythmically rocking themselves by covering their eyes and ears from the unwelcome stimuli. The private world these children entered into could be construed as a crucible for introspection, fantasy-proneness, and dissociation.

Perceived Electrical Sensitivity

One of the survey's most interesting and statistically significant results is the extent to which persons who consider themselves sensitive claim that their very presence affects lights, computers, and other electrical appliances in an unusual way. This could, of course, be viewed as an extension of the idea (outlined above) that such characteristics as fantasy proneness, absorption, suggestibility, and transliminality lead certain people to attribute highly improbable explanations to fairly typical occurrences. (Thalbourne 2000, Houran and Lange 1996a & 1996b, Wilson and Barber 1983, Ross and Joshi 1992, Irwin 1992 and 1996) However, as an unusually high percentage of the sensitive respondents indicated that they had been struck by lightning or otherwise suffered a severe electrical shock (a memorable and potentially verifiable event) the author proposes that electrical sensitivity may represent a bona fide aspect of sensitivity – and one whose neurobiological effect might be independently gauged.

Additional Points of Interest

The item 'unusual sensitivity to light or sound' deserves further attention in any characterization of environmental sensitivity. Although it was added midway through the project, one-quarter of the sensitive group marked it. When asked the open-ended question, "How long has this condition affected you," nearly two-thirds of those responding (16 people) wrote "all my life" or "since infancy." While the sample size is too small to draw firm inferences, this result suggests that at least one form of sensitivity may have its origins very early in life.

Likewise, the incidence of synesthesia among self-described sensitives presents a fascinating opportunity for study. If, as has been theorized, synesthesia results from the retention of early neural connections (Baron-Cohen 1996, Moreno-Davis), the role of *environmental factors* in sensitivity could be more precisely sketched based on the extent to which such factors (e.g., childhood trauma) were indicated in the completed surveys of synesthetes.

Another fascinating point concerns a gender difference in the survey's findings of apparitional experience. Male sensitives checked the visual mode twice as often as any other – whereas the response by female sensitives was much more varied. What this suggests in terms of the role of sense perception in potential anomalies is unknown but deserving of further study. It should be noted that, in other surveys of apparitional experience (e.g., those performed by Celia Green and Erlandur Haraldsson), *vision* is the predominant perceptual mode – much more so than in the present survey. (Watson 1979, Stokes 1997) The author suspects that gender and age will be shown to be major factors in individuals' anomalous sense perception, such that survey results are bound to differ given the varying demographic of their participants.

One additional and very unexpected finding is the *higher* percentage of controls than sensitives who assert that their unusual experience has been shared by someone: a relative, friend or pet. This result can be appraised in the following light. First, if psi influences are indeed at work in a given situation, we might expect various people (or animals) – and not just the 'subject' individual – to react. Secondly, in the face of an ostensibly psi experience, the non-sensitive individual might be inclined to look to someone nearby for validation of whatever he/she is perceiving, whereas a sensitive might be more inclined to trust his/her own perceptions.

Caveats on Survey Reliability and Scope

As noted earlier, the survey instrument is brand new and has not been validated. Beyond that, it seems appropriate to state three quite obvious limitations to this type of research.

First, most of the survey questions are retrospective; that is, subjects were asked for their recollections and self-assessment. Even assuming that every subject responded to the best of his/her ability and with utmost candor (which may not be true, as outright fabrication is certainly one possibility), responses may still be colored by

- poor or insufficient recall
- perceptions unsupported by objective, clinical criteria
- credulity, vivid imagination or hypochondria
- the mere fact that the person was feeling poorly at the time he/she was responding.

In particular, persons beset with anxiety or stress are more likely to notice – or imagine – physical symptoms. This could certainly influence self-reports of environmental sensitivity. By the same token, it should be added that a person can harbor a legitimate illness and not feel unwell, at least in the early stages. (Martin 1997)

A second limitation is the relatively low number of persons in the control group. Without having a motivating interest or 'stake' in the survey, controls for this type of exercise are difficult to come by. A larger control population would enable better comparisons to be made regarding the prevalence of conditions associated with sensitivity (e.g., allergies, migraines, chronic fatigue, alcoholism, depression, nightmares, etc.) as well as better inferences to be drawn regarding the occurrence of such conditions within families.

Third, beyond presenting a few self-assessment items (imagination, temperament) and one question concerning psychotherapy, the survey did not attempt to profile respondents according to scales common in parapsychological research: namely those that assess for hypnotizability, absorption, somatization, transliminality, proneness to dissociation, magical thinking, and belief in the paranormal. Inclusion of survey questions reflecting these concepts – while clearly relevant – would have made the instrument unwieldy and diminished the likelihood that someone would take the time to complete it. The author believes a credible argument can be made, however, that a survey assessing heightened sensitivity implicitly touches on the above concepts. Indeed, early childhood sensitivity may be a harbinger of these and similar personality characteristics. This subject would be ideal for future investigation.

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10) Are you right-handed? _____ Left-handed? _____ or Ambidextrous? _____

11) How would you describe your tendency toward imagination? Please mark one of the numbers below:

Think Literally				Think Imaginatively
_____	_____	_____	_____	_____
1	2	3	4	5

12) How would you describe your temperament? Please mark one of the numbers below:

Introverted/Restrained				Extroverted/Emotive
_____	_____	_____	_____	_____
1	2	3	4	5

13) Please note your interests or hobbies below (list up to 4)

Hobby or interest one: _____

Hobby or interest two: _____

Hobby or interest three: _____

Hobby or interest four: _____

14) How satisfied are you with the level of physical/sexual contact in your life? Please mark one of the numbers below:

Unsatisfactory				Ideal
_____	_____	_____	_____	_____
1	2	3	4	5

15) How many siblings do you have? _____

16) Please indicate birth order, i.e., what 'number' sibling are you? _____

17) To your knowledge, were you born prematurely? Yes _____ No _____
Not sure _____

18) To your knowledge, were you a late arrival? Yes _____ No _____
Not sure _____

19) If yes to either question 17 or 18, approximately how long before or after your due date were you born? (leave blank if unsure)

Within 1-2 weeks _____ 3-4 weeks _____ More than a month _____ Unsure _____

20) Were you raised by, or are you now living with, an adoptive family?

Yes _____ No _____

21) How would you rate your childhood? Please mark one of the numbers below:

Wonderful				Extremely Unhappy
_____	_____	_____	_____	_____
1	2	3	4	5

22) Was there any particular event or experience in childhood or adolescence that could be characterized as 'traumatic,' i.e. physically threatening or emotionally wrenching? If no, leave blank. If yes, please describe below, indicating how old you were at the time.

23) Do you smoke, or have you?

Yes, I currently smoke _____ No, I have never smoked _____
Yes, I used to smoke _____

24) If yes to question 23, please indicate how long you smoked (or have been smoking):

1 to 3 years _____ 4 to 6 years _____ 7 to 9 years _____ 10 years or more _____

25) Was tobacco smoke commonplace in your house when growing up?

Yes _____ No _____

26) Have you ever suffered from any of the following? (check any that apply; if not, leave blank):

Asthma	_____	Dyslexia	_____
Allergies	_____	Chronic fatigue/exhaustion	_____
Migraine headaches	_____	Depression	_____
Chemical sensitivity	_____	Mood imbalance	_____
Electrical sensitivity	_____	Schizophrenia	_____
Sleep disorder	_____	Epilepsy	_____
Eating disorder	_____	Alcoholism	_____
Unusual sensitivity to light or sound	_____		
Synesthesia (overlapping senses, such as seeing numbers in color)	_____		

Other (please describe) _____

27) To your knowledge, has a family member (child, sibling, parent, grandparent, aunt or uncle, first cousin) suffered from one of the conditions listed above?

Yes _____ No _____ Not sure _____

PLEASE NOTE: If you did not check off an item in question 26 and indicated 'no' to question 27, please skip ahead to question 33.

28) If yes to question 27, who is/was that family member(s) and what is/was the condition?

Relation	_____	Condition	_____
Relation	_____	Condition	_____
Relation	_____	Condition	_____
Relation	_____	Condition	_____
Relation	_____	Condition	_____

Relation _____ Condition _____

29) If you checked off an item in question 26, over how long a period of time has this condition (these conditions) affected you?

Condition checked _____	Length of time _____
Condition checked _____	Length of time _____
Condition checked _____	Length of time _____
Condition checked _____	Length of time _____
Condition checked _____	Length of time _____
Condition checked _____	Length of time _____

30) Please rank the severity of the condition(s) noted in the previous item on a scale of 1 ('mild') to 5 ('severe'):

Condition one:	Severity _____
Condition two:	Severity _____
Condition three:	Severity _____
Condition four:	Severity _____
Condition five :	Severity _____
Condition six:	Severity _____

31) Please rank the frequency of symptoms suffered in connection with the condition(s) noted above, on a scale of 1 ('occasional') to 5 ('constant'):

Condition one:	Frequency _____
Condition two:	Frequency _____
Condition three:	Frequency _____
Condition four:	Frequency _____
Condition five:	Frequency _____
Condition six:	Frequency _____

32) Are you aware if there was any 'trigger' event or exposure that brought on the condition(s) noted above? If not, leave blank. If yes, please describe briefly below.

33) Have you ever been struck by lightning or suffered a severe electric shock?

Yes _____ No _____

34) If yes, approximately what age were you when the electric shock took place?

Age _____

35) Does your presence ever appear to affect electrical or mechanical devices (such as watches, computer monitors, home appliances, automobile ignitions, etc.) ?

Yes _____ No _____

36) If yes, please note which device(s) and describe, if possible, the circumstances below. If no, skip to question 39.

37) If yes to 36, how long ago did you first start to notice this effect? _____

38) If yes to 36, did the effect begin occurring before or after the 'trigger event' you may have noted in your response to question 32?

Before _____ After _____ Unsure _____

39) Have you ever been in psychotherapy? Yes _____ No _____

40) If yes, briefly indicate the reason(s) for psychotherapy:

41) Have you ever taken any type of medication for more than 6 months?

Yes _____ No _____

42) If yes to above, indicate medication(s):

Drug one _____

Drug two _____

Drug three _____

Drug four _____

Drug five _____

Drug six _____

43) If yes to question 41, please indicate to the best of your recollection over what dates you were/are taking the medication(s):

Dates of use (drug one) _____

Dates of use (drug two) _____

Dates of use (drug three) _____

Dates of use (drug four) _____

Dates of use (drug five) _____

Dates of use (drug six) _____

44) Have you ever seen, heard, smelled or felt something in your presence that you couldn't verify was physically there?

Yes _____ No _____ Unsure _____

45) If no, skip to question 54. If yes, briefly describe the sensation or phenomenon experienced.

46) Please indicate what time of day this experience took place, and what time of year.
(Leave blank if you are unsure)

Time of day: _____ Time of year: _____

47) Approximately what age were you when you had this experience (these experiences)?

Age _____

48) Has this experience or something similar to it recurred?

Yes _____ No _____ Not sure _____

49) If yes to above, how frequently has this type of experience recurred?

Once _____ Rarely _____ Intermittently _____ Frequently _____

50) If yes to question 48, indicate what time of day and what time of year the recurring experience took place. (If recurrence has been more frequent, indicate time of day and time of year only if you can discern any commonality.)
Leave blank if you are unsure.

Time of day: _____ Time of year: _____

51) If yes to question 48, briefly describe the sensation or phenomenon experienced (if different from your answer to question 45):

52) Has anyone you know (even a pet) reacted similarly in the circumstances you described?

Yes _____ No _____ Unsure _____

53) If yes, what is the relationship between you and the person(s) or animal(s) involved? (Check as many as are appropriate)

- Immediate family _____
- Other relative _____
- Friend _____
- Pet _____
- Other (please describe) _____

54) Is there anything further you would like to add that might be relevant to this survey?

Thank you very much for your time and interest in taking this survey. Your responses will provide an extremely helpful base of information to assess the relation between personal history and environmental sensitivity. All information provided will remain confidential.

In future, if you are willing to grant us a follow-up interview, please give your permission by filling in the portion below. We will hold your name and address in confidence, and contact you only if we wish to speak with you personally. If you would rather not, simply leave this area blank.

Name _____

Address _____

Phone _____ Email _____

I give my permission for Michael Jawer, the author of this survey, and/or his associates, to contact me in relation to this survey for the purpose of scheduling a follow-up interview. I understand all information provided, whether in writing or in person, will remain strictly confidential.

Signature _____ Date _____

EVIDENCE OF BRAIN CORRELATIONS BETWEEN ISOLATED HUMAN SUBJECTS: ELECTROENCEPHALOGRAPHIC (EEG) STUDY IN A POPULATION OF EXPERIENCED MEDITATORS¹

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ABSTRACT

Purpose: the purpose of this study was to determine whether brain activation triggered by a visual stimulus in a member of a bonded pair could be detected in the other member who was physically distant and sensory isolated.

Subjects: sixteen subjects (n=16) who had undergone primordial sound meditation (PSM) training participated in the study. These subjects were asked to meditate together, twice a day, for 30 days before beginning the study.

Methods: simultaneous digitized eeg was recorded in pairs of human subjects while members of the pair were placed in sound attenuated rooms separated by 10 meters. Subjects were randomly designated to begin the session as 'sender' or 'receiver.'

Stimulus: the stimulus condition consisted of a flickering black and white checkerboard pattern (2.11 cycles/degree) presented on a video monitor at a flickering rate of 1 hz. Senders were presented with a series of six alternating stimulus-on/stimulus-off conditions (on/off/on/off/on/off) of random time duration ranging from 20 to 50 seconds. Alternating stimulus-on/stimulus-off conditions were presented throughout the session to the sender, while a stimulus-off condition was presented to the receiver at all times.

Data collection: data from each pair were collected in three consecutive visits. Each of those visits included two sessions in which both members alternated as sender and receiver.

Data analysis: eeg data were analyzed looking for changes ("hits") in the non-stimulated subject's eeg activity (receiver) that were time-locked to their partner's stimulus-on condition. Test results at $p < 0.01$ were considered evidence of brain correlations.

Results: of the sixteen receiver sessions recorded during each visit, four sessions showed brain activity that was significantly correlated with their partner's stimulus-on condition ($p < 0.01$). None of the pairs replicated the results. In one case, a statistically significant result was observed during the stimulus-off condition.

Conclusions: Results indicate that in some pairs of human subjects a signal may be detected in the brain of a distant member of the pair when the other member is visually stimulated. These data support the findings of similar studies published by other laboratories throughout the world. A lower percentage of pairs presented statistically significant results as compared to other EEG experiments using subjects who were not trained meditators. This difference may be related to the sustained effect of meditation on brain activation shown in practicing meditators. Future studies should explore other techniques looking at changes in global activation (such as alpha power) instead of "bursts" of activation in 100 millisecond epochs, as well as investigate possible differences between experienced meditators versus non-meditators responses.

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INTRODUCTION

During the last 10 years, a new paradigm has been emerging in medicine that is slowly but steadily spreading throughout the Western world (Schlitz et al, 2005). This paradigm of “integrative medicine” is providing a new option to the old dichotomy between “traditional” (allopathic) versus “alternative” views of healing. An important aspect of this new emerging paradigm is the crucial role of consciousness-based approaches to healing, such as distant healing and other healing techniques that involve the use of intentionality. This shift into a consciousness-based approach to healing in medicine was already predicted by Dossey in the late 1980’s (Dossey, 1989). Along with this shift, a growing body of knowledge has emerged suggesting the positive effects of spiritual practices on health and healing (George, 2003; Plante & Sherman, 2001). Consequently, consciousness-based healing modalities such as those involving distant healing intention, have become more and more popular in the medical environment. Although there is a wealth of evidence suggesting the effect of intentionality on healing (Jonas & Crawford, 2003), and several ideas have been proposed to explain these consciousness-based effects (Schmidt, 2003) little is known about the mechanism underlying therapies such as distant healing. Some researchers in the parapsychological and biomedical communities have suggested that exploring the field of Direct Mental Interaction with Living Systems, or DMILS, may help clarify the mechanism underlying healing phenomena (Radin, 2004; Standish et al, 2002). With the publication of Grinberg-Zylberbaum et al in 1994 (Grinberg-Zylberbaum et al in 1994) reporting the phenomenon of “transferred potentials,” another stage emerged in the study of EEG correlations and its possible implications in the mechanism of consciousness-based healing. Although the experimental evidence is still scarce and controversial (Wackermann, 2004) since then, at least six experiments (Kittennis et al, 2004; Radin, 2004; Sabell et al, 2001; Standish et al, 2003, 2004; Wackermann et al, 2003) have been published reporting the existence of correlated brain activity between isolated members of pairs. In a recent meta-analysis All these studies used a similar experimental design, in which one of the subjects was presented with visual stimuli (either a black and white checkerboard, a live video image of the distant partner or a single flash of light) while the other subject, sitting in a distant room, was not visually stimulated. Digitized EEG data in the non-stimulated subject were collected during their partner’s visual stimulus-on and stimulus-off conditions and data collected were then compared for differences between the two conditions. All studies reported that 10-20% of subjects tested showed EEG activity in the receiver subject that correlated to the stimulus condition in the sender (Kittennis et al, 2004; Radin, 2004; Sabell et al, 2001; Standish et al, 2003, 2004; Wackermann et al, 2003).

Although the relationship between the neurophysiological correlates of anomalous cognition and healing have become increasingly popular since the publication of Grinberg-Zylberbaum et al’s study, the origins of this field can be traced back to the early 1900’s when psychophysiological studies on mental suggestion were carried out by Leonid Vasiliev, a Russian psychologist and physiologist. Vasiliev, who was perhaps the first researcher to test the hypothesis of consciousness effects at a distance using a solid scientific design and statistical methods. Vasiliev (1891-1966) began his experiments into the investigation of what he called “mental suggestion” in the 1920’s (Braud, 2003) guided by Mesmer’s work. Mesmer, a physician who developed the theory of “animal magnetism” in the 1790’s (Vasiliev, 2002) described humans as “emanating a magnetic force that could be manipulated in a state of hypnotic trance” (Guiley, 1999, p.366). Mesmer believed that this magnetic force could work at a distance, and practitioners of mesmerism (a discipline that later developed into hypnotism) reported effects such as the induction of physical sensations and the triggering of physiological changes on distant subjects (Vasiliev, 2002). Vasiliev’s work was published for first time in English in 1963, the same year in which Charles Tart published his groundbreaking study reporting on the physiological correlates of psi cognition (Tart, 1963). In 1965, yet another publication reporting correlated brain activity between physically and sensory isolated monozygotic twins appeared in *Science* (Duane & Behrendt, 1965). Since then, an array of studies has reported the existence of brain correlations between pairs of physically and sensory isolated human subjects. A detailed historical account of these studies has been published by Radin (Radin, 2004).

The purpose of this paper is to discuss a study carried out at our lab between 2002 and 2004. This study was the second of this kind run at our lab; details about the initial experiment were previously

published (Standish et al, 2004). Two important methodological issues that emerged during our first study were addressed during this second experiment: the experimental design was modified to include randomization of visual stimulus presentation and evaluation of within-subjects replicability. In addition, because previous studies have suggested that meditation may enhance the feeling of connectedness between members of the pairs (Grinberg-Zylberbaum et al, 1994) and because it was assumed that this increased feeling of connectedness may enhance the probability of observing correlated brain signals, we recruited subjects with meditation training who reported a consistent meditation practice for at least 2 years. Initially, these data were collected with the intention to compare to the previous data set in which our team tested pairs of non-meditators (Standish et al, 2004). However, due to later methodological improvements in the study design, data were collected using a slightly different stimulation paradigm and comparison of the two datasets was no longer appropriate.

Background

In 2000, the Bastyr University/University of Washington Consciousness Science Lab (BU/UW-CSL) was created as a collaborative effort between the University of Washington School of Medicine and Bastyr University. Funding for the lab was initially provided by an R21 grant from the National Institute of Health (NIH)/National Center for Complementary and Alternative Medicine (NCCAM) and later by the Chopra Foundation, IONS and the Samueli Institute for Information Biology. The initial NIH funding was provided to investigate the existence of “signal transfer” phenomena between isolated brains at a distance (Standish et al, 2002). The rationale for the study was that, if these “signal transfer” phenomena existed, it might provide an explanation for healing modalities such as distant healing and other intention-based healing modalities (Standish et al, 2002). (*Note: The term “signal transfer” was later replaced in our studies by “brain correlated activity” because the initial term implied a pre-supposed mechanism for which there is still no clear evidence.*)

The purpose of the BU/UW-CSL was to replicate Grinberg-Zylberbaum’s findings reporting the existence of a “transferred potential” using an improved methodology and state of the art EEG and fMRI techniques. To this purpose, the BU/UW-CSL carried out one EEG and two fMRI experiments from 2000-2004. A grant from Samueli Institute of Information Biology (SIIB) also supported further statistical analysis of the data. A second EEG experiment, funded by the Chopra Foundation and IONS, was carried out between 2002-2003. This EEG experiment involved 16 subjects who were trained in Primordial Sound Meditation and who followed a 30-day meditation protocol. A description of this study reporting on one of the three different statistical techniques proposed to analyze the data obtained follows below.

METHODS

Experimental Design

This study was designed to determine whether EEG activity in the non-stimulated subject was significantly different in the epochs in which the study partner was visually stimulated as compared to the epochs in which the study partner was not stimulated. To test this hypothesis simultaneous EEG data from both subjects were collected while the study partner was presented with an alternating stimulus-on and stimulus-off conditions. A complete description of the experimental design, including graphics of the experimental set up, was previously published (Standish et al, 2004).

Subjects

The Bastyr University Institutional Review Board provided approval and ethical oversight for the study. Fifteen healthy adults (26-57) trained in meditation were recruited, enrolled, and tested as pairs in the Bastyr University/University of Washington Consciousness Science EEG Laboratory. All subjects were trained in a technique called “Primordial Sound Meditation (PSM)” - a technique that involves the internal repetition of a sound or “mantra” - and had been practicing this technique daily for at least 2

years. All subjects participated in a meditation protocol in which they established a “meditation time“ with their partner twice a day for 30 days prior to the recording sessions. Self-reported adherence to the meditation protocol was 90%. PSM is a variation of a technique known as “Transcendental Meditation-TM” – a meditation technique that has been extensively used in psychophysiological research (Alexander and Langer, 1990). Participants’ mean age was 44.17 years. A total of 15 subjects participated in the study, while one of the subjects participated with two different study partners due to last minute personal issues that interfered with the 16th subject’s participation in the scheduled session. All subjects participated as senders and receivers, producing a total of 16 pairings from which data were recorded. Fourteen of the pairs were female/female, and the remaining two were male/female.

Procedures

Upon arrival, members received a two letter serial ID code and were randomly assigned to begin the experiment acting during the first session as either the stimulated (sender) or non-stimulated (receiver) subject. Subjects stayed in his/her assigned room throughout both experimental sessions and reversed roles during the second session. The two experimental rooms were completely separated from each other by another room ("control room") creating a 10-meter distance between the stimulated and non-stimulated subjects. All three rooms were sound-attenuated but not electromagnetically shielded. A diagram below shows room configuration and experimental set up (as published in Standish et al, 2004).

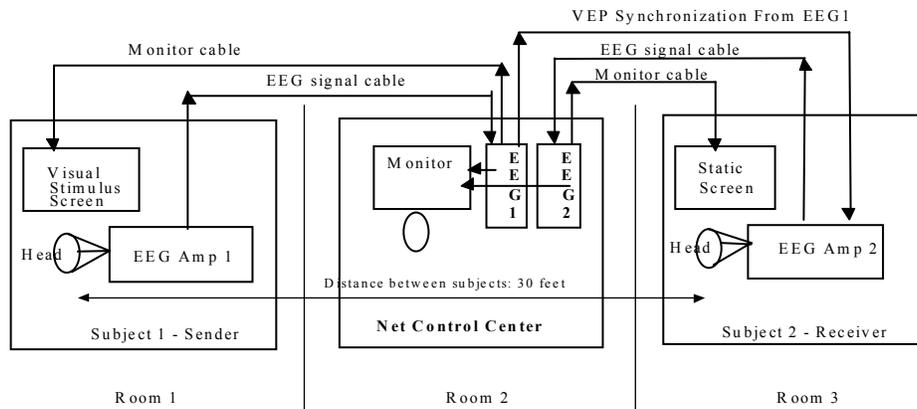


Figure 1: room configuration and equipment set-up

EEG Methods

Two EEG systems (Lexicor, Neurosearch-24) were combined to allow simultaneous measurement of cortical EEG potentials from the two individuals. Each Lexicor system had a computer controller card that digitized the EEG signal from an amplifier and also generated a synchronization signal at the beginning of each visual stimulus epoch (see description of stimulus below.) The output of the stimulated subject’s visual evoked potential (VEP) synchronization signal was sent to the auxiliary channels of the non-stimulated subject’s EEG amplifier. The EEG equipment was configured so that an experimenter could control both the stimulated and non-stimulated EEG computerized acquisition systems from a single workstation.

Data acquisition

A standard 19-channel Electrocap (International 10/20 placements) was placed on the head of both subjects. To maximize electrical contact with the scalp, a blunt 23-gauge needle was used to gently scratch the skin on the scalp, and four of the nineteen channels (O1, O2, CZ and Ground) were filled with conductive gel (ECI, ElectroGel) to achieve impedance below 5 ohms. Self-adhesive electrodes (E5 9 mm

3 ½” Din Socket) were applied to both ear lobes and then connected to the Electrocap to serve as reference. The wires from the cap were then connected to the amplifier for display and data acquisition. The EEG signal was acquired using the VEP mode of the Lexicor EEG system with the following parameters: sampling at 512 Hertz (Hz); high-pass filter off; 1 Hz reversal of checkerboard pattern; six different conditions consisting of three Flicker (on) and three Static (off). To minimize experimenter error during data acquisition, software was developed to automate all steps and keystrokes necessary to acquire EEG data during the sequential Flicker/Static stimulation conditions.

Only four channels were used in order to speed up the already long EEG recording process. These four channels O1, O2, CZ, ground are the most important for recording visual evoked potentials. Only four channels were used in order to speed up the already long EEG recording process. These four channels O1, O2, CZ, ground are the most important for recording visual evoked potentials. There was very little DC offset measured during the EEG recording. A calibration was made for the EEG frequency response using the Lexicor software which measures a simulated EEG intensity at a range of frequencies from 0 to 128 Hz for the 512 Hz sample rate which was used for our experiments. The calibration software also performs a correction based on the calibration file and so the subject EEG intensities are voltage intensity corrected except for a narrow range of frequencies near the notch filter at 60 Hz. For our experiment, the important range of frequencies between 1 to 50 Hz were completely corrected for any frequency response drifts. The software performs the frequency response calibration and correction for each of the electrode inputs. O1 & O2 were referenced to Cz because Cz is commonly used as reference when recording VEP signals (Grabowska et al, 1992). The system latency from our Lexicor system was measured using an AV Tester (Electrical Geodesics, Inc; Eugene, Oregon). This AV tester consists of a photocell which measures the exact change between checkerboard flicker changes and outputs a signal which we digitized along with the synchronizing pulse that we normally use for the VEPs. System latency was measured on our Lexicor system using an AV tester (Electrical Geodesics, Inc; Eugene, Oregon). This AV tester consists of a photocell which can measure the exact optic change between checkerboard flicker changes and outputs a signal which we recorded along with the synchronizing voltage pulse that we normally use for the VEP recording. The distance in time between these two signals is the system latency which was measured to 23.4 milliseconds. The system latency includes the computer display time for the checkerboard image refresh rate.

Pattern reversal checkerboard stimuli were selected because they are standard in visual physiology research (Fortune & Hood, 2003). Pattern reversal visual evoked potentials were triggered in the stimulated subject's brain by a flickering black and white checkerboard pattern (2.11 cycles/degree) presented on a 17-inch CRT computer video monitor (MultisynXV15T model made by NEC Corporation part number JC-1571VMA-2) at a flickering rate of 1 Hz. The display resolution for the checkerboard display was 640 X 480 and the refresh rate was 60 Hz. The monitor was located 50 cm from the subjects' eyes. Eye fixation was directed to the center of the screen where a red dot subtending 0.5 visual degrees was presented.

As stated above, the stimulus protocol for this study was an improved version of that used in our previous EEG study. A description of our previous stimulus protocol may be found in Standish et al, 2004. The sender was presented with an alternating schedule of stimulus-on (Flicker)/ stimulus-off (Static) conditions (F/S/F/S/F/S) of random lengths ranging from 20 to 50 seconds. The receiver was presented with a static image of a checkerboard pattern (stimulus-off condition) throughout the entire session. A static image was selected for the non-stimulated subject to provide a focus point and to ascertain that subject was not receiving any other visual stimulus from the environment.

A total of 150 “Static” (control) and 150 “Flicker” 1-sec EEG samples (epochs) were generated for each sender subject session. In both cases, the non-stimulated subject data collected during the Static condition were used to construct a within-subject control statistic with which to compare EEG data collected from the non-stimulated subject during the stimulated subject's Flicker condition.

Control experiments included the following: 1) a non-stimulated *receiver* was connected to the EEG, while *in* the sender's room an Electrocap was connected to the EEG amplifier but no *sender* was present, 2) EEG amplifiers were recording data with no subjects connected to the amplifier. In addition, the

stimulation protocol served as a “built in” control condition in which the subject became his/her own control (i.e. stimulus-off condition).

Description of experimental sessions

Subjects were asked to meditate together for 30 minutes using the PSM technique at the beginning of each of the three visits. At the end of the meditation, subjects were escorted to their rooms. During the first session the stimulated subject was presented with the alternating on-off stimulus conditions while the non-stimulated subject was presented with a static checkerboard throughout the whole duration of the recording session. Subjects were instructed to keep their eyes open at all times and to look at a red dot located at the center of the screen. The sender was instructed to “hold the intention to send an image or thought” to his/her partner while the receiver was instructed to “remain open to receive any image or thought” from his/her partner. Upon ending of the first recording session, subjects were allowed to rest for a few minutes. A study team member walked into their room to re-check electrode connections in both subjects. Once all electrode placements were checked to assure appropriate impedance, a new set of instructions was read to the subjects to remind them of their reversed roles during the new recording session. The study team member then left the room and closed the door. During the second session, subjects reversed their roles while staying in their same room. The experiment proceeded identically to the first session. At the end of the second recording session, a team member entered each room to remove the Electrocap and subjects were dismissed.

Data pre-processing and Artifact rejection

A review of the raw EEG data identified epochs in which this contamination was obvious. Data sets were screened for 60-Hertz contamination and blink/muscle movement artifact. Blink-artefacts were removed in the same way than muscle artefacts: One of the experimenters carefully inspected each EEG epoch and blindly made a decision if the epoch was bad based on qualitative signal amplitude and wave form. Epochs removed were replaced with a randomly selected epoch drawn from the available data within the relevant stimulus condition (e.g. Flicker or Static) of that person. Although it may have been possible that the same epoch could have been used more than once, random replacement is commonly used in statistics and provides an unbiased way to replace missing data (Allison, 2001; Laird, 1988; Little & Rubin, 2002)

Statistical Analysis

In order to obtain a summed signal from the occipital area bilaterally the signal from O1 and O2 was summed and referenced to CZ using the following equation: $(O1-CZ) + (O2-CZ)$. O1 & O2 were summed together to provide a higher signal-to-noise data. Data were treated using a Monte Carlo randomization test and subsequently analyzed using a runs test. A randomization test is commonly used when inferential statistics that assume a normal distribution (e.g. F, χ^2 , etc.) cannot be applied, or for the analysis of data from single subject experimental settings. In this study both of these conditions apply. Methods were applied as follows: A sampling distribution was calculated to determine the significance of an observed statistical value. This sampling distribution was derived for each target subject (and each test) using the control data contained in that subject’s data record (e.g. 150 seconds of EEG data collected while the distant partner was observing a non-stimulus image). The randomization test method randomly selects a point in these data. Then, using this randomly selected point as an anchor, it generates the test statistic. This process was repeated 10,000 times. The resulting 10,000 sample statistics form the sampling distribution used to determine the statistical significance of an observed value in the data record associated with the stimulated (e.g. Flicker) portion of the non-stimulated data record. Data were then tested using a non-random sequence model based upon the non-parametric “runs” test. This test is sensitive to “bursts” of activation from one epoch to the next. To apply this test we defined a “hit” as an epoch for which the sum of squares statistic of the raw EEG signal was significant at the 0.01 level. This criterion was used to generate a time series of binomial data (0 = non-hit, 1 = hit) from the 150 non-stimulated subject epochs

generated when the stimulated subject was looking at the “Flicker” condition. The Runs test determined if hits were observed in sequences (e.g. hits are clumped together) more often than the random model associated with the observed underlying probability of their occurrence.

RESULTS

Of the sixteen receiver sessions recorded, four sessions showed brain activity that was significantly correlated with their partner’s stimulus-on condition ($p < 0.01$). None of the pairs replicated the results. In one case, a statistically significant result was observed during the stimulus-off condition during the second visit. Interestingly, this statistically significant result happened in the only pair in which both members showed significant results in one of the visits (subjects GC and HC, See Tables 1 & 2). None of the

TABLE 1:
SUMMARY OF RESULTS FOR STIMULUS-ON CONDITION (FLICKER)

Pair		Visit 1		Visit 2		Visit 3	
Number	Non-stimulated Subject ID	Runs value for flicker condition	Probability	Runs value for flicker condition	Probability	Runs value for flicker condition	Probability
1	GA	0.30	0.32	0.44	0.54	0.53	0.76
	HA	-2.4	0.21	0.001	0.17	0.19	0.44
2	GB	-0.12	0.53	0.90	0.94	-1.28	0.16
	HB	-0.05	0.33	0.27	0.69	-0.96	0.48
3	GC	0.44	0.39	0.80	0.95	-3.44*	0.01*
	HC	-2.23*	0.001*	0.27	0.81	0.36	0.37
4	GD	0.44	0.50	-1.74	0.27	-2.22	0.04
	HD	0.19	0.30	0.53	0.54	0.71	0.85
5	GE	-1.69*	0.01*	-0.68	0.27	-0.68	0.22
	HE	0.12	0.60	0.53	0.91	0.44	0.57
6	GF	0.44	0.75	-0.68	0.56	0.12	0.65
	HF	0.44	0.60	-0.45	0.66	-0.68	0.69
7	GG	0.44	0.72	-3.00	0.29	0.44	0.99
	HG	-1.28	0.06	-2.22*	0.001*	0.90	0.93
8	GF2	-0.05	0.40	-1.18	0.29	0.38	0.68
	HH	0.36	0.42	-0.68	0.40	-2.22	0.03

Table 1 shows the runs test values and corresponding probabilities obtained for all three visits in 16 non-stimulated subjects during the periods in which the other member of the pair was looking at the stimulus-on (flicker) condition.

subjects replicated statistically significant results. $p < 0.01$ was chosen to be more conservative than the traditional 0.05 but not too conservative to completely miss any possible effects. Since we are testing at the $p \leq 0.01$ level, we would expect to observe at random 16×3 sessions = $48 \times 0.01 = 0.48$ significant subjects. The fact that the observed rate of significance is greater indicates that the null hypothesis is not valid.

TABLE 2:
SUMMARY OF RESULTS FOR STIMULUS-OFF CONDITION (STATIC)

Pair Number	Non- stimulated Subject ID	Visit 1		Visit 2		Visit 3	
		Runs value for static condition	Probability	Runs value for static condition	Probability	Runs value for static condition	Probability
1	GA	0.53	0.61	-1.28	0.20	-0.68	0.29
	HA	-0.12	0.23	0.53	0.65	0.62	0.77
2	GB	-0.68	0.45	-1.28	0.28	-2.08	0.07
	HB	-1.69	0.12	-3.56*	0.01*	0.53	0.90
3	GC	0.53	0.53	-0.58	0.42	0.44	0.73
	HC	0.36	0.44	-2.15	0.19	0.90	1.00
4	GD	-0.68	0.14	-1.28	0.36	-0.96	0.28
	HD	0.71	0.93	0.90	0.88	0.99	0.96
5	GE	0.90	0.99	0.53	0.58	0.53	0.62
	HE	-1.47	0.32	-3.44	0.07	1.09	0.99
6	GF	0.27	0.58	-3.18	0.09	0.53	0.86
	HF	0.22	0.39	-1.47	0.39	-2.22	0.25
7	GF2	0.53	0.67	-0.68	0.45	0.27	0.59
	HH	0.99	0.97	-1.28	0.21	-0.68	0.40
8	GG	0.44	0.72	-1.28	0.65	-2.17	0.57
	HG	0.62	0.72	0.71	0.88	0.53	0.65

Table 2 shows the runs test values and corresponding probabilities obtained for all three visits in 16 non-stimulated subjects during the periods in which the other member of the pair was looking at the stimulus-off (static) condition

DISCUSSION

Significant brain correlated activity was detected in four of the non-stimulated subjects when the stimulated subject was presented with a stimulus-on condition. In one subject, statistically significant results were found during the stimulus off condition. One possible explanation is that all the results may be a mere artifact. However, there were four times more hits on the receiver data during the stimulus-on

conditions than on the receiver data during the stimulus-off conditions: while four pairs showed statistically significant results during the stimulus-on conditions only one pair appeared significant during the stimulus-off conditions. Second, when the authors investigated the particular pair who produced these contradictory results (GB & HB, see Table 2), it was found that during the pre-experimental activities, it was noted that these subjects presented unusually high amplitude alpha activity even while their eyes were open (Alpha activity usually increases when eyes are closed). In addition to this unusual characteristic of the subject's EEG, it may be possible that due to EEG brain rhythms triggered by meditation, high amplitude EEG alpha activity may be present for certain subjects during both the stimulus-on and stimulus-off conditions. In this situation, it may be possible that correlated brain activity may emerge even during the epochs during which the stimulus-off condition was presented to the sender. In fact, it may be possible that brain state correlations be independent from the stimulus conditions or even that the stimulus condition may act more as an "interference" for correlations to occur. As meditation facilitates a general decrease in brain activation, which is characterized by an increase in alpha band activity, it is possible that a better technique to assess brain state correlations in a population of experienced meditators would involve looking at changes in alpha power instead of changes in 100 millisecond "bursts" of activation. As alpha power is calculated over an entire one-second epoch of EEG recording, it may be possible that the runs test, which is only sensitive to "bursts" of activation (100 millisecond duration) from one epoch to the next, may not be as sensitive to changes in this population. Preliminary analysis looking at changes in alpha power have shown no statistically significant results from receiver data during the stimulus-off conditions as well as a higher number of statistically significant subjects in the receiver data from the stimulus-on conditions (Kozak et al, 2003).

Although the percentage of subjects showing significant brain correlations during this study was not very high, the data does provide some evidence of above chance correlations. The fact that even some of the subjects would show significant correlations is intriguing and warrants further investigation. This study supports evidence already published by researchers around the world (Duane & Berhendt, 1965; Kittennis et al, 2004; Radin, 2004; Sabell et al, 2001; Wackermann et al, 2003) as well as the EEG and functional magnetic resonance imaging (fMRI) studies published by our team (Standish et al, 2003, 2004). These results support the hypothesis that, under certain conditions, neural events triggered in one human brain may be reflected as correlated brain activity in another brain of a physically distant and sensory isolated subject. Because preliminary fMRI studies have also supported the results obtained from EEG data, it seems that the phenomenon may be detected by other neurophysiological methods (Standish et al, 2003, 2004).

At this time, no biophysical mechanism is known that could explain the correlations observed between EEGs of physically distant and sensory isolated subjects (Wackermann et al, 2003). An unknown "informational connection" (Radin, 2004), either by means of "distant signaling" (Standish et al, 2003, 2004) or "quantum brain entanglement" (Wackermann et al, 2003) has been suggested as possible explanations for this phenomenon.

Alternative explanations for these results have been considered, such as the possibility that there may be spontaneous EEG correlations that occur without stimulation. However, spontaneous EEG correlations have been ruled out by introducing a built-in control (stimulus-off) condition interspersed in between the stimulus-on conditions presented to the stimulated subject. Control experiments which yielded no significant results were also recorded in the absence of a stimulated subject. Although unlikely because of the distance, it is possible that the visual stimulus on the stimulated subject's video monitor could have been the cause of the EEG correlations in the non-stimulated subject. This possibility should be tested in future studies by introducing other control conditions such as the visual blocking of stimulated subject's video monitor. Imagery could have an effect on the EEG of non-stimulated subjects. However, the fact that correlations were significantly associated to the stimulus-on condition and not to the stimulus-off condition seems to indicate this may not be a cause of the observed correlations.

In spite of the deeply controversial nature of these findings for the current neurophysiological paradigm, the fact that four independent laboratories found similar results should at least propel an interest in the neurophysiological research community to further investigate the existence of this phenomenon. Research is needed to further establish that the phenomenon in question is not an artifact of any sort, as

well as to reveal the underlying biologic mechanism and the extent to which this phenomenon appears in different populations. The study of parametric effects of distance on signal intensity and delay may be necessary to assess the underlying nature of this phenomenon (Standish et al, 2003, 2004).

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PSYCHOKINESIS ON SINGLE QUANTUM EVENTS USING FALSE FEEDBACK

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ABSTRACT

Although Psychokinesis is perhaps the most experimentally accessible of anomalous phenomena, interest in laboratory studies seems to have waned because of a failure to produce significant effects under experimental manipulation. This presentation reports two PK experiments where the RNG was varied and experimental manipulation was introduced. The output of the RNG's was visualized on-line and experimentally manipulated by randomly balanced positive false feedback. In Study 1, a traditional electronic RNG (Orion REG) was used. In Study 2, a radioactive source (Thorium) and a GM tube particle detector (sqREG) were used to generate a few single-quantum events per second. It was assumed that reducing the rate of quantum events would enhance the effects of intentionality. The results of both studies suggest that false feedback is associated with an increase in the differences between means under intentional conditions. The use of an RNG with a reduced number of quantum events per unit time proved promising.

INTRODUCTION

There is a strong belief that an understanding of the phenomenon of consciousness will involve quantum ideas, both at the level of brain processes and, more subtly, at the level of the mind/brain interaction. Stapp's theory of consciousness (Stapp, 1993), for example, may be directly applicable to psychokinesis (PK), the direct action of mind on the physical world, should this phenomenon exist. The commercially available random event generators (REGs) are quantum-based devices only in the sense that everything in physical reality is quantum based: the number of individual quanta, in this case electrons in a reverse-biased diode, is enormous. These electrons are moving thermally, and thus independently; any mind/device interaction would of necessity involve trillions of individual interactions. (By contrast, the many particles making up the brain are not independent entities: there is a coherence to them that is not yet understood (quantum entanglement?) – this is one of the serious deficiencies of the Stapp model. But however it comes about, this coherence may be what makes the mind/brain interaction successful.) It is famously claimed that focused intention by human subjects modulates a probabilistic system created by apparatus that simulate true randomness. Without speculating what mechanisms are determinant for such effects, studies with electronic randomizers, REGs, claimed significant shifts in the statistical distribution (Schmidt, 1973, Jahn 1997, Radin & Utts, 1989). In particular the Princeton group PEAR found highly significant shifts in means associated with the intention to increase (high), decrease (low) or leave alone (baseline) the number of ones generated by the REG. The effect size, however, was very small, some one part in 10^4 . Intrigued by these findings, and by the criticisms (Jahn & Dunne, 2001, Jeffers, 2003, Pallarki, 2003 and our own views) that surrounded them, we conducted a series of PK experiments with modified methodology and design.

1. We assumed that any PK effect on a randomizer would be enhanced if the randomizer involved a smaller number of individual quantum events per unit time¹. We therefore reduced this number by choosing explicitly quantum processes as the source of randomness in our REGs and conducted three studies where the number of events was systematically reduced.

¹ Although the number of quantum events per trail were reduced, the number of trials per session remained constant

(a) We first used a commercial Orion REG which relies for its randomness on electron tunneling in electronic components.

(b) We reduced the number of quantum events to some hundreds per second by using a GM (Geiger-Müller) tube and a very weak radioactive source (the quantum or qREG). The number of decays in a specified time was then compared with the median to determine a zero or one.

(c) We reduced the count rate still further, to a few per second, by using a lot of lead shielding (the single quantum or sqREG). Lead sheets were used to absorb most of the decay particles, and a thick lead cylinder was constructed to house the GM tube and source to cut the background radiation to acceptable levels.

2. All experiments were conducted in a controlled environment. A 2.4mx3.0mx2.2m insulated aluminum cubicle adequately sound-proofed, ventilated and electro-magnetically shielded to reduce external interference. The cubicle was furnished with a lounge chair, a small end-table and a free standing lamp next to it. The computer monitor and keyboard were positioned on a table in front of the chair.

3. In most PK studies, subjects were instructed to either increase or decrease the number of ‘ones’ generated by the REG when, respectively, the words High or Low appeared on a monitor screen in front of the subject. When the monitor indicated the third condition, the Baseline, subjects were instructed to *not* influence the device. To concentrate on a device in a box and its invisible output and to make it or not make it do more or less of something puts high demands to the human processing system and invites failure in executing the task. In particular, the intention to ignore the device is challenged by theories of selective attention. To address this problem we introduced a speed/accuracy task during the baseline condition. The task captures attention and allows experimental control. When the word ‘paper’ appeared on the screen, indicating the Baseline condition, subjects were instructed to draw a line passing 11 rows of 18 circles each in an ascending sequence of the numbers within the circles as fast as possible without touching the circles and without lifting the pen from the paper. The space between the circles is small. A ‘beep’ sound and the word ‘Stop’ on the screen indicated ‘stop the task immediately’. The number of circles passed (speed) and the number of crossed circles (accuracy) were the dependent variables.

4. To improve the cognitive ergonomics of the task further, we introduced a visible display of the output.

(a). The output of the Orion REG was visualized in real time by a little block (6x6 pixels) representing a bit in each 200 bit trial. A zero-bit was presented as a black block whereas a one-bit block was one-quarter red. False feedback was presented by coloring the block by more than a quarter (see Method Orion REG).

(b) In case of the qREG, which involved the use of photophilic plants and lights, feedback was automatic and unavoidable (Bedford et al, 2005).

(c) In the sqREG, which again used human subjects, the feedback was provided by a graphical representation of the output: the subjects were instructed to make the graph climb more steeply (more ones) or less steeply (fewer ones).

5. Visualising the output of the REG implies also direct feedback. The PEAR group indeed introduced protocols where direct feedback was provided in different visual formats (Jahn & Dunne, 2001). The true feedback, however, may not enhance the subjects’ performance. For one thing, the discriminative ‘stimulus’ should be specifically related to an emitted response and its consequence. Thus, if the instruction triggers some response that sometimes might, or might not, or might wrongly, result in the change of the REG output, feedback loses its efficacy and might even extinguish a potential relationship. The probability that this will occur is large enough to concern us for, inherent in randomness, the outcome of the 200 bit sample could be positively or negatively associated with the instruction without this having anything to do with the subject’s intention.

Table 1.1 presents the events occurring in a setup with direct feedback. It shows how feedback is related to different levels of instruction and success in influencing the device.

Table 1.1. Feedback given the relationships between influencing the device and instruction

<i>Instruction</i>	<i>Device is influenced by subject</i>	<i>Device is not influenced by subject</i>
Consistent with output	Positive Feedback	False Positive Feedback
Inconsistent with output	Negative Feedback	False Negative Feedback

Table 1.1 reveals that only positive feedback efficaciously reinforces the correct mental process triggered by the instruction. Negative feedback is only effective if the control over the response is large; that is, if one knows what one is doing wrong. Thus negative feedback is at the least confusing and *false* negative feedback is ‘negatively misleading’. False positive feedback, in contrast, is not necessarily confusing. If indeed a subject’s intention is to act in accordance with the instruction - and there is reason to believe that in general subjects intend to perform well in test environments - then, whether the signal is too weak, strong enough, or simply absent, false feedback should stimulate whatever mental process the subject uses to influence the device. Providing false positive feedback, therefore, should stimulate rather than obstruct the mental processes involved.

Furthermore, providing false feedback allows the experimenter to control the process of feedback. This is not so with true feedback. If feedback is not delayed, as it appears in the reference studies, then any successful manipulation should be instantly observed on the screen or device representing the performance of the REG. This implies that the subject must be able to detect every 200 milliseconds a change in a state that also lasts for at most 200 milliseconds. To detect a signal that changes with such speed requires attentional perceptual and cognitive processing. It is evident that if the signal detection requirements do not match the properties of our sensory processing system, the signal may be lost or the detection might interfere with the original task; the subject might shift his/her focus away from intentionality. We addressed this problem by providing false feedback on a chance basis but consistent with the instruction.

We reasoned that if there is a potential that makes it possible to change the output of the device in the direction as instructed, weighted (false) positive feedback should reinforce this potential. If the potential is absent, feedback is still false but has no negative effect. Therefore, since the processes involved are so enigmatic at this stage of our understanding of the phenomenon, if the principles of operant learning apply to the potential, controlling false feedback stimulates it and protects the subject from confusing and inconsistent feedback.

Finally, the introduction of a controlled feedback factor with two levels, no feedback and false feedback, makes us less dependent on significance only in the instruction factor: if the output of the REG is associated with the instruction and level of feedback, arguments that claim an effect and acknowledge a potential become more compelling.

The results of both studies with human subjects using respectively the Orion REG and the sqREG both with a False Feedback condition and with different visual REG output representation are presented below.

METHODS (ORION REG)

Subjects

Eighteen subjects participated voluntarily in the experiment. Subjects were recruited from a commercial institute. The majority of the subjects participated in a similar pilot experiment. They were informed about the general tendencies found in that experiment and that a follow up was designed to increase the assumed effects. Subjects were selected neither because of their beliefs nor because of their previous performance. Since literature cannot provide valid selection criteria our initial (test) approach was that human beings, in general, are not equipped with a latent potential to perceive or experience or influence, in an anomalous manner, external events.

Apparatus and Experimental environment

A commercial random number generator, the Orion RNG was used to generate random events. It consists of two independent analogue Zener diode based noise sources. The signals are converted into random bit streams, combined and transmitted in the form of bytes to the RS-232 port of a computer. Special timing circuits ensure that crucial logical operations occur at moments that the device has stable signals. The rate is 9600 Baud supplying 960 random bytes or 7680 random bits per second. The device is powered by RTS and TXD signal of the serial port of an Intel PIII, 960 MHZ, 128 MGB Ram computer. First and higher order biases vary between less than 1 in 4000 and less than 1 in 14,000,000. The output of the Orion REG was continuously sampled by taking every 8 bits in such a way that 200 bits were sampled. Thus a trial had a duration of 192 milliseconds. This data was stored in a database (created in SQL) and related to the following ID's: subject, series, session, run, trial and condition. The Orion REG and computer equipment were placed on a table in the cubicle.

Design

The Orion REG was set to generate a trial of 200 bits. A trial had duration of 200 milliseconds. A run consisted of 200 trials. The first 25 trials (5 seconds) were collected during the start and instruction phase. In the next 150 trials (30 sec) subjects were supposed to influence the device as instructed. The last 25 trials of a run were used to allow the subject to relax briefly. A session consisted of 15 runs and a series of 3 sessions. The experiment lasted about 40 minutes with two minute intersession breaks. The number of 'ones' per trial* was used as dependent variable. The experimental conditions are presented in Table 1.2. The instruction factor had three levels: (1) increase the number of ones, (2) decrease the number of ones, (3) interference task. The feedback factor had two levels: Positive feedback and no feedback. The conditions were randomized (Latin Square). After three runs the subject was instructed to conduct the interference task.

Table 1.2. The combination of Instruction and feedback

	<i>Instruction</i>				
	Increase 'ones'		Decrease 'ones'		Interference task
Feedback	Positive	No	Positive	No	No

The control conditions were divided into controls with 'subjects absent' and 'subjects present'. The absent category refers to four sources of control of the Orion REG performance: the vanilla control (calibration) and conditions where the subject was not in the cubicle, namely before, during a break and after the experiment. The present category refers to three experimental control conditions where the subject was in the cubicle but not instructed to influence the device. The conditions are presented in Table 1.3.

Table 1.3. The various control conditions

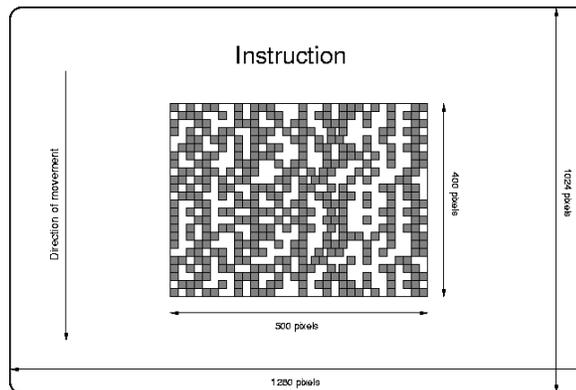
<i>Control conditions</i>	
Subjects Absent	Subjects Present
control Orion REG performance	Experimental control
Vanilla	Pre-run
Pre-series	Post-run
Post-series	Interference task
Inter series	

* The theoretical mean per trial equals 100

Visual representation

The output of the Orion REG was graphically presented in real time by a little block (6x6 pixels) representing a bit in each 200 bit trial. If the bit was a ‘one’, a quarter of the block, 3x3 pixels, was colored red. If the bit was a ‘zero’, the whole block remained black. A trial of bits was presented as a row of blocks that passed a 550x400 pixels window in the middle of 1280x1024 pixel monitor screen (see Figure 1.1). Thus only 83 bits of a trial fitted the window. This was done to prevent the visual system being over-stimulated and to improve the detection of changes in a row. With every new trial shown on top of the window, previous rows were shifted downwards causing the rows to move from top to bottom with a speed of five rows per second.

Figure 1.1. The visual representation of the ‘ones’ of the Orion REG.



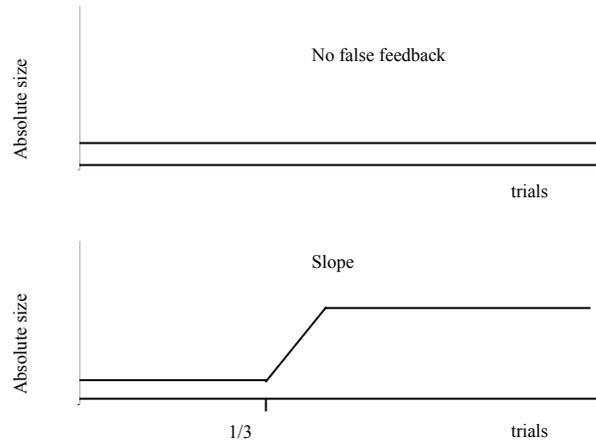
False Feedback

False feedback was provided only when the instruction was to make more or less ‘ones’. Furthermore, false feedback was always positive. Thus, if direct feedback were detectable it would not obstruct but increase the impression of success and therefore stimulate whatever process the subject is using to influence the device. False feedback was presented by slightly increasing the colored pixels of a block (4x2) when the instruction was to make more ‘ones’ or, by decreasing the colored pixels (2x3) when the instruction was to make less ‘ones’. Thus, the impression that more ones were made was created by less ‘blackness’ in a row. The opposite impression, that less ones were made, was created by more ‘blackness’. The levels of feedback are presented in Figure 1.2.

Procedure

The Orion REG was pointed out and the subject was informed that the device is a randomizer generating ‘ones’ and ‘zeros’ randomly. The output representation was displayed. The experimenter explained the task and showed what the window would look like if the subject were able to increase or decrease the number of ‘ones’ generated by the Orion REG, making sure that the subject was able to correctly interpret the subtle changes of the false feedback. The subject was told that the object of the experiment was to concentrate on the device and to make less or more ‘ones’ when the instruction on the screen showed either ‘L0’ or ‘H1’. A third instruction indicated by the word ‘PAPER’ instructed the subject to perform the interference task, a speed/accuracy task as described above. A few trials were used to familiarize the subject with the task. A run was introduced by the word ‘ready’, followed with an instruction and then the word ‘Start’. The end of a run was indicated by a ‘Stop’ on the screen. The subject was allowed to leave the cubicle for a short break when the word ‘Pause’ appeared. In the briefing after the experiment, subjects were asked about their impression of their performance.

Figure 1.2. The manipulation levels of feedback



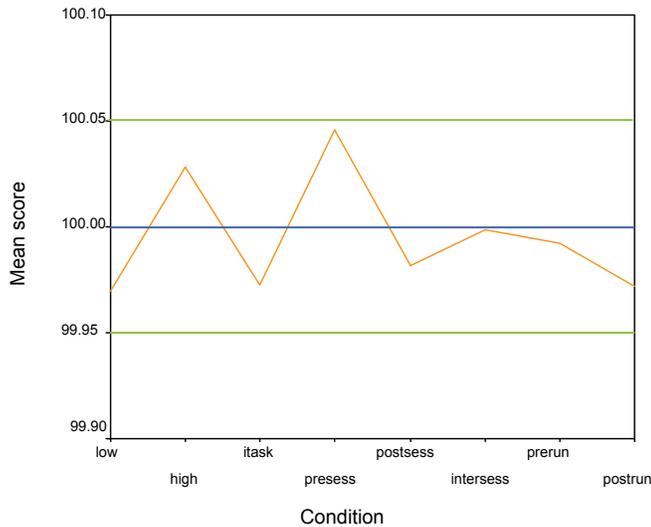
RESULTS (ORION REG)

The summaries of the control and experimental data are presented in Table 1.4 and Figure 1.3. No main and interaction effects were found to be statistically significant. In general, the results show that the experimental means do not differ significantly from the means in the control conditions. The difference between the means for High and Low instruction is also not significant. It is evident that the observed means differ from the theoretical mean (=100) as a function of the sample size as expected. A real effect would have to be sufficiently robust to show a significant difference from control measurements.

Table 1.4. Descriptives of the control and experimental conditions.

Conditions	Type	Mean	SE	N	95% Confidence Interval		
					Lower Bound	Upper Bound	
Experimental	low	99.970	0.032	48600	99.907	100.032	
	high	100.028	0.032	48600	99.965	100.091	
Control	subj present	itask	99.972	0.045	24300	99.883	100.061
		pre-run	99.992	0.049	20250	99.895	100.090
		post-run	99.972	0.051	18900	99.871	100.072
subj absent		presess	100.045	0.050	20000	99.947	100.144
		postsess	99.981	0.048	21600	99.887	100.076
		intersess	99.999	0.034	43200	99.932	100.066
Calibration		100.006	0.007	1milj			
		99.993	0.008	882239			
		99.953	0.040	30460			

Figure 1.3. Graphical representation of Orion REG output under all conditions



The difference between H1 and L0 appeared to increase when false feedback was provided. The difference between H1 and L0 with false feedback was not significant: $F_{(1,32398)}=3.7$; $P=0.054$.

Table 1.5 The results of Instruction crossed with Feedback.

Feedback	Instruction	Mean	SE	95% Confidence Interval*	
				Lower Bound	Upper Bound
none	low	99.998	.056	99.889	100.108
	high	100.006	.056	99.896	100.115
ffeedback	low	99.948	.056	99.839	100.057
	high	100.100	.056	99.991	100.209

*Bonferroni

In exploring the data, further analysis revealed that individual differences between subjects account for some variance in the difference between the ‘High and Low’ means. Figure 1.4 shows that a number of subjects ‘reversed’ the instruction: the mean output of the device was opposite direction of the instruction. For example, when subject 6 was instructed to go ‘High’, the mean output of the device was relative lower than when this subject was instructed to go ‘Low’.

Table 1.6 shows that this ‘reversal effect’, where the direction appears wrong, decreases when false feedback was provided: Almost half of the subjects obtained means where L0 is smaller than H1.

Table 1.6. Number of subjects with L0<H1 per level of feedback.

Feedback	Direction		Total
	wrong	Right (L0<H1)	
no	8	10	18
	44.4%	55.6%	
Yes	4	14	18
	22.2%	77.8%	

Figure 1.4. Performance per subject when instructed to make more ore less 'ones'

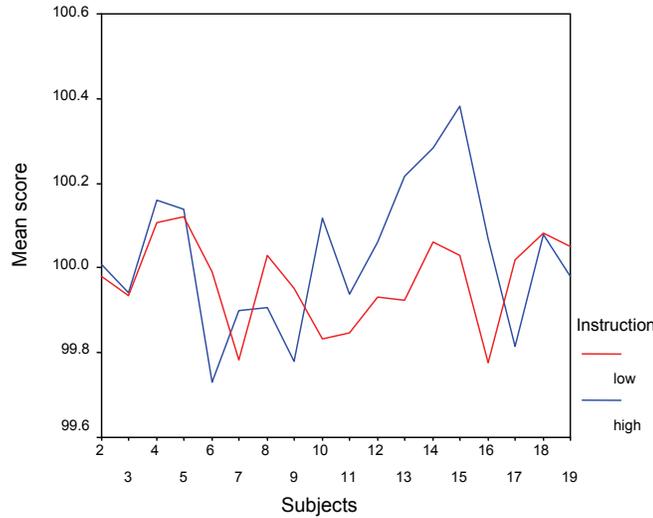


Table 1.7 shows how many of the subjects per feedback condition performed as (1) hypothesized where the direction of the means are congruent with the direction of the instruction, (2) when the direction was congruent but with both means either higher or lower than the theoretical mean and, (3) when the means were opposite with the instruction

Table 1.7. Break down of right and wrong categories per level of feedback.

	<i>Right</i>		<i>Wrong</i>
	L0<100 H1>100	L0<H1 but both <100 or both >100	L0>H1
No Feedback	5	5	8
False Feedback	7	7	4

Based on Table 1.7, the real probability that the means are congruent with the instruction and higher or lower than 100 when false feedback is given is provided by the following conditional probabilities:

$$P(fF|R)=7/18 \quad P(fF|W)=11/18$$

$$P(nF|R)=5/18 \quad P(nF|W)=13/18$$

Thus the probability that the means differ in the right direction when false feedback is provided is true is $P=0.58$. In contrast, the probability that the means do differ but in reversed direction or in the right direction but both smaller or larger than 100 is, $P=0.54$. The true (Bayesian) probabilities are presented in Table 1.8.

Table 1.8. Conditional probabilities of feedback

	<i>Means are correct</i>	<i>Means are not correct</i>
False feedback provided	$P(R fF)=.583$	$P(W fF)=.417$
No False feedback provided	$P(R nF)=.458$	$P(W nF)=.542$

The difference between H1 and L0 scores, based on a 2x2 ANOVA, of the seven subjects with ‘correct’ means when feedback was provided, showed a significant interaction between Instruction and Feedback, $F_{(1,25196)}=5.842$; $P=.016$. (see also Tables 1.9 and 1.10).

Table 1.9. Results of 7 selected subjects with means $L0 < 100 < H1$ when false feedback was provided.

Feedback	Instruction	Mean	SE	95% Confidence Interval	
				Lower Bound	Upper Bound
none	low	100.113	.089	99.938	100.288
	high	100.015	.089	99.840	100.190
ffeedback	low	99.831	.089	99.656	100.006
	high	100.165	.089	99.990	100.340

The difference between L0 and H1 of the seven selected subjects was, when False Feedback was provided, significant at $F_{(1,12598)}=6.981$; $P=0.0083$. The difference between L0 and H1 of the five selected subjects was, when no Feedback was provided, was significant at $F_{(1,8998)}= 5.783$; $P=0.016$.

The z-scores, based on the theoretical mean (100) as criterion, of the seven selected subjects, are presented in Table 1.10 per subject.

Table 1.10. The results per subject of the 7 selected subjects with false feedback

Subject	Instr	Mean	n	SE	properties	Z score
2	low	99.6911	900	.239	0.4985	-1.29
	high	100.0911	900	.238	0.5005	0.38
3	low	99.9722	900	.240	0.4999	-0.12
	high	100.0844	900	.236	0.5004	0.35
8	low	99.9800	900	.242	0.4999	-0.08
	high	100.1789	900	.231	0.5009	0.77
10	low	99.8411	900	.231	0.4992	-0.69
	high	100.1222	900	.235	0.5006	0.52
12	low	99.9011	900	.234	0.4995	-0.42
	high	100.0667	900	.239	0.5003	0.28
13	low	99.8711	900	.231	0.4994	-0.56
	high	100.3022	900	.236	0.5015	1.28
14	low	99.5611	900	.239	0.4978	-1.84
	high	100.3100	900	.239	0.5016	1.29
.Total(*)	low	99.8311	6300	.089	0.4991	-2.16
	high	100.1651	6300	.089	0.5006	1.37

*The difference between total L0 and total H1 is significant $F_{(1,12598)}=6.981$; $P=0.0083$

DISCUSSION (ORION REG)

Although our findings do not contradict claimed differences between H1 and L0 in literature, they also are too weak to support them, in particular considering the baseline and calibration means. The introduction of a visual display of the output and the provision of false feedback in the experimental design did reveal a qualitative effect. When false feedback was provided, the congruency between the means and the instruction increased. After selection based on the congruency criterion, subjects were able to differentiate significantly between the High and Low instruction when false feedback was given. These

means, however, did not vary significantly from the output of the device when subjects were conducting the interference task during the baseline. The finding of this conditional differentiation tempts the odds, taking into account that the data was collected at a conditional level (subset of N) and that false feedback was designed to be completely independent of the output of the Orion REG and randomly presented as an experimental condition.

The next experiment, therefore, was designed to answer two questions. (1.) Would a different randomizer increase size effects of a potential anomaly? (2) Is the qualitative effect of false feedback replicated with a different representation? The need to investigate PK with the same experimental design but a different randomizer was based on theoretical and methodological considerations: theoretical, in the sense that if the reduction of the quantum wave function of a superposition of states is influenced by an intentional mind-process, then minimizing the number of relevant quantum events per unit time should stimulate that process; methodological, in the sense that reducing the number of quantum events per unit time would increase experimental control and perhaps allow insight into the mechanism of the phenomenon..

METHOD (SQREG)

Subjects

Twenty-one subjects participated voluntarily in the experiment. Subjects were recruited from the same commercial institute as in the previous experiment. Some subjects had participated in the Orion REG experiment. Subjects were not selected on the bases of their previous performance.

Apparatus and Experimental environment

It is central feature of quantum theory that systems can exist in superpositions of (classically) mutually exclusive states. The reduction of such a state to one or other of the possibilities constitutes a measurement. In the presence of an unstable nucleus a Geiger-Müller (GM) tube will evolve into a superposition of states “Fired” AND “Not fired” in response to the nucleus evolving into the state “Decayed” AND “Not decayed”. Our hypothesis was that a possible mechanism for PK is the direct influence of intentionality on the reduction of this superposition. So, a single-quantum random event generator (sqREG) was constructed by placing lead plates between a radioactive source (Thorium) and a GM tube to reduce the count rate to around four counts per second. These were then enclosed in a thick lead cylinder which reduced the background count (primarily cosmic rays) to around one count every 10 seconds. In the radioactive decay of a sample with a long half-life, the probability that the time between successive decays will be between t and $t + \Delta t$ is an exponentially decreasing function of t . The time between counts was measured and compared with an established median: if the time interval between successive GM firings was greater than the median, the output was ‘one’; if not, then ‘zero’.

Design

The sqREG generates trials distributed around 300ms. A session consisted of a pre-run of 5 seconds followed by an intentional run of 30 seconds and a post run of again 5 seconds. The intentional run is expected to vary between 0 and 120 trials per run. Each session had 15 pre- and intentional runs and 14 post runs. There were three sessions per subject; with breaks between sessions, each subject spent approximately 40 minutes doing the experiment.

Visual representation

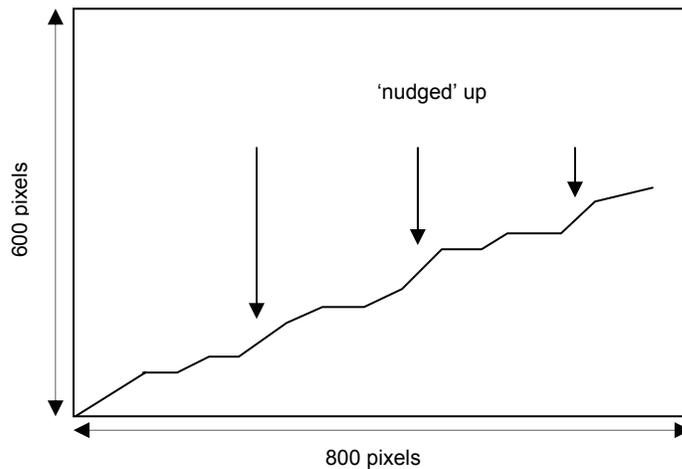
The output of the sqREG was graphically presented in real time in a 800x600 pixel graph by a line that starts in the bottom left corner and climbs up diagonally. The x-axis represents each consecutive trial event: it correlates to time. The y-axis is the cumulative “score” of the binary decisions for each trial. At

each event, the graph marches along in the x-direction by 7 pixels. If the trial resulted in a ‘one’ the graph marches up in the y-direction by 5 pixels as well. Thus a perfectly random trial output should follow an imaginary line from the (0,0) position diagonally up to the right. If relatively more ‘ones’ occur in the run, the graph will tend to march above the imaginary line with a steeper gradient. If relatively fewer ‘ones’ occur in the run, the graph will climb with a less steep gradient.

False feedback

As with the Orion REG, False Feedback was only provided when the instruction was to make more or less ‘ones’ and was always positive. False feedback was provided by altering the size of the upwards step and thus creating the impression of success. Thus in the False Feedback condition, every 5th step (or trial) is altered such that when the subject is instructed to go H1 the trial would march upwards 7 pixels instead of 5 if it was a one. If the instruction was to go L0 the trial would march upwards 3 pixels instead of 5 if it was a zero. The resulting graph will rise more or less steeply with the instruction when False Feedback is provided. Figure 2.1 illustrates how the graph is “nudged” up or down every 5th step congruent to the instruction.

Figure 2.1 Visual output of the sqREG when False Feedback is provided.



Procedure

The experimental protocol followed that of the Orion REG with some minor differences to account for the different visual representation.

RESULTS (SQREG)

Calibration data was collected in 19 series with sample sizes varying between 5000, 50,000 and 100,000 observations of nuclear decay. The time between clicks of the GM tube was recorded. A total of 1,125,000 time intervals were collected.

The distribution of the times between clicks was exponential, as expected. The overall observed mean decay time $\mu_{\text{time}} = 318.05$ ms. Summaries of the statistics are presented in Table 2.1.

Table 2.1. Performance of the sqREG

	Time intervals	Medians (of 19 series)
N	1125000	1125000
Minimum	0	205.00
Maximum	4392	236.00
Mean	318.05	218.90
Std. Error	.3031	

The mean of the medians was used to transpose the time variable into a binary output: time intervals, measured in whole numbers of milliseconds, which were less than the mean of the medians were defined as zeros, the other half, above the mean of medians, as ones. The threshold criterion to dichotomize the output of the sqREG was therefore set to $L0 \leq 218$ and $H1 > 218$. The following statistics were obtained when the criterion was applied to the calibration data: $\mu_{bin}=0.5002$; $\sigma_M=0.0047$.

The summaries of the control and experimental data are presented in Table 2.2. The results show similar trends with the results obtained using the micro-electronic Orion REG: the experimental means do not differ significantly from the means in the control conditions. The difference between the means for High and Low instruction is small and not significant.

Table 2.2. Overall statistics of controls and performance by subjects

Conditions	Type	Mean	SE	N	95% Confidence Interval	
					Lower Bound	Upper Bound
Experimental	low	.4957	.002	45360	.491	.500
	high	.4986	.002	45360	.494	.503
Control	subj present	.4993	.004	15120	.491	.507
	subj absent	.4952	.002	65520	.495	.499
Calibration		.50024	.0005	112500	.499	.501

Figure 2.2 shows that a number of subjects ‘reversed’ the instruction: the mean output of the device was opposite to the direction of the instruction.

Figure 2.2. Performance per subject when instructed to make more ore less ‘ones’

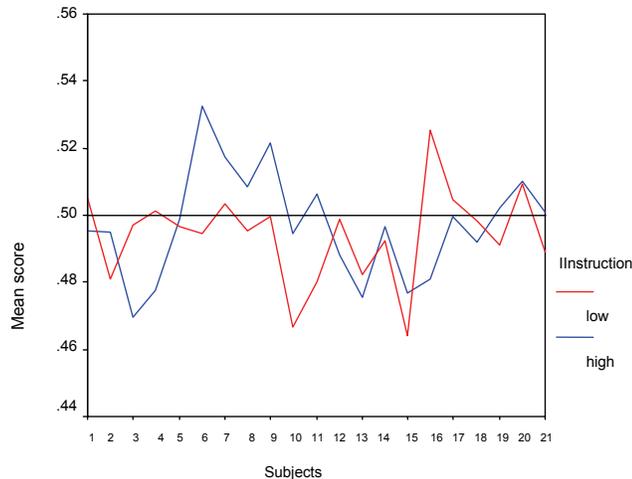


Table 2.3 shows how many of the subjects per feedback condition performed (1) as hypothesized where the direction of the means is congruent with the direction of the instruction, (2) when the direction was congruent but with means either higher or lower than the theoretical mean and, (3) when the means were reversed with the instruction. A small improvement in the performance appears to be associated with the provision of false feedback. The improvement, however, appears less explicit than in the previous experiment with the Orion REG.

Table 2.3 Break down of right and wrong categories per level of feedback.

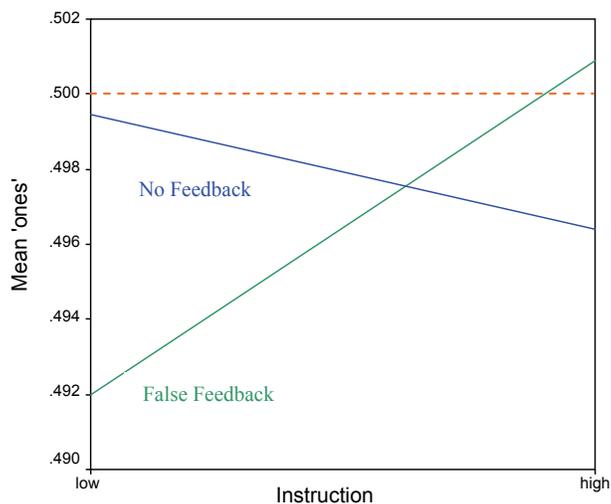
	Right		Wrong	
	L0<.50 H1>.50	L0<H1 but both <.50 or both >.50	L0>H1	
no	5	5	11	
false	6	8	7	

The mean scores per experimental condition are presented in Figure 2.3 and Table 2.4. Although the results suggest an interaction between Feedback and Instruction, the interaction is not significant: $F_{(1,90716)}=3.262$; $p=0.071$.

Table 2.4. Mean scores per instruction and feedback.

Instruction	Feedback	Mean	SE	N	95% Confidence Interval	
					Lower Bound	Lower Bound
low	none	.4993	.003	22680	.493	.506
	FFdb	.4920	.003	22680	.485	.498
high	none	.4964	.003	22680	.490	.503
	FFdb	.5009	.003	22680	.494	.507

Figure 2.3. Graphical representation of the Mean scores per instruction and feedback.



A 2X2 ANOVA of the six subjects who obtained L0<0.50 means and H1>0.50 means in the False Feedback condition did show, however, a significant interaction between instruction and feedback $F_{(1,25916)} = 5.11$; $P=0.024$ (see also Table 2.5). In contrast, with the five subjects who obtained L0<0.50 means and H1>0.50 means in the No Feedback condition, the interaction between instruction and feedback was not significant $F_{(1,21596)} = 0.082$; $P=0.775$.

Table 2.5. Results of six selected subjects

Instruction	Feedback	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
low	none	.5000	.006	.488	.512
	FFdb	.4841	.006	.472	.496
high	none	.4989	.006	.487	.511
	FFdb	.5111	.006	.499	.523
itask	itask	.5150	.008	.499	.531

The difference between L0 and H1 of the six selected subjects was, when False Feedback was provided, significant at $F_{(1,12958)} = 9.458$; $P=0.0021$. The difference between L0 and H1 of the five selected subjects was, when no Feedback was provided, was significant at $F_{(1,10798)} = 6.07$; $P=0.014$.

DISCUSSION

Again, the overall results did not show significant differences between intentional conditions and control conditions. The differences between H1 and L0 were, in both experiments, in the same range but H1 was <100 in the experiment using the sqREG. The initial effect of false feedback found in Experiment 1 (Orion REG) was replicated in Experiment 2 where the sqREG and a slightly different visual representation were used. A subset of subjects seemed to benefit from the false feedback to such a level that the (group) difference between H1 and L1 reached z scores of 3.74 and 4.36 using the Orion REG and the sqREG respectively. This subset, of course, reflects the selection of means based on the applied selection criterion. We are aware of the danger of biasing the results through such a selection. The criterion, whether nominally L0<100<H1, was defined and validated by the qualitative effect of false feedback and not the overall performance. In fact, some of the subjects would not have been selected if the criterion had been applied to the overall performance. Furthermore, the difference between H1 and L0 and its power of significance increased when false feedback was provided within each selected group that did meet the criterion. This finding was consistent in both experiments. This additional experimental variable, randomly presented amongst other experimental conditions, leaves the probabilities of zeros and ones equal. That this variable accounted for variance that was reproduced in a second experiment with some small changes is an insight that questions the null hypothesis. The results based on the changes in the design do indicate the use of a paradigm that allows the application of classical learning principles. Furthermore, the use of a single-quantum RNG did not reveal substantial differences in trends and both effects sizes² were small: Orion REG: 0.047 and sqREG: 0.054 . This result, however, is rather encouraging, for the sqREG was designed, for theoretical reasons, to register many fewer quantum events per second than the Orion REG. These reasons are based on the premise that since quantum mechanics must be involved in PK phenomena, isolating quantum events should enhance the mind/matter interaction. On the other hand, reducing quantum events per unit time affects the task of the subject as well as the sample size and could introduce unwanted variance. We dealt with the task by using a visual display that was supposed to capture attention and that facilitated the intentional ‘manipulation’ of the REG by the subjects. The consistency in the differences between H1 and L0 associated with false feedback with either

² $d = \sqrt{F \left(\frac{1}{N_1} + \frac{1}{N_2} \right)}$

the Orion REG or the sqREG are therefore not only supportive but also challenging in terms of the setup with fewer quantum events per unit time.

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FACTORS AFFECTING THE RELATIONSHIP BETWEEN HUMAN INTENTIONALITY AND THE HEMOLYSIS OF RED BLOOD CELLS

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ABSTRACT

20 psychic healers and 40 non-healers participated in a conceptual replication of an experiment by William Braud, which appeared to demonstrate that a significantly large number of participants (Ps) were able to influence the process of hemolysis of red blood cells *in vitro*. This finding, however, could have been artifactual. Following Braud's procedure, hemolysis was induced for each trial by mixing 50 μ l of blood with 3 ml of .425% physiological saline in a cuvette. The cuvette was then placed inside a spectrophotometer that measured the rate of hemolysis over a 1 min period. Healers completed 2 sessions and non-healers 1. Each session consisted of 2 runs of 8 trials. During the test run, Ps attempted to psychically retard the rate of the hemolysis from a distant room on Trials 4 and 5, preceded by a progressive relaxation tape. They were unaware of any of the other trials in either run. During the non-intention periods healers were interviewed about their healing practices and beliefs, whereas non-healers completed a rating scale on these themes. Both samples completed a shortened version of the Hartmann Boundary Questionnaire (BQ) and the Spiritual Transcendence Scale (STS). For half the runs, the DC component of the earth's geomagnetic field (GMF) was essentially eliminated around the cuvette inside the spectrophotometer; for the other half, the GMF was set at 0.5 Gauss, its normal magnitude in nature. Hemolysis scores consisted of the ratio between *t*-scores for the test and baseline runs, each of which reflected the difference between the results of Trials 4 and 5 and the other trials within the run, and they were corrected for the influence of the hemolysis at the time the measurement process began. Overall hemolysis scores were non-significant, the scores of healers and non-healers did not differ significantly, and there was no direct effect of the GMF manipulation. Relative hemolysis retardation was suggestively associated with high values of ambient GMF on the day before testing, confirming a finding of Braud. Post-hoc, it was found that older non-healers appeared to accelerate hemolysis and younger non-healers to retard it. Combined hemolysis scores for both runs in 1st sessions revealed hemolysis acceleration with GMF on and retardation with GMF off, indicating the possible influence of non-intentional psi. Retardation with GMF off was greater among thin-boundary Ps on the BQ. Healers scored much higher than non-healers on the STS, and among non-healers the STS was positively correlated with estimated success on the hemolysis task.

INTRODUCTION

This study is a conceptual replication of an experiment by Braud (1990), in which volunteer participants (Ps) claiming no special psi talents were asked to retard the rate of hemolysis of red blood cells in a test tube from a remote location. Hemolysis refers to the bursting of the red blood cells, which can be induced *in vitro* by placing the blood cells in a solution differing from the saline solution they inhabit in the human body. The process can be measured by a spectrophotometer, which records the amount of light passing through the specimen as it becomes increasingly transparent as a result of the hemolysis.

In Braud's (1990) study, each of 32 Ps completed 4 15-min trials. In the 2 randomly determined experimental trials, Ps were to concentrate on retarding the hemolysis. During control trials, they were not to think about the blood cells. The experimenter (E) was blind as to the trial designations. Before the 1st trial Ps listened to a progressive relaxation and guided imagery tape over headphones. The one significant

finding was an excess of statistically significant scorers irrespective of direction: 7 retarded hemolysis and 2 accelerated it. The prevalence of retardation over acceleration was not significant.

Palmer discovered while preparing the report of the current experiment that this variance effect could be artifactual. Although E was blind to which trials were experimental, he could have guessed which those trials were and unintentionally performed the hemolysis slightly differently on those trials. If such changes of technique influenced hemolysis, an excess of extreme scores could have been created, even if E's guesses were at chance. The most likely mechanism involves exactly when in the hemolysis process measurement was initiated. As illustrated in Figure 1, hemolysis follows a decelerating curve. Thus, measurements taken early in the process will show greater changes than measurements taken later. Even slight variation in when the measurement process starts, which in our experience is impossible to eliminate even if skill in the technique is achieved through practice, can have a marked effect on the results.

Combining data from Braud's (1990) study and earlier pilot sessions, Braud and Dennis (1989) reported greater activity in the earth's GMF on the day preceding hemolysis sessions showing hemolysis retardation (psi-hitting) than for acceleration sessions ($p = .023$, one-tailed). As this finding refers to the direction of psi scoring, the artifact does not apply.

Our experiment, which controlled statistically for the timing artifact, followed Braud's (1990) basic procedure but with several modifications. Of most note, the concentration time was cut from 15 to 5 mins, and Ps were not aware of when control trials were being conducted and were engaged in other tasks, obviating the need to intentionally block imagery related to the hemolysis influence. Random decisions were eliminated wherever possible to reduce the chances of decision augmentation (May, Utts, & Spottiswoode, 1995). We also introduced two major independent variables. First, we tested a sample of professional psychic healers to compare with a sample of ordinary volunteers that is likely comparable to Braud's sample. Second, in addition to correlating our hemolysis results with the general index used by Braud of the average GMF activity around the world, we manipulated the strength of the local GMF around the blood specimens while they were being lysed.

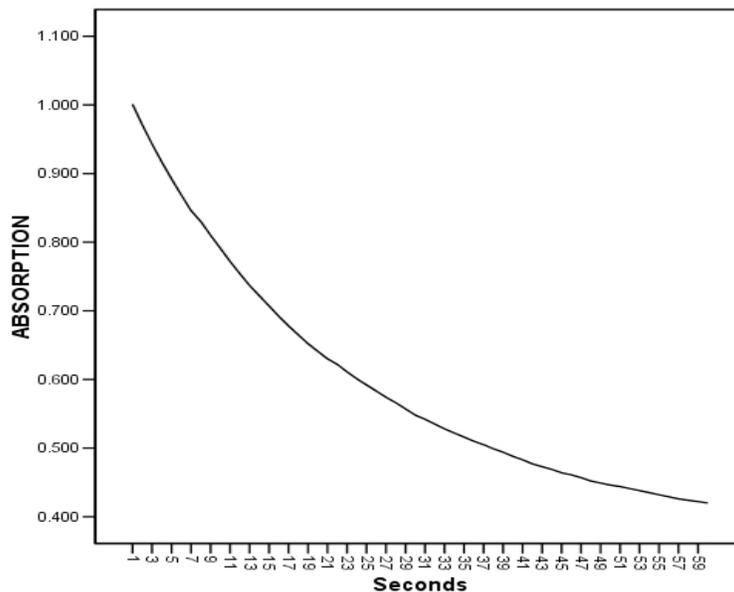


Figure 1. Decline in absorption of light over a 1-min interval in a hemolysis trial from the current experiment.

We had originally hoped to manipulate the AC component of the GMF, as this is the parameter associated with psi in the research literature (Persinger, 1989). However, this proved to be prohibitively costly, so we manipulated instead the DC component. The AC component is considered paramount

because of its proven relation to physiological processes *in vivo*, such as EEG (Persinger, 1989), but for *in vitro* processes the DC component might play a role. Finally, we incorporated a modified version of Hartmann's Boundary Questionnaire (BQ) and the Spiritual Transcendence Scale (STS). Thin psychological boundaries as measured by the BQ are reminiscent of the merging often reported by healers while engaged in healing. In a similar vein, the transcendent perspective is described as one where the person sees a fundamental unity underlying the diverse strivings of nature.

We generated the following hypotheses:

H1. For the sample as a whole, hemolysis will be retarded during concentration periods as compared to control periods.

H2. Healers will be more successful in the hemolysis task than non-healers.

H3. Hemolysis will be retarded more successfully when the GMF surrounding the blood specimen is on than when it is off.

H4. The hemolysis scores will be positively correlated with the earth's GMF on the day preceding the test session.

H5. High scorers on the BQ and STS will more successfully retard hemolysis than will low scorers.

H6. Healers will score higher on the BQ and STS than non-healers.

H7. BQ and STS will correlate positively with subjective estimation of success in the hemolysis task.

METHODS

Participants

Healers. Psychic or spiritual healers were recruited by announcements at Rhine Research Center (RRC) events, word of mouth, fliers distributed in the local area, and local magazines with a focus on spirituality.

Non-healers. Non-healers were recruited by announcements at Rhine Research Center events, distribution of fliers in the local area, and advertisements placed in local weekly newspapers. Six of these had undertaken introductory courses in healing methods, but none defined themselves as "healers".

Questionnaires

Boundary Questionnaire. A shortened version of Hartmann's (1991) Boundary Questionnaire developed by Rawlings' (2001-2002) was used for the experiment. This 46-item scale has an alpha coefficient of .74 and correlates .88 with the original BQ. It has 6 relatively orthogonal subscales: Unusual Experiences (UE), Need for Order (NFO), Trust (Tr), Perceived Competence (PC), Childlikeness (Ch) and Sensitivity (Se).

Spiritual Transcendence Scale – Revised. The STS consists of 23 items broken down into 3 subscales: Prayer Fulfilment (10 items), Universality (7 items), and Connectedness (6 items). The scale has good external validity and generalises across different religious groups and a culture outside of the US (Piedmont, 2002).

Post-intention Questionnaire. The PIQ is a 10-item rating scale developed by Simmonds that asked Ps about their beliefs regarding psychic or spiritual healing, personal experiences related to such healing, the method they used to protect the blood cells in the experiment, their state of consciousness during this effort, their motivation for the task, and the degree of success they expected. The PIQ was given only to the non-healers, as similar questions were included in an in-depth interview of the healers.

Lab Layout

The experiment was conducted in a 4-room suite at the RRC. Each room was partly sound-attenuated. The 2 rooms principally used for the experiment were at opposite ends of the suite, 12.75 feet apart and separated by 4 walls. The "intention room" was where P attempted to influence the blood samples under

the supervision of Experimenter 1 (E1). The "hemolysis room" was where the hemolysis of the blood was induced and measured by Experimenter 2 (E2). A third room was used for storage and preparation of materials. A diagram of the suite is presented in Figure 2.

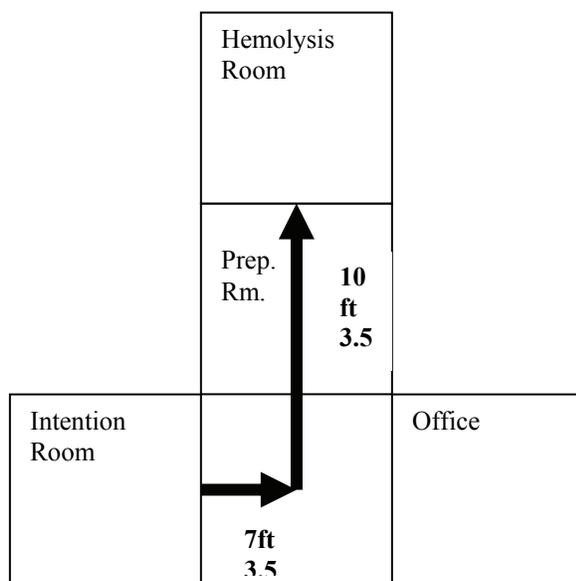


Figure 2. Layout of the research suite.

Experimental Design and Condition Assignments

There were 80 sessions in the experiment. Each healer completed 2 sessions and each non-healer completed 1 session.

Each session consisted of 2 runs, during each of which 8 consecutive 1-min hemolysis trials were conducted. One of these runs was labelled "test" and the other "baseline". Trials 4 and 5 of each run were labelled as "experimental" and the other trials as "control". The only difference between the test and baseline runs was that during the experimental trials of the test run Ps attempted to retard the hemolysis process, while during the experimental trials of the baseline run they did not intend to retard the hemolysis. In fact, Ps were not informed that hemolysis measurements were being made at any times *other* than those corresponding to the *experimental* trials in the *test* run.

The primary dependent variable in the study was the hemolysis scores, which reflected the decrease in the average absorption of light passing through the lysed blood samples from the 1st 5 secs of the 1-min measurement period to the last 5 secs of the measurement period. The two manipulated independent variables in the experiment were (1) the order of the test and baseline runs within the session and (2) whether the GMF surrounding the blood samples during hemolysis was on or off. E3 (Palmer), who was not involved in testing the Ps, created the counterbalanced orders for both independent variables. The within-session order of the test and baseline runs was varied according to an ABBA sequence, separately for the healer and non-healer sessions. The order of runs for the 2nd healer session was always the opposite of the order in the 1st healer session. For the order of runs, E3 placed two kinds of ESP cards in sealed opaque envelopes with the session number and subsample written on the outside of the envelope. The order of the cards reflected the desired ABBA sequences. However, he did not determine which symbol was to represent test and which was to represent baseline. This designation was determined by E1 by a coin flip prior to the 1st session, after she had received the deck from E3. E1 did not reveal to E3 the result of the coin flip, because E3 wanted to be blind to the run assignments while carrying out the preliminary phases of the data analyses. E2 was told that the run assignments were random, and she was thus blind to the run order designations as well.

Due to an error in the transmission of session assignments, all healers received the GMF-off condition in their 1st session and the GMF-on condition in their 2nd session. However, the GMF settings were orthogonal to the order of run types within the session for both subsamples. The switch positions on the GMF device were only labelled "1" and "2", and during the experiment only the builder of the device, Baumann, knew which of these positions corresponded to GMF-on and GMF-off. The device emits no detectible sound, heat, or light regardless of how it is set, so E2 could not tell in which state the device was in.

GMF Device

A digital magnetometer (F.W Bell model 7010, Sypris Test and Measurement, Inc.) with both axial and transverse probes was used to measure magnetic fields. Inside the spectrophotometer the magnetic field was highly distorted, especially when the unit was turned on and producing its own magnetic fields. To approximate the static component of the GMF, it was decided to suppress the distorted field around the blood sample for half the trials and then artificially approximate the ambient field outside the chamber (0.5 Gauss) with a pair of Helmholtz coils around the sample for the other half of the trials.

To shield against extraneous magnetic fields occurring inside the spectrophotometer measurement chamber, a box was constructed out of high-permeability mu metal. The box fits snugly inside the chamber and surrounds the cuvette holder containing the blood sample. A sliding door on top allows access for placing and withdrawing samples. Small apertures on the two side walls allow the spectrophotometer light beam to travel unimpeded through the sample during measurements.

To reimpose inside the shielded chamber a magnetic field of approximately the same strength as the static GMF, paired Helmholtz coils approximately 1 cm apart were wound around the cuvette holder in the center of the chamber and each supplied with sufficient current (~0.12 A) from a constant current source (Agilent E3642A DC Power Supply) to produce a 0.5 G field in the center of the cuvette holder. A switch between the power supply and the shielded chamber allowed the current to the Helmholtz coils to be toggled off or on, thus creating inside the cuvette either a negligible field or a magnetic field of approximately 0.5 Gauss. With the GMF-off setting (1), the static magnetic field measured at the level of the blood sample was ≤ 0.03 G (e.g. at least 94% attenuated). With the GMF-on setting (2), the field was $0.5 \text{ G} \pm 6\%$ in the vertical direction.

Blood Samples

To assure maximum safety for the experimenter handling the blood samples, we did not follow Braud's (1990) procedure of having individual participants contribute their own blood samples. Instead, we used outside donors whose blood had already been pre-screened for diseases such as HIV and hepatitis. During the course of the experiment, a registered nurse collected a single 40 ml sample of venous blood from one donor and 6 such samples from a 2nd donor into 6 ml Vacutainer tubes containing Solution B anti-coagulant. The Vacutainer tubes were stored in a refrigerator kept at 4° C. Each donor signed a consent form before their first blood draw.

Hemolysis Preparation and Measurement

Preparation for the Hemolysis Runs. As needed, approximately equal amounts of distilled water and .85% physiological saline were mixed by E2 in a beaker, yielding 700-800 ml samples of approximately .425% saline. The top of the beaker was covered with plastic wrap to minimize evaporation. Prior to each session, a small amount of the saline solution was titrated until the percentage was exactly .425, as measured by a Fisher Scientific Digital Conductivity Meter. A clean syringe with graded ml markings was then used to inject exactly 3 ml of the saline solution into each of 16 10-mm glass cuvettes located in a rack. The plastic caps were then put back on the cuvettes.

After it was allowed to warm up for 15 min, E2 entered the test parameters into the memory of a Unico S2100 Spectrophotometer (s-meter). Following Braud (1990), the wavelength of light to which the s-meter would be sensitive was set at 660 m μ . The trial duration was set to 63 sec, 3 more than needed.

Procedure for Hemolysis Runs. A few minutes before the 1st of the 2 hemolysis runs, the Vacutainer tube containing blood was inverted 8 times, uncorked, and part of its contents transferred to near the top of a 10 ml Pyrex test tube. Both tubes were immediately corked and the Vacutainer tube returned to its rack in the refrigerator. The rack containing the cuvettes with saline solution was transferred to the hemolysis room and placed near the s-meter. The Pyrex test tube of blood was moved to this same rack. E2 wore rubber gloves during all times that she was handling the blood.

E2 allowed a period of 10 min following her greeting of P to allow for the orientation period. (This time interval was reduced to 5 min for the 2nd session of healers.) E2 then set her digital timer to 2 min and transmitted the 1st of 3 beeps over the intercom to E1 in the intention room (see Test Procedure below). She then conducted the calibration test, which provided the baselines for the test absorption values, by transferring one of the cuvettes from the rack to inside the s-meter and closing its door. When the computer screen indicated that the calibration test was completed, E2 placed the cuvette back in the rack, leaving the door of the s-meter open. She then affixed a plastic tip to a Model SC-300UL Finpipette and withdrew 50 μ l bloods from the Pyrex test tube, leaving the blood in the tip. When the timer reached 20 sec, signalling the beginning of the trial, E2 pressed a button on the computer keyboard that began the countdown of a pre-set 60 sec initial delay, the course of which she could follow on the computer screen. When the initial delay reached 14 sec, E2 in rapid succession transferred blood from the pipette to the to the cuvette containing the saline solution, recapped the cuvette, inverted it twice to mix the contents, placed it inside the s-meter, closed the lid of the GMF device, and then closed the lid of the s-meter. When the computer screen indicated that the 63 secs had elapsed, E2 immediately set her clock back to 2 min, saved the file with the digitized absorption values to the computer hard drive, ejected the used pipette tip into a BD Sharps waste canister, and proceeded with her preparation for the next trial.

The above procedure was used for each of the 8 trials in each of the 2 runs. The only modification was to signal E1 as to the start and stop times of the intention period for P. Thus E2 transmitted the 2nd of the intercom beeps when the digital clock recorded 23 sec prior to the start of trial 4, and the 3rd beep immediately after the 63-sec measurement period for trial 5.

Procedure for Participants

Prior to each session, E1 set the GMF device to “1” or “2” as listed by the order generated prior to the start of the experiment by E3. The envelope containing the code for the order of runs in the session was placed outside the intention room to be opened just before the start of the session. Prior to the testing period, E1 and E2 spent a few moments relaxing in the intention room, affirming the importance of the study and that the study would be a success. E1 brought P, who was usually waiting in the lounge area of the RRC, to the intention room. The procedure was explained to P, who then signed the information sheet / consent form.

Next, P was taken into the hemolysis room to meet E2 and see the sample of blood displayed in the Pyrex test tube next to the s-meter. Ps who asked whether they could handle the tube containing the blood were given a pair of rubber gloves for this purpose. Any questions about the general procedure were also answered at this time. Once P was happy with the general procedure, both E1 and P left the hemolysis room, closing the door behind them.

Orientation Period. On return to the intention room, E1 set a timer to 0 for the 10-min orientation period. The timer was used to help E1 coordinate the activities in the intention room with E2's activities in the hemolysis room, and it was closely monitored by E1 throughout the session. After P was seated in the intention room, E1 went to open the envelope indicating the order of the runs. She then returned to the intention room and described the specific details of the study to P. Ps were told that there would be two halves to the study, with a short break time in the middle, when they would be offered some refreshments. Ps were then shown a PowerPoint display illustrating a single red blood cell undergoing hemolysis. It was reiterated that P's task was to attempt to stop or slow down this process using mental intention and visualization. Ps were given an example of the signal beeps that they would hear at various times. They were also shown a screen shot of a healthy whole blood cell, which they could have on the computer monitor in front of them during the intention period if they wished.

At this point, the sequence of events began to vary, depending upon whether the test period or the baseline period was to be first. The test and baseline periods each lasted 25 mins, separated by a 15-min refreshment break.

Test Period. Ps were told that there would be 3 beeps during this part of the experiment. The 1st beep signalled the start of the preparation stage, which was timed to last 10 min. Non-healers were told that at this point they would hear some relaxation instructions (in the voice of E1), including music ("Discreet Music" by Brian Eno) and sounds of the sea in the background; the music was optional for healers. For all Ps, the recording included affirmations for success in the voice of E1. Healers were told that the wording could be ignored, or other words substituted in their mind, if they preferred. At the end of the 8.5 min recording Ps were told that they would continue to hear music (again, optional for the healers) and that this would be followed by a 2nd beep, indicating the start of the 5 min protection/intention phase. A 3rd beep would signal to P to stop the intention.

Prior to the 1st beep, non-healers were given a sheet containing written suggestions for visualization strategies that could be used to protect blood from the process of hemolysis. They were informed that they could also use their own visualization method or a combination of different methods. After Ps had read the sheet, they were asked to inform E1 which method they thought they might employ. To help them to focus on the task, P's were asked to press the down arrow key on the computer keyboard to see an example of a healthy blood cell during the protection stage. Healers were told that they should employ the methods that they usually use when undertaking their healing work as much as possible within the confines of the experimental set-up. If the baseline period was first, these instructions were given at the end of the break period.

At the sound of the 1st beep, E1 started the relaxation music, reset the timer to 0 and left the intention room. When the intention period was over, the intercom was switched off. Non-healers then completed the PIQ, and there was some informal discussion of the experience of the experiment. Healers, on the other hand, were interviewed by E1 in depth about their subjective experience of healing, including an exploration of the methods that they employ in the real world and what they had just experienced in the laboratory situation. The interviews were tape-recorded for later transcription.

Baseline Period. The intercom was switched off during the entire baseline period and turned on again during the break if the test period was to follow. (This assured that neither she nor P would hear the beeps being sent from E2, who needed to follow the same beep protocol for each run in order to remain blind as to which run was the test run.) During the baseline period the non-healers completed the BQ and STS. Healers in their 1st session either began or continued with the in-depth interview during the baseline period, whereas in their 2nd session they completed the BQ and STS during this period.

Conclusion. The whole experiment lasted 75 minutes including the orientation period and break time. At the end of the experiment, Ps were thanked for their time, given a debrief sheet about the nature of the study, and asked if they wanted additional feedback after the experiment was completed.

RESULTS

Aborted Sessions and Replacements

Ten sessions early in the experiment had to be aborted because of procedural errors. All these replacement decisions were made by Palmer prior to his awareness of condition assignments and computation of hemolysis scores.

Computation of Hemolysis Scores

Following Braud (1990), change scores were computed by subtracting the mean of the last 5 values in the 1-min trial period from the mean of the 1st 5 values. The beginning of the 1-min trial was defined as the highest value in the trial. On rare occasions where initial values were low due to a delay in getting the

door of the GMF device closed on time, one or more of the 3 extra values at the end of the trial were substituted. These change scores were transformed into *t*-scores representing the experimental manipulation by subtracting from the mean of the 2 concentration (experimental) trials the mean of the 6 control trials and dividing the difference by the unbiased standard deviation of all 8 scores, assuming in each case unequal variances for the *ts*.

To correct for the expected confounding of these change scores by the initial values of the trials, corresponding *t*-scores were computed for the initial values. A regression analysis of the change scores with the initial scores as predictor yielded $R = .720$. The residuals from the regression reflect the increase of absorption not associated with the initial values. The grand mean of the CH distribution was added to each of these residuals, the results of which then became the revised change scores.

To eliminate gross skewness of the score distribution, outliers were moved toward the mean such that they were less than .5 *SD* from the most extreme non-outlier, and a natural log transform was applied (Details of these adjustments can be found in Palmer, Baumann & Simmonds, 2005). Finally, a constant was subtracted from all the scores to bring the grand mean to 0 and the scores were then multiplied by 100. *Negative* scores indicate a decrease in the rate of hemolysis and positive scores an increase.

Only at this stage did Palmer, who performed the above analyses and decided how to do them, break the code to determine which of the 2 *runs* in the session was test and which baseline. The 160 run scores were then transposed into two columns representing the scores for the test and baseline runs respectively. The difference between these scores (test minus baseline) are referred to below as D-scores.

Adjustments of Other Scores

Global Geomagnetism (Ap) Scores. We decided to examine the *Ap* indexes for the day preceding the day of testing, as this is where Braud and Dennis (1989) found their effect, but we also analysed the day of the test, as this is the day one would expect on logical grounds to be the most relevant. These measures will be referred to as *Ap(-1)* and *Ap(0)* respectively. Again, adjustment of outliers and log transforms were applied to both measures, as well as to the BQ and the STS scores.

Tests of Hypotheses

The 1st 3 hypotheses were evaluated by ANOVAs and *t*-tests of the hemolysis scores for the test and baseline runs. The corresponding mean D-scores are presented in Table 1.

Table 1
Mean hemolysis difference scores for healers
and non healers in the two GMF conditions

<i>Participant group</i>	<i>GMF switch</i>		<i>Mean total</i>
	Off	On	
Healer	1.255	-.621	.317
Non Healer	4.409	-.025	.384
Mean total	2.832	-.323	1.25

H1 was tested by examining the hemolysis main effect (test vs baseline) in the analysis of all 80 sessions. The difference was not significant, and slightly in the direction of hemolysis acceleration (opposite the prediction), $F(1/72) = 1.07, p = .305$.

H2 was tested by comparing the 1st sessions of the 20 healers and the 40 non-healers. The healers accelerated the hemolysis slightly less than the non-healers, but the difference was not significant, $t(56) = 0.95, p = .348$. Healers showed a slight retardation of hemolysis in their 2nd sessions, $F(1/18) = 0.50, p = .826$, but this reversal of their session 1 results was not significant, $F(1/18) = .347, p = .563$.

H3 was tested separately for healers and non-healers, because GMF was manipulated between sessions in the former case and within sessions in the latter. For the non-healers, contrary to the prediction, the

acceleration of hemolysis was slightly greater in the GMF-off condition, $F(1/36) = 1.72, p = .199$. The same direction of scoring was found for the healers, again nonsignificant, $F(1/18) = 0.35, p = .583$.

Hypotheses 4 and 5 were tested using hemolysis difference scores (D-scores), which were simply the test run scores minus the baseline run scores.

Following Braud and Dennis (1989), H4 was tested by dividing the D-scores for each *session* at 0, referring to those with negative scores as *hitters* and those with positive scores as *missers*. The mean Ap(-1) score for hitters was .906 compared to .782 for the missers. This result, although in the predicted direction, was not quite significant, $t(78) = 1.42, p = .081$, one-tailed.

H5 was tested by computing correlations between the BQ or STS scores and the D-scores for the combined groups. In both cases, the results were in the predicted direction but nonsignificant. For the BQ, $r(58) = -.071, p = .590$. For the STS, $r(58) = -.067, p = .612$.

H6 was tested by computing the difference between the means of the BQ and STS for the 1st sessions of the healers and non-healers. The mean of the 20 healers on the BQ was 84.38 ($SD = 15.94$) compared to 90.05 ($SD = 18.65$) for the 40 non-healers. This nonsignificant trend indicates thinner boundaries for the non-healers, opposite the prediction, $t(58) = 1.37, p = .177$. The STS mean of the healers was 105.15 ($SD = 4.02$) compared to 89.88 ($SD = 9.77$) for the non-healers, $t(57.8) = 8.87, p << .001$. Thus H6 is strongly supported for the STS. The variance on STS was also significantly lower for the healers than for the non-healers, $F = 7.16, p = .010$, by Levene's Test.

H7 was tested by correlating the BQ or STS scores with the responses of non-healers to the PIQ question asking them to estimate their degree of success in retarding the hemolysis. For the BQ, the result was in the predicted direction but not significant, $r(38) = .200, p = .228$. For the STS, the result was highly significant in the predicted direction, $r(38) = .597, p << .001$.

For the overall sample, the BQ and STS were uncorrelated, $r(58) = .050, p = .705$. However, they were correlated positively to a significant degree for the healers, $r(18) = .345, p = .029$, with a reversal for the non-healers, $r(38) = -.204, p = .387$. The difference between these correlations approaches significance, $z = 1.94, p = .053$.

Significant Post-hoc Analyses

Age. The only psychological or demographic variable to correlate significantly with the 1st session D-scores was age. The healers had a mean age of 49.84 compared to 41.36 for the non-healers, $t(53.5) = 2.98, p = .004$. The ages of the non-healers were significantly more variable than those of the healers, $F = 11.32, p = .001$.

Older Ps were more prone to accelerate the hemolysis than younger Ps, $r(56) = .294, p = .025$. Non-healers conformed to the pattern for the entire sample, $r(37) = .461, p = .003$. However, the correlation reversed for healers, $r(17) = -.276, p = .253$. The two correlations significantly differ, $z = 2.60, p = .010$.

The age distribution of the non-healers was bimodal: a younger group ($N = 12$) with a range of 15-30 years, and an older group ($N = 27$) with a range of 36-63 years. The mean D-scores of the older and younger groups were virtually identical in magnitude (5.861 vs. -5.635). The mean for the older group was significant, $t(26) = 2.77, p = .010$, but the mean was not quite significant for the younger group because of the smaller sample size, $t(11) = 1.75, p = .108$. However, the difference between the 2 groups is now comfortably significant, $t(37) = 3.00, p = .005$. The point of all this is to show that it is best to interpret the age/hemolysis relationship bi-directionally: non-healers over 35 tended to accelerate the hemolysis and non-healers under 31 tended to retard it.

GMF and Run Order. In the original ANOVA for non-healers, a significant main effect for GMF, $F(1/36) = 6.44, p = .016$, was superseded by a significant GMF x run-order interaction, $F(1/36) = 4.58, p = .039$. The relevant hemolysis scores (T-scores) are based on the combined results of the test and baseline runs. Although the interaction does not include the run-order control, it is a psi effect because E2 was blind to the run order. An adjustment of 1 outlier brought the skewness of the distribution within acceptable limits.

As illustrated in Figure 3, the interaction is such that the effect of GMF on the T-scores is restricted to Run Order A (test run given first), for which the mean T-score was -3.292 with GMF off, $t(9) = -2.53, p =$

.032. With GMF on, the mean T-score was +3.899, $t(9) = 2.53$, $p = .032$. The difference between these two means is highly significant, $t(18) = 3.56$, $p = .002$. The means for Order B do not differ significantly from 0 or each other.

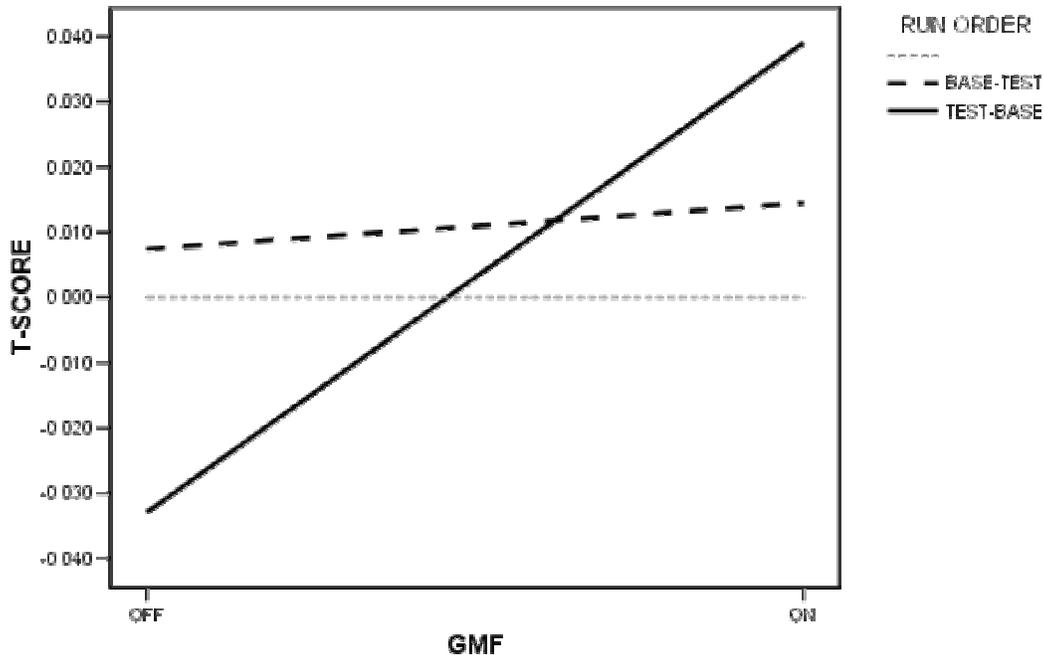


Figure 3. Hemolysis T-scores as a function of GMF and run order for non-healers.

For healers, the corresponding interaction was not significant, $F(1/18) = .821$, $p = .377$, but in the same direction as for the non-healers, with the biggest difference in Order A. The result of the GMF x run-order interaction for the two groups combined is associated with Stouffer $Z = 2.08$, $p = .038$, two-tailed.

Finally, it was found that Ps with thin boundaries on the BQ contributed most to the retardation of hemolysis (negative T-scores) found for the 1st run with Order A and GMF off, $r(18) = -.451$, $p = .046$. With GMF on, the corresponding correlation was close to chance: $r(8) = .127$, $p = .727$. The two correlations do not differ significantly from each other, $z = 1.37$, $p = .170$.

Variance

As it remains possible that Braud's (1990) variance scores reflected psi, we wanted to learn if there were any variance effects in the present experiment. The one legitimate way we could think of to test for this was to compare the variance of scores around mean chance expectation in the test and baseline runs. This ratio was not significant, $F(78/78) = 1.36$, $p = .354$, and the higher variance was in the baseline run. The subsample in our study most comparable to Braud's sample was non-healers with GMF off. Although the variance this time was higher for the test run, the ratio was not significant, $F(18/18) = 1.63$, $p = .618$.

DISCUSSION

None of the strictly parapsychological hypotheses (1-4) were confirmed, with neither healer status nor the GMF manipulation having any direct effects on the results. We did, however, come close ($p = .081$, one-tailed) to successfully replicating Braud and Dennis's (1989) finding of a positive relationship between naturally occurring GMF and success at producing hemolysis retardation. As this was the only

legitimate significant finding to emerge from Braud's hemolysis experiment, perhaps this result should not be too surprising.

If the effect is real, it is odd that it should be significant only on the day prior to the test session. In discussing results from the only other study to produce this "day -1" effect, Adams (1985) suggested solar flares as the origin of such a factor, as GMF activity is elevated the day after these flares. This implies that some consequence of solar flares that registers on earth at the time of the flare (light?) might play the causal role.

Our "data snooping" yielded 2 significant post-hoc effects, which, of course, must be considered only suggestive pending replication. The first was a positive correlation between age and the primary hemolysis difference scores, such that Ps 35 or above seemed to accelerate the hemolysis and Ps 30 or below seemed to retard it. We have no good explanation for the effect of age, which is only rarely reported as a significant correlate of psi in adults (e.g., Morris, Dalton, Delaney, & Watt, 1993, Novomeysky, 1984; Palmer, 1978).

The 2nd was a complex effect that applies to the combined hemolysis scores of both the test and the baseline runs. The finding was restricted to 1st sessions of Ps who received the test run first. Hemolysis was accelerated if the GMF was on and retarded if it was off. The retardation appeared more strongly with Ps who had thin boundaries on the BQ. The fact that the baseline run contributed to the effect is not surprising, as other evidence exists that PK can occur without awareness of the target system (e.g., Berger, 1988; Stanford, Zenhausern, Taylor, & Dwyer, 1976.) The fact that the effect was restricted to the test-first condition is consistent with E1's observation, solicited by Palmer before she was told of this outcome, that Ps' motivation for the task tended to be dampened when the test run was delayed. On the other hand, E1 noted that this tendency was more noticeable for the healers, whereas the effect was more prevalent in the non-healers. It may be that the interview given the healers was a more convincing and enjoyable filler than the questionnaire completed by the non-healers, reducing the effect of trial order in the former.

The differential effect of the GMF manipulation per se is harder to account for. One might speculate that it is the natural tendency of the GMF to accelerate processes such as hemolysis -- that is at least what the AC component of the field seems to do in the case of the EEG (Persinger, 1989) -- and when the Ps recruited this energy, it simply followed its natural tendency, despite the contrary intention of the Ps. In the absence of such energy, the Ps either recruited some other energy source without these accelerating tendencies or no energy source at all to retard the hemolysis. In any event, whereas the AC component of the GMF around the person seemed to facilitate hemolysis retardation in our experiment, the DC component of the field around the specimen seemed to thwart it. This finding contradicts Braud's (1990) results; one must assume that a standard GMF field was present around the specimens in his experiment, yet hemolysis retardation was more prevalent than acceleration in his data. However, even if this effect was psi-mediated, it could have been due to psi-mediated variation in the start times of the measurements rather than a physical effect on the specimens.

In line with Hypothesis 6, it was demonstrated that healers scored higher than non-healers on the STS scale, despite the fact that many non-healer participants also seemed to adhere to a spiritual world view (as reflected in the negative skew in the data). One of the reasons for the inclusion of spiritual transcendence as a variable in this study was the observation that healers are often considered to be spiritual individuals, even offering "spiritual" healing in their advertisements. During the interviews, many healers spoke of their personal spiritual development and had a focus on healing "with love" for the benefit of humanity and "the greater good". Spiritual transcendence has been related positively to mental health measures (e.g., Cooper, 2003) As such, healers, might be considered to be a well adjusted group of people, and the subjective experience of undertaking healing and feeling successful may be related to good mental health.

If we assume that the effects we have uncovered are real and due to PK on the part of the Ps, what implications do they have for psychic or spiritual healing? First, they demonstrate that practicing healers produce such effects no more strongly or reliably than do ordinary volunteers of the type tested by Braud (1990). Second, the results with the GMF manipulation suggest that the effect can be produced in the absence of specific intention or effort to produce them. The most sobering implication of our data derives from the evidence of hemolysis acceleration. Translated into healing terms, this means that healers could unintentionally "mis-direct" their PK to make an illness worse rather than better. Psi-missing is a well

known feature of psi, so one should not be surprised to see it apply to PK that occurs in the context of healing. Finally, if the finding with the Ap index continues to hold up, it may suggest that healing should be performed on days when the global GMF is relatively high, but not outside the normal range.

Finally, it should be noted that the failure of healers to show exceptional ability in this experiment says nothing about their abilities to perform the different kinds of healing tasks involved in their practices.

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DYADIC COMMUNICATION IN THE GANZFELD: REPORT ON A PILOT STUDY WITH A MODIFIED EXPERIMENTAL PROCEDURE

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INTRODUCTION

‘Psi-communication’ in the ganzfeld (‘ganzfeld telepathy’) is an established paradigm in experimental parapsychology of last decades (Honorton et al., 1990). Results have been considered as providing evidence for an ‘anomalous information transfer’ (Bem & Honorton, 1994), although later meta-analyses questioned validity of this conclusion.

In a typical ‘ganzfeld telepathy’ experiment both participants are aware of the ‘psi’ character of the task, i.e., the communication anomaly involved. For subjects not familiar with parapsychology research and/or not sharing the ‘belief’ in telepathy, this may mean facing a ‘mission impossible’. This leads to the question if the overt ‘psi’ character of the experimental situation is necessary for successful communication. Furthermore, in such a typical experiment the ‘receiver’ is allowed, or encouraged, to verbalise continuously her/his mentation. This may divert the ‘receivers’ attention from the instruction and contaminate the ‘true’ ganzfeld-induced imagery with free associations, thought fragments, and other cognitive processes; also verbal activity is known to cause muscular artefacts in simultaneous EEG recordings. Therefore we prefer participants in our experiments giving reports on their mentation in discrete ‘chunks’, at times of maximally developed imagery, as in our earlier studies (Pütz et al, 2005).

Some authors advocate dynamic targets of rich content and featuring ‘dramatic changes’ as facilitating the ‘psi’ communication (Parker, Grams, & Pettersson, 1998). On the other hand, May et al. (1994) argued for content homogeneity (‘noise reduction’) in Remote Viewing research. There is no evidence that rich content is really a necessary condition for efficient communication in ganzfeld.

The aim of this study was elaboration of an experimental procedure acceptable for all participants (no subject indoctrination), focusing on ganzfeld-specific imagery, and compatible with EEG recordings planned for later stages of the study. Specifically, in this pilot study we tested the experimental procedure in terms of time management, interactions with participants, acceptance of instructions by them, reporting and rating. The EEG recording system was used to record synchronisation markers triggered by subjects’ reports and/or issued by the target presentation software, but no real EEG was recorded.

METHODS

Participants

Ten pairs (15F / 5M; mean age: 28.4 yrs, range: 16–55 yrs) were recruited using the local university’s job exchange service. All participants were reportedly of good health, had no medical or neurological problems, and gave their signed consent prior to the study.

Experimental procedure

After introduction to the laboratory facilities the participants were separated, individually instructed of their tasks, and individually guided to their respective rooms.

One subject (A) was exposed to multi-modal ganzfeld (MMGF), using the same procedure as in our earlier studies (Wackermann *et al.*, 2002, 2003; Pütz, Braeunig, & Wackermann, 2005): anatomically shaped translucent goggles applied on the subject's eyes, illuminated with bright red light, a monotonous sound of waterfall applied via headphones. The subject was instructed to report her/his ganzfeld imagery whenever it occurred. The onset of her/his verbalisation elicited a signal via a voice-key, the acoustic stimulation was stopped, and the subject gave a verbal report of his experience, and responded to six questions from a structured inquiry via intercom. All reports and subject-experimenter communication were stored in audio files on a computer.

The other subject (B) was instructed to watch a repeatedly presented video clip, to experience it as intensely as possible ('immersion'), and memorise its content for a later report. The instruction allowed even 'mental play-back' of the material, while the subject closed her/his eyes. The focus was thus on the subject's inner experience, not on her/his continuous perception of the visual stimulus. Video clips were presented on a 17" TFT display in PAL resolution (720×576), using a modified version of the 'Automated Digital Ganzfeld' software developed at the University of Gothenburg (Goulding *et al.*, 2001). Digital signals marking the start/end of each presentation, and re-starts of the clip, were generated by the software and transmitted to one of the laboratory computers, where they were stored in parallel with the markers generated by the voice-key in room A.

An experimental session consisted of three consecutive trials, each trial consisting of a 'communication' and 'rating/reporting' phase. During the communication phase (20 minutes), subject A was relaxing in ganzfeld, and possibly reporting her/his inner experience, while subject B was watching the video clip. Then the subject B was transferred to room C, where (s)he gave a written account of the content of the presented clip. Subject A was then guided to room B, where (s)he was presented, at a random order, four video clips, the target clip and three 'decoys'. The subject watched the clips in an order to her/his choice and, afterwards, and rated the similarity of each of the four clips to her/his ganzfeld experience on a scale from 0 (no similarity) to 100 (maximal similarity), using a mouse-operated 'slider'. During the experiment participants were not aware what was the task of their partner.

Experimenters did not know which set and which clip within the set was selected as the target. Subjects were instructed not to communicate the contents of the video clips, their ratings, or any related information to the laboratory staff and/or a third party.

Stimulus material

The visual material used in the study was collected from diverse sources (publicly distributed feature or documentary movies, etc.). Sequences of minimum duration 30 seconds, showing maximal homogeneity of content, were selected and digitised (duration range 30–123 sec, median 60 sec). The clips were classified using the Stimulus Content Classification System (SCCS) developed to this purpose in our department. In this system, each clip is described by a 6-dimensional binary vector representing six primary content categories (Human, Animal, Artefact, Architecture, Nature, Elements); the presence of a content category is coded by 1, the absence by 0. The description space, $\{0,1\}^6$, thus consists of $2^6 = 64$ possible combinations. Hamming metric, d_H , defined in the description space,

$$d_H(\mathbf{u}, \mathbf{v}) = \sum_{i=1, \dots, 6} |u_i - v_i|, \quad \mathbf{u}, \mathbf{v} \in \{0,1\}^6,$$

measures the contents dissimilarity between two targets represented by binary descriptors \mathbf{u} and \mathbf{v} . The available material (32 sets) was subdivided into eight sub-sets by four clips, such that the sum of all pair-wise d_H 's within a set was maximised, to achieve maximal diversity of the contents within each given set.

RESULTS

Twenty-two imagery reports were collected (mean = 2.2 report/session). Average yield was 0.8, 0.7 and 0.7 reports for the first, second and third trial. One subject produced 10 reports, two subjects gave none. These rather low figures are not surprising: participants were not pre-selected, and this was their first ganzfeld experience. Accordingly to our previous studies, mostly visual imagery was reported (73%), while acoustic imagery was more frequently reported (41%), due to two subjects, who reported acoustic imagery unusually often.

Statistics of correct target identification

The target clips were correctly identified ('direct hits' in traditional nomenclature) in 10 out of 30 trials. This corresponds to the 'hit rate' of 33%, which is not 'significantly' different from the mean chance expectation (MCE) 25% ($P = 0.1966$, binomial distribution $B_{30}(0.25)$). (We would need 90 trials at the 33% success rate to reach the conventional 'significance' level 0.05). This test, however, treats all 30 trials as independent events with the same probability of success, which is an unrealistic assumption.

Of interest are thus totals of correct identifications in each session, which may range from 0 to 3, with probabilities $p_0 = p_1 = 0.4219$, $p_2 = 0.1406$, $p_3 = 0.0156$ (binomial distribution $B_3(0.25)$, if the null hypothesis applies). This distribution and the observed frequencies of hit totals are shown in Fig. 1. Note the shift towards correct identifications: all three targets were correctly identified in one session ('hat-trick'); only in two sessions no target was identified. Taken as a singular event, the 'hat-trick' response may occur as 'significant'. However, the binomial probability $B_{10}(p_3)$ of one 'hat-trick' occurring in *at least one* of ten sessions is $P = 0.1457$. Thus even this result should be considered as *merely suggestive* of anomalous communication, not as a statistical proof.

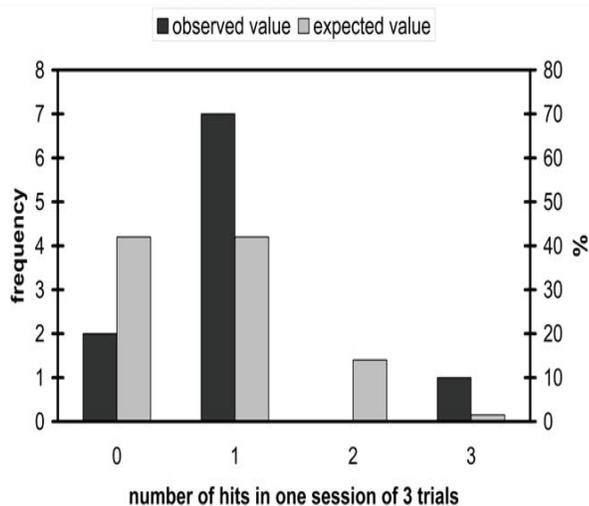


Fig. 1. Distribution of correct target identifications ('hits') per session.

There was no relationship between correct target identifications and presence or absence of imagery reports during the MMGF prior to rating ($\chi^2 = 0$, n.s.).

Rank-based statistics

The preceding section focused only on highest scorings; analysis taking into account all four clip scorings may be more adequate. However, scorings made on the [0;100] continuum pose certain problems: we possess no *a priori* knowledge of response distribution allowing for a parametric statistic, we have too few observations to construct these distributions *post hoc.*, and individual interpretation of the extreme points on the scale may be highly idiosyncratic. Indeed, frequent occurrences of 0's indicate that

some subjects interpreted this value as kind of categorical response. We thus reduce the scores from the interval [0;100] to their ordinal values (ranks): rank 1 ↔ highest score, and rank 4 ↔ lowest score.

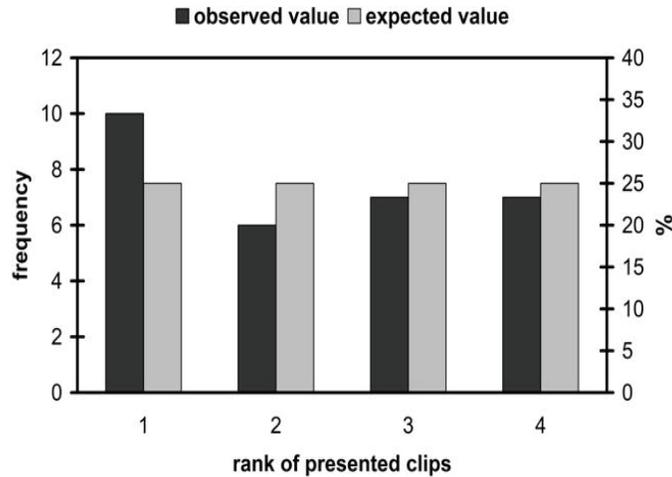


Fig. 2. Distribution of observed and expected ranks of presented target clips.

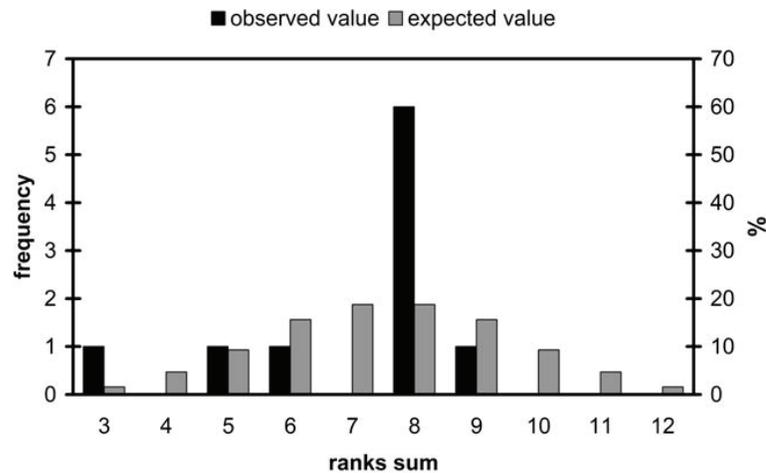


Fig. 3 Distribution of sum of the ranks of the 3 presented movies in one session

The null hypothesis predicts a uniform distribution of the ranks 1–4, with probabilities 0.25. Observed frequencies do not deviate significantly from the theoretical distribution (Fig. 2); $\chi^2 = 1.2$, $df = 3$, $P = 0.753$. As above, we take sums of the ranks given in each session. The theoretical distribution of these sums, ranging from 3 to 12, is shown in Fig. 3 together with observed values of rank sums. Seven out of 10 sums are actually higher than the MCE = 7.5: nothing suggests better performance, in terms of given ranks, than predicted by chance. The apparently deviating value 3 corresponds to the ‘hat-trick’ session mentioned above.

DISCUSSION

The obtained correct identification rate 33% is comparable with figures reported in the literature: there are no indications that our modifications have reduced the efficiency of a communication process (if there is any).

Multiple trials within a session may increase statistical power of the procedure and help to identify pairs able to establish the communication. Parker & Westerlund (1998) proposed use four clips / session (“serial ganzfeld”), and later used two clips / session (Goulding *et al.* 2001, 2004). Our choice, three clips / session, was a compromise: in future studies we intend use 4–5 clips/session.

Our modified procedure allows study of ganzfeld telepathy without confronting participants with an impossible task, forces the ‘sender’ to focus on the target during the ‘receiver’s rating phase, and is compatible with simultaneous EEG recordings. Forthcoming ganzfeld/EEG studies would involve pre-selection of subjects as to their responsiveness to ganzfeld, as we did in our earlier EEG studies (Wackermann *et al.*, 2003; Pütz *et al.*, 2005). Furthermore, we intend use head-up displays for both subjects, i.e. for ganzfeld induction as well as clip presentation; this should enable more intense presentations of visual material, and allow subjects’ rating without leaving experimental rooms.

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EXPERIMENTS TESTING MODELS OF MIND-MATTER INTERACTION

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ABSTRACT

A mind-matter interaction (MMI) experiment with random number generators (RNG) was used to test two types of causal models, those assuming forwards-time influences and those assuming backwards-time influences. Forwards-time influences are often referred to as psychokinesis or PK, and backwards-time influences as precognition or retrocausation. The test employed a Markov-chain, sequential dependency design to provide a way of tracing the history, and thus the possible causal sequences, within each trial. A pilot test and a replication provided significant evidence for an MMI effect, allowing the models to be tested. The forwards and backwards causal models were applied to the data, and in both cases the outcomes suggest that MMI is better accounted for by a retrocausal effect rather than a forwards causal effect. This outcome is consistent with goal-oriented models of MMI in RNGs, and it raises the possibility that teleological “pulls” from the future may be able to influence present-time decisions and events.

INTRODUCTION

Models proposed to explain effects observed in mind-matter interaction (MMI) experiments involving random number generators (RNG) tend to fall into two classes: those assuming processes moving forwards-in-time or backwards-in-time. The forwards-in-time models, known generically as *psychokinesis* (PK) models, assume the presence of an active, force-like influence. The backwards-in-time models assume either *precognition*, a passive, decision-like process, or *retrocausal PK* (retroPK), a backwards-active influence. One version of the precognition model is the Decision Augmentation Theory (May, Utts & Spottiswoode, 1995). Goal-oriented models that finesse the question of passive vs. active and forwards vs. backwards modes of influence have also been proposed (Schmidt, 1974; Stanford, 1974a,b).

One reason that a broad range of explanations has arisen for the same observations is because of the typical experimental design. The majority of RNG experiments have observed only the end-state of a sequence of random bits, or have recorded only summary statistics from multiple trials. Few experiments have explored the temporal details of how a particular trial ended up resulting in a “hit” or “miss.” And indeed, with most RNGs designed to produce independent and identically distributed (iid) random bits, even if those individual bits *were* available for study, we could not infer temporal effects with such sequences because a random walk with iid bits is fully symmetric in time. To overcome this time-symmetry, a sequential dependency can be employed. This was the approach used in the experiments described here.

PILOT STUDY

The experimental design, illustrated in Figure 1, used a random system that is mathematically described as a Markov chain. In this MMI “target,” an RNG is used to generate sequences of random bits that are in turn used to switch a random system between equally likely “1” and “0” states. The RNG was the Orion (Amsterdam, The Netherlands), an electronic noise-based circuit that provides sequences of truly random bits at 9600 baud to the serial port of a PC. The Orion RNG has been used extensively in

previous MMI research. This experiment was conducted on personal computers (PCs) running the DOS operating system, and the tests were programmed by the author in Microsoft QuickBasic 4.5.

The first random decision, state “R” in Figure 1, was produced by an Orion RNG generating a “1” or “0” with probability $p = \frac{1}{2}$. Then the RNG produced a series of random decisions which were processed sequentially through a Markov chain. The Markov chain caused the random system to persist in the existing state (with $p = 0.8$) and to switch to the other state occasionally ($p = 0.2$). Thus, even if the system started out with a highly biased RNG output at stage 1, say $p(1) = \frac{1}{4}$ and $p(0) = \frac{3}{4}$, as the decisions proceeded to later stages the outputs would progressively move towards equal probabilities, $p(1) = p(0) = \frac{1}{2}$. The longer the Markov chain, the more the final hit rate would approach $p = \frac{1}{2}$.

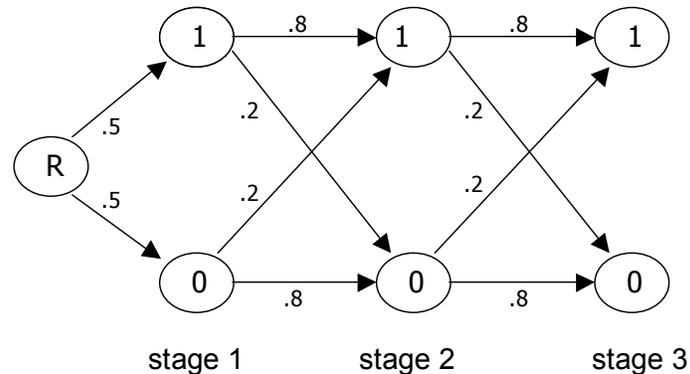


Fig. 1. Markov chain as a two-state, three-stage random target system for an MMI experiment. The circles represent states, the lines represent transitional probabilities.

Imagine that we sweep through this three-stage Markov chain N times. After each sweep or *trial*, we calculate the *hit rates* at stages 1, 2 and 3, where hit rate at stage x is defined as $hr_x = \sum(1's)/N$, and where the sum is taken over the number of times that the Markov system is in the “1 state” at stage x over N trials. With large N and an RNG designed to generate iid random bits with equal probabilities $p = 0.5$, this Markov chain will produce mean hit rates at stages 1, 2 and 3 approaching $hr = 0.5$.

Now consider the experimental task. The participant was asked to press a button with the intention of hearing a sound. After the button was pressed the RNG generated a random bit and the result was used to transition through the first stage of the Markov chain. Then the RNG generated a random bit for the second stage, and likewise for the third stage. If the last transition arrived in the 1 state, then the PC played an interesting audio clip, generally 5 to 10 seconds in length. Otherwise the PC was silent. Each sound clip was randomly selected by the PC, with replacement, from a pool of 500 available clips; most of the clips were short segments taken from popular television shows and movie soundtracks. Each trial was initiated with one button press.

For the first random decision, the PC retrieved a random byte. If the decimal value of the byte was ≤ 127 then the random system went into the 0 state, otherwise it went into the 1 state. For succeeding transitions, if a random byte was equal to 0 or > 100 then the byte was rejected and another byte was retrieved. When a byte with value 1 – 100 was obtained, if it ranged from 1 – 80 then the link $p = 0.8$ was followed, otherwise the $p = 0.2$ link was followed.

Results

Figure 2 shows the cumulative average hit rates over the course of six 100-trial pilot runs contributed by the author. This represents the entire dataset from the pilot test. The graph shows that by trial 100 the cumulative average hit rate at Stage 3 was $hr_3 = 0.55$. Stage 2 end up with somewhat less of a bias, and Stage 1 was close to chance expectation, $hr_1 = 0.50$.

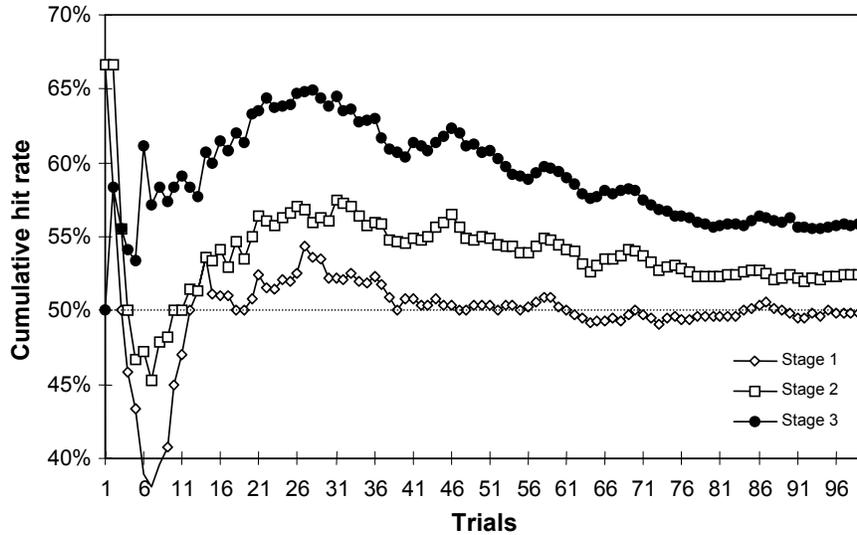


Fig. 2. Cumulative average hit rates obtained in six runs of 100 trials each.

Figure 3 shows the likelihood that the results of the pilot test were due to chance. Stage 3 ended up with overall odds against chance of about 1,000 to 1, and at about 50 trials Stage 3 peaked with odds of over 50,000 to 1.

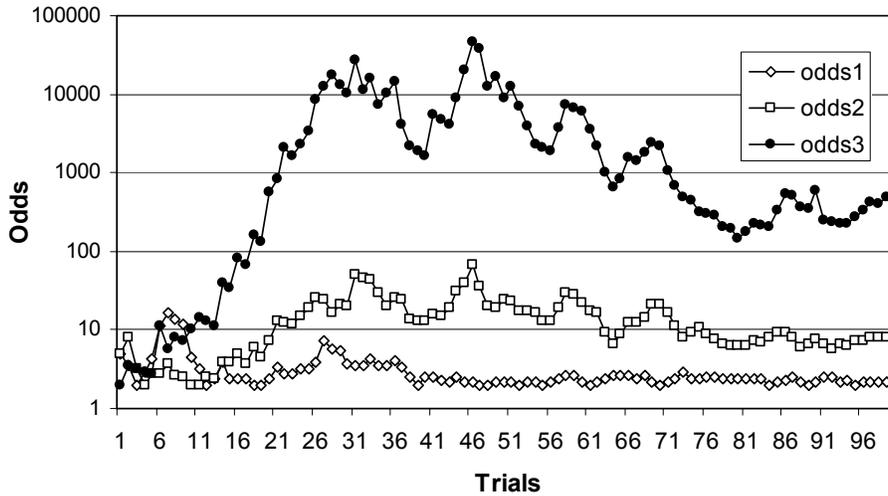


Fig. 3. Results of pilot experiment in terms of odds against chance.

Say that these results were caused not by some form of MMI, but by a malfunctioning RNG. What bias would have been required at Stage 1 to produce the terminal hit rate observed at Stage 3? Calculation shows that with a sufficiently large hr_1 bias at Stage 1, as shown in Figure 4, we could end up with the observed terminal value for hr_3 . But notice that this bias around trial 30 would have to be over 90% (meaning the RNG would have to be generating an enormous excess of 1 bits), rather than the 50% expected from a binary RNG. Given that the observed data shows that hr_1 at trial 30 was about 54%, and not over 90%, the observed test outcome is inconsistent with a “broken RNG” that was heavily biased at Stage 1.

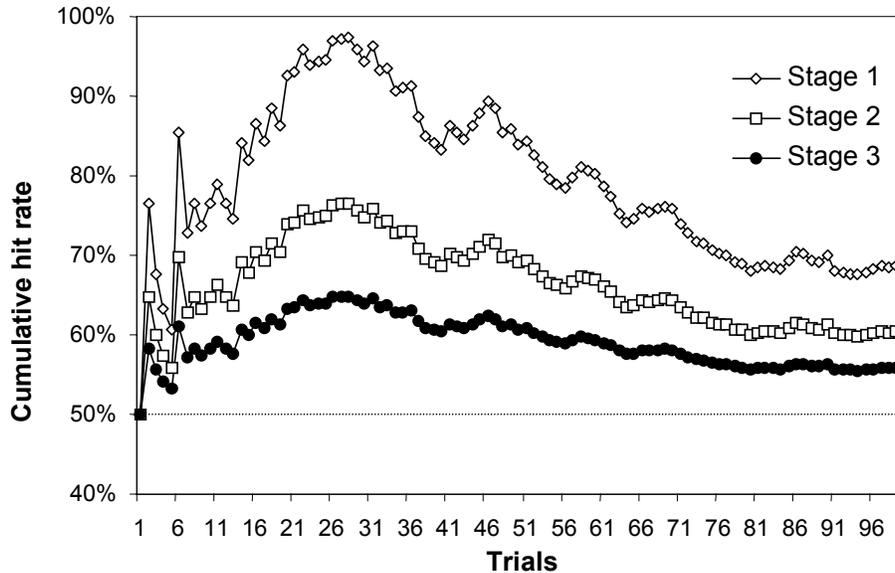


Fig. 4. Hit rate required at Stage 1 to produce the observed hit rate at Stage 3.

Instead of assuming that a large RNG bias appeared only at Stage 1, what if a small but constant bias was operating in Stages 1 and 2? Calculation indicates that a constant bias of +3% over chance expectation applied to Stages 1 and 2 of the Markov chain would result in the observed terminal $hr_3 = 56\%$ (the new hr_1 would be the original $hr_1 * 1.03$, and then $hr_2 = hr_1 * 1.03$), as illustrated in Figure 5. However, the shape of the curves in Figure 5 do not match those of the observed data, so a small but persistent RNG bias does not provide a viable explanation.

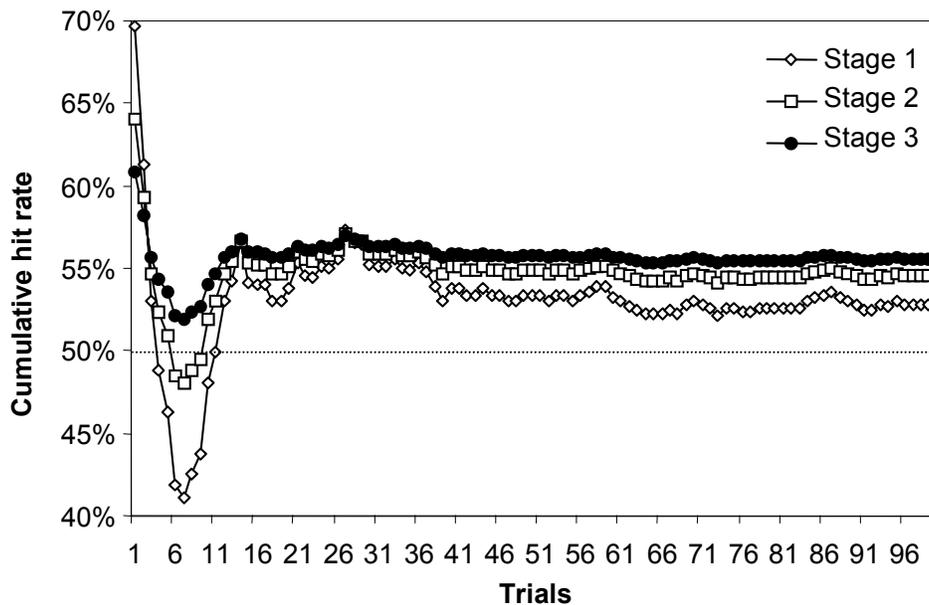


Fig. 5. Results of a constant 3% forward-time bias. This produces the observed terminal hit rate for Stage 3 (56%), but the shape of the resulting curves do not resemble the observed results.

What if the terminal $hr_3 = 56\%$ was achieved by intention somehow manifested a bias “in the future,” at the end-state? If this occurred, we could run the observed hr_3 curve backwards through the Markov chain to see what hit rates *would have resulted* at Stage 2 and Stage 1, assuming no other influences. Figure 6 shows the outcome. The line in Figure 6 labeled “Stage 3” shows the results originally observed at Stage 3. The line labeled Stage 2 shows what would have happened at Stage 2 after running through the Markov chain backwards in time, starting from Stage 3. And the line labeled Stage 1 shows what would result after running backwards from Stage 2. These curves are now much closer in appearance to the original results. This simple analysis suggests that the observed experimental results may be better modeled as a “passive” or relaxation process running backwards in time from a future end-point, rather than as an “active” pushing process running forwards in time trying to hit that same end-point.

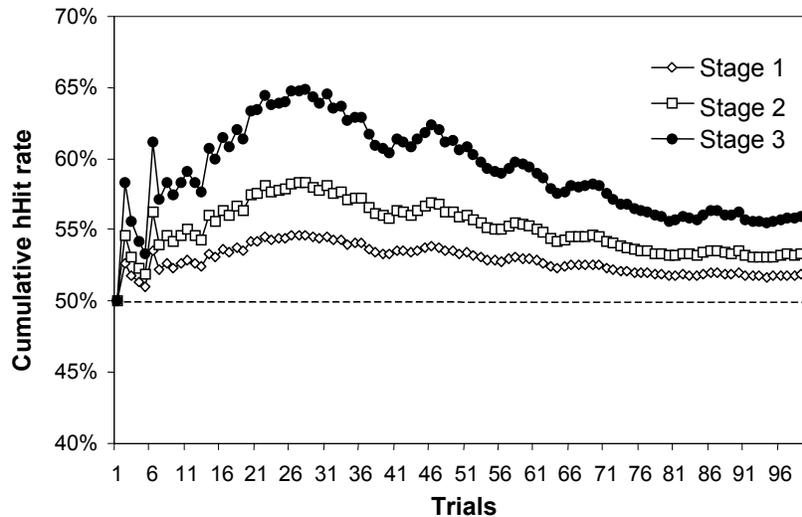


Fig. 6. Results obtained by running Stage 3 backwards through the Markov chain to see what hit rates would result in Stage 2 and Stage 1.

REPLICATION EXPERIMENT

This experiment used the same basic design as the pilot test, with a few additions. It employed a 10-stage Markov chain instead of 3 stages, and the “target” stage – the stage at which the feedback was provided – was randomly and blindly determined on each successful trial to be either stage 3, 6 or 10. This test also used three RNGs: the Orion; the idQuantique RNG, which provides random bits based upon the path that individual photons take upon striking a half-silvered mirror (Stefanov et al, 1999); and the Microsoft Visual Basic 6 pseudorandom number generator (PRNG) algorithm, which was reseeded on each successive trial based on the PC’s clock at the time of the participant’s button press. A high-resolution clock running at the PC’s CPU clock speed was used to generate this seed-number.

In addition to the use of audio clips for feedback, a trial-by-trial updated hit rate was shown on the PC monitor, and an initially gray rectangle slowly turned green if the hit rate remained above 50%, or slowly turned red if the hit rate fell below 50%. Moreover, if a trial was a “miss” (meaning the Markov chain ended up in the 0 state at the target stage), the PC played a soft “click” sound as feedback. This feature was included to make it clear that the trial had ended, otherwise the participant would not know for sure if the trial had been registered correctly. It was made clear to participants that the intentional task was to cause the PC to produce a 5 to 10 second interesting audio clip, and to *prevent* it from producing the click sound.

Finally, for each participant that had achieved a 53% overall hit rate at Stage 3 after 50 trials, the test automatically continued to 150 trials. This feature was employed as a rudimentary “talent test” in the

hopes that individuals performing well up to 50 trials would continue to perform well in the same session. The test was programmed by the author in Microsoft Visual Basic 6.

Results

A total of 15,930 trials were contributed in 218 sessions by 163 people¹: 14,091 trials in 149 completed sessions of 50 or more trials and 1,839 trials in 69 incomplete sessions with fewer than 50 trials. All of the incomplete sessions were due to equipment failure. These failures manifested as the operating system freezing up, probably due to the PC's serial buffer overflowing.² Figure 7 shows the cumulative z score based on the overall hit rate for all 149 completed sessions by trial number, regardless of which target stage (3, 6, or 10) the hit occurred in or the type of RNG. The terminal hit rate at 150 trials was significant at $z = 2.03$, $hr = 0.509$, $p = 0.02$.

The figure indicates that after the 50 trial "talent threshold" the scores declined, suggesting that boredom overtook possible talent. At 50 trials, a total of 7,450 trials (149 completed sessions \times 50 trials) had been contributed, resulting in a deviation from chance expectation associated with $z = 3.82$, $hr = 0.522$, $p = 0.00007$. Because of this unambiguous deviation from chance expectation, these data (the 149 completed sessions) were used to test the models. This post-hoc data selection would be inappropriate for a proof-oriented study, but given the model-testing, process-oriented purpose of the present study, the selection seems justified.

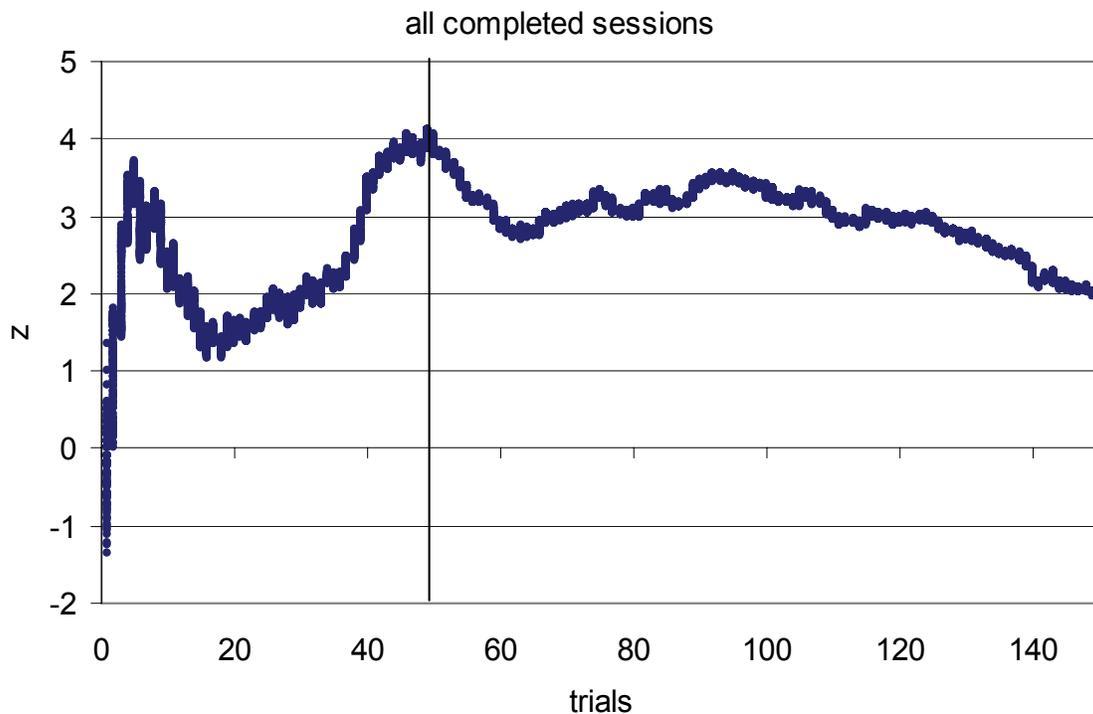


Fig. 7. Cumulative z score for all completed trials, $N = 14,091$.

¹ The author's data, which were used in testing the experimental system, are excluded from analysis.

² Random bits were continuously generated by the RNGs, so if the latency between trials was too long the serial buffer ran out of memory.

“Failed” sessions

Figure 8 shows that the cumulative z score based on the 1,839 trials in 69 incomplete sessions was nearly significantly negative, $hr = 0.478$, $z = -1.889$, $p = 0.059$ (two-tailed). The *prima facie* reason for this negative result is optional stopping, as participants in this test received trial-by-trial feedback. It would seem that those participants who were doing poorly decided to opt out of the test before completing their 50 trials. However, all participants were monitored by the investigator during the experiment, and no one was allowed to voluntarily opt out. Thus, all of the incomplete sessions were cases in which the PC froze and the experimental program could not be restarted without rebooting the PC. The “coincidence” of those sessions with equipment failures resulting in a nearly significantly negative outcome is interesting to ponder.

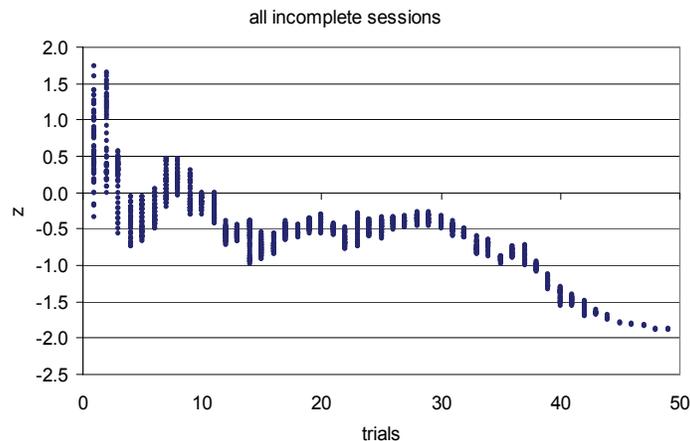


Fig. 8. Cumulative z score for all incomplete sessions with < 50 trials, total = 1,839. A range of z scores is displayed for each trial because, e.g., say 22 people each provided 10 (or more) trials. The cumulative z score at trial 10 is recalculated as each of these 22 responses are successively added to the cumulative dataset; the resulting new z scores are thus all plotted at trial 10.

Hit rates on the target stages

Figure 9 shows the terminal hit rates for the three blindly-determined target stages based on the 149 completed sessions of 50 trials each. The observed hit rates for stages 3, 6, and 10 are associated with $z_3 = 2.04$, $z_6 = 0.97$, $z_{10} = 3.60$, respectively. The Stage 6 results were not significant, but for the sake of completeness the models were applied to all three curves. Overall these results indicate that those participants who completed at least 50 trials were able to “cause” the random Markov-system to be in the 1-state at stage 3, 6, or 10, even when they were blind to the target state.

Calibration tests

Potential biases that might have accounted for the observed results were checked with calibration tests. The Orion RNG calibration consisted of 1 million trials (about 10 million bytes) run using the identical programming code used in the experiment, except with a timer in place of a human. This resulted in an overall $hr = 0.5003$ for targets at Stages 3, 6, and 10 combined, $z = 0.686$, $p = 0.25$. Thus, the Orion RNG did not appear to exhibit any inherent biases that could have produced the observed results.

The idQuantique RNG is a relatively new device and has not been previously used in MMI research, so a total of 3 million calibration trials (about 30 million bytes) were run. These were randomly distributed among the three target stages to provide about 1 million trials in each condition. Results showed an overall $hr = 0.5002$, $z = 0.597$, $p = 0.275$. Hence, there was no evidence that the true RNGs or the testing software was biased.

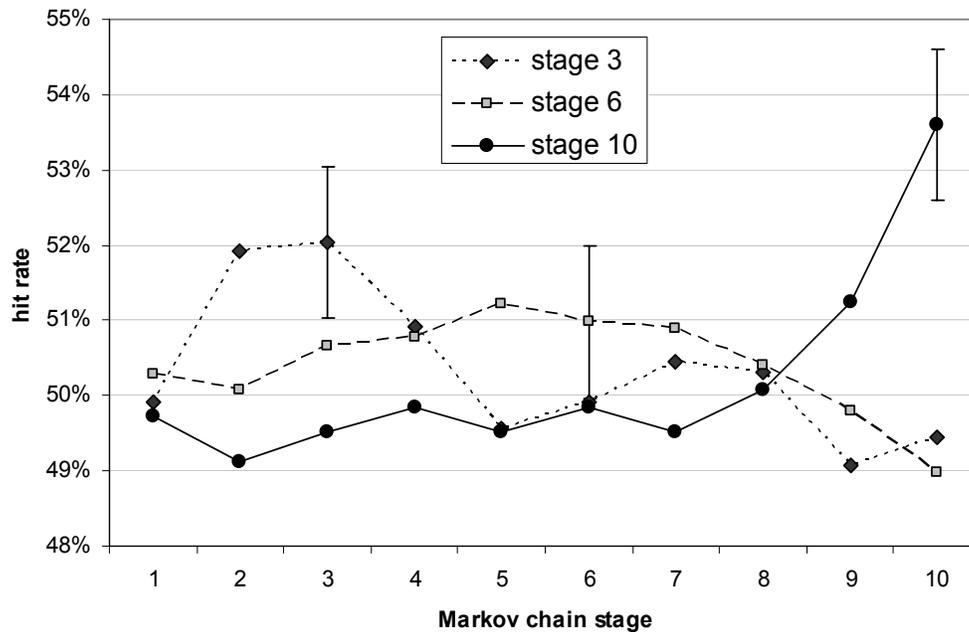


Fig. 9. Hit rates and one standard error bars associated with each stage in the Markov chain, for each of the three target stages.

Model testing

With x referring to a target stage number, the three models tested were as follows:

□ Model 1: *Push forward* or PK, a forwards-time causal model. This assumes that we start at the observed Stage 1 hit rate (hr_1) and the RNG is influenced by MMI at each successive stage with a constant bias until we reach the observed hit rate at hr_x .

□ Model 2: *Relax backward* or precognition, a passive retrocausal model. This assumes that individuals know the right time to take advantage of fortuitous fluctuations in the RNG output so as to select biased deviations at hr_x . This model imagines that we start at hr_x and passively “relax” backwards from Stage x to Stage 1 and then forwards again from Stage x to Stage 10 by following the Markov chain transition probabilities. This curve, r_i is defined as $r_{i-1} = (0.8 r_i) + (0.2 (1-r_i))$ for $i = 2$ to x , and $r_{i+1} = (0.8 r_i) + (0.2 (1-r_i))$ for $i = x$ to 10, and $r_x = hr_x$.

□ Model 3: *Pull backward* or retroPK, an active retrocausal model. This assumes that MMI intentionally sets the observed hr_x and applies a constant bias to the RNG output backwards in time. That is, $p_i = k * r_i$, where i refers to the stage number, r_i is the value determined by the relax backwards model at each stage, and k is a constant MMI bias. The constant k is determined such that it minimizes the value $s = \sum_{i=1-x} |r_i - o_i|$, where o_i refers to the experimentally observed hit rate and r_i refers to the hit rate predicted by the relax backwards model.

Figures 10 – 12 show the observed and modeled hit rates for the three target stages. A goodness-of-fit metric for each model was determined by forming a linear correlation between the observed and model-predicted curves and then ranking those correlations by magnitude. Table 1 indicates that the best fit in each case was the pull backwards curve.

stage number	target stage		
	3	6	10
push forwards model	0.89 (1.021)	0.88 (1.003)	0.73 (1.008)
relax backwards model	0.82	0.78	0.95
pull backwards model	0.99 (1.014)	0.94 (1.007)	0.97 (0.985)

Table 1. Model testing results in the form of correlations (with bias constants in parentheses, as appropriate). Results for each of the three target stages indicate that the best fit is the pull backwards models, suggesting a form of retroPK. For example, the best fit to the stage 10 curve requires that each previous stage followed the Markov chain transitions backwards and in addition was “pulled down” with an additional 0.985 bias. Thus $hr_9 = 0.985 * M_9$, where M_9 is the Markov chain calculation for stage 9, $hr_8 = 0.985 * M_8$, and so on.

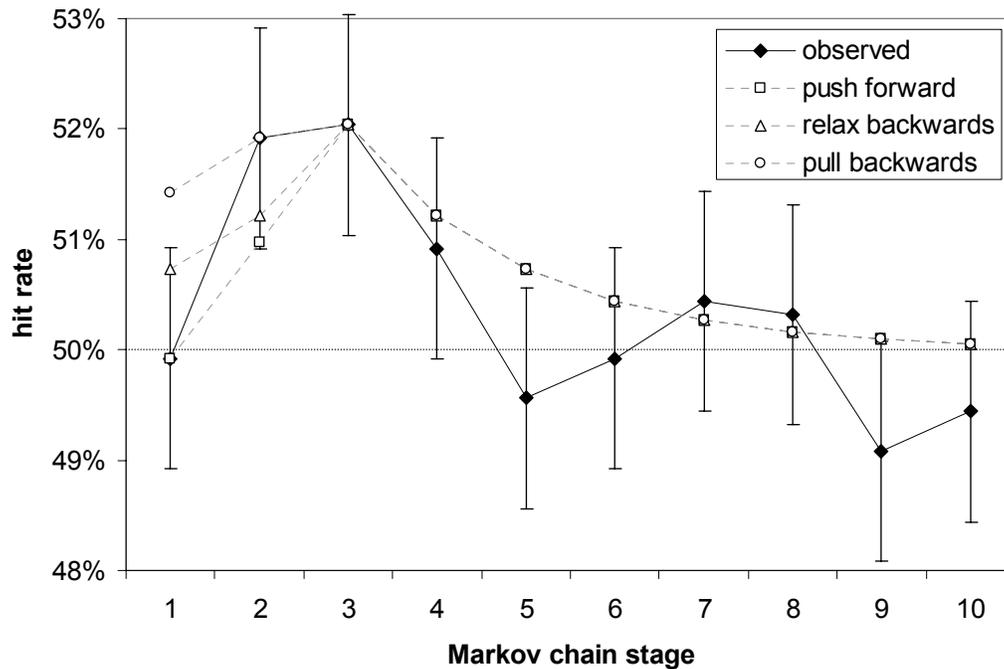


Fig. 10. Observed hit rates when Stage 3 was the target (solid line), and three curves (dashed lines) predicted by the three models. The models were tested only for hit rates at Stages 1, 2, and 3, as all of the models assume that once the target stage is reached the remaining stages passively follow the Markov chain transition probabilities.

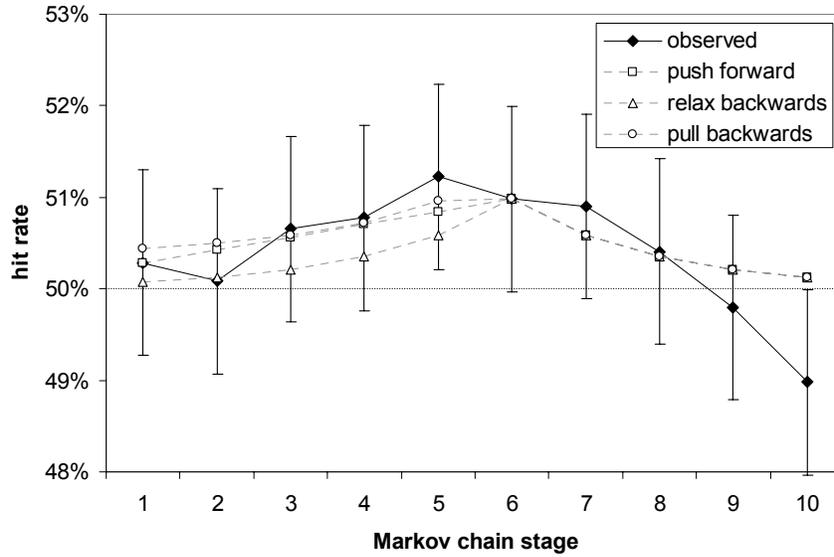


Fig. 11. Model testing results when Stage 6 was the target.

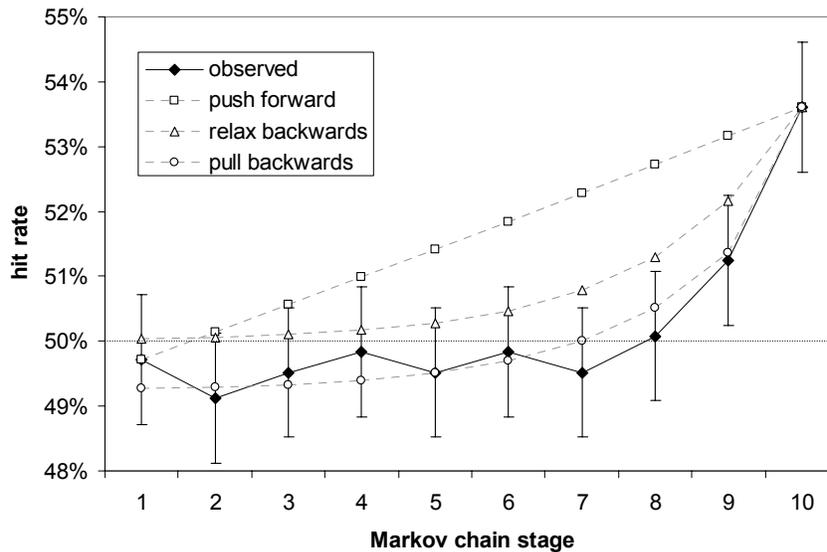


Fig. 12. Model testing results when Stage 10 was the target.

Comparison of hit rates for true and pseudo RNGs

In experiments using the true RNGs, the hit rates on each stage within the Markov chain were sequentially biased but not pre-determined. By contrast, in experiments using pseudoRNGs (PRNG), the successive states derived were determined at the moment of the button press that began each trial, because that is when the PRNG seed-number was generated, and that seed-number was the only truly random component of those trials.

This means there were more opportunities for a true RNG to be influenced than for a PRNG, especially in the 6 and 10-stage Markov test conditions. If we are dealing with a mechanism that is causally influencing the random system, then this should presumably lead to higher hit rates with true RNGs vs. PRNGs. On the other hand, if we are dealing with precognition or retroPK, which would allow the participant to respond in such a way as to probabilistically favor a future end-stage, then the hit rates with the two RNG types should be about the same.

Figure 13 shows that five of six effect sizes (calculated as $e = z / \sqrt{N}$) were statistically indistinguishable. The six effect sizes refer to the different types of RNG and PRNGs and different operating systems used in the experiment. That five of the six effects were essentially the same provides additional evidence that a PK model is not as good an explanation as a precognition or retroPK model. The one negative effect was observed on a PC running the Windows 98 operating system with a Orion RNG. That PC was also responsible for the majority of the session failures.

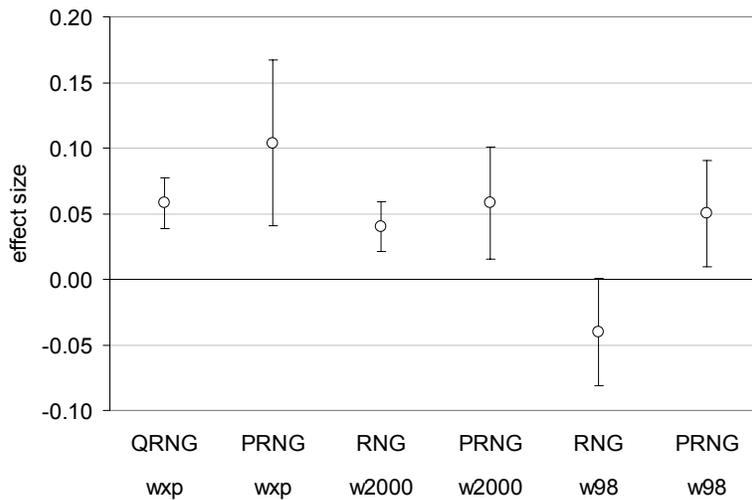


Fig. 13. Comparison of effect sizes (and one standard error bars) on three different PCs and two three types of RNGs. It shows that 5 of the 6 systems produced statistically indistinguishable results. The term “w xp” refers to PCs running the Windows XP operating system, “w2000” refers to Windows 2000, and “w98” to Windows 98. QRNG refers to the photon-based quantum RNG, PRNG to the Visual Basic 6 pseudorandom number generator, and RNG to the Orion noise-based truly random RNG.

DISCUSSION

Analysis of these experiments suggest that the observed deviations were due to something – perhaps information – moving backwards in time, or perhaps “outside” of time. Because this conclusion may not be clear to some readers, to illustrate why this conclusion seems unavoidable, consider Figure 14. This shows the observed data, plus five forwards-in-time and one backwards-in-time model, all ending on the same hit rate actually observed at Stage 10.

The five forward-in-time models start at Stage 1 with an initial hit rate of 0.50, 0.52, 0.54, 0.56, and 0.60. We then add a constant factor to each successive stage so the curve ends up at the experimentally observed hit rate at Stage 10 of 0.536. Calculation shows that the required constants range from 1.41% to 1.45%. That is, given the constraints imposed by the transitional dependencies in the Markov Chain, if we began with a 60% hit rate at Stage 1, we would have to add a 1.4% bias to the hit rate resulting at each stage to end up at the empirically observed 53.6% hit rate. Likewise, if we began at a 50% hit rate at Stage 1, we would have to add a 1.4% bias at each stage to end up at the same spot.

A 1.4% added bias per stage means that instead of the RNG producing 0's and 1's each with 50% probability, it has to produce 1's, on average, 51.4% of the time. This is not an especially large bias, so imagining that such an MMI effect could be imposed on an RNG is not unthinkable. The problem is that the shapes of the theoretically expected forward-going curves differ dramatically from the observed results. By contrast, a backwards-going curve *without any bias added* is much closer to the observed results. This is why a retrocausal model appears to be superior to any model following a *simple* forward-time causal process.

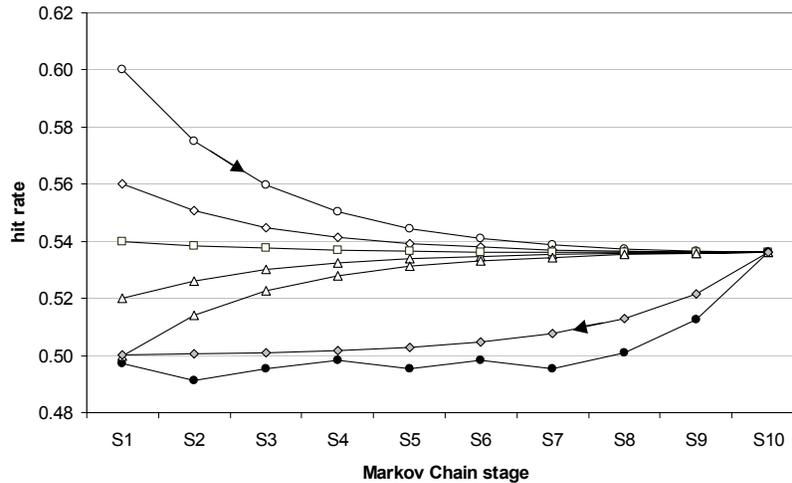


Fig. 14. Comparison of five forward-in-time models (white symbols), each requiring a constant mind-matter interaction bias imposed at each stage of the Markov Chain, a backwards-in-time model without any bias (gray diamonds), and the actual hit rates observed when Stage 10 was the target in Study 5 (black dots).

In conclusion, some forms of apparent mind-matter interaction appear to involve processes that are more consistent with retrocausal “pulls” from the future than with causal “pushes” from the present. One practical implication of this outcome is in understanding the “mechanism of action” in MMI effects on living systems, including in distant healing phenomena. These effects may not understandable in terms of common sense, forwards-in-time causal processes. Determining which model best fits the data is important because causal models would be analogous to familiar medical interventions and would be amenable to investigation using standard methodologies. But retrocausal models would not. Given the difficulty in replicating and amplifying MMI effects, it seems likely that radical models of “mechanism” will be required.

ACKNOWLEDGEMENTS

The designs in these experiments were inspired by the ideas of Thomas Etter (1960, 1977). I am indebted to Tom, and to Richard Shoup, Edwin May and Russell Targ, for many conversations about models and mechanisms relevant to understanding MMI effects. The pilot tests were conducted under the auspices of Interval Research Corporation. The formal replication and preparation of this report were funded by the Samuelli Institute for Information Biology. I am also grateful to Dr. Cassandra Vieten, Dr. Jane Katra, Charlene Farrell, Tina Amorok and Jenny Matthews for assisting in recruiting and running participants in this experiment.

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PSI AND THE LONG BODY

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ABSTRACT

Mind is embodied and the body is emplaced, which means that mind is also emplaced. Mind has conative, cognitive and executive functions performed respectively by the limbic system, the cerebral cortex, and the cerebellum. The first gives objects conative meaning, the second provides a cognitive map to reach or avoid objects, and the third provides the means to do so. Cognition makes it possible to locate an object in space and time, to determine its distance from the body and from other objects in space-time, and to establish its size, weight, and other quantifiable aspects. A material object is local. The conative meaning of an object, on the other hand, may be apprehended in another place and at another time than its material form. Knowing the conative meaning of distant objects is important to humans and other higher animals. Meaning is often nonlocal.

ESP is to perceive the conative meaning of another person or object whose material form is absent. While the material aspect of an object usually remains the same in different places and at different times, its conative meaning is liable to change. The same object can have different meanings to different people or to the same person at different times. The meaning with which an object has been endowed does not disappear when the object is out of sight but may persist in the object and may affect others who come in contact with the object.

The body's sensory and motor functions are mostly about objects that are conatively meaningful to the person. The objects can be reached by sight, hearing and the other senses, and they may be manipulated by the muscular system. Something that is out-of-reach of the familiar senses may be apprehended by perceiving its conative, nonlocal meaning (by ESP) and it may be affected by influencing its conative meaning (by PK).

The sensory and muscular systems are properties of the familiar or "small" body. A person also has "long body" that can perceive and affect conatively significant objects that are out of reach of the small body. The long body is an Iroquois term that refers to the tribal body, and embraces living members of the tribe, as well as ancestors, tribal lands and objects. Families, tribes, corporations, churches and other groups, are long bodies that are composed of the long bodies of their members.

Place and time are relative to the state of the observer. Events that are in the future or past to the small body may be in the present for the long body. What to the small body is precognition or postcognition is perception of the present to the long body.

INTRODUCTION

In the early days of the Parapsychology Laboratory at Duke an issue came up: Is there evidence for telepathy (person-to-person ESP), or could the results in telepathy tests be due to clairvoyance, inanimate object-to-person ESP? The question seems trivial at this distance in time but it remains relevant.

The quandary arose because the Duke researchers found themselves unable to obtain evidence for what they called "pure" telepathy, that is, ESP where the source is the thoughts or images in the mind of another person. The problem was due to the impossibility of ruling out clairvoyance as the explanation for telepathy. For results to be assessed in a telepathy test there had to be a physical record of the targets that the subject might perceive instead of the images or thoughts of the targets in the mind of the telepathic agent. In automated clairvoyance tests, on the other hand, which were coming into prominence, the targets were determined inside machines to which no one had access. The targets could therefore not be transmitted by telepathy.

The rejection of telepathy in favor of clairvoyance created a break with British researchers. They could understand telepathy because it seemed analogous to wireless telegraphy but in clairvoyance there was no mind to send a message and the researchers could not see how this could be done by an inanimate object.

Price's (1940) theory of ESP had a solution. Price was a professor of philosophy at Oxford and my teacher. The world, he suggested, is a myriad of rudimentary minds each made up of a perspective and place memory. When a person occupies a perspective, the world is sensed from that point of view. But you can also occupy a perspective without bringing your sense organs along as in ESP. Since perspectives are linked to place memories, you can also recall the past. Price in effect proposed that clairvoyance is a form of telepathy, that is, perception from one of the perspectives of rudimentary minds. The mini-minds, he suggested, make up the "World Soul."

Researchers in the US were indifferent to Price's proposal. They had no difficulty with the idea of clairvoyance since they thought there are no limits to ESP and that the subject can go to the target and perceive this although there is evidently nothing that can be perceived.

In place of telepathy, the Duke researchers used general ESP or GESP for either or both telepathy and clairvoyance. The G was soon dropped and clairvoyance itself has sometimes been replaced by terms such as remote perception and distant sensing.

Whatever words we use, the question remains, what is there about a physical object that can elicit a response when the object is concealed or too distant for light rays or sound waves to reach the person? Or, for PK, what is there in a physical object that the subject can grab hold of? The questions have been with me these many years. Let's see what you think of my solution.

MEASUREMENT AND MEANING

The experienced environment is an assemblage of objects that includes people, other living things and inanimate objects. An object has two properties, material form and affective meaning. The two aspects are said to originate in two major parts of the brain, the cerebral cortex and the limbic system. The cerebral cortex is our organ for mapping and measuring things. The limbic system, our emotional brain, is what gives objects affective meaning. Then the cerebellum engages the muscular system to reach, avoid or ignore the objects.

The body responds to other bodies and objects by sight, hearing, touch, smell and taste and it manipulates things by the cerebellum and muscular system. Manmade extensions of the senses carry them far into space and time. The aspects of objects that can be sensed and manipulated compose a cognitive system which is accessible to all within a given society. A physical object, that is, an object that can be sensed, can also be measured. Such an object usually has a certain size, a certain weight, a certain duration, and it is amenable to counting and calculation by anyone who has the same measuring stick and tools. As Francis Galton famously said, "If you can, count." Measurement and counting have given us science and technology with all their benefits and drawbacks.

A material object as encountered in everyday life is located in a place and at a time. It is local. Such an object has another property; it has affective meaning. People give objects meaning according to the significance the objects play in their lives. Meanings can be positive or negative, strong or weak, with all kinds of gradations and all sorts of qualities. The same thing can have different meanings to different people or to the same person at different times. Meanings have emotional and energetic components. They color perception and engage the muscles. Meanings cannot be measured by number but belong to objects that can. Mind can be regarded as the meanings of the body. Counting is important but only meaningful objects count.

The meaning of someone or something, a friend or enemy, one's home, land or belongings, may be present although physically absent. Before Israel was established with Jerusalem as its capital, Jerusalem was powerfully present to the diaspora. Now Palestinian Arabs are the diaspora and long for Jerusalem.

The meaning of an object has a cognitive and a conative aspect, it is cortical and limbic. The object's cognitive meaning reflects its measurable aspect, the conative aspect reflects its emotional quality. It is emotion that makes people move towards or away from things. The affective meaning of things is personal and changing, and it is their most important aspect. A life surrounded by meaningless objects is worthless and can lead to death, whether self-inflicted or by illness. It is lawful to disconnect the feeding

tube to a body that is alive if it shows no evidence of awareness (at least as of this writing). To do the same to a conscious body is murder.

Life without meaning has no value. But perception of meaning, including ESP, which does not point to its material counterpart also has little value. Meaning and matter are mutually contradictory and still belong to the same thing. A similar situation arose in physics and led to the principle of complementarity, which Jahn and Dunne (1987) then applied to parapsychology.

ESP AND MEANING

ESP is to perceive the meaning of another person or inanimate object whose physical form is absent. If you are good at ESP you may perceive the affective meaning of a distant thing but this does not entail that you will also perceive its cognitive form. While the cognitive form of an object usually remains more or less the same in different places and at different times, its meaning may change. At the present at least, ESP is unreliable as a way to discover the physical aspect of an unknown object.

Psychokinesis is to act on a physical object without tangible contact. There are two types of PK, micro-PK and macro-PK. Micro-PK is not apparent when it occurs but requires probability statistics to be discerned. This introduces uncertainty in the evaluation of results. The uncertainty is reduced the higher the level of statistical significance but it does not disappear. Micro-PK has only been observed in experiments but undoubtedly also occurs in nature.

Macro-PK includes movement of objects near a person without tangible contact and is observed without the aid of statistics. A cup does not lift off a table and crash against a wall by chance coincidence. It may also not move without an emotional charge. Uncertainty enters if someone could have thrown the cup.

ESP occurs in nature and in the laboratory. Researchers usually focus on one or the other. Serious work began in the second half of the 19th century with studies of natural ESP. Then experimenters set up tests to validate the natural phenomena.¹ The experimental model they adopted came from behaviorism, a branch of psychology which denies that mind and meaning can affect perception and therefore does not provide for them. There have been successful ESP tests but they have not been repeatable. This is not surprising if ESP is perception of meaning because the meaning of a test to subjects and experimenters usually changes if the physical conditions are kept the same.

There have been other problems. Most ESP experiments have been based on two questionable assumptions held by Western society. One assumption is that the meaning of a physical object only changes if the physical condition and context of the object change. If the meaning of a brick is to be part of a building, it ought not to affect its meaning if the brick is used as a weapon instead. If the brick is subsequently handled by someone who is ignorant of its violent history, this should not affect the person. Similarly it ought not to affect results in an ESP test if the laboratory where the test is run has recently been the scene of a violent argument. A physical object, it is thought, is a *tabula rasa* with no previous imprints of meaning. These assumptions may be wrong.

Another assumption underlying ESP tests is that the subjects and not also the experimenters may affect results. The subjects, it is thought, will stick to the task of attempting to perceive the ESP target, and the experimenters will stick to their task of running the experiment and will not otherwise aid or impede the subjects' responses. Experimental evidence is accumulating that this assumption may be wrong as well. Test protocols that are supposed to show evidence of a person's ESP may instead prevent ESP from happening. It is not surprising that experimental parapsychology has not done well.

MEANING, MEMORY AND THE LONG BODY

Natural ESP is usually about family and friends rather than strangers. In tests of ESP the subject is often introduced to the other participants beforehand so that they get to know each other. The contact can also be by proxy. If you handle an object that has been handled by another person or if you are in a place

someone else has occupied you are thereby in the presence of the other person and may become aware of events in her life. Memory underlies ESP, and so does meaning which is based on memory.

Memory (Roll, 1988) brings people and events from the past into our presence. It is usually thought that memory is private and that we cannot perceive the actual circumstances of the person we remember except if she is known to us. Natural and experimental ESP both say that this assumption is wrong. Our memory not only reflects our personal history but is at the same time our means of relating to people to whom we are close. Memory and the hippocampus, the brain structure that processes memory, may be a “channel” for ESP and also its “sense organ.” Memory may be a channel for ESP insofar as the remembered relationship is a link to the person; the hippocampus may be a sense organ for ESP insofar as ESP relies on memory.

Memory, our personal history, is mind stretched out in time, into the past. Memory is also mind stretched out in space. Though distant in place or time, ESP calls the remembered person or object to mind. More rarely we may call up persons or things with which we are not connected but these usually turn out to be connected to those we know. Memory reaches into the future as well. Through our hopes and plans we project our personal history ahead and, more or less successfully, bend future events to our needs. Memory may be the basis of precognitive experiences as well. Rhine (1954) said that her informants often “marveled at the fact that the precognitive experience was just like ‘remembering’ the future.” The difference between precognition and familiar forms of prediction and planning is that the knowledge required to foretell the precognized event is apparently not available at the time of the experience, nor can you bring on the event by tangible contact. In precognition we may tap into a wider source of awareness and planning.

Memory may underlie PK as well. It connects the subject to the PK object and may provide the means to affect it. Before a PK test, the range of targets is committed to memory and then recalled during the test, hopefully enabling the subject to affect the target. In reports of natural PK, the event often has symbolic or mnemonic meaning. Pictures fall at their owner’s death and clocks stop (Rhine, 1963). In RSPK the disturbed objects often reflects a disturbed family (e.g., Roll & Storey, 2004). Our memories are entwined in the objects of our environment and may enable us to take hold of them.

Memory is mostly of significant relationships. It brings people, places and objects to mind that are important to the person. It is usually assumed that memory is a private matter but this assumption is evidently wrong. Together with the remembered face and name, an actual event involving the individual may come to mind even when there is no way that the person could know about the event by sense-perception or logic. The event is often traumatic to the other person although not necessarily to the percipient.

This web of connected parts is somewhat like the familiar body but extends farther in place and time. It has been called the long body. The term is a translation from the language of the Iroquois, the American Indian tribe, and was first used in a parapsychological context by Aanstoos (1986). The long body includes the familiar “small” body of traditional psychology and others who are significant to the person, especially family and friends.

Psychoanalysis gives a similar account. Freud (1964, p. 55) proposed that parents, siblings, and others with whom the person identifies are incorporated into the ego and superego. This provides an extrasensory link between self and non-self in the unconscious that is equivalent to telepathy. “Psychoanalysis by inserting the unconscious between what is physical and what was previously called ‘psychical’ has paved the way for the assumption of such processes as telepathy” (from Jahn & Dunne, 1987).

It is interesting that according to Freud telepathy is not something that goes on between separate individuals but takes place in the person’s ego or superego, that is, within a group of significant others that is the foundation of Freud’s concept of mind.

Freud assigned a place to this telepathic congregation, by calling it the unconscious. An alternative concept might be the autonomic nervous system, or rather an extension of this to include others. Braud (2003), in an important series of ESP experiments, used the subject’s autonomic reactions as the ESP response. Autonomic ESP may be the prototype of ESP which would mean that ESP has as much to do with physiology as with psychology.

The properties of the autonomic system are well known, as are its connections to other parts of the nervous system. This is a distinct advantage of the ANS over Freud's unconscious. On the other hand, the ANS is hardwired and therefore cannot be brought into awareness while the unconscious may become conscious. In this respect the unconscious is the more interesting concept.

I have extended the concept of the long body to the departed and also to the objects and places that members of a long body have occupied, whether the objects are near or distant in place and time. The long body includes the inanimate places, structures, and objects, natural and manmade, on which the group depends for its existence and well-being. (The inanimate things that belong to a tribe are inanimate in the same sense that the atoms and molecules that make up the individual body are inanimate. When atoms and molecules function in the body, they are animate. The same with the things in the long body; their membership in this body makes them animate.)

When one's tribe is threatened by other tribes or when the tribe seeks expansion, it is often valued more highly than the individual's own life. At such times people may sacrifice their individual bodies for the good of the tribal body and do so willingly. Our tribe is precious and we could not manage without it.

At times of pressure from other tribes or opportunity to expand into their territory, attachment to tribe can become tribalism. Like egotism, tribalism is to be blind to a larger context. Today, when populations are exploding and tribal weaponry is increasingly more deadly, tribalism can be cataclysmic for all.

ESP shows an apparent paradox in that it is unconscious but can be conscious at the same time. ESP is conscious insofar as it is often associated with a visual or auditory experience or with a verbal impression. It is unconscious insofar as the person rarely knows that the experience is due to ESP.

Sex and the Long Body

The human body results from sexual intercourse. The same applies to the long body. The most pleasurable activity for many adults is having sex. This is true even if one has sex with oneself; but the pleasure is greatly enhanced during intercourse and increased more if one loves the person.

Love usually brings with it the desire to be near the person in a regular way and thereby leads to attachment to the partner. If the partner is of the opposite sex, love may lead to childbirth and to the additional love and attachment that follow.

If it were not for sexual love between woman and man, few children would be born and there would be few people on earth. Society rests on sex, although often uneasily. Only the kingdoms of the wild would benefit if humans were to lose their sexual drive.

Giving birth and having a child involve grandparents and perhaps other family members, whether living or departed, and childbirth may lead to in-laws and their families. Sexual love can extend the couple in place and time. It is foundation of the long body.

BIO-PK

A new term, biological psychokinesis or bio-PK, has appeared in the Parthenon of parapsychological entities (Braud, 2003). The term refers to the effect that an agent or influencer exerts on a living system, often another person, without tangible contact and is used for situations where measurable biological effects have been recorded.

Braud says, "...the magnitude of the PK effect appears to increase as the target system becomes more meaningful to the influencer. The magnitude is smallest in the case of fish targets, greater for the warm, fuzzy gerbil targets, better still for the red blood cell targets, and greatest when the target system is another person. It is almost as if the magnitude of the effect increases as the similarity of the target to the influencer increases" (p. 27).

Similarity often goes with meaning. The more similar another system is to a person, the more meaningful it may be. Meaning is also central to inanimate object-PK. PK targets that work in REG tests of micro-PK and in studies of macro-PK are usually rich in meaning. Strength of meaning could be the psi equivalent to what proximity in space is to the sensory system of the little body. Braud (email 14/iii/05) has brought up the mouse/ether studies by Watkins and Watkins (1971, 1974; Watkins, Watkins, & Wells,

1973; Wells & Klein, 1974) in which anesthetized mice that were targets for bio-PK revived sooner than mice treated by people with no apparent healing ability. The only successful subjects were known psychics (Karen Getsla and Sean Harribance). An interesting aspect of the study was the discovery that the healing effect “lingered” in the spot where a mouse had been revived such that a new mouse placed there would also revive sooner than the controls.

Braud notes, “The effect was not only emplaced but also ‘entimed’ (if I may coin a term), in that the anomalous events were limited in space (and varied in intensity along a spatial gradient), but also were focused in time (and varied in intensity along a temporal gradient), in that the effect decayed over a 30-min. period...In brief, the PK outcomes depended upon where the target mice had been placed--whether in a ‘fresh’ location or in one in which prior ‘distant healing (bio-PK)’ had already occurred.” The intention that brings on PK within the long body is analogous to the effect of intention on a person’s small body. The question then becomes to what extent long body physiology is similar to the physiology of the small body and in which respects it differs.

Dissociation and Arousal

In our active waking life, memory and mind are usually oriented to a narrow window of time and place: the desk where I now work, the food in the kitchen that will later become lunch. We may become aware of a wider field when we disconnect from waking awareness. The dissociation may occur naturally as in dreams, or be deliberately induced as in hypnosis. Conditions like this may be ESP conducive because dissociation may reduce irrelevant chatter from the memory record and thereby clear “the eye of ESP.” The attendant physiological state is often relaxation. In macro-PK, on the other hand, the person is often in an aroused state. This is true for reports of single instances of macro-PK (Rhine, 1963) and for reports of recurrent macro-PK (Roll, 1972/2004; Roll & Storey, 2004). In experimental studies of macro-PK the experimenter (or experimenter-subject) usually induces a state of heightened arousal (e.g., Batchelder, 1982; Gregory, 1982). Like familiar forms of behavior, PK may entail an active organism.

ESP and Subliminal Perception

ESP is similar to subliminal sense perception (Dixon, 1979; Kreidler & Kreidler, 1973; Nash, 1979; Nash & Nash, 1963; Roney-Dougal, 1979). Like subliminal perception, ESP may serve the organism of which it is part. In particular, ESP may act as a pain receptor for the long body by sensing accident or death afflicting family or friends, members of the percipient’s long body. ESP may also provide warning about locations that may be dangerous because people have experienced injury or death there (thereby giving rise to haunting legends). Similarly, precognition may alert one to dangerous situations in the future.

DWARFS AND GIANTS

When I visited Dean Radin at the University of Las Vegas in the 1990s he showed me a device he had built to test precognition (Radin, 1997). The subject’s response was not a mental impression or image but consisted of physiological reactions (heart rate, electrodermal activity and finger blood volume) to two types of target, photographic slides of placid landscapes and sexual situations. Under non-precognitive conditions when his subjects saw the photos, their physiology would show emotional arousal at the sexual photos and none at the landscapes. The same happened in the precognition part of the test when the pictures had not yet been shown or their sequence determined. I asked to be a subject and my reactions were the same (the emotional target showed more than one couple, giving the term entanglement new meaning).

Braud (2003) offers an alternative interpretation. Instead of supposing that the subjects became aware of events in the future, Braud suggests that the finding, “could just as well be interpreted as an objective event (the presentation of...the slide picture itself or the person’s *reaction* to the slide picture) acting backward in time to influence a person’s physiological activity” (p. 240). Braud presents the outcome of

an evaluation of 19 experiments (including two insignificant studies of his own) that suggest backwards influence on physiological activity. The result is highly significant ($P = .00000032$).

Braud's interest in backward causation stems largely from the work of Schmidt (e.g., 1976), a theoretical physicist and parapsychologist. Schmidt used a random event generator to produce a string of binary numbers which were automatically recorded on paper-punch or magnetic tape, no one being present or looking at the data until the test had been completed. During the test, the prerecorded tape was played back, causing a sequence of blue and red lights to come on, the subject's task being to mentally enforce lighting of the red and not of the blue lamp. The subjects succeeded and did so at about the same rate as subjects who used targets in their own time-frame.

Of all psi phenomena the evidence for retroactive PK, whether on inanimate or animate systems, has been the most difficult to comprehend (but not for the quantum physicist, as Schmidt emphasizes). Everyday life is based on the belief that time has an arrow that points from past to future, not the other way. The changing positions of the hands of the clock and the added lines in the face in the mirror are examples.

I think there may be a solution and that it is not complex. We need to remember that time, which is to say, change, happens in place (place is more descriptive than space for the human world). Place and change go together though they are measured differently. A certain hour implies a certain place, and a place has a past, a present and a future. That is, a place changes and the change has an arrow, from 1 p.m. to 6 p.m., not from 6 p.m. and back to 1 p.m.; and from fewer lines in the face to more lines, not from more to fewer lines. Botox or plastic surgery may reverse the trend but not for long.

Change has an arrow also in the larger picture. Each of us has experienced growing from child to adult, and we are told that our species has evolved from primitive organisms to its present stage of evolution; and there may be more steps ahead.

Places are made up of objects and objects change, whether they are animate or inanimate. An object is an event, and events are made up of objects. The forms of Plato are eternal but actual objects do not remain the same, and sometimes their names change as well.

Place is personal, that is, we experience things from the place that is occupied by our body. A tall person experiences the world somewhat differently than a short person. If you are a dwarf or a giant the difference can be extreme. A giant can see farther than a dwarf but the dwarf can see things close to the ground more clearly than the giant. By seeing further in space, the giant can also see things coming down the road that are still in the future for the dwarf, and when the dwarf has lost sight of something that was previously present but is now past, it may still be in the present for the giant.

If the giant is a police officer who sees a car in the distance weaving from side to side, he is likely to drive out and stop it because the driver may be drunk. If the officer is watched by a dwarf, the officer may disappear beyond the dwarf's horizon and the car may never be seen because it is too far down the road. But if the driver refuses to stop and the officer gives chase, both cars passing the dwarf, and the officer pulls the car over further along, arresting the driver, the dwarf may only see the two cars speed by without stopping. From the dwarf's position, he cannot know about the arrest because it is in his future. For the police officer and the driver, on the other hand, everything occurs in the present.

Braud (email, 31/iii/05) has pointed out that the giant and the long body are the same. Both know and do things that less expansive/extended beings, or ways of being, are not able to know and do. "*Both would have a more far-reaching and more nonlocal view and grasp. The 'giant' may be the 'long body,' and the 'long body' may be the interconnected, more-than-local aspect of all of us...*"

Psychics habitually experience places as present that are in the past or future for the rest of us. They are our giants. In states of dissociation, as in dreams or altered waking states, anyone may briefly be a psychic giant. If an event occurs in your place, you may be able to change it even if the event is in the past or future of others.

Braud (2003, p. xxxvii) refers to a study by Leibovici (2001) that prayer for groups of patients with blood infections showed evidence of an effect although the prayer was done 4-10 years after the infection. Braud believes that retroactive healing intention may work, "especially if they are present in a large number of healers or prayers." Again, a patient who is in the past for most of us may be in the present for the long body of the healer and may thereby be helped. The event is only strange when looked at from the

point of view of the patients who were healed. From their and their doctors' perspective, the cure had to be miraculous or at least spontaneous remission, which is the term for miraculous preferred by the educated.

If place and time are linked as they clearly are and if place and time are relative to the observer, which they must be because place and time depends on the position of the observer, what appears as temporal reversals are to be expected. If the intention is collective as when there are several healers or prayers, it would not be surprising if the results are stronger than if there is only one or a few.

The Self and the Other

Reports of ESP in natural settings often involve close friends and relatives and concern life-changing events, usually accident or death but also positive events such as a wedding or release from prison. Examinations by Schouten (1979, 1981) of two major collections of natural ESP suggest that the tendency for close rather than remote friends and relatives to be involved and for the experience to concern trauma and death cannot be attributed to sampling errors.

From this perspective, the human mind and the human body are a synthesis of many minds and many bodies. Some are our ancestors in the near or distant past, others are living people, some close to us in place and time, others distant. In our daily lives, when we act as one single-minded body, the many voices are joined into one. This joining forms the basis of our individuality and of our corporeal existence. It is the transpersonal core of personal existence. As a rule it is only at times of injury or death that a strand of the fabric stands out and that we may have an ESP experience.

Mind and Memory

Remembering (Irwin, 1979; Roll, 1966) is part of the ESP process insofar as the ESP response consists of revived memory images. The memory record and its brain structures, primarily the hippocampus, may be the "sense organ for ESP."

Memory may provide the link to the target as well. When a person from our past comes to mind during an ESP experience, this may appear as an image of the person combined with other memory images that reflect the new situation. We remember a member of our long body. Here memory is more than a reflection of something gone by; it presents a new event. These "presenting memories" often relate to significant others, that is, they are also "self memories."

ESP Amnesia

In exploring ways to control or predict ESP, it is important to take into account the two ways in which memory may be involved, namely as part of a receptive organ for ESP and as a link to the target.

A person's memory record is not a collection of disjointed images but includes a structure into which the images are woven. This structure is given by society and is expressed in language. It is a set of interwoven schemata that determines what we experience and what we remember. Insofar as the ESP response is constituted by memory, it is affected by the schemata of memory. Some languages, such as American Indian and African tribal languages, are psi-supportive because they provide for psi, whereas Western languages tend to be psi-inhibitory because they do not allow for the possibility of psi. When we learn to speak in the West, we learn sharply to distinguish the self from others and to separate here from there, now from then, and mind from matter. Experiences that bring together events distant in place or time then become paranormal or anomalous.

If our cognitive schemata obscure ESP, it should be possible to improve ESP by relinquishing the schemata. ESP studies of young or learning-impaired children, for whom cognitive limits have not taken hold, and studies of adults in dissociated states (or who dissociate easily) suggest an inverse relationship between ESP sensitivity and the extent to which the person's mentation is deterred by language.

The reduction of cognitive impediments may increase awareness of the self and its world, and thereby ESP awareness, but it may not necessarily improve results in an ESP test. This entails another step, namely that the purpose of the test and the way this is conducted is meaningful to subject and

experimenter. The ESP test must provide the kind of relationship with significant others that is found in natural ESP.

PLACE MEMORY

All of us have memories of the past; we could not manage the present without bringing up the past. Memory is built into the very act of perception. We see a chair, a cup, and so on, rather than a jumble of incomprehensible shapes and colors because previous experiences of chairs and cups are automatically called to mind. Even precognition, foreseeing the future, is made up of memory images. As the White Queen in *Alice in Wonderland* said, "It's a poor sort of memory that only works backwards."

When we visit a place where we have been before, memories of the visit that we had forgotten may return. Casey (1987) said, "To be embodied is *ipso facto* to assume a particular perspective and position...a place in which we are situated...As embodied existence takes place in place...so our memory of what we experience in place is likewise place-specific" (p. 182). In other words, a certain place will invite certain memories and ignore others. This is well-known. Places where we have been may evoke memories of events there.

There is another form of place memory. When a person visits a place that has been occupied by another individual, an image of the individual may appear. The image may arise whether or not the person is deceased and whether or not the visitor knew the person. It may appear out in the open as an apparition or in a dream. If the person is deceased, and especially if she seems to interact with the viewer or dreamer, it may be thought that she has survived death, which she has at least in the form of a place memory. A place memory of an event that the person has not experienced herself may be called a Type 2 Place Memory to distinguish it from Type 1 Place Memories that are drawn from the person's own past.

Note that if your memories may be experienced by others than yourself, then memories are not yours alone, they are not private. Alzheimer's may cause you to lose touch with your memories but they may persist in other persons and places. In Eastern traditions, place memories have karmic effects.

The police (Duncan & Roll, 1995, Ch. 10) sometimes report that they have been aided in solving crimes or finding missing persons when psychics picked up information known to neither them nor the police by going to the place that the person had occupied or by handling an object the person had touched. The psychics, in other words, relied on place memories. Price (1939) suggested that "localized images" and "place memories" may account for ESP, including psychometry and apparitions of the departed that are seen in their former homes.

Place memories may intrude in experiments. Braud (email, 4/iii/05) says, "Chuck Honorton and I, independently, frequently observed, in our free-response ESP studies, something like 'place memory.' A research participant sometimes would describe, very closely, what the immediately preceding participant had reported about an ESP target--whether this description matched the 'correct' target for the session or not (these often were too specific to be attributable to general response biases or similar artifacts). It did not seem to matter whether the two participant sessions were separated by minutes, hours, or days. It was as though Person A's images/thoughts/feelings lingered, under certain circumstances, in the testing location and the next person, Person B, tended to report similar things. Chuck and I used to joke that it might have helped to 'exorcize' those 'haunting' traces--to get them out of the way, so they would not interfere with the psi perceptions of the targets at hand."

Speaking seriously, labs and the lab equipment to be used for a test should be "cleansed" beforehand. I don't know how this might be achieved but intention would undoubtedly be an important ingredient. Spiritual cleansing (Williams, 2005) is routinely done by American Indian tribes before important functions and involves drumming and ritual that call on spiritual forces and may help participants enter a PK-conducive state.

A test of the efficacy of this type of treatment could be done by comparing healing success in a laboratory that has been "treated" by positive intention with results in an untreated lab.

Williams (2005) says that it is a common belief by Indian tribes that objects possess or may become endowed with beneficial psychic powers (in Braud's terminology with bio-PK). Similarly certain places are thought to have positive effects on people while other places are thought to be harmful.

If the intentions of people have effects that persist in a building or place when they are no longer there, new occupants may be affected. When the US conquered Iraq, the troops used the notorious Abu Ghraib prison for captured insurgents and suspects, in the process continuing the atrocities and murders committed there under Saddam Hussein. Whether or not the new crimes were in line with US policy, they were consistent with the place memories that must have permeated the buildings. Like the Germans did with the Nazi concentration camps, Abu Ghraib should not have been used for its old purpose but either turned into a memorial for the victims or razed to the ground, with only flowers and grasses covering the area.

PLACE MEMORY AND LIFE AFTER DEATH

Past events and past lives may continue as place memories associated with objects, places and people. Veridical apparitions of the dead are usually experienced either in the area that the deceased occupied when living or in proximity to individuals who knew the deceased in life. Rhine (1957) coined the phrase "bystander case" for an apparition seen near an individual who knew the deceased. It is probably this tendency of the dead to be seen in their physical or social environment that has led to the belief in haunting ghosts ("haunting" comes from the same root as "home"). However, the typical haunt rarely includes veridical apparitions, that is, apparitions with an ESP component.

The same characteristics may hold for deceased individuals who seem to communicate through mediums and for ostensible reincarnation memories. It is a little-known fact that in most of the verified reincarnation cases, the deceased person had lived in the social or physical environment of the subject. In this respect rebirth memories are similar to mediumistic communications and to veridical apparitions of the deceased. In all three, information about the deceased is remembered in the places or near the people where the person lived.

It seems unlikely that a person survives death as an individual because individuality is a property of the small body which is certain to die. Lived experience includes other people and physical objects; it is a property of the long body. The long body persists after the deaths of its individual members much like the death of the cells of the small body do not endanger the life of the long body. On the contrary the death and renewal of cells are necessary for life. In the same way the death of individuals may benefit the health of the long body as long as others are present to take their place.

Memories go with place and objects. They may even go with body parts. Lois Duncan, coauthor of *Psychic Connections* (Duncan & Roll, 1995), had an 18-year-old daughter, Kait, who had been murdered. Afterwards, Duncan donated Kait's heart and lungs, it turned out, to a young man who then dreamt about the murder. There are other examples in a book whose author I have forgotten. It is curious but not really surprising in view of the connection between body and mind that a person who has received an organ transplant may relive events in the life of the donor.

I collaborated with Duncan on *Psychic Connections* because of another sequence of events that surrounded the murder. In one of her mystery novels for young adults, in which the personality of the heroine was based on Kait, and which came out a month before the murder, Duncan apparently precognized several of the events connected with this. In the book Duncan wrote that a murder contract is put out on the girl's family because they are going to blow the whistle on a drug ring, that the girl is chased by a hit man in a Camaro, and that the man is named Mike Vamp. It seems more than coincidence that Duncan and her family had to flee their home and hide in an apartment because of death threats by a relative of one of the suspects, that the suspects were involved in dealing drugs, that the hit man was driving a Camaro, and finally that man indicted for the killing was named Mike and was known as Vamp.

How was it that Duncan could have this foreknowledge? Her ability as a creative writer may be a clue since ESP appears to go with creativity. From the point of view of Duncan's long body, the murder of her daughter occurred in the present.

My students and others who have who have precognized the sudden death of loved ones are often burdened with guilt in addition to their grief. They feel that if they knew about the death, they should also have known how to prevent it. There are in fact indications that people who have foreknowledge about death or injury can sometimes prevent it. Cox (1976) made a survey of cancellations of train reservations and found that there were significantly more cancellations before journeys that ended in a crash than before uneventful trips. He ruled out normal explanations and concluded that some of the prospective passengers were guided by precognition of the accident to cancel their trip. Successful intervention may be more common than we think but is likely to remain unknown because the predicted event does not occur. We need to also keep in mind that people often have a sense of foreboding without the dreaded event taking place. We are up against the fact that the meaning of an event, such as the death of a relative, is not necessarily tied to this specific event but may come from many other sources, including the percipient's own worried mind.

CONCLUSION

A material object by definition is located in a certain place and at a certain time but its meaning is nonlocal and may be experienced in a different place and at another time. Meaning is based on memory. It may not be possible to remember a meaningless object. When we recall people and things from our past we bring them into our presence, and when we apprehend the current circumstances that surround the remembered object this is ESP. Meaning overrides distance in space and time, in other words, the four dimensions of space-time are subservient to affective meaning. If the meaning is strong, it is not difficult to suppose that it may reveal events that seem distant in place and time.

ESP and PK suggests that affective meaning may be associated not only with the familiar body and its current environment but also with other places and objects that have been important to the people in whose lives the places and objects figured. How to be more specific is a matter of choice. You can say that psychometry and other forms of postcognition result from place memories, that past segments of meaning-space-time are perceived, or that what appears to be a past event as far as others are concerned is present to the long body of the percipient and can be apprehended.

In any case, if you allow that events in one form of another may persist in physical objects beyond the moment of observation, you have laid the foundation for a theory of ESP. If you insist that memory and meaning must be reserved for living bodies, ESP will remain a mystery that is impossible to predict or control. Answers to questions as to how long place memories persist in objects and how potent they are should be the same as for the memories of the familiar body. In other words, a predictive scheme is already in place for this aspect of ESP. Things that are emotionally neutral are usually ignored by ESP as they are by sense-perception. Place memories, we should expect, are subject to emotional valence, frequency and primacy the same as bodily memories. They are essential for the survival and well-being of the person and group.

A study of memory as an intentional, meaningful relation to other bodies, animate and inanimate, suggests that memory is not only a reflection of one's history as an individual but is also the means of interaction with other people and things. Memory is our way of bringing the past into our presence, not only in the sense of reviewing earlier relationships but also in the sense of actually perceiving or interacting with the people. The result may be occasional images or impressions that are identified as ESP. But ESP is at the same time autonomic, that is, it may go on below the surface of awareness and may do so all the time. This normal process becomes paranormal only because we assume that people are basically distinct, an endemic feature of thinking in the West.

The lived body is not limited to the little body. The small body is an abstraction from a larger field of experience. The lived body is a long body that stretches beyond the places and times of the small body to encompass people and things that are significant to us or whose places or objects we share. Mind and body go together, small mind with small body and group mind with long body. When someone is close to us in meaning but remote from our small body, our long body may bridge the separation.

The reach of the long body is the reach of mind and memory. Memory defines the limits of the long body and thereby of psi interactions. What you cannot remember, you cannot connect with. But the reach of memory may be increased if the preconceptions that limit the self are set aside.

The view from the long body sees the traditional evidence for survival in a new light. An apparition of someone is potentially present in the place she occupied in the past or now occupies. All homes are “haunted” by past occupants and may affect those who now live or visit there. Similarly those to whom we are close, whether living or dead, continuously “channel” their emotions and intentions to us. Reincarnation, too, is not reserved for the person who relives a stream of events from an earlier life. Through the people and places where our lives are lived and where they are embedded, these lives continuously become flesh, *carno*, again.

This perspective gives new meaning to self interest. The result is an ethics that is intrinsically social. If our lives are interwoven in the people and places around us, our intentions and actions by affecting others affect ourselves.

NOTE

1.) Spontaneous psi is the common term for natural psi. I prefer natural psi because psi appears and disappears as unexpectedly and spontaneously in the laboratory as in real life.

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APPENDIX: IMPLICATIONS FOR EXPERIMENTAL METHODOLOGY

When I came to the Parapsychology Laboratory at Duke I expected to succeed better at ESP tests than I had at Oxford. I did worse. I turned to field investigations instead and to tests with special subjects, such as mediums and psychics. Like the parapsychologists in the US who I emulated, my work in England had largely been with subjects who had no obvious ESP ability, the same when I took up testing at Duke.

A serious experiment in ESP or PK with subjects who have little ability to begin with is not easy. For people determined to persevere, here are some pointers. Conventional test procedures may impede psi rather than support it, resulting in the repeatability problem. The test often has little personal meaning to the subject; it frequently takes place in an alien environment where the person is surrounded by strangers with whom she shares no history. From the long body point of view, the body we attempt to engage in an ESP or PK test is often dismembered.

Insofar as ESP and PK reflect the subject's personal history, then that history must be engaged if results are to be expected. The researcher needs to determine the meaning of psi in the life of the subject and the extent to which the test responds to that lived meaning. If results are obtained during pilot testing, it needs to be determined what effect they have on the subject. Opening oneself to ESP with strangers may evoke anxiety and may lead to a distortion of the ESP connection. ESP entails a disclosure of one's personal history, of who one is and what one hopes to be. It is an offer of intimacy that may not be easy to give or to accept.

A psi test is not replicated by reproducing the manifest conditions. The meaning that the earlier study had to the participants, including the experimenters, must be recaptured if similar results are to be expected in the later study. It may be necessary to change the conditions of the test to retain its meaning.

The experimenter effect suggests that the experimenter is also a subject and gives rise to the same questions asked of other subjects, including administration of the same psychological questionnaires. In addition, place memories from previous users of the laboratory that are enfolded in the building and equipment may affect results. The long body model implies a laboratory psi effect that goes beyond the manifest features of the laboratory and beyond the experimenter effect as this is usually understood.

FURTHER TESTING OF THE PRECOGNITIVE HABITUATION EFFECT USING SPIDER STIMULI.

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ABSTRACT

This paper outlines two studies conducted to further test the precognitive habituation (PH) effect using spider stimuli, following the success of Savva, Child and Smith (2004). The PH effect was first developed by Daryl Bem (2003) and was based heavily on the conventional mere-exposure effect, in which the presence of a stimulus leads to participants showing a preference for it, over other stimuli. The PH effect is a time-reversed mere-exposure effect, since participants are asked to make a preference choice between two stimuli before they are presented (or exposed) with one of them. In his original study, Bem had made use of violent and pornographic stimuli, which were replaced with spider stimuli in a successful conceptual replication by Savva et al. This paper reports on two further replications; Study I incorporated a number of developments, most crucially using supraliminal rather than subliminal exposure of targets. Fifty participants took part in study I and although there was a small yet significant above chance hit-rate (53% where MCE is 50%; $p = .046$), no PH effect was found. Study II incorporated a larger sample ($N = 92$), though testing took part in small groups (although again it was hoped that this minor adaptation would not have an effect on the results). No PH effect was found in the data, although Bem has suggested that study II may provide evidence of what he has termed a precognitive aversion effect. The authors tentatively present that interpretation, although the inability to replicate the original Savva et al. (2004) findings, does raise doubts about the reliability and strength of the PH effect.

INTRODUCTION

Study I

It is two years since Daryl Bem (2003) first introduced the precognitive habituation (PH) effect to the parapsychological community, as a candidate for the holy grail for psi researchers; “a straightforward, transparent laboratory demonstration of psi that could be replicated by any competent experimenter” (p. 7). This paradigm derives from the suggestion that there may be time-reversed influences on behaviour that can be investigated using conventional psychological techniques looked at from an alternative perspective. The PH effect was initially characterised by Bem as a time-reversed mere-exposure effect. Conventional mere-exposure research shows that the very presence of a stimulus will increase liking for it (for a more detailed explanation of the mere-exposure effect see Zajonc, 2001) such that when asked to make a preference between two matched stimuli presented simultaneously, participants will tend to choose the stimulus that they have been previously exposed to over the novel one. This effect occurs even where the initial exposure is so degraded or brief that the participant has no apparent conscious awareness of its presentation.

Bem (2003) was interested to see whether it was possible to adapt the typical mere-exposure methodology so that it constituted a parapsychological experiment. He achieved this by reversing the temporal order, so that participants had to register their preference between two stimuli *before* one of them was randomly selected and exposed to them subliminally. Although success at this version of the task seems to require participants to be influenced by information that only existed in their future, Bem found that there was evidence of a time-reversed mere-exposure effect (or as Bem described it, a precognitive habituation effect).

Given that the paradigm was proposed in part because of the ease with which the experiment could be replicated, it is encouraging to note that since that initial presentation there have been a number of

reported and unreported replications and methodological discussions (Don, McDonogh & Warren, 2004; Morris et al., n.d., as cited in Bem, 2005; Savitsky, n.d., as cited in Bem, 2005; Moulton, n.d., as cited in Bem, 2005; Savva, Child & Smith, 2004; Sjoden & Parker, n.d., as cited in Bem, 2005). However, these have had mixed results, and suggest that the effect is more complex than first thought. Over the intervening period since first describing the PH effect, Bem has proposed a number of related effects, such as “precognitive boredom”, “precognitive déjà vu” (Bem 2004) and the newest effect, “precognitive aversion” (Bem, 2005). These different developments seem to be a combination of post hoc conclusions

A number of different researchers involved in attempting to replicate the PH effect had raised ethical concerns about using the original PH stimuli (which included pornographic and violent images taken from the International Affective Picture Set and from the internet) in any replication. Savva et al. (2004) replaced these images with pictures of spiders in an attempt to provide a less ethically problematic target pool. As an analogue for Bem’s reactive and non-reactive types, and building on the previous work of the first author (e.g. Savva & French, 2001), it was hoped that those rating themselves as afraid of spiders would show the PH effect with spider images, whilst those who rated themselves as not afraid, would not. A significant, seemingly PH effect was found in the data, in the predicted direction (where a significant difference was found for the spider stimuli and low-affect stimuli hit rates for the spider-fear group ($t(24) = 2.48, p = .0021$).

The research outlined in this paper builds upon developments in both Bem’s research and the success of the use of spider stimuli by Savva et al. (2004). In discussion with the first author, Daryl Bem kindly rewrote two versions of his precognitive habituation software, to not only incorporate a number of spider items into the questions already administered as part of the software program, but to produce a supraliminal version of the software. The supraliminal version was used instead of the previously successful subliminal version, for a number of reasons. Firstly, the technical limitations of the PCs and monitors available to the researchers meant that the subliminal version of the PH software could not be guaranteed to be truly subliminal for all participants. Secondly, although a significant deviation in procedure from previous studies in which Bem identified a significant PH effect using subliminal exposures (Bem, 2003, Series 100 & 200), supraliminal presentation had been used successfully before (e.g., Bem, 2003, Series 300 for negative pictures) and current developments in Bem’s testing had suggested supraliminal exposure may produce the best effect (personal communication, March 30th, 2005).

Study I was an attempt to incorporate these developments in the precognitive habituation research during the intervening period since Savva et al. (2004). It was hoped that those who rated themselves as high-fear on the spider items would show the precognitive habituation effect when presented with supraliminal images of spiders and that no paranormal effect would be found for those rating themselves as low-fear. That being said, Bem had predicted before data collection that, in line with his own research findings, we might capture precognitive boredom, whereby participants in the low-fear group would show target missing.

METHODS

Design

The study was a 2x2 mixed design, with two independent variables: type of stimulus (spider vs low-affect) and fear group (high-fear vs low-fear).

Participants

There were 50 participants (22 males and 28 females) representing an opportunity sample recruited mainly from staff, students and visitors to Liverpool Hope University College. Participants were not recruited on the basis of any variable. Ages ranged from 17 to 52 years ($M = 26.6; SD = 9$). Participants were not given detailed information about the aims of the study, but were informed that they would be presented with visual stimuli of spiders and that they could withdraw at any point if they became uncomfortable.

Materials

The only apparatus used in this study was the precognitive habituation software as developed by Daryl Bem. The version used incorporates a number of spider questions based on the Szymanski and O'Donohue (1993) fear of spiders questionnaire (see appendix).

The experimental program was run on a laptop computer (working under Windows XP at screen resolution 1024x768). The stimuli incorporated into the current version of the software as used by Savva et al (2004) and include both spider stimuli and low-affect landscape stimuli.

Procedure

Participants were recruited individually and as part of their recruitment were made aware of the general nature of the study, including that they would be presented with pictures of spiders (although the fact that the experiment was a psi task was not made apparent to participants). Experimental sessions took place in LS's work space at Liverpool Hope University College, so that lighting conditions were as consistent as possible across participants. Once LS had explained the procedure and the participant had confirmed understanding, LS left the room, and the participants was left alone whilst viewing the images. All participants were asked to switch off their mobile phones to prevent any disturbances during the experiment.

Participants were then asked to fill out some questions collecting demographic data as part of the computer program.

The precognitive habituation software then presented a screening test, which is a 30-item questionnaire including the spider-fear questions. Although this data was collected during the current research, only the spider-fear items were used in any subsequent analysis.

The software then provided a cool-down period, where participants were provided with 3 minutes of relaxing sounds and images.

On each trial, participants were shown two pictures side by side and asked to indicate which one they liked better by clicking on it with the mouse. They were then asked to watch the screen, as one of the pictures was flashed 12 times (for 500ms each) full on the screen. There were 12 spider trials and a further 12 low-affect trials. Participants were instructed to watch the computer screen at all times, even if they found the stimuli aversive. However, since participants were tested on their own, this was not monitored.

At the end of these trials the experimenter debriefed the participants as to the aims of the study. The entire procedure lasted approximately 20-25 minutes. The PH program supplied by Daryl Bem includes a database program that collated the data and exported the required data to SPSS for further analysis.

RESULTS

The overall hit rate for study I was 53% (which represents all correctly identified trials, both low-affect and spider stimuli, for both fear groups) ($t(49) = 2.04$, $p = .046$, 2-tailed). Although not expected, this significant deviation from chance does suggest that there is a possible paranormal influence in the data. The high fear group (i.e. those scoring above the median on the combined spider fear item) have a hit-rate of 52.7% for the spider stimuli ($t(24) = .79$, $p = ns$) and 51% for the low-affect stimuli ($t(24) = .32$, $p = ns$). The low fear group (i.e. those scoring below the median) have a hit-rate of 52% for the spider stimuli ($t(24) = .65$, $p = ns$) and a significant 56.3% for the low-affect stimuli ($t(24) = 2.43$, $p = .016$).

To investigate whether the anomalous hit-rates were a reflection of a precognitive effect in the data, a 2x2 mixed ANOVA was conducted. No within-subjects main effect of stimulus type (spider vs low-affect) was found ($F(1, 48) = .177$, $p = ns$). No between-subjects main effect of fear group was found ($F(1,48) = .627$, $p = ns$). No interaction was found between the two factors ($F(1,48) = .898$, $p = ns$).

DISCUSSION

The findings from study I are clear. Although there is a small yet significant deviation from chance there is no precognitive habituation effect in the data. Nor does there seem to be any other associated effects (such as the precognitive boredom effect). As such, study I failed to replicate the precognitive habituation effect reported by Savva et al. (2004). There are a number of reasons why this might have occurred. Perhaps the use of supraliminal exposures weakened or removed the effect altogether. Bem (2003, p. 8) states that “the ME effect is stronger when the stimuli are exposed subliminally, that is, at such short exposure times that they cannot be identified. This is interpreted as showing that the ME effect works at an unconscious level and that conscious cognitive processes actually interfere with the primitive affective process presumably responsible for the effect”. However, it should be noted that although this might seem a reasonable proposition, Bem (2005) has described a number of striking results using a supraliminal procedure.

The replacement of perhaps more arousing violent and pornographic stimuli in the study may be another reason for the lack of effect, but again, Bem’s current research into precognitive aversion, has seen him successfully remove the extreme stimuli and moreover previous research by the first author (Savva et al., 2004) had successfully used spider stimuli to elicit the PH effect.

One factor that is difficult to control for in any of this research, is the fact that participants can, if they so desire, shut their eyes or turn their heads, to minimise or eliminate exposure to the aversive stimuli. Although no systematic evaluation of this potential confound was undertaken, a number of participants admitted that on some of the spider trials, they had in fact reduced exposure through some mechanism. This obviously presents a major problem for any researcher studying the PH effect. If a significant amount of participants were at some point during the testing procedure reducing their exposure to the stimuli, by, for example, covering their eyes, it would be expected that the precognitive habituation effect would not be shown on those trials and the hit rate of the study will be reduced. That being said, it is very difficult to make sure participants are attending to the stimuli, even if the experimenter is present during testing (which itself raises further questions about any social facilitation effect which may arise as a consequence of the presence of the experimenter).

The slight deviations from chance seen in the hit rates are interesting, but if taken from a conservative perspective represent little more than normal deviations from chance. That being said, it was felt that further testing was warranted, despite the lack of effect in the data and would perhaps allow methodological procedure to eliminate or reduce the participant’s reducing their exposure to the stimuli.

INTRODUCTION

Study II

Study II was a direct replication of study I with only minor methodological differences. The main difference being that study II was conducted as part of a 2nd year psychology undergraduate practical session and testing occurred in a quiet lab, with between 5 and 12 participants taking part in the experiment simultaneously. All participants used one of 12 dedicated lab computers and despite taking part at the same time, each had different orders of presentation, with the targets being selected by their own PC. Although this was a deviation from the original methodology, it was hoped that it would not have a dramatic effect on performance and would allow the prevention of participants introducing strategies to eliminate or reduce exposure to the stimuli. That is, not only would the experimenter inform participants that they should keep their eyes on their own screen at all times during the experiment, but that the presence of the experimenter in the testing lab would decrease substantially the chance of the participant closing their eyes or turning their heads (against the instructions).

The hypothesis remained the same from study I: that those who rated themselves as high-fear on the spider items would show the precognitive habituation effect when presented with supraliminal images of spiders and that no paranormal effect would be found for those rating themselves as low-fear.

METHOD

Design

The study was a 2x2 mixed design, with two independent variables: type of stimulus (spider vs low-affect) and fear group (high-fear vs low-fear).

Participants

There were 92 participants (19 males and 73 females), all who participated as part of the 2nd year psychology practical course at University College Northampton. Ages ranged from 19 to 54 years ($M = 22.2$; $SD = 6.2$). Participants were not given detailed information about the aims of the study, but were informed that they would be presented with visual stimuli of spiders and that they could withdraw at any point, if they became uncomfortable.

Materials and apparatus

Materials and apparatus were as used in study I, except that in Study II a number of participants were run in the same lab space at the same time during each session. The program was therefore set up to run on 12 PCs.

Procedure

Participants were recruited as part of an undergraduate psychology practical sessions and given a brief outline of what they were to expect. A number of individuals did decline to participate at this stage. Then small groups of between five and twelve were taken to the testing lab where they were met by LS and given further instructions about the study (importantly participants were shown an example spider picture (not used in the study) to illustrate the nature of the stimuli). It was stressed that participants were merely to choose the picture they liked the best and it was highlighted that this may seem counter-intuitive on the spider trials but that participants should not think too long about their choice. Again participants were informed that at any time during or after the study, they could withdraw from the study or withdraw their data from the study. At no time did any of the remaining participants choose to withdraw themselves or their data. Participants were instructed not to talk with each other, or to look at anybody else's computer monitor during the testing phase of the research. The experimenter also highlighted some of the strategies employed by some participants to eliminate exposure to the stimuli and that if any participants exhibited this behaviour the experimenter would tap them on the shoulder. Participants were also instructed to wait quietly until every person had completed the experiment. All participants were asked to switch off their mobile phones to stop any disturbances during the experiment.

The rest of the procedure is identical to study I, except that no 3 minute cool-down period was used (as the testing environment did not allow this to be practical).

RESULTS

Study II

The overall hit-rate for study II is 49.8% which is not significantly different from chance ($t(91) = -.170$, $p = ns$). The high fear group (again calculated as those scoring above the median) have a hit-rate of 50.7% for the spider stimuli ($t(43) = .35$, $p = ns$) and 50.2% for the low-affect stimuli ($t(43) = .08$, $p = ns$). The low-fear group have a hit-rate of 47.2% for the spider stimuli ($t(43) = -1.28$, $p = ns$) and 51.1% for the low-affect stimuli ($t(43) = .49$, $p = ns$). In contrast to study I, none of these hit-rates is significantly different from chance.

As with study I and the earlier Savva et al. (2004) research, a 2x2 mixed ANOVA was conducted on the data. No within subjects main effect of stimuli type (spider vs low-affect) was found ($F(1, 90) = .649$,

$p = ns$). No between subjects main effect of fear group was found ($F(1,90) = .362, p = ns$). No interaction was found between the two factors ($F(1,90) = 1.099, p = ns$).

Precognitive Aversion Hypothesis

After we had completed studies I and II, we discovered that Daryl Bem has identified another variation on the original effect, which he has called the “precognitive aversion effect”, and which he presumes is different from the precognitive boredom effect. The precognitive aversion effect can be described as the situation in which repeated exposure to a negative stimulus does not simply render it boring, but becomes aversive. Bem therefore predicts that precognitive aversion results in participants choosing the alternative stimulus, over the stimulus that they find precognitively aversive. In response to personal communication between ourselves and Bem, we herein tentatively present the precognitive aversion results, as identified by Bem (2005). However, since both studies were conducted with the aim of learning more about the efficacy of using spider-stimuli in the precognitive habituation paradigm and were not intended to investigate the precognitive aversion effect, any results reported here should be regarded as post hoc and speculative rather than evidential, though it is hoped that they might stimulate further debate about the precognitive habituation phenomenon.

For study II, if we look at the second spider question (“in general, how gross or disgusting do you find spiders?”) we find that 37 participants score below the median (and therefore represent low-fear on that item). These participants select the target on 45% of negative trials, which is significantly below chance ($p = .016$). Importantly this 45% hit-rate is claimed to be almost identical to that obtained in Bem’s new research on the precognitive aversion effect.

DISCUSSION

In study II, despite the larger sample size, no precognitive habituation effect was found. Although in both studies there are hints of possible paranormal influences in the data (where in study I there was a significant above chance hit rate, and the possibility of a weak precognitive aversion effect in study II), the preplanned analyses have not yielded any precognitive habituation effect. Therefore if one takes a conservative or sceptical perspective on the results obtained, there is little to suggest that there is anything but expected deviations from chance here in the data. As such it is important to understand why the precognitive effect has not been found. Although at first most of the researchers investigating the phenomenon were using Daryl Bem’s software and could therefore fall foul of a systematic bias in the software, the lack of success in the two studies described, makes that hypothesis seem untenable. Perhaps the file-drawer effect is distorting the true picture of the research. Bem refers to the results of replications by a number of researchers, but details of these studies are limited and to our knowledge more detailed accounts have not yet been published. If there are many more unsuccessful studies languishing in researchers’ filing cabinets, knowledge of them would help us place the successful studies in a more appropriate context. However, it seems unlikely that there are a sufficient number of unpublished unsuccessful studies to counterbalance the precognitive habituation effect completely.

Interestingly, the presence of the experimenter in the company of the participants seemed to reduce the number of people who were employing strategies to reduce their exposure to the stimuli. During study II, very few people attempted to avert their gaze from the computer screen and those that did, quickly attended back to the task when the experimenter moved closer to them. Therefore it can be fairly certain that in study II, most participants were exposed to the stimuli. That no precognitive habituation effect is found, is disappointing based on this increase in exposure to the stimuli.

Perhaps, then, the most salient explanation currently being explored is surrounding the aversive nature of the spider stimuli, and the levels of fear exhibited by participants. Bem (2005) believes that the spider stimuli are not arousing enough to serve as PH stimuli. It is quite possible that this is true (although the same stimuli did provide an effect in the previous Savva et al. (2004). Although many of the participants did report that they had found the stimuli arousing, perhaps the use of “normal” participants, with the current stimuli, does not provide enough arousal to exhibit a PH effect. Why the Savva et al. (2004) study

did find a PH effect, could have been due to a number of factors, including the general fear levels of participant's may well have been higher. If future work continues along these specific lines, perhaps a greater investigation into the arousal of spider stimuli on the general public, may be worth pursuing. Perhaps it may also be worth targeting high fear, or phobic individuals, if they are willing to participate in this research. If in the two studies described, the spider fear groups, were in fact of mid-range fear (and it is difficult to extract this information due to the general nature of the scales use, it may well explain the lack of PH effect in the data. The Savva et al. (2004) research used the Symanski and O'Donohue (1995) fear of spiders questionnaire to categorize the fear group. This measure is a 6 item questionnaire, which categorizes individuals as afraid of spiders if they answer in the affirmative to any or all of the 6 questions. This then is not a sensitive measure of spider fear (and certainly not a reliable measure of arachnophobia), although it has the useful ability of splitting the population into a general 50/50 fear-no-fear group). However, the two studies outlined in this paper, made use of a scale devised by Bem, to be a more sensitive measure of spider fear. However without targeting more extreme fear populations, this measure still seems to not be sensitive enough at distinguishing the phobic individuals from a more general or mid-range fear. Recruiting high fear or phobic individuals and using the most extreme spider stimuli that can be found, may increase the chances of not only getting a PH effect, but understanding more about how and why the PH effect occurs.

Daryl Bem is currently developing and extending the precognitive habituation effect (and the other related phenomena). Perhaps at this juncture the most pertinent course of action is to broaden the debate and agree a co-ordinated plan for conducting future research, in the hope that the nature of the effect (be it real or artifactual) can be confirmed.

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Appendix

Spider Fear Items:

- 1) In general, how scared of spiders are you?
 - 2) In general, how gross or disgusting do you find spiders?
 - 3) How nervously would you react to a small, familiar-looking spider in your house?
 - 4) How nervously would you react to a very large, unfamiliar-looking spider in your house?
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OF TWO MINDS: SKEPTIC-PROPONENT COLLABORATION WITHIN PARAPSYCHOLOGY¹

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ABSTRACT

A large body of research has examined the possible existence of psychic ability. Proponents claim that some of this work supports the existence of such abilities; skeptics argue that such studies suffer from potential flaws and artifacts. As with other controversial areas of psychology, researchers on both sides of the debate have tended to collaborate only with colleagues who hold the same beliefs about the phenomena in question. This is unfortunate, as skeptic-proponent collaborations offer the potential for resolving key areas of disagreement. The first author, a proponent, and the second, a skeptic, have been conducting a systematic program of collaborative skeptic-proponent research in parapsychology. This involved carrying out joint experiments in which each investigator individually attempted to mentally influence the electrodermal activity of participants at a distant location. In the first two collaborations, experiments conducted by the proponent obtained significant results but those conducted by the skeptic did not. This paper describes a new collaborative study that attempted to replicate our previous findings and explore potential explanations for past results. The new study failed to replicate our previous findings. The implications of this work are discussed, along with the benefits of conducting collaborative work for resolving disagreements in other controversial areas of psychology.

INTRODUCTION

For well over a hundred years scientists have explored the possible existence of psychic ability (Edge, Morris, Palmer & Rush, 1986). This work has generated considerable controversy, with proponents arguing that the cumulative research supports the existence of such abilities (see, e.g., Utts, 1991; Bem & Honorton, 1994), and skeptics claiming that the evidence suffers from potential methodological or statistical problems (see, e.g., Hyman, 1994; Alcock, 2003). Researchers on both sides of the debate have tended to collaborate with colleagues who share similar beliefs about the existence of psychic ability. This is unfortunate, as joint skeptic-proponent collaborations offer the potential to help resolve key areas of disagreement (see, e.g., Hyman & Honorton, 1986). For several years, the second author (a skeptic about the existence of psychic ability) has collaborated with the first author (a proponent of such abilities) on a systematic programme of joint skeptic-proponent experimental work within parapsychology. To date, this research has involved two jointly conducted experiments exploring the possible existence of a commonly reported phenomenon, the “sense of being stared at.” (Wiseman & Schlitz, 1997; 1999). This paper presents a description of our third and latest study.

Surveys suggest that between seventy and ninety percent of the population have experienced an uneasy feeling of being stared at, only to turn around and discover somebody looking at them (Coover, 1913; Braud, Shafer and Andrews, 1993a). Research into this commonly reported phenomenon has a long and distinguished history, with initial papers on the topic being published around the turn of the last century by two pioneers of modern day psychology: E.B. Titchener (1898) and J.E. Coover (1913). The first experimental investigation into the phenomenon was conducted by Coover at Stanford University. It

¹ Our thanks to the Samueli Institute of Information Biology, the University of Hertfordshire, the Perrott-Warrick fund and the Institute of Noetic Sciences for supporting this work. Thanks also to Jenny Matthews for her invaluable assistance in conducting this research.

involved an experimenter sitting behind participants, either staring directly at their backs or looking away, and then asking them to decide whether they had just been stared at. Subsequent work has involved increasingly sophisticated methodological and statistical procedures. For example, researchers have minimized potential experimenter-participant sensory cues by employing one-way mirrors (Peterson, 1978) and closed-circuit television systems (Braud, Shafer and Andrews, 1993a,b), and created a more sensitive dependent measure of participant's arousal by recording their electrodermal activity (EDA) rather than asking them to report whether they are being stared at (Braud, Shafer and Andrews, 1993a,b).

The basic experimental procedure that has evolved involves the participant and experimenter being located in two separate, sensory-isolated rooms. A closed-circuit television system feeds a live image of the participant to a monitor in the experimenter's room and, at randomly determined times, the experimenter either stares at this image with intention to physiologically arouse the participant ('stare' trials) or looks away from the monitor and disengages his/her intention ('no-stare' trials). The participant's EDA is continuously recorded during the experiment, and any significant differential effects observed in EDA between 'stare' and 'no-stare' trials is inferred to reflect the existence of psychic functioning. A recent meta-analytic review of fifteen experiments using these types of procedures revealed a small, but statistically significant, overall effect (Schmidt, Schneider, Utts and Walach, 2004).

The first author (MS) has conducted numerous parapsychological studies that have obtained positive results, and has argued in favour of certain types of psychic ability (e.g., Schlitz & Honorton, 1992; Schlitz, 2001). In contrast, the second author (RW) has carried out several studies that have obtained chance results and has published critiques about the adequacy of experimental findings in supporting the existence of psychic abilities (see, e.g., Milton & Wiseman, 1999; Wiseman & Greening, 2002). In the early 1990s each of us carried out separate studies into the remote detection of staring. The experiments conducted by RW showed no evidence of psychic functioning (Wiseman & Smith, 1994; Wiseman, Smith, Freedman, Wasserman & Hurst, 1995) whilst MS's study yielded significant results (Schlitz & LaBerge, 1994). These conflicting results could be interpreted in many ways. MS's study may have contained an experimental artifact absent from RW's procedure, or vice versa. MS may have been more skilled than RW at eliciting participants' psychic ability, or was better able to psychically influence their EDA while staring at them. Rather than speculate about the potential reasons underlying our different findings, we decided to try to tease apart these competing explanations via a series of collaborative experiments.

Our first joint project (Wiseman & Schlitz, 1997) consisted of conducting two studies in RW's laboratory, using the same psychophysiology equipment, the same experimental procedures, and drawing participants from the same pool (N=16 for each study). The only difference between the studies was that one involved MS as experimenter/starer, whilst the other involved RW carrying out these roles. The two studies obtained different results. The EDA of MS's participants was significantly higher in stare vs. no-stare trials (effect size [es]=.50; p=.04, 2-t), whereas the EDA of RW's participants showed no such effect (es=.11; p=.64, 2-t). The second joint project (Wiseman & Schlitz, 1999) took place at MS's laboratory, and again involved two studies employing the same procedures, equipment and participant pool (N=35 for each study). Once again, MS's experiment showed a small but statistically significant effect (es=.33; p=.05, 2-t), whereas RW's did not (es=.07; p=.69, 2-t).

The present study attempted to replicate our previous findings and also evaluate two hypotheses that may explain the pattern of results obtained in these studies. In our previous work the experimenter both interacted with the participant at the start of each session (explaining the purpose of the study, administering questionnaires, etc), and carried out the staring/no-staring. The differing outcomes might thus have been due either to different ways in which the experimenters interacted with participants or how they performed their staring. The present study employed a 2 x 2 cross-over design to evaluate these hypotheses (see Table 1). In two of the conditions (A & D), either RW or MS met the participant at the start of the session (i.e., acted as 'greeter') and then the same person carried out the stare/no-stare trials (i.e., acted as 'sender'). In the other two conditions (B & C), either RW or MS acted as greeter and the other acted as sender. If the previous experimental results were due to the way in which MS interacted with participants, one would predict a main effect of greeter. If, however, they were due to the way in which the stare/no-stare trials were conducted, one would expect a main effect of sender.

TABLE 1:
STUDY DESIGN

	MS sender	RW sender
MS greeter	A	B
RW greeter	C	D

METHODS

Participants

100 participants took part in the study (32 male, 68 female; mean age: 49, age range: 21-86). Participants were either staff members of The Institute of Noetic Sciences or local volunteers, and were recruited through word of mouth, posters and email postings.²

Layout of rooms and apparatus

The experiment took place in two rooms of the Institute of Noetic Sciences' psychophysiology laboratory. The larger room contained a Lindgren/ETS double steel-walled, electromagnetically and acoustically shielded chamber, and two computers used to record EDA and control the random assignment of stare and no-stare trials. The shielded chamber contained equipment for measuring participants' EDA (see below), a reclining chair and video-camera. A smaller room, 15 meters away from the shielded room, and behind a double wall, contained a desk, chair and a television monitor linked to the video-camera in the shielded room. The acoustic shielding between the chamber and the remote observation room attenuated sounds by approximately 100 dB, making inadvertent auditory communications between participants and the experimenter highly unlikely. Visual communication between experimenter and participant was prevented because the shielded chamber had solid steel walls with no windows, its door remained closed throughout the stare/no-stare trials, and it was located in a different room and behind a double wall and two doors.

The measurement and recording of participants' EDA followed guidelines recommended by Schmidt and Walach (2000). The participant sat in a comfortable chair and both the humidity and temperature in the shielded chamber were monitored. EDA measurements in the form of skin conductance level (SCL) were obtained through two 9mm (diameter) silver/silver chloride electrodes filled with an isotonic paste, placed on the participant's nondominant palm with double-sided adhesive collars, and connected to an EDA amplifier on a Biopac M150 system, using a constant voltage (0.5v) in the direct-coupled mode. These signals were recorded at a rate of twenty-five samples per second. The physiological and video signals were routed outside the chamber through fiber optics to maintain the integrity of the electromagnetic and acoustic shielding. 100 participants took part in the study (32 male, 68 female; mean age: 49, age range: 21-86). Participants were either staff members of The Institute of Noetic Sciences or local volunteers, and were recruited through word of mouth, posters and email postings.

² This study was originally intended to involve 140 participants, 35 in each of the four cells. However, due to unforeseen constraints on time and resources, a decision was made in April 2004 to reduce the number of participants to 100, 25 in each cell. This decision was made prior to any examination of the data.

Assignment of stare and no-stare trials

Each session consisted of 20 stare and 20 no-stare trials. Each trial lasted 20 seconds and trials were separated from one another by a randomly determined inter-trial interval (ITI) of between 5 and 15 seconds. These random ITIs helped prevent participants from guessing when the next trial would begin, and also precluded the possibility of their physiological rhythms accidentally synchronizing to the uniform length of the stare and no-stare trials (see Schlitz & LaBerge, 1994). To help prevent artifacts due to participant relaxation or habituation over the course of the session, stare and no-stare trials were scheduled in groups of four, with each group consisting of either an ABBA (stare, no-stare, no-stare, stare) or BAAB (no-stare, stare, stare, no-stare) order (Wiseman & Schlitz, 1997). The ten ABBA or BAAB orders used in each session were randomly assigned by a pseudorandom algorithm initiated just prior to each session. During stare trials the monitor in the remote observation room displayed a live image of the participant. At all other times the monitor displayed a live image of an empty reception room. A computer-controlled video switch automatically directed the appropriate video signal. A Microsoft Visual Basic program controlled all aspects of the experiment.

Procedure

Before the experiment, a research assistant randomly assigned equal numbers of participants to each of the four conditions and prepared two envelopes for each session³. One envelope contained the name of the greeter and the other contained the name of the sender. Prior to the start of a session, RW and MS together opened the 'greeter' envelope. The designated greeter then met the participant, obtained informed consent, explained the nature of the experiment, showed them to the shielded chamber, and connected the EDA electrodes to the Biopac equipment. Participants were aware that the study was concerned with the remote detection of staring, and asked to remain psychologically open to any such influence during the stare and no-stare trials. After the participant was securely housed in the shielded chamber, both experimenters met in a distant office to open the 'sender' envelope. The designated experimenter then went to the remote observation room and carried out the stare and no-stare trials. During stare trials the experimenter quietly directed his/her attention towards the participant; during no-stare trials the experimenter directed his/her attention away from the participant. Participants were blind to the identity of the starrer. For additional information about the psychological procedures used by RW and MS during the sending period, see Watt, C., Wiseman, R., & Schlitz, M. (2002).

RESULTS

In our previous collaborative projects the participant's mean SCL level was used for the dependent measure. Prior to conducting the present study a more sensitive way of using participants' EDA was devised to obtain a measure of their autonomic arousal. First, the difference in each participant's mean SCL level for the 20 stare and 20 no-stare trials was determined. Next, an exhaustive permutation analysis was used to determine the exact probability of the observed difference by comparing it to the outcomes obtained in all the other ways in which the order of the stare and no-stare trials could have been randomly assigned. Each resulting p-value was then transformed into a one-tailed z score, such that a score of zero would indicate no difference in EDA between stare and no-stare trials. Based on the design of the present study, a 2 (RW or MS as greeter) x 2 (RW or MS as sender) between factors ANOVA was used to evaluate the resulting z scores. The main effects of greeter ($F[4,93]=.46, p=.50$) and sender ($F[4,93]=.21, p=.64$), and the interaction between these factors ($F[4,93]=.04, p=.85$), failed to reach significance (see Table 2: All p-values are 2 tailed).

³ Due to an administrative error discovered after the experiment had been completed, one of the four cells contained 24 participants and another contained 26.

TABLE 2:
MEANS AND S.D.'S (IN PARENTHESES) FOR SENDER AND GREETER CONDITIONS

	<i>MS sender</i>	<i>RW sender</i>	<i>Totals</i>
MS greeter	.012 (.84) N=25	.143 (1.04) N=24	.076 (.94) N=49
RW greeter	-.087 (1.16) N=25	-.032 (.95) N=26	-.059 (1.05) N=51
Totals	-.037 (1.00) N=50	.052 (.99) N=50	.007 (.99) N=100

Post-hoc analyses compared the results obtained in this present study with the findings from our earlier work. In our previous studies, Wilcoxon signed rank tests revealed that MS's studies obtained significantly different mean EDA during stare versus no-stare trials, but that this was not the case for RW's experiments. Identical analyses of the present data failed to reveal the same pattern. When MS acted as both greeter and sender (condition A in Diagram 1), participants' EDA was not significantly different in stare versus no-stare trials (N=25, stare trials; mean = 1.24, s.d. = 1.23; no-stare trials; mean = 1.24, s.d. = 1.21, z-score [corrected for ties] = -.17; p [2 tailed] = .87, es = -.03). This was also the case in condition D, where RW acted as both greeter and sender (N=26, stare trials; mean = 2.65, s.d. = 2.64; no-stare trials; mean = 2.67, s.d. = 2.24, z-score [corrected for ties] = -.35; p [2 tailed] = .72, es = -.07).

DISCUSSION

The results obtained in this study did not replicate our previous findings and failed to reveal any significant interaction effects. Indeed, in the condition wherein MS acted as both sender and greeter, participants' EDA was nonsignificantly higher in the stare than nonstare condition, whereas in our previous joint work, the opposite pattern was obtained. As a result, the findings from our three joint projects are open to competing interpretations. It is conceivable that the results from our first two studies represented chance findings or undetected subtle artifacts, and that the results obtained in the present study accurately reflects the absence of a remote detection of staring effect. It is certainly the case that the methodology and statistical analyses employed in this third study were more sophisticated than the techniques and procedures used in our previous work. For example, the equipment used to measure and record participants' EDA was superior to that employed in our previous two studies, and the safeguards against sensory leakage during this latest experiment was far better than those used in our second study (see Schmidt & Walach, 2000). However, such improvements were the result of the natural betterment that often takes place when researchers repeat their studies, rather than being driven by any concern that our previous findings were the result of any obvious artifacts. Alternatively, the results of our two initial studies may have been caused by a genuine remote staring effect, and the third experiment failed to replicate these findings because unanticipated and uncontrolled factors (e.g., lack of novelty or motivation on the part of the experimenters) interfered with this effect. Given that people tend to interpret ambiguous evidence in alignment with their prior beliefs (see, e.g., Roe, 1999), it is predicted that skeptics will tend to favour the former interpretation and proponents the latter. However, the inconsistent nature of our

findings does not allow for a firm acceptance or rejection of either interpretation, and the issue will only be resolved by further research. The controversy generated by research into the possible existence of psychic abilities reflects the theoretical and practical importance of the questions raised by such potential abilities, and we believe this justifies the additional work needed to help resolve the type of inconsistent results reported here.

It is hoped that post hoc analyses of the present data will help assess some of the alternative hypotheses outlined above and guide future research in this area. For example, prior to each session in this present study, the participant and the experimenters completed various questionnaire items; one asked the participant to indicate the degree to which they believed they possessed some form of psychic ability using a seven-point scale (endpoints: 'I have psi ability' and 'I have no psi ability'). A Spearman Rank Correlation between the z score outcome per session (described in the section above) and these ratings approached significance when MS was the sender ($N=49^4$, $Rho[\text{corrected for ties}]=.27$, $z[\text{corrected for ties}]=1.89$, $p[2\text{ t}] = .06$) but not when RW was the sender ($N=49$, $Rho[\text{corrected for ties}]=-.09$, $Z[\text{corrected for ties}]=-.64$, $p[2\text{ t}] = .52$). This asymmetry is similar to the pattern of results obtained in our previous two joint studies (Wiseman & Schlitz, 1997; 1999), and thus could be interpreted as supporting future research on the extent to which experimenter effects (in both parapsychological and psychological research) may be mediated in complex ways by interactions between experimenters and participants' expectations.

More importantly, this series of experiments demonstrates that it is possible to conduct fruitful collaborative research involving both skeptics and proponents, and it offers the potential of a more productive route than more traditional forms of skeptic-proponent debate (e.g., Hyman, 1985, Honorton, 1985). The joint project described here reduces the likelihood of perpetuating unconstructive rhetoric because skeptics and proponents are actively engaged in the same study, and the procedures employed should minimize methodological flaws and maximize the procedures that proponents believe to be conducive to psychic functioning. In addition, opportunities for explaining away the results post-hoc are limited since both parties are directly involved in the experiment and the interpretation of the data.

There are, however, several barriers that may hinder this type of collaborative venture. In many controversial areas of psychology, communities of researchers with opposing views tend not to attend the same conferences, publish in the same journals or even read the same type of academic articles and books (Blackmore, 1989). Additional barriers include an inherent distrust of one another fueled by ideological differences, personal beliefs, and past involvement in acrimonious debates. Our experience suggests that there is considerable value in trying to overcome these barriers and carry out systematic and collaborative ventures. It is hoped that the studies described here will encourage researchers working in other controversial areas (e.g., the role of trance in hypnosis, false memory syndrome, unorthodox forms of psychotherapy, complementary and alternative medicine) to engage in similar joint projects, and that such work will help advance our understanding of the phenomena underlying these controversies.

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⁴ The N in each of these analyses is less than 50 because in two sessions the participant questionnaires were inadvertently overlooked.

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THE BLIND PROTOCOL AND ITS PLACE IN CONSCIOUSNESS RESEARCH

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ABSTRACT

This paper describes the development of the blind protocol, and its place in this history of consciousness research. It was first devised by Croesus, King of the Lydians (BCE 560-547) and reported by Herodotus (≈ BCE 484 - ≈ 424), and was created to protect against fraud in assessing an Anomalous Perception (AP) event; a Remote Viewing (RV) experiment little different than those conducted today. Its next use in the 17th century was to study a peasant farmer, Jacques Aymar who solved crimes with Anomalous Perception, using dowsing. Not only was a blind protocol employed, but the rudiments of controls were introduced to assess Aymar. The next documented use of a blind protocol occurred in 1784, when it was explicitly employed in the interest of science, and its history as a research technique can be said to formally begin. King Louis the XVIth created a commission to evaluate Friedrich Anton Mesmer's claims concerning healing through "animal magnetism", administered while people were in a trance, and asked Benjamin Franklin to be the commission's head. The paper proposes that Franklin be considered the first parapsychologist. He created the blind protocol to answer the king's question as to whether or not "animal magnetism" was real, and not only introduced demographic variables and controls, but literally blind folded people, which is why today we call it the Blind Protocol. Franklin's observations also present the first recorded Western description of psycho-somatic illness. An unintended consequence of Franklin's Mesmer study was the loss of the idea of psycho-physical self-regulation (PPSR) as a research vector, although the English surgeon John Eliotson (1791-1868) apparently saw through the failure of Mesmer's explanatory model to the deeper insight in the form of hypnosis that was Mesmer's real discovery. He seems to have avoided all attempts at explaining how it worked, but conducted a considerable number of surgeries using hypnosis as the anesthetic, anticipating its usage in this capacity a century later. So great was the disapproval of Mesmer, however, that no one seems to have gotten Eliotson's point. Franklin's protocol though, rapidly became the gold standard of science. Rupert Sheldrake, however, carried out a survey of the leading scientific journals, and discovered that the main use of the blind protocol is not in medicine per se, but parapsychology, and consciousness research where it is used for the same purposes it was originally conceived: to winnow out fraud in anomalous consciousness events, and to avoid introducing experimenter effects. Ultimately, though the protocol may be based on a false assumption, since increasingly research in areas such as Therapeutic Intent/healing and Remote Viewing suggest that all consciousness from single celled organisms to human beings may be interlinked through a non-local aspect of awareness they all share.

INTRODUCTION

In a search for where the idea of scientifically studying consciousness¹ begins in the West, Herodotus

¹ By consciousness I mean the dictionary standard:

Source: The American Heritage® Stedman's Medical Dictionary. Houghton Mifflin Company 2002.

1. The state or condition of being conscious.
2. A sense of one's personal or collective identity, especially the complex of attitudes, beliefs, and sensitivities held by or considered characteristic of an individual or a group.

Source: Merriam-Webster's Medical Dictionary, © 2002 Merriam-Webster, Inc.

1. the totality in psychology of sensations, perceptions, ideas, attitudes, and feelings of which an individual or a group is aware at any given time or within a given time span <altered states of consciousness, such as sleep, dreaming and hypnosis —Bob Gaines>
 2. waking life (as that to which one returns after sleep, trance, or fever) in which one's normal mental powers are present <the ether wore off and the patient regained consciousness>
 3. the upper part of mental life of which the person is aware as contrasted with unconscious processes
- Which is also understood to include what is beginning to be called non-local mind.

of Halicarnassus (\approx BCE 484 - \approx 424), a Greek man of letters whose vivid histories have made him immortal, is a good place to start (Herodotus, 1949). In his *Histories*, he recounts how a wily Lydian King, whose name to this day is associated with great wealth – Croesus (BCE 560 to 547) -- carried out the first experiment in what today we would call anomalous perception, the ability to describe persons, places or events from which one is shielded by reason of time or space, or both. Croesus had lost his son, and was in deep depression when his mourning was interrupted by the news that he might be attacked by the Persians. He wanted to consult an oracle to tell him what to do. But which one could he trust?

The solution Croesus devised was both a blind protocol experiment and the first description of what today would be known as Remote Viewing. He sent out couriers to all the famous oracles of his day. To the Greek oracles he sent delegations to Delphi, to Abae in Phocis, to Dodona, to the oracle of Amphiaraus; to Trophonius; and another to Branchidae in Milesia. To Libya, which was then considered part of Asia, he sent another embassy, to consult the oracle of Ammon at Siwah in the Libyan desert. (Herodotus, 1949)

All of these messengers were given an identical task. “They were to keep count of the days from the time of their leaving Sardis, and, reckoning from that date, on the hundredth day they were to consult the oracles, and to inquire of them what Croesus the son of Alyattes, king of Lydia, was doing at that moment. The answers given them were to be taken down in writing, and brought back to him.” (Herodotus, 1949) None of the replies survive except that of the oracle at Delphi recorded by Herodotus. Following their king’s instructions the Lydians waited until the 100th day. No sooner had they entered the sanctuary, even before they could ask their question the Pythoness, as, the entranced young woman within was known, answered it in hexameter verse:

*I can count the sands, and I can measure the ocean;
I have ears for the silent, and know what the dumb man meaneth;
Lo! on my sense there striketh the smell of a shell-covered
tortoise,
Boiling now on a fire, with the flesh of a lamb, in a cauldron-
Brass is the vessel below, and brass the cover above it* (Herodotus, 1949).

Even though it sounded like gibberish, the Lydian embassy faithfully wrote it down and set off for Sardis to report to Croesus.

Herodotus says, “When all the messengers had come back with the answers which they had received, Croesus undid the rolls, and read what was written in each. Only one approved itself to him, that of the Delphic oracle. This he had no sooner heard than he instantly made an act of adoration, and accepted it as true, declaring that the Delphic was the only really oracular shrine.” (Herodotus, 1949)

Croesus, in stipulating 100 days, had set up an experiment, one little different from such blind protocols today. The messengers would not know the answer, nor could the oracle.

Herodotus says, “He set himself to think what was most impossible for any one to conceive of his doing, and then, waiting till the day agreed on came, he acted as he had determined. He took a tortoise and a lamb, and cutting them in pieces with his own hands, boiled them both together in a brazen cauldron, covered over with a lid which was also of brass.”(Herodotus, 1949)

Anomalous perception in crime-solving dates back at least 300 years, to 17th-century France, and provides the next use of the blind protocol. Once again its use was to study consciousness and avoid issues of fraud. On 25 July 1692, a wine merchant and his wife in Lyons were brutally murdered with a meat cleaver or scythe during the course of a burglary. The crime became a sensation, and then an embarrassment when the police were unable to solve it. Finally, Jacques Aymar, a 30 year old peasant farmer with a reputation as a dowser, volunteered to help. (Dym, 2005, and Elgar, 2000) The King’s Procurator, apparently impressed by Aymar’s record, summoned him to Lyons. Aymar was taken to the crime site; using his dowsing tools, he reconstructed the crime, and very quickly announced that three people had been involved in the murder. (Dym, 2005, and Elgar, 2000)

Guided by his dowsing rods, he tracked one of the perpetrators to a prison in the town of Beaucaire, about 150 miles away (241km) where, from a line-up of 13 men, he selected a man who had been arrested

for another theft just minutes before. (Dym, 2005, and Elgar 2000) The man was returned to Lyons, where he confessed and validated all of Aymar's anomalous perceptions. The procurator was so pleased with this success that he granted Aymar legal powers and assigned him a troop of soldiers to assist him in his work. Again using his dowsing rods, Aymar took up the search, eventually tracking the remaining two perpetrators to an inn in the town of Toulon—although they had fled French jurisdiction for Genoa by the time troopers arrived.

As a result of all this, Aymar became a national hero and was asked to help out in a number of other unsolved criminal investigations throughout France. A government commission was appointed to record those efforts. That led, in turn, to a counter-investigation by skeptics, who dismissed Aymar as at best a dupe and at worst a fraud. The argument, articulated most completely by the physician Pierre Garnier, was that dowsing was irrelevant. Success such as Aymar's resulted from tiny particles of matter exhaled by people, of whom murders and the like had an exhalation of a different quality at the moment they were committing their crime. (Garnier, 1692) These tiny exhaled "corpuscles" lingered in at the scene of the crime and penetrated the skin of dowsers who were particularly sensitive to their presence.

Following this repudiation of Aymar's abilities the Abbé de Vallemont, Pierre le Lorrain, wrote a treatise, *Occult Physics, or Treatise on the Divining Rod*, defending him, which was published in Paris in 1693. (De Vallemont, 1693) As a result Aymar was brought to the city by the Prince de Condé, and a prototype of the controlled experiment was carried out in the presence of members of the Academy of Sciences, once again with the goal of studying Anomalous Perception while avoiding fraud. In a garden, the scientists had six holes dug. Four were filled with different metals, the fifth was filled with gravel, and the sixth was left empty although the grass was restored. Aymar was able to locate the empty hole, and the one filled with gravel, but could not distinguish the metals. (Dym, 2005)

The controversy over Anomalous Perception, in the form of dowsing, continued unabated for years, with skeptics decrying its use, even as it flourished amongst miners and many in the intelligentsia, most notably perhaps the Bishop of Grenoble. Aymar himself retreated to his home, and although he enjoyed successes, he was never again the national hero he had been, and eventually died in relative obscurity.

But neither Croesus, nor those studying Aymar, although the later were considered scientists in their day, could be considered researchers intent on the explicit study of consciousness, nor did their intentions for using the blind protocol extend to issues such as experimenter effect, or control populations. The real beginnings of the blind protocol as the research tool we know still lay most of a century into the future, and the honor for creating it belongs to Benjamin Franklin.

Today, we don't often think of Franklin's scientific research except in terms of his work on electricity, and his story of flying a kite in a thunderstorm. But if his electrical work, diplomacy, and statesmanship did not overpower his other achievements, he would still be an historically significant individual for his studies in a half a dozen other disciplines. He was the first meteorologist in America, the first geographer, the first oceanographer, an inventor of medical apparatus and, least known of all, the first parapsychologist, and consciousness researcher. It was in this last capacity that he created the blind protocol.

In 1778, Franklin was in Paris, as America's Minister Plenipotentiary to the court of King Louis XVI, when the 18th century's greatest medical rogue, Franz Anton Mesmer², came to the city from Vienna in a cloud of celebrity and controversy. Mesmer had left Vienna rather hurriedly. He had been asked to treat Marie Paradies, a pianist who appears to have suffered from hysterical blindness. After receiving his treatment her eyesight was temporarily restored but the change was so overwhelming that it shattered her nerves and she lost the ability to play her instrument. Unhappily for Mesmer, Marie Paradies was the goddaughter of the Austro-Hungarian Empress, Maria Theresa, and she had taken umbrage at what had

² Mesmer's first name is quite frequently given in both popular and scholar writings as Friedrich. This confusion of Friedrich for Franz traces to 1814 when one of Mesmer's manuscripts was reprinted by a Berlin publishing house which appears to be the first time the mistake was made. His name in Latin was entered into the parish registry at his baptism as Franciscus which, in German, is Franz. See Tischner R & Bittel K. Mesmer und sein Problem. Magnetismus - Suggestion - Hypnose. Stuttgart: Hippokrates; 1941 for a discussion of this.

happened to Marie. Mesmer had prudently decamped Vienna for Paris, which is where he encountered Franklin.

Well-trained in both medicine and theology, Mesmer was a charming, rational, cultivated man who was admired by people like Mozart whom he commissioned several times to write special musical pieces. Like Franklin, and Mozart, and many of the aristocracy, Mesmer was also a Freemason, then the mark of a man of character. But he also had a flamboyantly theatrical style, more than a pinch of the con, startling theories of illness, and disturbing and erotically tinged methods of treatment. Larger than life he surfed controversy like a wave.

He treated his patients, known as *somnambule*, described by one observer as mostly “hysterical bourgeois women,” in groups during “magnetic seances”. Like many intellectuals of the 18th century, particularly those involved with Freemasonry, Mesmer was interested in alchemy and astrology and that may be why he cloaked his treatments in the symbols of these already contested fields. The *somnambule* sat holding hands around a large wooden tub filled with powdered glass and magnetized iron filings. They were relaxed and brought into *rapport* by the sweet haunting tones of the armonica, a glass instrument whose invention, coincidentally, was another Franklin achievement. The armonica was played from behind a curtain covered with astrological symbols, and produced ethereal sounds that were the 18th century’s equivalent of modern electronic consciousness music. At this point Mesmer, cloaked by a long purple robe, would enter. In a performance that was a cross between a modern entertainment hypnotist and a stage magician, he would take the *somnambule* down into a deep trance and give them healing suggestions. Then he would touch them with a white metal wand, sometime rub them, frequently on “the lower abdomen”, then command them to awaken rested and cured. It frequently worked, although not for the reasons Mesmer claimed, and this success made Mesmer popular with lay people, and feared by the medical establishment.

How Mesmer discovered the fundamentals of hypnotism, and stumbled onto the rudiments of the psycho-physical self-regulation which lies at the core of such modern treatments as psychotherapy, hypnotism, and bio-feedback, as well as the placebo effect is unknown. It may be that he just observed the anesthesia a relaxed trance state produced, and the physiological control it gave subjects over their bodies and minds. However it happened, he seems to have sincerely believed he had stumbled onto the cure for all illnesses.

It is clear though he had no real insight into why the trances worked. Mostly, he seems to have understood from the very beginning of his career in medicine that he needed an explanatory model, and his doctoral dissertation, *De Planetarium Influxu* (On the Influence of the Planets), written in fulfillment of his degree for the Faculty of Medicine at the University of Vienna, which he published in 1766, is his attempt to construct such an explanation. In its 48 pages he connected hypnotism, a kind of primitive description of cyclical activity in the biosphere (frequently mistakenly described by modern commentators as astrology), electricity, magnetism, and even a variant on Newton’s recently described gravity together to explain what he had observed. He would later call the model *gravitas animalis* or *magnetismus animalis* – animal magnetism.

It gave the effects he achieved a certain gloss -- electricity, magnetism, and gravity being the high technology of the day. And we now know where he got the idea for all this. He plagiarized it from one of the most prominent and well-regarded English physicians of the previous generation, Richard Meade (1673-1754). (Pattie, 1994) Mesmer’s *De Planetarium Influxu* bears a more than coincidental resemblance – portions are virtually verbatim -- to the 1746 revised edition of Mead’s 1704 book, *De Imperio Solis ac Lunae in Corpora Humana et Morbis inde Oriundis* (On the influence of the Sun and Moon upon Human Bodies and the Diseases Arising Therefrom).

Extending an alchemical belief, another fashionable subject in which he had an interest, Mesmer proposed that there existed a universal “fluid” possessed by all living forms, and that it could flow from one organism to another to the end of manipulating it to affect a patient’s health. It would not be the first time an observable phenomena was linked to an absurd explanation and, as time went on, Mesmer became more and more invested in it, even as it made him more and more a pariah to the medical community.

When he arrived in Paris the French medical establishment, alarmed as much by his entrepreneurial success as his unfounded theories, made it impossible for him to get a license to practice medicine in the

city. Mesmer got around this by partnering with his disciple, the already medically licensed Charles D'Eslon.

As he had in Vienna, Mesmer was soon operating at the very height of the Parisian social pyramid, collecting followers that included the young French aristocrat, and American Revolutionary War hero, the Marquis de Lafayette, as well as no less a personage than the Queen, Marie Antoinette. He was lionized by the glamorous, and Mozart made references to Mesmer and his magnets as a plot device to cure one of his characters in the opera *Così fan Tutti*. So great was his popularity that the terminology of Mesmerism, as it came to be known, was soon part of the language where it has remained to the present day -- his name gives us the verb to "mesmerize".

By 1784, six years later, Mesmer felt secure enough to issue a subscription for shares to establish a hospital for animal magnetism treatments, and quickly raised 340,000 livres -- a prodigious sum for the times. This development, his ever greater fame, his hold on the Queen, and the constant lobbying against him by the established physicians who saw his aristocratic patronage as an economic threat to their own practices, finally prompted King Louis to establish a commission to investigate his claims.

On the 12th of March 1784, four doctors from the Faculty of Paris were selected. One of them was Joseph-Ignace Guillotin. Although he did not invent it, he championed its use and his name comes down to us because it is linked with the only form of state sponsored legal killing associated with a single country -- France and the guillotine.

The four doctors asked that the Academy of Sciences provide scientists to augment their number, and five were chosen, including Lavoisier, the discoverer of oxygen, and Franklin, known throughout the world then as the man who discovered electricity. The king asked Franklin to be the commission's head.

He was now arguably the most famous man in the western world. When Jefferson went to Paris to replace him, he wrote of his friend and mentor, the man with whom he had written the Declaration of Independence, that "more respect and veneration (was) attached to the character of Dr. Franklin than to that of any other person, foreign or native." (Jefferson, 1791) He was also a man who lived in considerable pain. He suffered from gout, boils, and 80 years of hard living, and was mostly confined to his house in Passy, a mile from Paris and seven from the king's seat at Versailles. Why he took the assignment is not clear. It may be he felt obligated to the king. He had just talked Louis, the most autocratic and traditional monarch in Europe, into funding a war of liberation fought by the most revolutionary democracy in the world, at a time when France's financial situation was far from sanguine. Or it may be that whatever the condition of his body, his mind and his curiosity were as wide ranging as ever.

One thing is certain. As was usually the case, Franklin saw deeper into the matter than anyone else, and wrote what may be the first recorded commentary on hypochondria and psychosomatic medicine. On March 19, before the commission formally began its work he said, "delusion may, however, in some cases be of use while it lasts. There are in every great rich city a number of persons who are never in health because they are fond of medicines and always taking them whereby they derange the natural functions and hurt their constitutions. If these people can be persuaded to forbear their drugs in expectation of being cured by only a physician's finger or an iron rod pointing at them, they may possibly find good effects though they mistake the cause." (Franklin, IX)

Excepting the 18th century stylistics, this is a straightforward statement of psycho-physiologic self-regulation (PPSR). Delusion and psychosomatic healing must involve consciousness, since these are processes of the mind. But, even if that were not the case, we know that Franklin was aware of consciousness including what is increasingly referred to as non-local mind. One of the things that makes Franklin stand out from the other Founders is how modern he seems.

In 1722, at 16, not long before he left Boston, Franklin quite deliberately changed his life radically. After reading one of the first health books ever published in America, *The Way to Health* by Thomas Tryon (Tryon, 1683) he became a vegetarian for a while, a meditator possibly for life, and began a regular exercise program. Personal hygiene in a modern sense also emerged, and Franklin may have been the only man in Philadelphia who tried to bathe regularly. (Franklin, 1909) He also became concerned with ventilation, proper breathing, and good air, (Franklin, 1909) and, when he was 81, told his physician and friend Benjamin Rush, with whom he started the first hospital in Philadelphia, that he had "never snuffed, chewed or smoked." (Van Doren, 1938) All of these decisions flowed from an epiphany experience that

convinced him respecting his body and his mind made him a better more productive person, and expressed greater respect for his Creator; and, by Creator, he meant a non-religious spiritual presence. Better individuals made better citizens, better citizens made for a more civil democratic society. It was a view shaped by the Enlightenment Philosophers he had read who centered science on the idea that the human species was infinitely perfectible through the power of intention of one's consciousness.

Franklin also suffered from gout whose mind-body connection traced back before Hippocrates (≈460-357 BCE), and was so well understood it appeared in art and literature. The father of modern medicine, who had studied at the temple of Imhotep at Memphis, and who acknowledged his debt to that training, described how to differentiate what was called *podagra* -- pou = foot, 'agra' = prey: literally a foot-trap - a disorder of the feet, or *gonagra*, a disorder of the knees, from the more general "arthritis - a disorder of the joints." (Potter and Rousseau, 1998) All these conditions were seen as products of rheumatism, by which was meant the descent (rheuma) into the limbs of congested humors, a kind of ineffable fluid that supposedly flowed through the body and affected its health. It was a given that these humors could be influenced by one's mental and emotional state. The word constitution, which was the way an 18th century person would describe an individual's total mind and body condition, was always understood to include one's mental and emotional health.

Although Franklin would have lacked the modern language of psychology, the actions and choices of his life make it clear he understood consciousness was probably what he was going to be studying.

Unfortunately, in the event, he was not up to travelling when the commission began, so the initial meetings were held without him, and without his guidance as to how such an evaluation should be undertaken. Since Mesmer himself could not practice medicine, the members went to d'Eslon's clinic where they found a handsome dimly lit room in the center of which was the wooden tub with its pulverized glass and iron filings. In place of Mesmer's armonica, a pianoforte off to one corner provided a musical background. The patients were seated on chairs around the tub, linked together by cords, each holding their neighbor's thumb between their own thumb and first finger. From the tub long articulated iron rods projected, that could be touched to any part of a patient's body. D'Eslon explained to the commissioners that the tub was the condenser and conductor of the animal magnetism. As they watched he walked amongst the patients, touching one or another with a short iron rod, or rubbing his hands over their bodies, particularly the lower abdomen. (Van Doren, 1938).

The treatments went on for hours as the tension in the room grew. Nervous coughs, hiccups, hysterical cries, sobs, and even convulsions were observed and, d'Eslon told the observing commissioners, were welcomed as signs that healing was taking place. (Van Doren, 1938) Nothing was controlled, and the commissioners left with no more sense of what had taken place medically than before they had come. After attending a number of these sessions, on the grounds that they might be disturbing the patients, the commissioners resolved to attend no further seances, and passed on their findings to Franklin. (Van Doren, 1938)

Franklin saw none of this as very useful. He might believe in reincarnation, practice meditation, and have an interest in all kinds of phenomena, but he never confused interest with evidence. (Van Doren, 1938) What was called for he realized was some kind of controlled protocol and in April, since he could not go to them, he arranged for the other commissioners and d'Eslon to come to him. In late April and early May, and at least once in June, they trooped out from Paris to gather at his residence in Passy. (Hays, 1908)

On the theory that class and culture might explain what was happening, and to allow comparisons between populations, the first session at Passy involved only lower class patients, whose presence Franklin seems to have arranged. They included the asthmatic widow Saint-Amand; a woman named Anseune, who had a swollen thigh; six year old Claude Renard, scrofulous and tubercular; Geneviève Leroux, who was nine and suffered from what was called St. Vitus's Dance; François Grenet, blind in his right eye from a tumor; a woman named Charpentier who had been thrown by a cow two years earlier and never fully recovered; and a man named Joseph Ennuyé, whose reason for being included is not given. (Hays, 1908) After several hours, four of the seven were not affected at all by d'Eslon's treatments, those who were affected experienced mostly discomfort from having sore spots on their bodies pressed. No cures were achieved.

A few days later the commissioners arranged for four upper class people to be treated: Madame de Bory and Monsieur Romagni, who had no symptoms, or none listed, anyway; Monsieur Moret, who had a tumour on his knee and Madame de V-----, who had some kind of nervous disorder. To this group was added Franklin himself, his grandsons, his secretary, and an American officer who had called on Franklin, as well as a group of patients selected by d'Eslon from his Paris practice. (Hays, 1908)

Madame de Bory and M. Romagni, felt nothing during the treatment, nor did Franklin, the grandchildren, or the American officer. Madame de V----- almost fell asleep, although whether this was from hypnotism or treatment is unclear. The existing d'Eslon patients were more responsive, which was not surprising, and Franklin suggested what became the first use of blindness and sham treatments in a scientific protocol. He also clearly had in mind reducing the possibility of experimenter effect.

To achieve his ends, he directed that the d'Eslon patients were to be blindfolded -- which is why this protocol came to be known as "blind" -- and treatments continued. As Franklin had hoped this was very revealing. They could not tell when they were being "magnetized", and often thought that they were when they were not, or weren't when they were. (Van Doren, 1938) The personal charisma of d'Eslon, was eliminated as a factor.

During another session at Franklin's house they went out into the garden. Mesmer maintained, as did d'Eslon, that any living thing could be magnetized, and he either volunteered or more probably Franklin asked for a demonstration. d'Eslon went over to an apricot tree in the garden and touched it with his wand, supposedly magnetizing it. He said that any one who touched the tree now would be affected. What is clear from all this is that d'Eslon was either a fool, or genuinely believed what he was saying was true. Otherwise why would he expose himself to ridicule? But Franklin, once again, saw the matter not as a question of belief but of evidence obtained under blind conditions.

D'Eslon was required to stand several yards from the tree. (*Rapport des Commissionnaires, 1784*) When he was in place a 12-year-old boy was blindfolded with a bandage, and led out into the garden. He was taken to stand one by one in front of four trees, three controls and the treated tree. (*Rapport des Commissionnaires, 1784*)

At the first tree the boy began to perspire and cough. At the second tree he said he felt pain in his head, and languor in his body. At the third he said his headache was now much worse, and volunteered that he felt he was getting close to the magnetized tree. In fact he actually was moving away from it. At the fourth tree he fainted, had to be carried and laid out on a grassy area, where d'Eslon revived him. (*Rapport des Commissionnaires, 1784*)

Franklin and the other members of the commission in attendance were satisfied that the experiments conducted at Franklin's house, under the conditions of blindness he had devised, had settled the question they had been asked as to whether animal magnetism was real. It was not.

On the 11th of August they issued their report to the king; it bore each of their signatures. They were unanimous. Benjamin Franklin's signature stood in first position, and such was his preeminence that throughout Europe and America, scientists and lay people alike felt that it had been Franklin who had settled the issue. Ever after history has known this first formal study of anomalous phenomena as the Franklin Commission. Mesmerism was dead, and Mesmer soon left Paris. He was lucky. Ten years later Lavoisier would lose his head to the guillotine, and Dr. Guillotin would just barely miss going under its blade. Mesmer would end up in Switzerland, largely forgotten and ignored where, years later, he would die in poverty. (Pattie, 1994)

The development of hypnotism, and psychosomatic medicine, and the mind-body issues that it raised, which Franklin had commented on, would be crippled for half a century; an unintended consequence of Mesmer's linking them to animal magnetism.

Although Mesmerism died out in France, the English surgeon John Eliotson (1791-1868) remembered principally as the first physician in England to use the stethoscope, apparently saw through Mesmer's explanatory model to the deeper underlying principle of psycho-physical self-regulation in the form of hypnosis that was Mesmer's real discovery. He seems to have avoided all attempts at explaining how it worked, but conducted a considerable number of surgeries using hypnosis as the anesthetic, anticipating its usage in this capacity a century later. So great was the disapproval of Mesmer, however, that no one seems to have understood Eliotson's point.

But the importance of Franklin's blind protocol and sham treatments would not be lost, and would shape the course of medicine ever after.

In 1799, the English physician John Haygarth took the next step with the development of true sham (placebo) treatments. The Franklin protocol compared treatment or no treatment, under blind conditions. Haygarth refined this idea, when he was asked to evaluate a medical device that had arrived in Britain from America. (Haygarth, 1801) Invented by a Connecticut doctor, Elisha Perkins, like Mesmer's treatments it also was based on the manipulation of an ineffable energy. Perhaps that is what brought the Franklin Commission and its examination of Mesmer to Haygarth's mind when he was designing his own protocol. (Haygarth, 1801)

Perkins' apparatus consisted of two rods, one of iron, the other brass, about three inches in length. The rods had bulbs at one end, and points at the other, and treatment was effected by stroking the rods over the body at the site of the affliction. Perkins' theory was that the rods drew off a flux that was the cause of the problem. In considering how to go about testing the efficacy of such a device Haygarth says he quite consciously followed Franklin's lead. He describes how he created a true placebo treatment by creating a second set of rods that looked exactly like the metal ones, but which were made of wood, known not to be a conductor. Those receiving a treatment were blind to which rods were being used. As Haygarth explained it, "...prepare a pair of false, exactly to resemble the true, tractors. Let the secret be kept inviolate," he wrote. "Let the efficiency of both be impartially tried."(Haygarth, 1801)

In another set of experiments, Haygarth coated rods with wax, also known to be a non-conductor. As the result of using Franklin's blind protocol, and adding his contribution of an actual sham treatment, not just the absence of a treatment, Haygarth could report a conclusion much like Franklin's observations two decades earlier: "The whole effect undoubtedly depends upon the impression which can be made upon the patient's Imagination."(Haygarth, 1801)

Modern day surgeon and medical professor Stuart Green, on the faculty of the Department of Orthopaedic Surgery at the University of California, Irvine, has traced Franklin's influence through the history of medicine, and describes what happened next. Within "A few decades came numerous placebo-controlled inquiries, in Europe and America, into the professed benefits of Hahnemann's homeopathic remedies, which cited the Franklin Commission's strategies. Other blind assessments followed, scrutinizing everything from rheumatic fever and psychologic illnesses to testicular extract injections and cocaine."(Green, 2003)

Franklin began the idea of the blind protocol in science, and Haygarth added the concept of identical, but sham, treatments. However, the statistical understanding of their day had not evolved enough to supply the final missing piece necessary to conduct modern medical research. This would not come for more than a century. It was finally provided by the English mathematician and statistician Sir Ronald Aylmer Fisher. Beginning in 1919, while working at Rothamsted Experimental Station in England, he began a several year effort that would redefine the entire field of statistics. Franklin and Haygarth made observations about differences between real and sham or no treatment, but could provide no statistical assessment of the power of their conclusions. Fisher figured out how to do that, and augmented Franklin's blind protocol with the idea of randomization, and calculations of probability, and what he called "likelihood."

As Dr. Green explains, "The final step in creating a thoroughly modern method of verifying the benefit of a particular treatment followed statistician R.A. Fisher's insistence that randomly assigning subjects to a treatment group or a control (placebo) group permits valid statistical comparisons between the two groups to some definable level of confidence..." (Green, 2003)

T.J. Kaptchuk whose paper does not consider the role of consciousness research per se as playing an important part in the development of blind methods does, however, note that "blind investigation helped medical science isolate 'hard' knowledge and material causality from the contamination of mental delusion, enthusiastic bias, or even calculated deceit."

Thus the trail blazed begun by Croesus, and formalized by Franklin and his commission has grown to become the roadway in science that largely determines what medicines we take, what chemicals can be used in our environment, and whether we can trust an experiment's results.

Ironically, though it is in the area of exploring consciousness that the idea of the blind protocol has most deeply taken hold; in essence a return to its roots, and for much the same reason it began: a proof against trickery involving the anomalous, and as a means of avoiding experimenter effect. The English biologist Rupert Sheldrake (Sheldrake, 199) conducted a survey of leading journals published between October 1966, and April 1998. The papers these journals had published were broken into three categories: “1.) Not applicable: papers that did not involve experimental investigations, for example theoretical or review articles; 2.) Blind or double-blind methodologies used; and, 3.) Blind or double-blind methodologies not used.”(Sheldrake, 1999). The reader may find the results surprising. As can be seen in Table 1, parapsychology as a percentage of published papers overwhelmingly utilizes this protocol more than any other discipline.

Table 1: Comparison on Use of Double Blind Protocol by Discipline

<i>Area of Science</i>	<i>Number of Papers</i>	<i>Number with Blind Methodologies and as Percent of Total (0.00%)</i>
Physical Science Disciplines	237	0
Biological Science Disciplines	914	7 (0.8%)
Medical Science Disciplines	227	55 (24.2%)
Psychological and Animal Behavior Disciplines	143	7 (4.9%)
Parapsychology	27	23 (85.2%)

[From Sheldrake]

Table One

“Numbers of papers reviewed and the number involving blind or double-blind methodologies in a range of scientific journals. Only papers reporting experimental results were included in this survey; theoretical papers and review articles were excluded. All publications appeared in 1996-8 unless otherwise indicated.”(Sheldrake, 1999)

Five years later Caroline Watt and Marlene Nachtegaal, working at Edinburgh University restudied the use of the double blind protocol and reported in 2004 that in the ensuing years little had changed. (Watt and Machtegaal, 2004)

Over 30 years ago Rex Stanford proposed that if a person could obtain information via non-local awareness and sense impressions then it must follow that the target sought would not be the only object, place, or person they could perceive. He called this Psi-mediated Instrumental Response (PMIR). Since then, a considerable literature has grown up in fields ranging from Therapeutic Intent to Remote Viewing to quantum theory. The effect of this work can be seen in the change it caused in the thinking of one of the best known skeptics, Carl Sagan.

In 1977, Sagan asserted“ [The brain's] workings - what we sometimes call mind - are a consequence of its anatomy and physiology, and nothing more.” (Sagan, 1977)

Almost two decades later he said this:

... there are three claims in the ESP field which, in my opinion, deserve serious study: (1) that by thought alone humans can (barely) affect random number generators in computers; (2) that people under mild sensory deprivation can receive thoughts or images projected at them; and (3) that young children sometimes report the details of a previous life, which upon checking turn out to be accurate and which they could not have known about in any other way than reincarnation. (Sagan, 1996)

As we more fully come to understand the relationship of consciousness and nonlocality we see that the very idea of blindness may be just another incomplete understanding and that a more apposite model might be one that recognizes that all consciousnesses from single-celled organisms, to humans are, in some measure connected.

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SLEEP PATTERNS, PERSONALITY, AND SUBJECTIVE PARANORMAL EXPERIENCES

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ABSTRACT

This paper explores the relationships between personality, sleep length and quality and subjective paranormal experiences (SPEs). Previous research indicates a relationship between both a greater tendency to hallucinate and shorter sleep length, and among near death experiencers. It also indicates that sleep patterns should be considered in relation to personality. Individuals scoring high on personality variables related to boundary thinness (in particular schizotypy) may be more prone to experiencing SPEs as a result of their unique sleep-wake cycle, in particular, they may exhibit shorter nocturnal sleep patterns. The current study addressed the relationship between sleep length and SPEs. It was expected that both shorter sleepers and high scorers on schizotypy may be more prone to subjective paranormal experiences. A questionnaire-based survey was undertaken among 281 participants who included students, visitors to the Rhine Research Center (RRC) and its web site, and visitors to a local hotel. There was no difference between long and short sleepers in terms of number of anomalous experiences. There was, however a significant difference between short and average, and average and long sleepers on schizotypy. None of the other personality variables demonstrated a significant relationship with sleep related variables. Sleep quality was however, better for longer sleepers. A regression based path analysis was undertaken with anomalous experiences as the criterion variable. This indicated that sleep related variables along with gender and handedness may be indirect predictors of subjective anomalies via personality. Future work is planned to explore different types of SPEs among pre-selected extreme short and long sleepers, and to address sleep variables and psi performance in the laboratory.

INTRODUCTION

Short sleepers are usually defined as those who habitually need under 6 hours of sleep and function well on this amount; long sleepers on the other hand, are those who habitually need over 9 hours of sleep (see Hartmann, 1991). There are two key papers which were influential in the development of the current project. Firstly, a recent study demonstrated that shorter sleepers were significantly more prone to experience hallucinations than longer sleepers (Soper, Kelly & Von Bergen, 1997). Secondly, it was recently demonstrated that those who have experienced near death experiences (or NDEs) exhibit significantly shorter sleep overall than those who have not (Britten & Bootzin, 2004). It is clear that SPEs share many features with hallucinations (e.g., Williams, 1996) and that many occur in a hallucinatory context (e.g., Nepe 1988). It is also apparent that those who experience NDEs are particularly likely to report SPEs and paranormal beliefs (e.g., Greyson, 1983). As such, there may be something about the reduction in nocturnal sleep that is conducive to both hallucinatory experiences and to SPEs and anomalous experiences. If this is the case, length of sleep could prove to be a useful variable for understanding paranormal experiences more fully, and perhaps for understanding genuine ESP.

Dream deprivation

Soper et al. (1997) and Britten and Bootzin (2004) did not explore the reasons for the association between sleep length and hallucination/NDEs. The current author suggests that there is a human need to experience dream-like phenomena/states and that individuals with shorter sleep patterns might be more prone to experience these during wakefulness if their sleep is reduced. There are several lines of support for this hypothesis. Although dreams are not restricted to the REM phase of sleep, they are common during this phase of sleep (e.g., Hobson, 1989). It is clear that following REM deprivation, individuals actually compensate for the loss by REM rebound in the following night's sleep (see Horne, 2000) indicating that it is necessary. Three main theories have been put forward regarding the functions of REM. The ontogenetic theory, whereby REM provides the developing mammalian cortex with stimulation that would lead to the most favorable neural growth at the foetal stage; the sentinel/vigilance theory, whereby there is increased vigilance to danger in the environment that is lost in non REM sleep and would allow the sleeping organism to move quickly into wakefulness, and the homeostasis theory, which allows neural pathways to stay in tune by stimulation of the cortex and results in access to cortical and memory records (see Horne, 2000).

If there is a reduction in nocturnal sleep, this may result in increased *sleep-like* or sleep-related experiences in the daytime. In support of this hypothesis, Giesbrecht and Merckelbach (2004) found an association between disturbed dream patterns and dissociation. These authors applied Crick and Mitchison's (1995, cited in Giesbrecht & Merckelbach, 2004) theory of dreams to these findings. This would imply that humans may dream to reduce fantasy. Consequently, if dreaming patterns are disturbed (which could be associated with a reduction in overall sleep length) this might result in more daytime fantasies. It is clear that extreme sleep deprivation can result in symptoms similar to those seen in psychosis (see Coren, 1998).

If this is the case, how might this relate to increased reporting of SPEs? During the REM phase of sleep, there is an awareness of the environment such that the brain can make decisions about the potential threat of surrounding stimuli; this may include ESP stimuli. Tolaas (e.g., 1986) asserted that REM sleep is psi conducive as it is a primitive brain state, which reflects a vigilance toward the environment combined with an attendance to ones internal dream imagery. There is both anecdotal and experimental evidence for a strong association between dreams and ESP. For example, half of all reported SPEs in L.E. Rhine's spontaneous case collection were of the "realistic dream" variety (e.g., L.E. Rhine, 1961). The Maimonides dream experimental series (Ullman, Krippner & Vaughan, 1973) monitored the brain state of sleeping participants and undertook ESP experiments when they were in the REM state. The results demonstrated some impressive telepathic experiences under laboratory conditions. Also, nocturnal dreaming seems to have a stronger association with psi hitting than ganzfeld experiences among the same group of participants (e.g., Kanthamani & Broughton, 1996). More recently, De Pablos (e.g., 2004) has noted that acetylcholine plays a significant role in the neurobiology of REM sleep and memory, and could also be important for the psi process in dreams. Memory might well function as the "sense data" for ESP (see Irwin, ;Roll). It is of interest that REM sleep has been associated with the formation of emotional memories in particular, (e.g., Wagner, Gais & Born, 2001). De Pablos (2004) undertook a case study of his own precognitive dreams and found that psi was indeed enhanced when he took Rivastigmine (a drug that inhibits the breakdown of acetylcholine). This has led him to hypothesise that precognition during REM sleep could well be associated with memory functioning.

Dreaming whilst awake

It has been suggested that REM sleep is a *third* state of consciousness that is independent from sleeping and waking (Jones, cited in Horne, 2000). However, it mimics relaxed wakefulness in many ways and is often referred to as *paradoxical sleep* (see Horne, 2000). REM sleep is associated with a dominance of theta waves and high beta or gamma activity, equivalent to 40 Hz activity. Gamma activity has been associated with the way in which neural events could become conscious, binding events together by means of synchronized gamma oscillations across the brain (see Singer, 2000). It is of interest that both

theta (e.g., Healy, 1986) and gamma activity (e.g., Don, McDonough, & Warren, 1998) have both been associated with ESP in the laboratory.

It is interesting that sleep can be reduced in normal adults without adverse effects; indeed Horne (e.g., 2000) has suggested that some REM sleep is actually dispensable and may be considered to be “optional” and replaceable with relaxed wakefulness. There is little research on the EEG profiles of reduced sleep in general or on long and short sleepers in the daytime, although it is clear that people can be psychologically healthy with reduced sleep. In terms of comprehending SPEs from a sleep-related perspective, it is of note that many spiritual traditions encourage the reduction of nocturnal sleep patterns but increase the amount of daytime meditation (e.g., Ram Dass, 1971), which is also a state of relaxed wakefulness associated with increased reporting of SPEs (e.g., Honorton, 1977).

Sleep interjection theory

McCreery's (1997) theory on ‘arousability’ and hallucinations also sheds some light on the possible aetiology of SPEs from a sleep perspective. McCreery postulates that experiences such as the out of body experience (OBE) may be related to sleep processes projecting into the waking state of consciousness. He surveys the literature which supports the idea that sleep responses are likely to intrude into wakefulness, in situations associated with over arousal as well as a result of sleepiness and situations of under-arousal. McCreery suggests that the sleep processes are likely to be those associated with traditional stage one sleep, which reflects the hypnagogic state of consciousness (between wakefulness and sleep). This is supported by work indicating that the EEG record of a woman experiencing an OBE (Miss Z) exhibited an EEG pattern reflecting a hypnagogic-like state of consciousness, dominated by alphoid waves (see Tart, 1967). The hypnagogic state of consciousness has been associated with subjective alongside ostensibly real paranormal experiences (see Sherwood, 1998).

It is interesting to note that the hypnagogic state is not fixed to physiological sleep onset (e.g., Hayashi, Katoh & Hori, 1999; Hori, Hayashi & Morikawa, 1994; McKellar & Simpson, 1954; Wackerman, Putz, Buchi, Strauch & Lehmann, 2002). In fact, it has also been observed in relaxed wakefulness during daytime hours without any expectation that it might occur and accompanying a waking EEG reading (Foulkes & Fleisher, 1975). Just as REM sleep is a cyclical process occurring every 90 minutes in nocturnal sleep, it is proposed that there are analogous cyclical processes occurring during wakefulness. Such that every 90 minutes, there is an increased tendency to experience dream-like mentation. For example, Rossi (1986) describes *ultradian* rhythms, which occur every 90-120 minutes during the daytime. He suggests that “trance like” experiences in a variety of modalities occur on a cyclical basis, although these may not be as pronounced as during nocturnal sleep. A similar idea has also been explored by several other authors (see Tolaas, 1986). It is currently unclear whether increased hypnagogic thinking occurs as a result of reduced sleep. However, it may be that those with shorter sleep profiles could experience more sleep-related interjections into wakefulness which could be associated with hallucinatory experiences and SPEs. Sleep profiles may also be relevant when considering anomaly-prone personalities.

Personality and subjective anomalous experiences

The personality variables explored in this investigation are all associated with increased reporting of SPEs and may share neurological and cognitive attributes. These are schizotypy, temporal lobe lability, boundary thinness and transliminality. All four variables are considered by the author to be associated with reduced inhibitory processes in the brain and mind, which results in “thinner boundaries”, e.g., wider attention, sensitivity to subliminal information, more memory for dreams, etc (see Simmonds, 2003).

Schizotypy is a term derived from ‘schizophrenic genotype’ and indicates a greater disposition toward schizophrenia (Claridge, 1997). Recently, schizotypy has been reconsidered as a personality dimension where the cognitive and perceptual anomalies associated with schizophrenia vary along a continuum in the general population with extreme levels resulting in psychotic breakdown. At one end there is very little manifestation of the traits, while the majority of people would exhibit the traits to a certain extent. There is some evidence for the idea of the “happy schizotype” (e.g., Goulding, 2004; Jackson, 1997) who is psychologically healthy and exhibits adaptive traits such as creativity (e.g., Brod, 1997). As such, there is

a personality continuum ranging from low scorers through normals to high scorers who may be more prone to schizophrenic breakdown.

Positive schizotypy, reflecting magical thinking, hallucinations and altered perceptual experiences, has been related to subjective anomalous and paranormal experiences and beliefs (e.g., Simmonds & Roe, 2000; Wolfradt, Ouibaid, Starube, Bischoff & Mischo, 1999). It has also been demonstrated that this variable relates to heightened psi performance in a variety of settings. For example, the Magical Ideation variable has been found to be a predictor of above chance ESP scoring in the ganzfeld (Lawrence & Woodley, 1998; Parker, 2000b; Parker, Grams & Petterson, 1998; Parker & Westerlund, 1998).

Temporal lobe lability may be considered to reflect a continuum from normals through to epileptics in the general population (Persinger & Makarec, 1987). It is associated with increased reporting of paranormal beliefs (e.g., Persinger & Richards, 1991), SPEs (e.g., Persinger & Valliant, 1985) and anomalous experiences (e.g., Kennedy, Kanthamani & Palmer, 1994). It shares considerable variance with schizotypy, (e.g. Brugger and Graves, 1997) and with the Transliminality scale (Thalbourne, Crawley & Houran, 2003).

Thin boundaries in the mind refer to a relative connectedness of psychological processes, which is reflected in a thinking style of ‘shades of grey’. *Thick* boundaries in the mind, on the other hand, refer to a relative separateness of psychological processes, which is reflected in a thinking style of ‘black and white’ (Hartmann, Rosen & Rand, 1998). These concepts reflect structural boundaries, e.g. how connected neural structures are to one another; representational boundaries, e.g. how related representations and concepts are to one another, and boundaries in how one thinks or processes information, e.g. is thinking focused or unfocused/associative. Boundary thinness has been associated with subjective success at a psi task (Richards, 1996) and is higher among those who consider themselves to be psychic (Krippner, Wickramasekera & Tartz, 2001). Boundary thinness has not yet been directly compared to schizotypy, but those with a schizotypal personality have been found to score thinner (Hartmann, 1991).

The Transliminality variable reflects “the hypothesised tendency for psychological material to cross thresholds into or out of consciousness” (Thalbourne & Houran, 2000, p. 861). It was originally derived from a factor analysis of several variables including paranormal belief, magical ideation, manic like experience, depressive experience, creative personality and mystical experience. These clustered on a single factor (Thalbourne & Delin, 1994). Transliminality correlates positively with boundary thinness (Houran, Thalbourne, & Hartmann, 2003), and temporal lobe lability (Thalbourne, Crawley & Houran, 2003). Thalbourne (1999) has suggested that “schizotypy represents what is probably the closest conceptually and empirically to transliminality” (p. 20).

Personality and sleep

Giesbrecht and Merckelbach (2004) suggest that it is astonishing that so little attention has been applied to the potential relationship between individual differences in sleeping behaviour and traditional personality traits. These authors found that dissociation was associated with an increased likelihood of experiencing sleep disturbances. Dissociation is a variable which correlates with positive schizotypy (Merckelbach, Rassin, & Muris, 2000.) and is itself related to SPEs (Pekala, Pekala, Kumar, & Marcano, 1995). One study addressing personality differences between long and short sleepers found that although there were no differences for the majority of personality measures, short sleepers displayed more sub-clinical hypomanic symptoms than long sleepers (Monk, Buysse, Welsh, Kennedy, & Rose, 2001). In support of the idea that reduced/altered sleep patterns may be associated with more daytime hypnagogia, those with hypomania (and positive schizotypes) are actually more prone to hypnagogic experiences (Jakes & Hemsley, 1987; McCreery & Claridge, 1996). In McCreery’s sleep interjection theory of hallucination, the tendency for sleep related states to project into the waking state focused on schizotypy.

The schizotypal nervous system seems to be associated with anomalous arousal mechanisms, such that sleep processes are more likely during the waking state as well as at night (cf. McCreery, 1997). As such, hypnagogic microsleeps (and hallucinatory experiences) may interject into the waking mind (e.g., McCreery, 1997). In support of a relationship between sleep, personality and anomalies, schizotypy is actually associated with a tendency to hallucinate (Brugger, Regard, Landis, Cook, Krebs, &

Niederberger, 1993) as well as subjective paranormal and anomalous experiences and beliefs (e.g., Simmonds, 2003; Wolfradt et al. 1999).

The altered sleep-wake processes among schizotypes may be mediated by the effects of the temporal lobes. For example, it has been suggested that sub-cortical structures are important in the experience of hypnagogia (Mavromatis, 1987). Temporal lobe lability is associated with hypnagogic-like activity in the form of alpha and theta waves in the waking brain (e.g., Munro & Persinger, 1992). Interestingly, temporal lobe lability can be considered to be both state and trait and fluctuates within any particular individual's brain (Persinger & Makarec, 1993). In the normal population, electrical lability within the temporal lobes can be affected by fatigue, meditation, hypoglycaemia (prolonged fasting), hypoxia, alterations in vascular flow associated with drugs and the biochemical effects caused by personal crises (Persinger & Makarec, 1987; Persinger, 1989). Dissociators and those with high schizotypy might pass more easily from normal waking into dream-like/sleep-related states (Giesbrecht and Merckelbach 2004; McCreery, 1997).

Only one of the personality variables addressed in the current investigation has been investigated with regard to sleep length to date. Although those with thinner boundaries exhibit sleep-like thinking during wakefulness, in contrast to expectation, Hartmann (1991) found that short sleepers actually scored slightly thicker on the boundary questionnaire than long sleepers. Hartmann suggests that short sleepers definitely fit his thick boundary person description, while longer sleepers did not necessarily fit the thin boundary person description. This was a very small correlation, and may indicate that there are different aspects to boundary thinness. It may be that some of the sleep length-personality literature has been compromised by addressing how *much* sleep people get as compared to how much people actually *need*, as a regular behaviour pattern (Monk, Buysse, Welsh, Kennedy, & Rose, 2001). To address any such differences, the current study will address sleep length, sleep need and sleep quality as independent variables.

This paper explores several questions regarding the aetiology of subjective paranormal experiences (SPEs) and focuses on the relationships between personality, sleep patterns and subjective paranormal experiences. It is suggested that SPEs may be associated with individual differences in the sleep-wake cycle, which are notable during both nocturnal sleep and daytime sleep patterns/indices. The emphasis in this paper is on sleep length, sleep quality and SPEs and how these interact with personality factors.

Hypotheses

- H1. Shorter sleepers will score higher on a measure of anomalous experiences than longer sleepers
- H2 There will be a difference between category of sleeper and scoring on positive schizotypy, transliminality, temporal lobe lability and boundary thinness
- H3 There will be a negative correlation between quality of sleep and scoring on the AEI.
- H4 Personality variables will correlate positively with one another
- H5 There will be a positive correlation between each personality variable (positive schizotypy, transliminality, temporal lobe lability and boundary thinness) and anomalous experiences.
- H6 Those who score higher on positive schizotypy, transliminality, temporal lobe lability and boundary thinness will have more sleep disturbances than lower scorers.

METHODS

Design

The overall design of this investigation was a survey-based correlational study, which addressed a variety of variables including sleep length, sleep need sleep quality, transliminality, schizotypy, boundary thinness, temporal lobe lability, and their relationship to anomalous experiences. Anomalous experiences, Boundary thinness, Schizotypy, Transliminality and temporal lobe lability were all interval level scales. The study had a quasi experimental design with regard to the effects of sleep length (measured on an ordinal scale of hours per night but categorised into short, average and long) on anomalous experiences and personality.

Participants

Participants were recruited via opportunity sampling from a number of sources: those attending a lecture given by the author, those visiting the Rhine Research center on a reunion tour, those visiting the Rhine Research center website, and those visiting a local hotel. As such, participation was self selecting, particularly for the web group. A total of 281 participants returned questionnaires. Overall, 105 males and 175 females participated. One person did not record their gender. The modal age range in this study was 0-20, although participants ranged across all the age categories, from 0-20 up to 71+.

Materials

A questionnaire battery was constructed addressing gender, age, handedness, sleep length, sleep need, sleep quality, Hartmann's Boundary questionnaire, the Anomalous Experience Inventory, the STA scale for measurement of schizotypy, the Complex Partial Epileptic like signs scale of the Personal Philosophy Inventory and Thalbourne's Transliminality scale.

The Anomalous Experience Inventory (AEI) (Kumar, Pekala, & Gallagher, 1994)

The anomalous experience sub-scale of the Anomalous Experience inventory contains traditionally parapsychological items in conjunction with a broader spectrum of phenomena such as experiences of altered states of consciousness, OBEs, witchcraft, aliens, belief in horoscopes among others. The anomalous experience subscale has 29 items, which are worded such that the total number of yes responses in each sub-scale forms the total score. The instrument has good internal consistency with KR20 reliability values (Kuder-Richardson Calculation for assessment of internal consistency of a test or scale) ranging from between 0.64 and 0.85 for the five sub-scales (Gallagher et al., 1994).

The STA scale of the STQ schizotypy scale (Claridge & Broks, 1984).

The STQ was devised by Claridge & Broks (1984) as a psychometric instrument to investigate the incidence of schizophrenic symptoms in a normal population. The STA contains 37 items in total. Items are worded such that the total number of 'yes' responses add to form the schizotypy score. The STA has a high internal consistency, $\alpha=.86$, good test-retest reliability, $r=0.60$, and good criterion validity (Jackson & Claridge, 1991).

The Complex Partial Epileptic-like Signs scale of the Personal Philosophy Inventory (Persinger & Makarec 1987).

The Personal Philosophy Inventory (PPI) comprises sub-scales that assess temporal lobe signs. The CPES is one of these and measures an aspect of temporal lobe lability. The scale has 16 items, and comprises a series of true or false response options; the total number of 'true' scores forms the temporal lobe lability score. The CPES and control items have a test-retest accuracy of 0.85 to 0.95 after 10 days and 0.60 to 0.70 after 100 days (Persinger & Makarec, 1987).

Hartmann's Boundary Questionnaire (short) (Kundzendorf, Hartmann, Cohen, and Cutler, 1997)

At 146 items, Hartmann's original Boundary Questionnaire was considered to be too long and too time consuming to be included in this study. An 18 item short version of the BQ was derived rationally from the original 146 item questionnaire (Kundzendorf, Hartmann, Cohen, & Cutler, 1997). The short BQ has an alpha of .66 and correlates .83 with the original BQ. It is measured by summing the responses to questions measured on a Likert response scale ranging from 0-4. Four of the BQ items are reverse-scored.

The revised Transliminality Scale (Lange, Thalbourne, Houran & Storm, 2000).

The revised Transliminality scale is comprised of 17 items and is scored by summing the number of yes responses given by the respondent. The revised scale has a reliability of .82 and demonstrates good concurrent validity with other existing personality measures.

Age, gender and handedness were addressed by tick boxes on the form. Sleep length and sleep need were assessed by scale asking individuals to tick a box ranging from one hour to twelve hours of sleep per night. Sleep quality was assessed by a visual analogue scale ranging from 0 to 100, where 0 reflected poor sleep quality and 100 reflected good sleep quality.

Procedure

Questionnaires were distributed to participants or available electronically on the Rhine Research Center website. Potential participants were invited to ask extra questions to the researcher and space was left for participants to leave a contact address or email to receive feedback on the study results. The data collection phase lasted 10 months.

RESULTS

Sleep length differences

Sleep length grouping was calculated by categorising individuals into one of three groups; under 6 hours sleep was defined as “short”, those who slept for 7 or 8 hours were defined as “average”, while those who slept for 9 hours or longer were defined as “long”. Descriptive statistics are presented in Table 1.

<i>Type of sleeper</i>	<i>Anomalous experiences</i>	<i>Boundary questionnaire</i>	<i>Schizotypy</i>	<i>Temporal lobe lability</i>	<i>Transliminality</i>
Short N=94 (83)*	7.8 (5.8)	38.5 (10.6)	19.3 (7.7)	6.0 (3.9)	9.0 (4.0)
Average N=154 (140)*	7.0 (5.7)	36.8 (10.2)	16.4 (7.6)	5.2 (3.5)	8.4 (4.0)
Long N=30 (22)*	8.6 (5.1)	39.9 (9.7)	20.3 (7.8)	6.2 (3.3)	10.0 (3.8)
Total N=245*	7.5 (5.7)	37.7 (10.3)	17.7 (7.8)	5.6 (3.6)	8.8 (4.0)

*Due to missing data, the N was effectively reduced and is equivalent to 245 in these analyses.

Table 1 Comparison of the descriptive statistics of anomalous experience and personality variables broken down by sleep length (standard deviations in parentheses).

The largest sleep length grouping was that of the average sleeper, followed by short sleepers and then long sleepers. Tests for parametric assumptions revealed that variances for all variables were homogenous and all but temporal lobe lability and anomalous experiences were normally distributed. Given that there were uneven numbers in each level of the IV, six Kruskal Wallis analyses were undertaken to maintain conservatism, as opposed to a multivariate parametric test.

A Kruskal-Wallis analysis found a significant difference between types of sleeper and schizotypy ($\chi^2=10.09$, $df=2$; $p<.006$, two-tailed) and for sleep quality ($\chi^2=14.8$, $df=2$; $p<.001$, two-tailed), None of the other analyses attained statistical significance.

A series of post hoc Mann-Whitney U tests revealed that the difference for schizotypy was located between short and average length sleepers, such that short sleepers scored higher than average sleepers ($Z=-2.57, p<.01$). There was also a difference between average and long sleepers, such that long sleepers scored higher than average sleepers ($Z=-2.42, p<.01$). There was no difference between short and long sleepers on schizotypy scoring ($Z=-.77, p=.44$). As such, it is apparent that both short *and* longer sleepers may score higher on schizotypy than those who have average sleep.

The difference for sleep quality was located between short and average sleepers ($Z=-3.56, p<.001$), such that short sleepers had worse sleep quality than average sleepers. There was also a significant difference between short and long sleepers ($Z=-2.75, p<.006$).

Correlation analysis

A correlation matrix was computed for how each variable related to anomalous experiences and is presented in Table 2. Pearson's product moment correlation coefficients were calculated for each relationship¹.

Scale	anomalous experiences	Boundary questionnaire	Schizotypy	Temporal lobe lability	Transliminality	Sleep length	Sleep need	Sleep quality
Boundary Questionnaire	.38*	1						
Schizotypy	.51**	.60**	1					
Temporal lobe lability	.74**	.52**	.68**	1				
Transliminality	.74**	.53**	.65**	.70**	1			
Sleep length	-.03	.04	-.02	.04	-.00	1		
Sleep need	-.10	.10	.15*	-.03	.00	.44**	1	
Sleep quality	-.11	-.05	-.12	-.04	-.02	.24**	-.04	1

** significant at $p<.01$

* significant at $p<.05$

Table 2 Correlations between personality and sleep variables and anomalous experiences

The strongest correlations with anomalous experiences were transliminality and temporal lobe lability. This was followed by schizotypy, then boundary thinness. None of the sleep related variables have a significant relationship with anomalous experiences, or the personality variables although they do relate with one another. Sleep quality correlates with increases in sleep length. The personality variables all correlate moderately to strongly with one another.

Regression path analysis

An exploratory regression path analysis was undertaken by means of a series of stepwise multiple regression analyses, which will enable us to look at the relative contributions each variable makes to a criterion variable (here anomalous experiences) and the structure the data forms. The goal of a path analysis is to construct a model of how all the variables might predict one another in order to look more intricately at relationships between them. Path analysis is also known as 'hierarchical multiple regression' (Clark-Carter, 1997). Figure 1 represents a series of significant regression analyses with Anomalous experiences as the criterion variable at the beginning. The best predictor of the criterion variable at each stage is entered as the new criterion variable and the old criterion variable is removed, alongside other variables further forward in the path. Demographic and other variables were included in the path analysis (gender, handedness, age, etc.). In Figure 1, all relationships are significant. An arrow indicates the

¹ These were undertaken despite the skewed nature of some of the variables. Several statisticians consider parametric tests to be robust to these deviations (e.g., Howell, 1989). Also, one of the planned analyses was a regression path analysis which is not possible employing non parametric methods.

direction of each regression prediction. The numbers next to the arrows indicate the standardized beta weights of the relationship between the left and right variables (all to 2 d.p.).

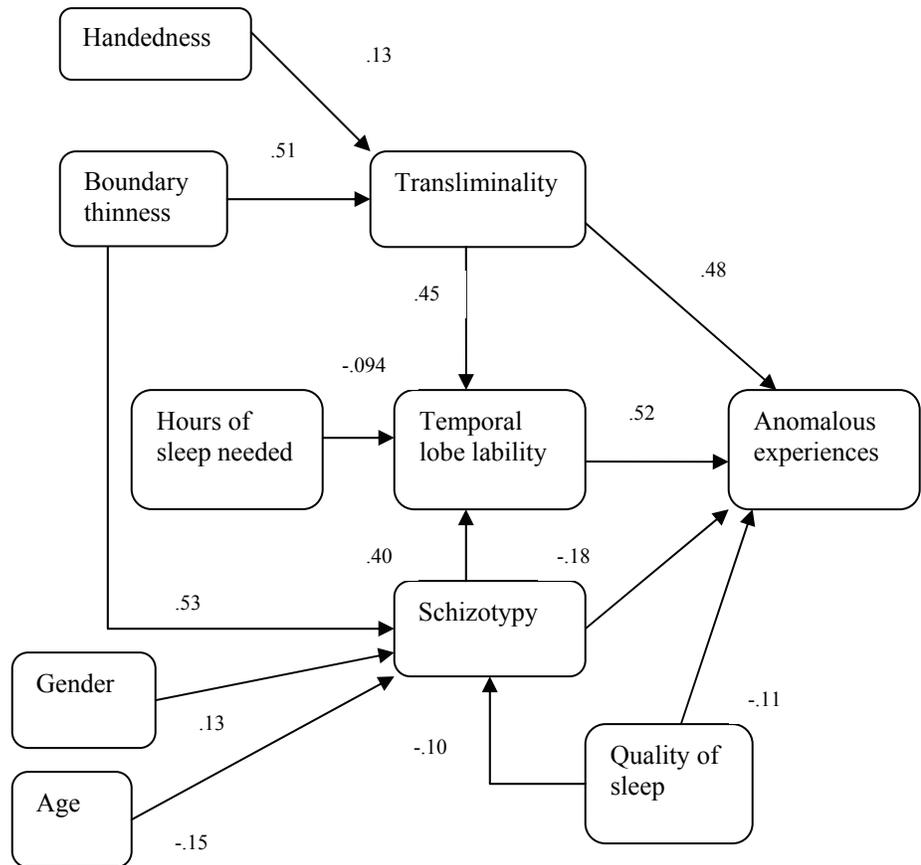


Figure 1 Path model of personality, sleep related and demographic variables predicting anomalous experiences

In the above model, 66% of Anomalous experiences were explained by (in order of magnitude): temporal lobe lability, quality of sleep schizotypy and transliminality; 59 % of temporal lobe lability was explained by (in order of magnitude): transliminality, schizotypy and hours of sleep needed; 29% of transliminality was explained by (in order of magnitude): boundary questionnaire and handedness; 39% of schizotypy was explained by (in order of magnitude): boundary questionnaire, age of participant, gender and quality of sleep. Overall, the path analysis indicates that there are both direct and indirect predictors of anomalous experiences.

Post hoc findings

Although no predictions were made regarding gender, as this was one of the indirect predictors of anomalous experiences in Figure 1, comparisons were made between males and females on anomalous experiences and the personality variables, see Table 3.

<i>Gender</i>	<i>Anomalous experiences</i>	<i>Boundary questionnaire</i>	<i>Schizotypy</i>	<i>Temporal lobe lability</i>	<i>Transliminality</i>
Male N=105	6.5 (5.5)	35.7 (11.3)	15.6 (8.2)	5.03 (3.5)	7.9 (4.1)
Female N=175	8.0 (5.7)	38.9 (9.5)	19.0 (7.5)	5.9 (3.7)	9.3 (3.9)

Table 3 Descriptive statistics for personality and anomalous experiences between males and females (standard deviations in parentheses).

Females scored higher than males on all variables. To maintain conservatism due to differences in group sizes, a series of Mann-Whitney U test were undertaken, which resulted in a significant difference between males and females for transliminality ($Z=-2.64, p<.008$), schizotypy ($Z=-3.4, p<.001$), boundary thinness ($Z=-2.18, p<.029$) and anomalous experiences ($Z=-2.18, p<.029$). Differences between males and females for scoring on temporal lobe lability were not significantly different from one another.

As handedness was one of the indirect predictors of anomalous experiences in Figure 1, post hoc comparisons were also made between the different types of handedness and anomalous experiences and personality, see Table 4.

<i>Handedness group</i>	<i>Anomalous experiences</i>	<i>Boundary questionnaire</i>	<i>Schizotypy</i>	<i>Temporal lobe lability</i>	<i>Transliminality</i>
Right handed N= 232	7.3 (5.6)	38.1 (10.1)	18.1 (7.8)	5.6 (3.6)	8.8 (3.9)
Left handed N=29	5.9 (4.6)	33.1 (10.9)	14.1 (8.1)	4.5 (3.2)	7.2 (3.9)
Ambidextrous N=20	11.27 (6.2)	39.0 (11.1)	17.8 (7.5)	6.7 (4.0)	10.2 (5.1)

Table 4 descriptive statistics for scoring on personality and anomalous experiences between types of handedness (standard deviations in parentheses).

Ambidextrous individuals scored higher for anomalous experiences, boundary thinness, temporal lobe lability and transliminality. Schizotypy was higher among right handed individuals. To maintain conservatism due to the large differences in group sizes, five Kruskal-Wallis tests were undertaken to address differences in scoring broken down by handedness. There was a significant effect for anomalous experiences ($\chi^2=10.2, df=2; p<.006$, two-tailed), for transliminality ($\chi^2=7.1, df=2; p<.03$, two-tailed) and for schizotypy ($\chi^2=6.2, df=2; p<.045$, two-tailed).

A series of post hoc Mann-Whitney U tests revealed that for anomalous experiences, the difference was between left handed and ambidextrous individuals, where ambidextrous people scored higher ($Z=-2.9, p<.003$) and ambidextrous and right handed individuals where ambidextrous people scored higher ($Z=-3.0, p<.003$). For transliminality, the difference was between left handed and right handed individuals, where right handed people scored higher ($Z=-2.10, p<.035$) and left handed and ambidextrous individuals, where ambidextrous people scored higher ($Z=-2.24, p<.025$). For schizotypy, the difference was between left and right handed individuals, where right handed people scored higher ($Z=-2.47, p<.013$).

In terms of the study predictions; H1 was not supported as shorter sleepers were not found to score higher on a measure of anomalous experiences than longer sleepers. H2 was supported for schizotypy only, such that both longer and shorter sleepers scored higher than those who were average sleepers. H3 (there will be a negative correlation between quality of sleep and scoring on the AEI) was supported in terms of the direction of the correlation, but was not statistically significant. H4 was supported as all the

boundary related personality variables correlated positively with one another; H5 was supported as there was a positive correlation between each personality and anomalous experiences. H6 was not supported as correlations between sleep quality and positive schizotypy, transliminality, temporal lobe lability and boundary thinness were not found to be significant, despite being negative in direction.

DISCUSSION

In contrast to expectation, in this sample, there was no difference in scoring on the anomalous experience inventory between individuals classified as short sleepers, and those who are average sleepers and long sleepers. As such, the results of this survey investigation indicate that sleep length and quality are not strongly *directly* related to anomalous experiences, when anomalous experiences are measured globally. It would be interesting to address how sleep-related variables relate to specific types of anomalous and paranormal phenomena, for example extrasensory perception experiences, apparitional experiences, psychokinesis experiences, experiences of communication with apparently deceased individuals. Given the previously demonstrated relationship between sleep length and hallucinations (Soper et al., 1997) it is possible that sleep length could actually relate more directly to anomalies that are associated with hallucination-like experiences, for example, apparitions.

In terms of sleep length and personality, there was found to be a difference for schizotypy such that those with short sleep and longer sleep both scored higher on schizotypy than those with average sleep. None of the other personality variables demonstrated any relationship with sleep length. The relationship between schizotypy and sleep length is of interest, as it seems that both short and longer sleepers score higher on schizotypy than those who are average sleepers. The finding that short sleepers score high on schizotypy and that schizotypy is highly correlated with anomalous experiences is of interest given the expectations of the study. This may imply that hallucination proneness and magical thinking via reduced sleep could be important in the aetiology of an anomalous experience (although schizotypy was not a strong predictor when entered into the regression equation alongside other boundary-related variables). It is of interest to note that McCreery's sleep interjection hypothesis focused on hallucinatory experiences among positive schizotypes, and was aimed at understanding phenomena such as the out of body experience in these groups. The relationship between sleep and schizotypy supports the recent work by Giesbrecht and Merckelbach (2004) who found a relationship between sleep quality and scoring on a scale measuring dissociation.

The relationship with long sleep is less clear, and may be due to the low N for the long sleeper group. There were only 30 people (reduced to 22 with missing data) people who were classified as long sleepers, which may compromise the results of the statistical analysis and result in a Type I error. It could alternatively be that the sleep length and schizotypy relationships are indicative of the altered arousal patterns among high scoring schizotypes, which result in deviations away from the norm for sleep length. The STA scale actually comprises three sub scales associated with positive schizotypy, 'magical ideation', 'unusual perceptual experiences' and 'paranoid ideation and suspiciousness' (e.g., Joseph & Peters, 1995). As such, sleep-schizotypy relationships may be better understood by a re-analysis based on each sub-scale's relationship with sleep length and anomalies. It should also be borne in mind that the sample employed in this investigation was to a certain extent self-selecting. This is apparent in the elevated mean scores for schizotypy than data presented as normative in Claridge (1997). It may be that individuals with a particular interest in paranormal phenomena were more likely to answer this questionnaire, and as such, this sample is not representative of the general population.

Although there was an unexpected small negative correlation, the relationships between both sleep quality and SPEs and sleep quality and schizotypy were not significant. The relationship between sleep quality and sleep length is straightforward and implies that longer sleep is associated with better quality of sleep. Overall, it may be that individuals may have approached the sleep question as having less sleep because they find it hard to sleep, or that their sleep was disturbed. This is a different question from sleep length as more of a personality trait, whereby the sleep reduction is not detrimental to the person's

lifestyle. Addressing different types of reduced sleep may be of benefit with regard to understanding the aetiology of anomalous experiences.

In the regression-based path model constructed in this investigation, it seems that sleep related variables were weak (but apparent) as direct predictors, when entered with personality variables in the same model. The path model indicates that temporal lobe lability is the strongest predictor of anomalous experiences, followed by transliminality. Schizotypy and quality of sleep relate directly but weakly and negatively, and may relate indirectly via their relationship with temporal lobe lability. Boundary thinness is indirectly related to anomalous experiences via transliminality and schizotypy. Reduced hours of sleep needed relates indirectly via temporal lobe lability, and handedness relates indirectly with anomalous experiences via transliminality. Gender, age and quality of sleep predict schizotypy and may be considered to relate indirectly to anomalous experiences. As such, in this sample sleep-related variables seem to relate more indirectly to anomalous experiences and may relate to anomalous experiences via personality. In this analysis, it should be borne in mind that correlation does not indicate causality in any of these relationships, and that for each level of the path analysis, these variables only explain a proportion of the variance. The first level of the analysis indicates that these variables only explain around 66% of the overall variance for anomalous experiences. As such, in addition to sleep related and personality related variables, other variables also contribute to reporting SPEs.

These results indicate that the boundary-related variables have slightly different relationships with anomalous experiences and have slightly different variables as their own predictors. These variables may all be measuring aspects of *boundary thinness* but some are more directly important when considering the aetiology of anomalous experiences than others. It should be borne in mind, however, that overlapping items were not removed for the current analysis, as such some of the shared variance may be associated with similarity in questionnaire content. Sleep quality is weakly implicated in anomalies and schizotypy, while marginally reduced sleep length is associated with temporal lobe lability. Sleep length is biologically determined, and may impart its influence via the temporal lobes. It is of interest that sleep deprivation has been associated with increased temporal lobe lability, as this variable can be considered to be both a state and a trait. Future work is planned to address the relationships between dissociation, sleep-related variables and SPEs as this variable may fit the current theory better than the variables considered in this survey investigation.

It is of interest that there are other indirect predictors of anomalous phenomena alongside sleep variables. Handedness and gender both related indirectly to anomalous phenomena when considered statistically as IV's in a regression model. Where these were addressed in post hoc analyses, handedness seems to relate to anomalous experiences via ambidextrous individuals reporting more anomalies than those with left handedness and those with right handedness. Although there are very small N's for left handers and those who are ambidextrous, this is of interest with regard to laterality research. This may imply that those with more bilaterality rather than being right or left dominant would be associated with experiencing more subjective paranormal phenomena. Similar findings were demonstrated recently in a study by Houran, Ashe and Thalbourne (2003), who found that left and mixed handed women scored non-significantly higher on reports of apparitions than a comparison group. As such, boundary thinness in the form of use of *both* hemispheres may relate to SPEs and perhaps ESP. This idea is supported by research by Wolfradt et al. (1999). These authors found that there was a relationship between expressing *two* thinking styles simultaneously and paranormal belief, experience and ability such that those who possessed both an intuitive and a rational thinking style were likely to have beliefs, experiences and subjective ability. This looks a lot like the deployment of both the right and left hemispheres. Having just intuitive or rational thinking did not demonstrate a relationship. In terms of handedness and boundaries, it seems that left handed people had lower scores on boundary thinness than right handed and ambidextrous individuals. This is an interesting finding reflecting thicker boundaries with right brain dominance.

In this survey, females scored significantly higher than males on anomalous experiences, and all the personality questionnaires bar temporal lobe lability. There is a mixture of findings in the literature regarding gender differences and SPEs. Some surveys find that there are non significant trends toward a gender difference (e.g., Palmer, 1979), while others, have found that women do report more experiences than men (c.f. Blackmore, 1991). The indirect relationship demonstrated here (i.e., that gender relates to

SPEs via schizotypy) was demonstrated previously by the author (Simmonds, 2003). It may be that some research samples finding a stronger gender difference may have contained individuals who score higher on boundary-related measures of personality, thus inflating the gender effect per se.

It may be that more of a difference would be demonstrated if the group sizes were equivalent for sleep length. It is clear that in a general population survey such as this one, there will be an over-representation of individuals in the average sleeper category. Although short sleepers were the second largest group, the size was almost half that of the average sleeper group. The long sleeper group comprised only 22 individuals, as such the trend toward longer sleep and schizotypy may not be a real finding. The fact that there is some relationship between sleep patterns and anomalies, and certainly with personality, indicates that further study should be undertaken by pre-selection of those who are short sleepers, average sleepers and long sleepers. By so doing, the relationship between sleep length and anomalous phenomena and personality can be clarified. Future work will also address how sleep related variables relate to performance at a psi task in the laboratory, for example, a current ganzfeld investigation at the Rhine Research Center includes assessment of sleep length and sleep quality as potential predictors of psi performance.

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PUEBLO PARAPSYCHOLOGY: PSI AND THE LONGBODY FROM THE SOUTHWEST INDIAN PERSPECTIVE

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ABSTRACT

The longbody is a concept that has its origin within the spiritual tradition of the Native American culture (particularly that of the Iroquois Indian tribe) to describe the broad interconnection between family and tribal members (both living and departed), the objects they possess, and the physical location in which they dwell as one large living body. It was first introduced to parapsychology by Christopher Aanstoos (1986), and adopted and extended by William Roll (1988, 1989, 1993, 1997) as a metaphorical way to understand the links between individual embodied minds, objects, and places that are suggested in one form or another by all the known types of psi phenomena.

The longbody concept does not seem to be unique only to Eastern United States tribes like the Iroquois; several Indian tribes of the Southwest United States also have aspects of their oral-based spiritual tradition that reflect something very similar to the longbody. In this paper, the similar aspects from the traditions of four Southwest Indian tribes (the Hopi, the Navajo, and Laguna & Zuni Pueblos) are reviewed, and their implications for psi experiences within these cultures and Roll's longbody hypothesis are discussed. It is suggested that the oral-based traditions of these cultures, which are based in memory, opens the way for psi as a means to ensure the survival of the tribes and their respective longbodies across space-time. Other aspects, such as beliefs and rituals that suggest close human interconnection with nature, place, and the spirits of the departed, also invite the experience of psychometry, place memories, and survival-related phenomena, particularly apparitions. It is further suggested that the geophysical characteristics of the location of certain Pueblos and sacred tribal sites may display anomalous activity similar to that observed in investigations of reported haunted sites, which may help to give rise to the experiences through their possible effects on the human brain. Possible directions for future research are also offered.

INTRODUCTION

Although it has not been widely recognized in recent years, it seems that the worldviews of Native American tribal cultures may offer perspectives about the relationship between humans, nature, and the physical world that could lead to new insights about psi phenomena. William G. Roll (1981b) was one of the first to recognize the potential value of these worldviews from tribal and Third World societies, pointing out that within such views there is often no individual distinction between humans and the objects and locations associated with them. From the viewpoint of these cultures, everything is interconnected in some way. Psi seems to suggest interconnections of a similar sort: telepathy suggests interconnection between human minds, clairvoyance can suggest interconnection between human minds and objects or places as in psychometry and geographical remote viewing, respectively; and psychokinesis (PK) suggests a sort of interconnection that allows interaction between mind and matter. This is quite different from the worldview of most of the Anglo-Western world cultures, which tend to emphasize individuality and may be one reason why psi is often perceived as anomalous or "strange" within those cultures.

From this worldview of interconnectedness, it would seem that Native American concepts might be useful in attempts to understand and describe psi. One concept that has been previously used in such a way within parapsychology is the longbody. This concept, the origins of which derive from the spiritual tradition of the Iroquois Indians of the Eastern United States to describe extended family and tribal interconnections, was first introduced to the field by Christopher Aanstoos (1986) as a means of

advancing the phenomenology of psi experiences. It was soon adopted and extended by William Roll (1988, 1989, 1993, 1997) in order to develop a more holistic way of understanding psi, one in which it may be possible to see and understand the broader interconnections shared by humans and the objects and locations associated with them, which are mediated and sustained by psi.

The longbody concept from the Iroquois tradition holds that tribal members are related by blood in such a way that they are not in the fullest sense individual people. Such an idea is also reflected in other larger Indian cultures such as the Navajo and the Cherokee when they refer to themselves as nations, aside from its other symbolic meaning as a political representation of their self-governing nature. In the tribal sense, members are related by sharing the same cultural and ancestral blood, what is now recognized as genetic inheritance. This leads to the perspective of extended families and the unity of the tribe as a whole. Through this perspective, the members are not simply individual living bodies, but are really part of one larger tribal body encompassing all members of the tribe.

In his extension of the concept, Roll (1988, 1989) also adds the objects and places associated with individuals as part of the longbody, all of which can be seen as a part of the extended self of the individual. From this viewpoint, the mind of the individual is embodied within the living brain and body, and the body is emplaced with other material objects in space. The mind also includes memories of other people, objects, and places, often in the form of images of their appearance, so the mind within the emplaced body of the individual is also linked through memory with the emplaced minds and bodies of others, as well as their objects and locations. From this, it may be possible to conceive of these linked, emplaced mind-bodies as part of a larger, living body of interconnection that is the longbody, which opens the way for psi (Roll, 1989, 1993, 1995). Thus, the longbody may be seen as that larger entity which links persons either by relation or through a shared frame of mind (e.g., religious groups and corporations can have their own longbodies) (Roll, personal communication, 2005), mediated by psi and ruled by meaning, which is also a part of a grander universal consciousness or “Big Mind” of interconnection across all existing people, objects, and places (Roll, 1997). Similar views about person, objects, and place are inherent in the traditions of several Indian tribes besides the Iroquois, particularly the Indian tribes of the American Southwest.

The concept of the longbody also does not seem to be unique to the Iroquois; these Southwest Indian tribes also have several aspects of their primarily oral-based tradition that seem to reflect something very similar to the longbody. In this paper, those aspects from four Indian tribes of the Southwest (the Hopi, the Navajo, and Laguna & Zuni Pueblos) are reviewed, and their possible implications for psi experiences occurring within those cultures and for Roll’s longbody hypothesis are discussed. Possible directions for further research on these aspects are also offered.

UNITY AMONG PEOPLE, PLACE, & SPIRITS

One of the aspects of the four Southwest Indian tribes that reflect something like the longbody consists of the references within the tribal traditions that are suggestive of a collective unity among tribal people, places, and the spiritual beings inherent in the religious beliefs of the culture.

Tribal unity is often expressed in verbal ways. One way is the referral to the tribe as a nation by its members as mentioned previously, in order to reflect that the members all share a common tribal bloodline. Another way that is observed among Navajo tribal members is the referral to themselves by their ancestral tribal name of *Diné* (pronounced “dee-nay”), which means “The People.” The plural of this, *Dine’é*, is often the full and more correct term, and also means “tribe,” “people,” and “nation” synonymously (Kluckhohn & Leighton, 1962, p. 23). Thus, when Navajo people refer to themselves and their origin, they do not perceive themselves as individuals, but as part of a collective tribal unit that includes their family and tribal ancestors, both living and departed.

This latter type of verbal reference is also meant to reflect the importance of kinship in a given tribe to preserve ancestral relations and help define the past. Within the Navajo and Laguna tribes, the basic unit of kinship is the family (or the clan, called *dóone’é* by the Navajo). The individual self and its origin are defined by group identity to a clan and all the family members that comprise it, whether they be direct

relation or extended family (the latter often declared through spiritual rite), and relationships between clans in turn helps to structure and define the tribe as a whole. In addition, the clan also helps to define a given tribe's past (described more below).

Within the Laguna Pueblo, tribal unity is displayed overtly through the behavior of the tribal members with respect to one another. Though the tribal members live as separate families within villages, many of them respect the tradition of their shared bloodline, and this underlies the social unity of unrelated members. Thus, many unrelated tribal members and families know, support, and/or help each other, and interact on a frequent basis. The unity is more overtly displayed during times of ceremony, when an entire village or even larger parts of the tribe comes together to take part.

A given tribe may also claim unity with a given location, leading to the concept of sacred sites. This not only is meant to reflect an ancestral and spiritual tie to the land for planting and harvesting, but can also reflect tribal origins and places of mystical significance to a tribe. For example, the Navajo trace a part of their origin to an area known as *Dinétah*, an area of canyons, mesas, and mountains located southeast of Farmington, New Mexico. Navajo mythology holds that *Dinétah* was the site where ancestral relations between the Navajo and the deity-like spirits inherent in the tribal religion originated when both emerged from an underworld existence (Marriott & Rachlin, 1968), and it also thought to have curing powers for this reason. When a healing ceremony is done, reference to *Dinétah* is made in the ceremony, if it cannot be directly held there (Kluckhohn & Leighton, 1962; Pratt, 1993).

Among the Hopi, unity is held with a small point in ground space called the *sipapu*, to which they trace their own origin. Like the Navajo, Hopi mythology dictates that the tribal members also emerged from an underworld existence (Marriott & Rachlin, 1968), and the *sipapu* is thought to be that point of emergence. It is also thought that when Hopi people die, they return to an afterlife in the underworld through the *sipapu*. Spiritual beings known as kachinas are also thought to emerge through the *sipapu* to enter the physical world at times of ceremony. Typically, an entire Hopi village ties itself to one central *sipapu* located toward the center of the village, although individual families also often reflect the tradition themselves by having a smaller *sipapu* in one room of their homes (Hieb, 1992). The Laguna Pueblo also has a loose interpretation of the *sipapu*, represented by a cave in the foothills of Mount Taylor to the northeast of the pueblo in New Mexico, which is thought to be the place that all of the departed journey to at death in order to reenter the underworld (Mails, 1983, p. 280).

In each of these four Southwest Indian tribes, there is often a tribal tie to the piece of land on which the *kiva* (ceremonial room) is built. The usual significance of the *kiva* is that the village *sipapu* is located within it, although it can have other spiritual significance such as being a place of natural healing power or a place where spiritual visions have supposedly been reported in the past (Hieb, 1992).

Pueblo houses and *kivas* are thought to have significance to the tribe because of their symbolic connections to people, to the underworld afterlife, and to other parts of nature. According to one perspective by Rina Swentzell (2001) of Santa Clara Pueblo, the structure of houses and *kivas* "...emulated the low hills and mountains in their connectedness to the earth. The adobe structures flowed out of the earth, and it was often difficult to see where the ground stopped and where the structures began. The house structures were, moreover, connected to each other, enclosing an outdoor space from which we could directly connect with the sky and focus on the moving clouds. Connectedness was primary. The symbolic flowed into the physical world as at the nansipu [the Santa Clara word for the *sipapu*] where the *po-wa-ha* (the breath of the cosmos) flowed out of the underworld into this world" (p. 87).

Spiritual unity is that aspect that often seems most reflective of the longbody within the four Southwest tribes. Each tribe's religious beliefs hold a tradition of interrelatedness and interconnection as mentioned, not only with themselves and the natural world, but also with the spiritual beings of the underworld existence, which are thought to help guide tribal life and survival, leading to the concept of the kachinas (David, 1993). The spiritual beings of the underworld are not only comprised of deity-like spirits that often have ties to natural phenomena, but also of the spirits of departed tribal members. Among their symbolic purposes (others to be mentioned below), kachina figures in ceremony are meant to represent these deity-like spirits in temporary earthbound form after emergence from the *sipapu*, but they can also represent departed tribal members that have returned to the physical world to aid in tribal ceremony (Kealiinohomoku, 1989, p. 53; Mails, 1988/2003, pp. 76 – 77; Ricks & Anthony, 1993, p. 7). Thus,

kachina religion has often been viewed by scholars as ancestor worship and a religious cult of the dead (Adams, 1991, pp. 9, 11 – 12). Since the longbody is thought to encompass both living and departed members of a tribe (Roll, 1989), kachina ceremonies might also be viewed as ceremonies to honor the tribal longbody. A possible indirect (and literal) symbol of this among the Zuni is the existence of the *Shalakos*, towering kachina figures appearing in the winter that have elongated bodies (Scully, 1975, p. 271).

Since spiritual unity also includes ties to the departed, it is also used to define the past of the tribe. It seems that for tribes "...[w]here there is an oral tradition, the emphasis is on the need to remember the past and to teach it. This is basically for survival" (Pratt, 1993, p. 154). Oral traditions are inherent in each of these four Southwest Indian tribes, and are passed onto others based on memory, which in turn is based on the recounted actions of departed tribal ancestors and relatives. This is reflected in a poem on the definition of the past through oral tradition by Navajo writer Luci Tapahanso (1990, in Pratt, 1993):

*It has been this way for centuries among us [the Navajo]
This is our history and way of raising children.
It has worked well for centuries.
You are here, your parents are here, your relatives are here.
We are all here. (p. 152)*

This piece, in encompassing everyone one is related to, suggests that the longbody is vital in defining a tribe's view of the past as well as their identity, and it can be argued from this that it is important to remember the past in order to ensure that the longbody of the tribe survives over time.

A broader reference to unity among people, nature, place, and spirits comes from the Navajo, where these interconnections are thought to be part of a sacred wholeness known as *Diyin*, which is fundamental to the human life process. *Diyin* is thought to be a dynamic and ongoing process that encompasses all things existent in the universe through a pattern of complex interrelationships, and which constantly changes as the living and natural elements which make it up change (Maryboy & Begay, 2004). Since human behavior changes frequently and humans often manipulate their surroundings in various ways, it is thought that humans can greatly affect the flux of the *Diyin* process, as can the spirits of the underworld through their spiritual effect on nature. This effect that humans and spirits can have on the *Diyin* flux (as well as the effect from natural phenomena) is thought to generate both positive and negative relationships between all things, and in turn, both positive and negative "energy" within the flux of *Diyin*, which ties into other events such as human sickness and tribal conflict.

These references to unity among people, place, and spirits among the Southwest Indians seem to reflect the idea of an emplaced mind-body that encompasses others mind-bodies and their objects and places that has been previously proposed by Roll (1993, 1995), and may therefore shed new light on that idea.

THE COGNITIVE & THE CONATIVE IN PUEBLO SOCIETY

In relation to psi and the longbody, it has been proposed by Roll (personal communication, 2004) that objects have two aspects: cognitive and conative. According to Roll, an object is a structure within three-dimensional space that changes with the dimension of time, and this dimension-defined image is used by the brain to chart the territorial point where it exists and operates for the benefit of the survival of the body and its group. This perspective of the object also makes it a cognitive construct that is shared within a tribe. This cognitive aspect is also local in that it occurs within a defined point of space-time.

Also, according to Roll, an object can also carry a conative or semantic aspect which contains meaning and is central to survival and well-being. This conative aspect is nonlocal, and is that aspect that is perceived in ESP.

The Native American culture seems to be a good context in which to address the dual cognitive and conative aspects of objects, as there seem to be several suggestive indications of them inherent in the life of the four Southwest Indian tribes examined here, particularly in rituals and ceremonies.

The clearest suggestions seem to be found within kachina religion. Hopi scholar Barton Wright (1977, in Ricks & Anthony, 1993) writes: “The basic concept of the katsina cult is that all things in the world have two forms, the visible object and a spiritual counterpart, a dualism that balances mass and energy” (p. 7). This not only sets a basis for kachina representation in ceremonies (which have a dual visible [i.e., human impersonation] and spiritual nature), but also for all other activities within Hopi life (e.g., crop growing has a physical aspect in planting and harvesting, and also a spiritual aspect in ritual prayers to the spirits that guide growth and rain), which the kachina religion also honors and celebrates through ceremony and ritual. In relation to this, Native American historian Thomas Mails (1988/2003) also writes: “In its essence, the central pathway walked by the Hopi has been an annual cycle of rituals that are preparatory in nature and go hand in hand with specific planting, cultivating, and harvesting tasks. These rituals include acts having to do with the continuance and heightening of their spiritual awareness of everything needful to life and survival. In other words, *both the material and the spiritual sides of life are addressed in the central pathways, although in truth the Hopi sees no distinction between the two, for the material life is itself infused with spirituality*” [emphasis added] (p. 73). In other words, the cognitive (the material) and the conative (the spiritual) are both involved in the process.

Another clear suggestion within kachina religion is the way in which tribal people regard the kachina mask worn in ceremonies. Usually in the eyes of non-Indians, a kachina mask is a wonderfully simple piece of cultural art made of wood, plants, and bird feathers, although Indians do not see it that way. Instead, in addition to its material form, which localizes and defines the mask in the particular place, time, and culture for a given tribal religion (on which the survival of the tribe is based), a tribe also gives a mask conative meaning that through their perspective might also allow them to nonlocally connect with the spiritual underworld and their tribal longbody of which it is part.

In another sense, the kachina mask might reflect a material object as a cognitive construct in that it defines in material form a spiritual aspect of religion that was originally derived within the brain when the kachina religion first evolved for the purpose of survival through deity worship and celebration. The conative meaning of the kachina mask is evident in accounts of how it is cared for and perceived among tribal members, in which they equate the mask with the spirit of the kachina itself. When a tribal male dons the mask in ceremony, it is believed that he is instilled with the spirit of the kachina, and rather than being a simple man impersonating a kachina, it is believed that he becomes the kachina in every way (Adams, 1991; Ricks & Anthony, 1993). When not in use in ceremony, a kachina mask is carefully stored and is fed ritually every day, and there are certain songs and prayers associated with these processes that must be expressed to the mask during them (Mails, 1988/2003, p. 79). In addition, during ceremonies, tribal villagers symbolically “feed” the kachinas by offering food or cornmeal while making prayers to them. Mails (1988/2003) notes that this ritual represents that, of the offerings made, “. . .the spirits only eat the soul of the food” (p. 76). Roll (personal communication, 2004) has also noted previously the cognitive and conative aspects of this ritual, which is present in many other tribal cultures of the world.

Another suggestion of the cognitive and the conative in Pueblo life is the way in which the ceremony is approached by the participants. Historian Edward Dozier (1970/1983) notes: “Pueblo ceremonialism is best understood as an aspect of the general Pueblo concept of the interrelatedness and cooperative nature of the universe. Ceremonial activity is the Pueblo’s contribution to maintaining a harmonious balance which is believed to be the natural state of affairs” (p. 200). In relation to this contribution, Thompson and Joseph (1944, in Dozier, 1970/1983) also note: “The rules of ceremonial observance have two aspects, the spiritual and the psychical. If either aspect is neglected or any regulation is broken, failure will result” (p. 200). This suggests also that the ceremonial process has cognitive (physical/material) and conative (meaningful/spiritual) aspects to it that complement each other. This is also the viewpoint in healing ceremonies of the Navajo with regard to *Diyyin*, which will be examined further in the next section.

A third suggestion of the cognitive and the conative comes from the rituals and customs observed when a tribal member has died. Though the viewpoints differ slightly between tribes, each of the four Southwest tribes examined here hold the belief that the soul departs from the body and makes a spiritual journey back to the underworld at death (Erdoes, 1976, p. 202) to live on as part of the larger tribal longbody. The Laguna Pueblo also believes that the departed can interact with the physical world as a spirit, helping to bring rain (Mails, 1983, p. 280), and also acting as guiding spirits for the tribe through ties to the

longbody. The Hopi believe that upon death, the departed become kachina spirits (Kealiinohomoku, 1989, p. 53; Mails, 1988/2003, pp. 76 – 77; Ricks & Anthony, 1993, p. 7), forming the basis for viewing the kachina religion as a cult of the dead (Adams, 1991). A burial ritual done in both Hopi and Laguna involves covering the face of the deceased with cotton or placing cotton tiers along the top of the head, which is meant to symbolize the kachinas as cloud spirits (Mails, 1983, p. 280; 1988/2003, p. 77). Feathers and other sacred animal objects are also commonly placed with the deceased for the same purpose, as well as to symbolize the connection between humans and the spiritual aspects of nature and the tribal land, both of which bring rain and life (and again seem to reflect Roll's [1993, 1995] idea of the relation between mind-body and place). Food, filled water jugs, and other material belongings are also buried with the deceased, in line with the belief that the spirit of the departed needs to take what they need to make the journey to the afterlife in the underworld, which is often thought to be a long process (though it is believed in some tribes like Laguna that the actual metaphoric "distance" between the physical world and the underworld is very close, which is what allows the spirits of the departed to interact with the physical world and continue guiding tribal life). This ritual of burying objects with the deceased apparently dates back to the time of the Ancient Anasazi Indians, the historical ancestors of modern Pueblo people, as evidenced from the archaeological record in which pottery artifacts found at Anasazi burial sites that date from the Mimbres period (1000 – 1150 A. D.) had holes punched into them. It is thought that the Anasazi believed that upon molding the pottery, a pottery "spirit" (most often an animal spirit, given the frequency of animal designs on pottery artifacts) became embodied within the piece, and that when the pottery was placed with the deceased in burial, a break in the piece (called a "kill hole") had to be made so that the embodied "spirit" could then be released and accompany the spirit of the departed to the afterlife (Erdoes, 1976, p. 202; Peckham, 1989). This ritual is still done in modern times by tradition, and one tends to find many pottery shards littering Pueblo cemeteries.

Rituals carried out following the burial also suggest cognitive and conative aspects. It is believed in some tribes like Laguna that after the burial, the spirit of the departed lingers for a short time in their home before beginning the journey back to the underworld. During that time, the spirit is invited into the home, and food and drink are offered to it (Erdoes, 1976, p. 202). Following this short period, the home of the departed is then spiritually cleansed by washing its walls and repainting them (Mails, 1983, p. 280).

These are a few of the many possible examples from Pueblo life that seem to reflect Roll's idea of the cognitive and the conative, and may open the way for psi among tribal members, particularly psychometry and apparitional experiences.

CEREMONY, HEALING, & PSI

When you put a thing in order, and give it a name, and you are all in accord, it becomes.

- From the Navajo tradition; Frank Waters (1950), *Masked Gods*

Perhaps one of the best examples from Southwest Indian life that seems to reflect the cognitive and the conative is the healing ceremony. A central focus of Navajo spirituality is on achieving a balance between the positive and negative relationships between everything in the universe that is inherent in the flux of *Diyin* (homeostasis, which the Navajo call *hozho*, loosely translated as meaning "harmony"). As mentioned previously, it is thought that humans can have a great effect on *Diyin*, not only by manipulating the environment, but also by holding negative thoughts and dabbling in magical powers (a strong belief in witchcraft exists within Navajo mythology; see e.g., Kluckhohn & Leighton, 1962, pp. 187 – 193), which upset the balance by creating more negative "energy." An excess of this negative "energy" within *Diyin* is thought to lead to such things as human sickness and social and intertribal conflict. In order to cure an ill person and/or restore the balance to *Diyin*, the healing ceremony is carried out (Kluckhohn & Leighton, 1962; Maryboy & Begay, 2004).

Healing ceremonies among the Navajo (and other tribes) are often communal events that can involve entire families or even an entire village. Central to the ceremony is the medicine man, who acts as both a

spiritual healer and the Indian equivalent of a psychotherapist, hearing the ill person's guilty acts that lead to the *Diyin* imbalance and forgiving them. As a result of this trusting relationship, both healer and the patient form a bond analogous to kinship that remains for life (Kluckhohn & Leighton, 1962, p. 198). In addition, the families or larger parts of the tribe that are participating aid each other in performing the ceremonial acts, and this large cooperation by the participants for a central purpose may entail forming their own temporary healing longbody. Healing deity-like spirits and the spirits of the departed are also called upon during the ceremony for help in guiding the restoration of *Diyin* balance, and this too may suggest the involvement of the tribal longbody (Pratt, 1993, pp. 155 – 156).

Navajo and Hopi healing ceremonies (a Navajo ceremony is often called a “Chantway”) often consists of a number of rituals that can take anywhere from an hour to several nights to complete. Rituals include herbal medicine (both tribes), ceremonial song (both), sandpaintings that contain depictions of healing spirits of the underworld and natural phenomena to represent the same components of *Diyin* (Navajo), and group prayer and meditation (both) (Mails, 1988/2003, pp. 81 – 84; Maryboy & Begay, 2004). Each of these rituals seems to have cognitive/material and conative/spiritual aspects associated with them: herbal medicine is associated with spiritual healing powers of the earth, the balance and rhythm of ceremonial song is associated with the cosmic order of the universe (Maryboy & Begay, 2004), sandpainting is associated with healing through contact with the spirits (this is believed to be achieved by having the patient sit on the sandpainting during a ceremony, and pouring and rubbing the colored sand on their body following it) (Kluckhohn & Leighton, 1962), and group prayer and meditation are associated with summoning the spirits of the underworld through the use of *pahos*, or prayer sticks (Mails, 1988/2003, pp. 85 – 89). These dual aspects may make these rituals conducive to ESP, interpreted as spiritual vision. Mistakes in any of them are thought to have a negative effect on *Diyin* (Maryboy & Begay, 2004).

Similarly, the communal group nature of the ceremony, with its dual aspects and its shared focus toward healing and restoring *Diyin* balance, may perhaps make it conducive to a group PK effect. This group effect may have a physiological effect similar to that seen in bio-PK and the concept of distant mental influence on living systems (DMILS) that has received growing attention in recent years (e.g., Braud, 2003; Delanoy, 2001; Schlitz & Braud, 1997; Targ, 1997), and may also have an effect on the surrounding environment that is interpreted as human effects on *Diyin*. This latter effect may be analogous to the PK-related concept of “field consciousness” (Nelson et al., 1996, 1998). This seems to be further suggested in the notable results from healing-related workshops and meditations (Nelson & Radin, 2003; Williams, 2004), and from a sacred site healing and preservation ceremony carried out by a Shoshone Indian shaman at Devil's Tower in Wyoming (Nelson et al., 1998, pp. 432 – 433; Nelson & Radin, 2003, pp. 53 – 54). The concepts of both DMILS and field consciousness also have been suggested or seem to suggest some form of interconnectedness through partnership (e.g., Braud, 2003, p. xliii – xliv) and shared group experience (e.g., Nelson et al., 1996, pp. 136 – 137), respectively, and may be another basis for their relevance within this context.

Kachina ceremonies in Pueblos like Laguna and Zuni are thought to also have a healing-related purpose behind them (Adams, 1991), as well as a contribution to maintaining a harmonious balance in the natural world (Dozier, 1970/1983, p. 200), and they may have their own cognitive and conative aspects associated with them, as suggested by the quote by Thompson and Joseph (1944, in Dozier, 1970/1983, p. 200) noted above. Thompson and Joseph (1944, in Dozier, 1970/1983) go on to say: “...to carry out a rite successfully, the participants must not only follow the prescribed ritual behavior, perform all the proper acts and observe the tabus [*sic*], but they must also exercise control over their emotions and thoughts. They must keep a ‘good heart.’ A ‘good heart’ means that one must not feel fear, anger, sadness, or worry. In other words, one must be inwardly tranquil and of good will” (p. 200). In other words, analogous to the Navajo tradition of human effects on *Diyin*, participants must keep a positive mind-body during a ceremony in order to ensure success of the kachina ceremony. If such an outlook is shared among all the participants, this too might entail a kind of group mental “coherence” suggested in field consciousness (Nelson et al., 1996, 1998).

Like the Navajo healing ceremony, the large group nature of a kachina ceremony might also suggest the possibility of a group PK effect. Such ceremonies involve large group kachina dances that are rhythmic and synchronized, and large masses of the tribe are in attendance to view them and work

together to ensure that the ceremony goes smoothly, which also invites social gathering and cohesiveness (Adams, 1991; Kealiinohomoku, 1989). With regard to this group nature of a Hopi kachina ceremony, Joann Kealiinohomoku (1989) writes: "Both dancers and non-dancers are mesmerized by the rhythmically pleasing patterns, and the collective thoughts and energies magnetically attract the katsina spirits. This [spiritual energy] vortex is intensified by the accumulation of rhythms that systematically and insistently beat together with some combination of drums, rattles, bells, and moving bodies...A feeling of closeness and caring envelops the people who sit or stand quietly together while surrounding the dancers in the plaza" (pp. 58 – 59). This seems to be akin to the social atmospheres reported in group situations that seem to be conducive to field consciousness (Nelson et al., 1996, 1998), and may also perhaps entail the formation of a short-lived ceremonial longbody. Kachina ceremonies also have the purpose of bringing rain, and group effects with this purpose may lead to a possible PK effect on the environment. The sensibility of such a notion is seen in the findings of a natural "group consciousness" study by Roger Nelson (1997), in which it was found that there tended to be less rain over time on days of Princeton University ceremonies held outdoors. This might be seen in one sense as the opposite effect of the stereotypical Indian "rain dance."

This viewpoint of the healing ceremony also seems to reflect Roll's concepts of the cognitive and the conative.

PLACE MEMORY AND SACRED SITES

When I went to New Mexico I felt the past from the Pueblo nation. You stand out on those plains, and you just see them coming over the hill, you see the horses coming over the hill, and that land is still alive with those memories, the Southwest, that's one reason that I was drawn to go record there.

Tori Amos, on moving to and recording in Taos, New Mexico, 1993 (in Rogers, 1994, p. 73)

There is one other aspect of the Southwest Indian culture that seems to reflect another idea that has been promoted by Roll (1989), and that is sacred Indian sites as possible harborers of "place memory." The concept of place memory was first proposed by the Oxford philosopher/parapsychologist H. H. Price (1939, 1940) as a means to account for psychometry and hauntings. Roll (1989, 1993) expanded the concept by providing a basis for a mind (which harbors memories) that is embodied, which in turn is emplaced. From this, it can be argued that memories are also emplaced. Roll (1988) further argued that memory can be seen as mind stretched out in space-time, and therefore serves as a basis and limiting factor for the reach of the longbody. Thus, place too may harbor the personal history of a tribe as part of the tribal longbody in the form of place memory.

Anecdotal accounts like the one above by musician Tori Amos of people "feeling the history of the tribe" or a "deep sense of tranquility or peace" at a sacred site or a place inhabited by a tribe may be akin to reports of place memory as it relates to psychometry and haunting in Price (1939, 1940) and Roll's (1989) sense. In relation to this, Price (1939) had once written: "Persistent and dynamic images, which when once formed may have a kind of independent life of their own, and may escape more or less completely from the control of their author...An image or a group of images may get itself localized in a particular region of Physical Space...Once localized there, they might continue to be so localized for a considerable period, retaining the telepathic charge which they had at first, though this might gradually diminish in intensity" (pp. 325 – 326). Thus, one might argue that sacred tribal places like *kivas* might be most susceptible to place memory given the persistent annual celebration and ritual repetition of ceremony, and the dynamic nature of such events (e.g., drumming, rattling, and dancing), the memories of which might be experienced by others later in time as a form of preservation of the tribal longbody. The sensibility of this is also suggested when Steve McDowell (1990, in Hieb, 1992) metaphorically stated in relation to historic New Mexican religious architecture, "Architecture is a form of memory, less similar to the structured mechanisms of history than it is a life form, with a growth, adaptation and life span that resemble those of an ancient tree" (p. 76). Architecture can also be a defining part of place, and from this memory may also be associated with place.

There may be some suggestion of psi-related experience of persistent place memory within the traditions of a few of the Southwest tribes. Mails (1988/2003) had written that, according to the Hopi tradition, “The place where one worships and petitions is extremely important. Closeness to the deities, the very warmth and power of their beings, must be felt. When this is so, people hear the powers speak, motivation comes, and amazing things happen. The dead return, magic and miracles occur, and *believers are simultaneously transported back into ancient time and forward into the future. Consciousness is expanded*” [emphasis added] (p. 91). This suggests that experiences of spiritual vision at a Hopi worship site may in part involve the experience of place memory in the same sense as one might experience it when seeing an apparition at a reported haunt site (Roll, 1981b).

Similar perceptions about the home (called a hogan) are held by the Navajo in relation to bad dreams. Kluckhohn and Leighton (1962) note: “If bad dreams keep coming, the hogan will be torn down and a new one will be built some distance away, because the bad dreams are supposed to come from ghosts who are frequenting their old haunts and trying to draw their relatives into ghostland with them” (p. 204). This too suggests ESP impressions of place memory and apparitions as it relates to haunts (Roll, 1981b). It also seems to be in line with a slight difference in dream content observed at sacred sites in the UK as compared to home dream reports, though this observed difference is tentative and still needs to be studied further (Krippner, Devereux, & Fish, 2003).

Rina Swentzell (2001) states that homes in Santa Clara Pueblo are also viewed in a similar fashion, noting that “Many different kinds of energies flowed through the structures because they shared in the energies of the people who lived and died within them” (p. 89). This seems to suggest both the possibility of place memories, and a connection between embodied mind and place, in line with the concepts by Price (1939, 1940) and Roll (1989, 1993, 1995), respectively.

DISCUSSION

My people once hunted for buffalo — now we hunt for knowledge.

Chief Joseph Chasing Horse of the Lakota Nation, as quoted in a NASA press release announcing a meeting in South Dakota to explore “connections between recent space findings and traditional Lakota star knowledge.”
Science 283(5410), March 26, 1999. p. 2007 [“Random Samples”]

The suggestions of unity between person, place, nature and spirits; of cognitive and conative aspects in daily life, and of a possible connection between place memory and sacred sites among the traditions of four Indian tribes of the American Southwest all seem to entail a psi-related interconnectedness between self, body, objects, place, and others that has been proposed previously by Roll (1988, 1989, 1993, 1995) with respect to the concept of the longbody. What might the implications of these suggestions be for psi and the longbody? Given that these four tribes largely maintain an oral-based tradition based on memory to preserve their culture, it could be the case that ESP plays a large factor in forming such traditions and maintaining them over time for the benefit of the survival of the larger tribal longbody, following the proposed link between ESP and memory (Roll, 1966). By keeping departed tribal members in memory through an oral tradition, the tribes might keep a very close connection to their tribal longbody, thus perhaps making them susceptible to ESP and psi in general. From this perspective, ESP might serve a useful role in preserving the history of the tribe and thereby maintaining tribal longbody ties across space-time. This would entail survival in the sense of a persisting longbody rather than survival of an individual mind.

The possible importance of memory and ESP in an oral tradition might further open the way for not only place memory, but also psychometry (Roll, 1978, 2004) in preserving tribal culture, in which case the conative aspects of objects, when persistently used in ceremony, might be perceived through ESP. An interesting example of this possibility comes from the book *Psychic Connections* (Duncan & Roll, 1995) in which a psychic is challenged to pick up psi information from Pueblo artifacts in order to tell where they came from: “‘One tiny piece of shell gave me a picture of a civilization to the west of me,’ she says. ‘I got the styles of houses, decorations and styles of pottery, and the name *Zuni*. From a fragment of a pot

I got entirely different styles of dwellings, pottery, and decoration, and the word *Aztec*. I identified three more fragments, one of them *Hopi*. The archaeologist verified that all these impressions were accurate and said he did not believe that any professional archaeologist could have done better unless he had spent a lifetime with Indian artifacts from those particular civilizations” (p. 65).

One possible way to account for these experiences of place memories and object impressions is to consider the possibility that they might be tied to the concept of the psi field (Roll, 1964), involving interactions between the psi fields of people, places, and objects over time. Given that spiritual aspects have been traditionally regarded for ages by Southwest Indian tribes in skilled crafts such as pottery making (e.g., the concept of a pottery “spirit” in Anasazi pottery [Erdoes, 1976, p. 202; Peckham, 1989]), this possibility might provide a psi basis to such beliefs. In terms of the cognitive and the conative, the crafting of a ceremonial pottery bowl with decorative artwork of spiritual images and natural phenomena helps to localize and define a cognitive construct of tribal religious belief in material form in space-time. The artwork gives the bowl spiritual meaning behind its utilitarian use, giving it conative aspects, as well. This is taken into consideration when the bowl is first made and decorated, and perhaps PK has a role in defining the conative meaning of the piece. In this case, the psi field of the pottery maker might interact with the psi field of the bowl as the spiritual rites associated with pottery making are kept in mind in the process and carried out. This is akin to the idea that agents in cases of recurrent spontaneous psychokinesis might interact with an object’s physical condition when they also interact with its meaning, causing it to move (Roll, 2000). In the present context, when the maker is interacting with the material form of the bowl and giving it meaning through spiritual rite and decoration, they might perhaps be affecting its physical form as well, instilling it with nonlocal conative aspects that may be picked up later in time by others through psychometry or other forms of ESP. This might be akin to the process of observer participancy, in which information is injected into an object through observation, information that can include “the meaning of the acquired data to the observer” (Frieden, 1998, p. 235).

PK might also have a role in defining the conative aspects of a sacred site as a part of the place memory of the site. In this case, the conative aspects of the site might be achieved primarily through group PK effects during a ceremonial event, with the latter being largely imbued with spiritual meaning for Indian tribes in terms of their survival (Adams, 1991; Dozier, 1970/1983; Kealiinohomoku, 1989; Waters, 1950). As a site is continually used over time as a ceremonial site in which large groups participate, then perhaps over time the psi fields of the participants continually interact with the psi field of the location to form a place memory as suggested by Price (1939) that may also have nonlocal aspects that linger over time. As with ceremonial healing, this interaction through PK might be akin to the ostensible group PK effect of “field consciousness” (Nelson et al., 1996, 1998) in relation to other spiritual techniques such as mediation (Nelson & Radin, 2003; Rowe, 1998; Williams, 2004).

It may perhaps be the case that the experience of these place memories at sacred sites are similar to haunt experiences, in that some locations deemed as sacred by Indian tribes may possess geophysical characteristics very similar to those observed in field investigations of reported haunt sites (Roll & Persinger, 2001). Another reason for thinking this is that measurements taken at archaeological sites in England and other places in Europe suggest unusual geophysical properties at the sites (Devereux, 1990). Similarly, some sacred Indian artifacts might show unique physical properties (e.g., an artifact that has radioactive elements as part of its material composition).

Given the geographical location of most Southwest Indian reservations, the most likely geophysical phenomena that may be associated with tribal psi experiences are ionizing radiation and geomagnetism, based on the geology of the American Southwest (Adams, 1999). Within New Mexico and Arizona, where the four Indian tribes examined here largely reside, there is frequent mining for radioactive elements such as Uranium-238, the decay of which can contribute to background radiation levels if considerable concentrations of them are present in rock formations surrounding tribal sites. In addition, dry desert winds such as those produced by the Santa Ana winds can also affect radiation levels by producing excess positive ion counts (Assael, Pfeifer, & Sulman, 1974; Charry & Hawkinshire, 1981; Persinger, 1979). Some studies seem to suggest that atmospheric ionization can have an effect on the brain, based on observed changes in the electroencephalogram (Assael, Pfeifer, & Sulman, 1974) and behavior and mood (Frey, 1961).

In addition, radon gas might also be a possible factor. Radon is often a decay product of uranium, and is known to be toxic when inhaled in large amounts (Kerr, 1988). Concentrations of radon gas might build up within rock formations and seep into enclosed tribal sites like *kivas*, where it also may concentrate without proper ventilation and be frequently inhaled by tribal individuals, leading to hypoxia and the hallucinatory effects associated with it. The toxicity of radon might be one factor behind one Hopi tribal tradition warning non-tribal people not to trespass on a sacred tribal site, the consequences of which might be deadly (Marriott & Rachlin, 1968, pp. 243 – 245).

Electromagnetic and geomagnetic fluctuations within the Southwest region might also be a factor. Regions such as the Tukumcari Basin in New Mexico have been found to have geomagnetic variation anomalies in the areas around deep basins that are filled with sediments associated with such variations (Persinger, 1987; Porath & Dziewonski, 1971). Anomalies arising from thermoremanent magnetization as a result of excessive heat in room fire hearths and roasting or cremation pits may also be a source of magnetic field fluctuation in sacred sites (Sternberg, 1987). The presence of localized geological characteristics around the location on which a sacred site is built, such as an underground water aquifer and seismic variation, may be other possible contributors to anomalous magnetic field activity (Persinger, 1979, 1985, 1987).

The effects of these magnetic fluctuations may be similar to the effects proposed for haunt cases, in that they might affect the brains of individuals present at the site, leading to subjective experiences similar to reports of apparitions and other haunt-related phenomena (Persinger, 1979, 1985, 1987, 1993, 2001; Roll & Persinger, 2001). In particular, high magnetic fields may affect those brain areas that are most sensitive to magnetism, such as the temporal lobes (Persinger, 1983, 1993, 2001) and the limbic structures (i.e., the hippocampus and amygdala) involved in memory and emotion (Halgren et al., 1978), possibly leading to greater psi sensitivity (Persinger, 2001). This latter possibility seems to be suggested in the results of studies of psychic subjects Sean Harribance (e.g., Roll & Persinger, 1998; Roll, Persinger, Webster, Tiller, & Cook, 2002) and Ingo Swann (Persinger, Roll, Tiller, Koren, & Cook, 2002), in which the right hemisphere of the brain along the temporal lobes and near the limbic structures seemed to be active during psi tasks by both subjects. Possible activation of the right hemisphere and the hippocampus through adjacent neural synaptic connection during psi tasks may also hint at the connection between ESP and memory previously proposed by Roll (1966). Activation of other areas associated with emotion such as the amygdala also through adjacent neural connection with memory-associated areas may also give meaning to psi experiences in the same way these areas seem to for negative memory development (LeDoux, 1998), making a psi experience seem profound and meaningful to the individual. Similarly, the limbic structures might serve as “sensory organs” for conative aspects of objects and places received through ESP (Roll, personal communication, 2004). The link between emotion, memory, and psi might seem sensible when considering the fact that Native American tribes often rely on meaningful event-related memory for their oral history, as shown throughout this paper.

There might also be some aspects of the ceremonial process itself that are conducive to altered states of consciousness that can facilitate psi, such as the rhythmic beats of ceremonial drumming. Drum beats seem to produce acoustic sound waves that at times can modulate and produce brain wave patterns that “follow” the same frequency as the sound waves, a process called “auditory driving” (Vaitl et al., 2005, p. 107). This may be similar to the process involved in the technique of binaural beating to induce altered states in individuals (Atwater, 1997). The rhythm of ceremonial dancing might also help to facilitate auditory driving effects, as well as facilitate PK effects in the same way that body arousal seems to facilitate macro-PK in sitter group settings. The sound waves of unified ceremonial singing and chanting localized within an enclosed space (like a *kiva*) may also create a standing sound wave within the space that could have an auditory driving-related effect over time. Sound measurements taken in European archaeological sites by Devereux and Jahn (1996) and Jahn, Devereux, and Ibison (1996) seem to indicate the presence of such sound standing waves, hinting at the sensibility of the idea.

CONCLUSION

The traditions from four Indian tribes of the American Southwest (Hopi, Navajo, and Laguna & Zuni Pueblos) seem to possess aspects that are very similar to the longbody tradition of the Iroquois Indians, and which seem to reflect the ideas proposed by William Roll (1988, 1989, 1993, 1997) about the longbody concept as it relates to parapsychology. These aspects seem to suggest a close interconnection between all aspects of the physical universe (particularly self, nature, place, objects, and significant others); seem to reflect the significance of the conative and the conative aspects (Roll, personal communication, 2004) of objects and places in tribal society, ceremony, and everyday life; and point at a possible connection between place memory and the existence of sacred sites.

Some of these ideas seem open to further exploration. Possible directions for future research might include:

1) examining through survey study the frequency of psi-related experiences (particularly ESP and apparitions) among Indian tribes that strongly rely on a memory-based oral tradition as a means of examining the relation between ESP and memory among Indians,

2) further field exploration of the geophysical properties of sacred Indian sites using measuring instruments, with a comparison to the measurements recorded at traditional haunt sites;

3) field measurements of possible group PK effects during Native American tribal ceremonies through the use of portable random number generators to explore the implications of psi field interactions [Note: a preliminary field study of this is planned by the author for late April 2005 at the Gathering of Nations Powwow, held annually in New Mexico]. Similar measurements can be done for healing ceremonies as they might relate to bio-PK and DMILS;

4) collecting, and taking a closer examination of the phenomenological aspects of, reported psi experiences among Native Americans to see what they might tell us about the tribal experience of psi as compared to psi experiences among Anglos. This, along with 1) above, might help to estimate the frequency and type of psi experiences of Native Americans, which can also be compared to Anglo reports.

Findings from these directions might be useful in further supporting some of the ideas suggested here, as well as possibly deriving more refined perspectives on psi and the longbody within the Native American tradition.

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ENERGY EMISSIONS FROM AN EXCEPTIONAL SUBJECT

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ABSTRACT

Findings are reported from an ongoing study of electromagnetic phenomena associated with alternative medicine practitioners. Data are summarized from 31 recording sessions involving 6 control subjects and 19 alternative practitioners engaged in bioenergy transmission or focused meditation. Data collected from the experimental subjects generally could be mimicked by the control subjects and explained on the basis of thermal effects, with one striking exception. One subject was able to produce large bursts of photons on two occasions that were accompanied by voltage surges from an arm electrode. A narrative of these events and the effects on the subject are similar to descriptions of kundalini phenomena, especially in inexperienced practitioners.

INTRODUCTION

The rationale, equipment and methods for this study have been previously described (Joines et al., 2004) and will be reviewed briefly here. There exists a large literature indicating that attentive humans can mentally influence living systems (for reviews see Targ, 1997; Benor, 2001; Jonas & Crawford, 2003). Similarly, there exists a large literature on low intensity electromagnetic (EM) emissions from organisms, i.e. biophotons (for reviews see VanWijk, 1992; Tilbury, 1992; Popp, 2002). Of particular importance to our work are reports that human tissues radiate in the ultraviolet region of the spectrum (Rahn, 1936; Konev, et al, 1966). Light emission from humans has been reported many times over hundreds of years, and a review of luminous phenomena around the human body is given by Alvarado (1987). A pilot study conducted in our laboratory 30 years ago with a gifted subject showed an extraordinary range of electromagnetic phenomena that she could produce with effort during periods of focused intent, such as large changes in body voltage, the emission of light and the ability to speed wound healing, including on laboratory personnel. Many alternative healers engage in bioenergy techniques in which they attempt to send healing energy to patients, often via their hands (Grad, 1965; Krieger, 1979). We are systematically exploring the possibility that there may be a detectable electromagnetic component associated with these practices.

METHODS

A 10'x 12' aluminum enclosure was erected within an 18'x 20' laboratory space, and the enclosure was sealed to shield the interior from stray light. Four pieces of monitoring equipment was placed within the enclosure: 1) a Hughes Probeye thermal video system to record infrared emissions; 2) a Keithley 6514 system electrometer with a 7001 switch system to record charge buildup from up to 10 electrodes attached to the body; and 3) a Sypris/F.W. Bell model 7010 gaussmeter to record magnetic fields from dc to 20,000 Hz with a resolution of 0.001 gauss; 4) a Thorn EMI photomultiplier tube (PMT) model S20 (9658) to record photons of light with maximal sensitivity in the near ultraviolet to the visible blue range. The quantum efficiency of our PMT is approximately 20-27% from 200-500 nm with a peak in the near ultraviolet at 385 nm. This means that each count recorded from the PMT corresponds to about 4-5 photons in this bandwidth and even more for visible wavelengths above 500 nm where the efficiency falls off rapidly. All cables from the equipment were run through a patch panel to recording devices and

computers located outside the enclosure. Data collection from the magnetometer was not automated until midway through the study, after the session with the one exceptional subject described here.

Experienced healers were recruited by local reputation, by prior experience, and by word of mouth. On average they had been practicing various alternative healing techniques (e.g. Healing Touch, Reiki, Qigong) for about 20 years. All subjects completed a consent form approved by the Institutional Review Board and a questionnaire concerning their demographics and healing experience.

After a brief description was provided of the function of the equipment, up to 10 Ag/AgCl ECG recording electrodes were attached to the front and back of the torso and arms. Subjects were then instructed to sit quietly in a lounge chair while the doors to the enclosure were sealed from light. (The interior of the enclosure was so dark that most dark-adapted subjects could not see anything with their eyes wide open.) The lights in the laboratory were then turned off, and light from the computer monitors was used by the experimenters to perform the study. After a baseline recording period of approximately 10 minutes, subjects were asked to place their hands within 3-12 inches of the photomultiplier tube and attempt to transmit energy into the tube for 10-15 minutes at a time. Periodically, they were asked to turn their hands and face towards the IR camera to record the temperature or to place their hands near the magnetic field probe to record magnetic field perturbations. The duration of each recording session was approximately 45-60 minutes.

RESULTS

For all but one subject there was no significant difference between controls and healers detected from any of the four measurement devices. Other than increased body heat associated with effort and associated temperature rises detected by the equipment, there was little difference between the baseline and task periods of time. During a recording session photon counts from the photomultiplier tube were typically 10-20 per half second during baseline and sometimes rose as high as 40/half sec during periods of maximum effort (the PMT is temperature sensitive and thermionic emissions increase slightly with temperature); the IR camera typically recorded skin temperature of 82 to 96 degrees; the magnetometer typically recorded less than a 0.03 Gauss change and rose slightly when a subject's hands were placed near the tip of the sensor, since the Hall effect element in the sensor is temperature sensitive; voltage measurements from the electrodes were typically less than ± 30 millivolts (mV).

One subject, a 26 year-old devout Hindu student from Asia, participated in the study three times. In the first two sessions he tried a passive meditation technique that was not successful in producing any anomalous effects on the detectors. He then changed to practicing a more active, ancient Buddhist meditative technique called Aloka Kasina that he studied from a book. It involved the visualization of light and heat within the body, which might then be discharged outward. The subject chose to modify the technique to discharge the energy out from his hands at the PMT and the magnetometer sensor. The book included an admonition that the technique should be performed only with the assistance of a master yogi.

After about eight weeks of practice with this technique he returned to the laboratory for a third session. At this time only one electrode was connected to his left forearm and the magnetometer was not yet connected to a computer for automated data acquisition. After about 10 minutes of baseline data acquisition, the subject repeatedly meditated, put his hands up and took them away from the PMT to get a sense of the distance to the shutter. No dramatic changes were noted, although he repeatedly felt a slight headache or heaviness in the head. He then proceeded to meditate for several minutes after which he expended a good deal of physical effort and brought his rapidly vibrating hands near the PMT. He repeatedly faced the IR camera for a frontal view, and mentioned that he had a minor headache and that his eyes were hot. The camera showed hot areas around his eyes and lower neck. A minute later he said that his forehead was burning, so he sat back and meditated before beginning the visualization exercise again.

About two minutes later he briefly brought his vibrating hands near the PMT, and a large spike was observed that produced 205,535 counts/half sec, while the immediately preceding baseline had been less than 20 counts/half sec. The voltage from the single electrode on his upper left forearm exceeded -1.0 V

and caused the program to freeze, as we later learned, from a bug in the software that prevented it from auto scaling when voltages more negative than -1.0 V were encountered. Preceding this no negative voltages greater than -0.074 V had been recorded, although some positive voltage surges of from 0.2 V to 0.5 V were recorded. The subject covered his eyes and held his head in his hands. He felt heat in his body and face, especially his eyes. He repeatedly rubbed his face and eyes, and he faced the IR camera to show heat that was coming off of his face, neck, and upper chest. The IR camera recorded temperatures as high as 98° F, and these areas, especially his eyes and forehead, felt very hot to him. He had a “burning headache.” He was in so much pain, that we suggested aborting the experiment, but he said that he was improving, and that he wanted to continue. Five minutes after the burst he lifted his shirt to show his upper chest and torso, especially the lower left side, which felt very hot to him, but it was the upper right chest that was warmest at approximately 98° . He continued to rub his face and especially his eyes, and then settled back into meditating and charging himself up again.

For a time he sat bent over with his head bent low between his legs and his hands in his abdomen. He deliberately tried to channel the energy, which he felt as heat rising up inside his torso, down his arms and into his hands. Seven minutes into this second meditation period he again briefly put his hands near the PMT and felt his hands and fingers were stuck together. He tried to open his hands and had to use considerable strength to open the fingers and move the hands apart, so that he could place his palms towards the PMT. Immediately, a second large spike of 42,411 counts/half second was recorded from the PMT and a surge of greater than -1.0 V from the left arm electrode before the program crashed again. The subject was in so much pain that he grabbed his head in agony. When asked if he needed help, he said yes, and the experiment was aborted.

He felt pain and heat coursing through his body, especially his torso, but this time not above his neck. His hands were temporarily contracted and stuck. He tried to stand up, but was weak in the legs. He felt “an unbelievable burning inside.” He was moved to a large cushion chair outside the shielded enclosure. He writhed, contorted and winced in pain. He repeatedly spit up small amounts of blood, although of lessening amounts. An ice pack was used to cool him down, and he placed it over different areas of his torso as the heat moved around inside of him from his heart and lungs to his abdomen and his kidneys. His t-shirt was removed, soaked with cold water and he was helped to put it back on. Although he was repeatedly asked if medical assistance was necessary, he said no, that he thought he was gaining control over the pain and heat, and that he wanted to wait. When he eventually went to the bathroom, he noted that it was painful to urinate. Over the course of the next 1.5 hours the pain and heat gradually subsided, so that he was able to leave the building of his own accord.

Shortly afterwards a number of control tests were performed by the experimenters, who attempted to mimic the subject’s gestures and produce possible inadvertent sources of artifact by jarring the equipment table in the enclosure, rubbing feet on the carpeted floor to induce static charge, rubbing hands on the chair to induce static charge, vibrating the hands rapidly in front of the PMT, touching or banging the PMT, and touching or banging on the enclosure. None of these efforts produced effects much larger than baseline values.

That evening the subject continued to have pain upon urination, and there was a small amount of blood in his stools. He had difficulty getting to sleep and laid in bed for several hours resting and trying to control the heat he felt moving around inside his torso. Although not as intense as it was earlier that afternoon in the laboratory, the movement of heat within his body was still uncomfortable and a cause for efforts of control. It felt like “an electrically charged worm” moving around inside his belly. The next day he had a sore throat. The heat effects persisted for nearly a week at gradually subsiding levels of intensity.

DISCUSSION

Although apparently quite rare, visibly detectable photon emissions from humans are a matter of ancient record, and instrumental detection of the phenomenon is even more rare, but has been observed (Alvarado, 1987). In a previous pilot study conducted in our laboratory over a span of several months, charge build-up and decay and concurrent light emission were repeatedly measured from one subject

during periods of effortful focused intent. This subject was seen to glow in the dark on at least one occasion, much to the discomfort of the graduate student observer.

Subsequent to our pilot study, another research group constructed a specially designed laboratory to measure body voltages from meditators and from practitioners of non-contact therapeutic touch, a type of bioenergy healing (Green et al., 1991). Surges in body potential measured from 10 experienced meditators did not exceed 4 volts. However, in 6 out of 14 experienced healing practitioners, surges of 4 to 221 volts (median = 8.3 volts) were recorded and returned to baseline within a matter of seconds with durations ranging from 0.5 seconds to 12.5 seconds (median = 3.6 seconds). Most of the surges were of negative polarity. Mathematical modeling indicates that an electric dipole, originating in the lower abdomen, and with a charge separation extending from the head (negative) to the feet (positive), can adequately account for the data (Tiller et al., 1995). No attempts were made to record or model biophoton emissions by this group. Our own calculations indicate that the sweat ducts may be able to act as a conduit for light emissions produced by charge fluctuations in the dermis, but more experimental data is needed to assist in these theoretical efforts.

Although unknown to the experimenters at the time of the study, the description of the meditative technique called Aloka Kasina (Bhikkhu, 2004), and its possible effects on inexperienced practitioners, is very similar to descriptions of kundalini yoga for raising one's prana (Chinmoy, 1992): "When the kundalini is awakened, the vital heat, the dynamic heat inside the ... body very often causes them great discomfort. Very often seekers ... find that the intense inner power is too difficult to bear." And there are admonitions for those who do not follow the proper prescription: "If one opens the heart centre first, there is practically no risk. But if one starts with the ... [lower] charka[s], it is very dangerous... If these centres are opened without the proper purification, the seeker will encounter great pain. It will be like playing with fire or a sharp knife." Our young subject is a devout meditator, but previously he had not tried the visualization of light and heat, and he concentrated on raising it from his lower torso. This may have been a mistake that resulted in the painful side effects he experienced for many days afterward and which are similar to those described by others attempting to harness kundalini (Sannella, 1987).

This study was conceived as an effort to measure anomalous bioenergy phenomenon associated with alternative healing practices. With the exception of the one subject described here our instruments have not been able to detect much more than small thermal effects from the local healers we have studied. Further studies are planned with more renowned healers and bioenergy practitioners.

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REG-ARRAY WITH NON-DETERMINISTIC TIMING SCHEME FOR PK STUDIES

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ABSTRACT

We are reporting on a recently begun exploratory study that involves a new REG device with methodological improvements in the timing of events. In this respect the device differs significantly from any commercially available generator. It was built from the bottom up using latest PLD electronics and is currently going through an intense testing phase. When the proof of concept has been firmly established a series of experiments is planned, involving human subjects whose psi performance will be measured under a given task. A newly developed methodology called the 'horse race paradigm' is tested. In particular we hope to be able to distinguish the predictive power of various theoretical models that have been proposed in the past to explain anomalous deviations from the expected normal statistics. If the device proves useful in the context of micro-PK research, it may point into an entirely new direction for psi and its possible applications. Furthermore the paradigm of coincidence may shed some light on the nature of information when meaningful action is observed.

INTRODUCTION

In this technical oriented note we describe an improved method for measuring the effect of psi with a newly constructed electronic Random Event Generator (REG). The project is in large parts centered around the design of a new hardware platform, which differs significantly from similar attempts in micro-PK research. As our study is still in an early stage of development, we only report briefly about preliminary results. At the current stage we have completed the proof of concept analysis. The actual experiments are planned to be conducted in the second half of this year.

Random Number Generators form a class of instruments with interesting features and properties as they are generally supposed to have a deep connection with fundamental reality. Although there are many ways to draw upon the true randomness inherent in physical systems (e.g. radioactive decay), electronic circuits with chaotic oscillators or noise sources are the most widespread in application. Commercially available devices are used for encryption (key generation), lottery, randomization and statistical simulation (Monte Carlo). Sometimes a distinction is made for so-called pseudo-random number generators, which are based on numerical algorithms rather than physical randomness. The strength of physical RNG devices lies precisely in the non-deterministic nature of the underlying physical process, be it chaotic as in the case of oscillators, or quantum in the case of electronic noise. General purpose generators chiefly require robustness in the production of random bits with an equal distribution. While these design goals can be made reliable and fast with standard components and procedures, the use of REGs in parapsychological experiments demands a much more careful design, not usually found among commercial devices: We wanted to avoid any external clock time that is normally inherent in the sampling process, and thereby achieve a maximum of freedom in the timing of events. These events are generated by triggers coming from possibly physiological sources, such as EEG measures or other environmental signals. In an extension to the above generic concept, we describe how a network of so-called channels can be combined with one or several random sources, allowing different paradigms or models to be tested in parallel. In this way we are able to compare competitive setups while keeping the experimental conditions essentially the same. In a similar fashion with user interaction, where a human participant

receives feedback on her psi performance, we can directly monitor the results in competing channels, thus allowing quantitative analysis while secondary parameters are under control.

METHODS

Random Sources

The main entropy source of our REG device is a semiconductor diode operating in reverse-biasing mode producing a fluctuating analog signal. (Electrons are tunneling over a band gap.) As the causal chain of amplification between the initial fluctuation and the macroscopic voltage signal is well enough defined to propagate the entropy from the source upward, this signal is generally a good source of randomness. Similar constructions (PEAR Labs. US patent 5,830,064 (1998)) are sampling the analog output at a fixed frequency rate or with an analog-to-digital converter (ADC) irrevocably imposing clock time on the signal. But we decided to avoid this sort of 'time granulation' entirely using a single-input element instead. According to our design goals the task of the ADC had to be divided up into a digitizing part and a sampling part. The conversion is achieved with Schmitt-trigger alone. After the conversion of the source signal we are left with a purely digital design. The raw random digital signal fluctuates between hi and lo states in continuous time, or, in other words, with no artificial time structure as to when the rising and falling edges of the signal occur. The advantage of this freedom becomes obvious when the raw signal is sampled at a second stage to obtain the output bit stream. Delay times are kept constant and very short (within 10's of nanoseconds), as compared to fixed frequency signals with uncontrollably changing delays in the order of magnitude of their sampling frequency. Together with the trigger mechanism we consider this technique as new in the application to (electronic) PK experiments, with possibly dramatic consequences for the psi performance, as no other process is allowed to interfere with the generation of events than the actual trigger.

Triggers

The trigger signal is similar to the function of a starting push button in other experiments. It triggers the sampling of the raw random signal obtained from the noise source, generating exactly one bit per trigger pulse. This is done effectively with a D-flipflop, which when triggered delivers the state of the input signal at its output, and remains in its last state otherwise. In the previous section it has been made explicit that sampling in our approach is almost instantaneous (within some typically small and constant delay). The triggered data bit is counted at irregular times, until a counting cycle of N bits is complete. Its serial transmission to data storage (computer), which by all means requires fixed frequency, is decoupled from the non-deterministic timing of the event generating process.

The trigger pulses are generated in a similar fashion as the raw random signal from the analog noise. Out of several envisaged trigger setups the use of an EEG signal from a human operator is the most promising. The brain activity remains largely within the subconscious, but the neuro-physiological signal still remains fully effective informing both the subject and the device. This will play the central role in the forthcoming experiments. Another setup makes use of a voltage controlled oscillator (VCO), which reads on the output sequence of the REG (talking to itself). From this setup we expect a zoom effect on the sampled raw bit sequence and enhanced sensitivity when the resonance condition is met.

Channels

It is part of the design consideration to be able to test several models in parallel on the same source signals, and/or on an array of sources. To this end we used electronic PLD (programmable logic device) components that allow us to re-program the hardware in such a way that micro-PK models can be realized according to DAT/IDS of May et al. (1995) and MPI of Lucadou (1995) for example, within the same setup. With channels defined as independent random bit streams with their own set of operations and parameters, it becomes possible to run separate REG experiments in parallel under different technical

constraints. We are thus able to compare their results on performance, discerning between the various theoretical assumptions. Using channels is not meant to separate them, but rather to test their respective power. In his influential paper H. Schmidt (1976) claimed that interchanging statistically equivalent random generators without the knowledge of the observer does not alter psi performance, provided the conditions are sensorially equivalent. With channels and an experimental design described below it should be possible to put this claim to a test with tightly controlled conditions.

Experimental Design

When the experiments are run with human subjects, who are asked to intentionally diverge the statistical outcome of the device, it had previously been necessary to conduct separate trials with possibly changing secondary parameters between runs. With channels as defined above we can run these experiments in parallel. Switching between channels during a run enables us to give feedback on each channel. In the 'Horse Race Paradigm' we developed a protocol that allows simultaneous testing, while keeping parameters effectively the same for each setup, giving feedback only on the best performing channel. The switching can be hidden to the participant and the experimenter, so that in principle a distinction between DAT and MPI models seems reasonable.

DISCUSSION

With a suitable trigger sequence it is possible and may actually occur that the raw random signal coincides with the triggers, indicating a resonance in the output bit stream. If the trigger produces significantly more coincidences of one kind with the raw random signal, it must be reflected in the statistics of the output bit stream. This is by no means a trivial control over the process - as the null hypothesis will not be affected - but a potentiality that may enhance psi sensitivity beyond past experiments. As REG events (sampled at trigger pulses) take place in the time domain, but actual psi phenomena may not, it shall be interesting to see how the proposed modifications can possibly improve the gain for a detection of psi effects. We hope to have made clear that by giving up clock time, the processing 'time granulation' due to technical design restrictions is effectively avoided. A participant can enter into a coherent mode, or resonance, in which data is sampled in 'eigen-time' (a characteristic patterning) rather than in cycles artificially imposed upon the user, which may have little in common with the system. If a patterning occurs in the random bit sequence with distinguishable histories, the term 'eigen-time' seems justified to describe the nature of interaction between the participant and the device, indicating an aspect of operational closure in which the user becomes meaningfully involved with the system.

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PRESTIMULUS RESPONSE IN THE PARASYMPATHETIC NERVOUS SYSTEM: AN ON-GOING RESEARCH PROJECT

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ABSTRACT

We are extending earlier work that demonstrated anomalous anticipatory skin conductance responses prior to acoustic startle stimuli by hypothesizing that the balance between the sympathetic and parasympathetic nervous system in governing heart rate inter-beat interval will prove to be a more sensitive measure of prestimulus response. A second hypothesis is that any observed effects are participant-centered as opposed to experimenter-centered—in direct contrast to our earlier skin conductance results. In this experiment we are monitoring electrocardiogram (ECG) continuously for about 35 minutes and compare inter-beat interval data prior to 24 randomly timed startle acoustic stimuli to the same data prior to silent controls to determine if there are statistically significant differential effects in the prestimulus region.

INTRODUCTION

Vassy conducted what he conceived of as a classical, but remote, conditioning experiment in the 1960's (Vassy, 1978). In that experiment, a sender, who was sensorially isolated from a receiver, was shown a randomly determined light flash as a signal to “transmit” a telepathic warning message (i.e., a putative conditioned stimulus) to the receiver that he/she was about to experience a mild electric shock (i.e., unconditioned stimulus) in their left hand, while their skin conductance was monitored continuously in their right hand. The stimuli timing was such that if there were a conditioned response to the telepathic conditioning stimulus, it would appear before the unconditioned stimulus and a few seconds before the well-known unconditioned response (Woodworth & Schlosberg, 1961). Using manual and graphical methods of analysis, Vassy analyzed 10 sender-receiver sessions and found that six pairs were individually significant at the $p < 0.01$ level. While impressive, these results were obtained with visual meter readings and not with state of the art equipment and techniques. The experiment was repeated in 2002 with 50 sender/receiver pairs and showed significant evidence ($p < 0.01$) in the first of three series of what appears to be a telepathically conditioned response. Subsequent series, however, with some changes of equipment and protocol did not produce significant effects (Vassy, 2005).

Radin and Bierman began investigating, and observing significant anticipatory differential orienting effects in skin conductance responses prior to emotional and neutral photographic stimuli (Bierman & Radin, 1997; Radin, 1997a, 1997b, 2004). Radin coined the term presentiment to describe this type of pre-orienting effect.

More recently, significant anticipatory effects were observed not only with skin conductance measures but also with electroencephalogram and electrocardiogram measures (McCraty, Atkinson, & Bradley, 2004a, 2004b).

May and Spottiswoode adopted a different approach to remedy a possible problem associated with idiosyncratic responses to cognitive stimuli. They replaced the emotional visual stimuli with acoustic startle stimuli and vastly simplified the analysis. Their dependent variable was the difference of proportions of prestimulus intervals that contained non-specific skin conductance responses prior to acoustic stimuli as compared to prior to silent controls. The null hypothesis was that these proportions should be equal. The first 105 participants of 125 reported later (Spottiswoode & May, 2003) were considered a pilot study. After trying a number of different approaches and parameters, they found mean proportions of 0.099 and 0.064 before acoustic stimuli and silent controls, respectively. Instead of an expected ratio of 1.0, they found a ratio of 1.53

($Z = 2.84$, effect size = 0.086 ± 0.030 , $p = 0.002$).¹

In a 100-participant formal follow-on study (May & Spottiswoode, In preparation), they reported proportions of 0.162 and 0.087 prior to acoustic and control stimuli, respectively, for a ratio of 1.87 ($Z = 5.08$, effect size = 0.162 ± 0.032 , $p = 1.79 \times 10^{-7}$).

To complement and extend the successful skin conductance results, we are examining changes in instantaneous heart rate prior to randomly-timed acoustic startle stimuli compared to changes before silent controls. There is a substantial literature on the balance between the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS) in the regulation of heart beat. It appears that heart rate responses to stimuli may be driven more, but not exclusively, by the PNS. Since skin conductance is governed by the SNS, this study will investigate the “other half” of the autonomic nervous system (i.e., the possible role of the PNS in prestimulus responses).

Anticipation of stimuli produces an orienting response as a deceleration in instantaneous heart rate. Yet, a post stimulus response might be orienting or defensive depending upon individual differences and stimulus intensity (Brownley, Hurwitz, & Schneiderman, 2000). In any event, it is clear that if there is a prestimulus anomalous anticipatory effect in the instantaneous heart rate, we can expect it to be an orienting response and be represented by a deceleration of the heart rate relative to controls. A substantial added benefit of looking for prestimulus response in heart rate is that by definition there are no “zombies—non-responders” as there are in the skin conductance studies.

METHODS

In this study, the inter-stimulus interval (ISI) is uniformly and randomly distributed uniformly between 15 and 45 seconds for a mean ISI = 30 seconds. The total number of stimuli for each participant is 48. The stimulus type and the stimulus timing will be determined electronically within a non-algorithmic, non-deterministic, commercially available random number generator². This device and its associated driver software passes the “Gold Standard” for random number generators—The Die Hard tests³. If this generator returns a binary one, an acoustic stimulus is presented; if it returns a binary zero, a silent marker of equal length as the acoustic stimulus is inserted into the data stream.

Electrodes and Electrode Placement: We are using three standard ECG electrode cables with disposable and pre-gelled electrodes. Because an ECG signal is so large, electrode placement is not critical but we use a standard ECG 3-lead placement for such measures.

Data File: The commercial software from Contact Precision Instruments saves two channels (i.e., ECG and stimuli markers) of data at 500 samples per second.

Analyses: The analysis uses a Matlab code and accesses the data file and creates epochs from -3.5 seconds to 10.0 seconds around each stimulus. The code computes the inter-beat intervals and translates the result into an instantaneous beats per minute epoch. In addition, the resulting histogram is down sampled to 50 samples per second for convenience.

Two independent averages will be created: [-3.5, 10] seconds relative to the stimulus onset around an acoustic stimulus and for the same region around a control marker. The dependent variable is the area between these two averages in the prestimulus (i.e., -3.5 to 0.0 s) region. We will use a non-parametric random permutation technique to determine the statistical significance of the ensemble averages across epochs and across participants to construct an overall Z-score and 1-tailed p-value; that is, we expect a prestimulus orienting effect and thus a heart rate deceleration. Figure 1 shows the results from a single participant using the method described above.

Figure 1 shows the results from a single participant using the method described above.

¹ The effect size is defined here as the proportion Z-score divided by the square root of the number of acoustic stimuli.

² Details of this generator may be found at <http://www.araneus.fi/products-alea-eng.html>.

³ See <http://stat.fsu.edu/~geo/diehard.html> for information and source code of these tests.

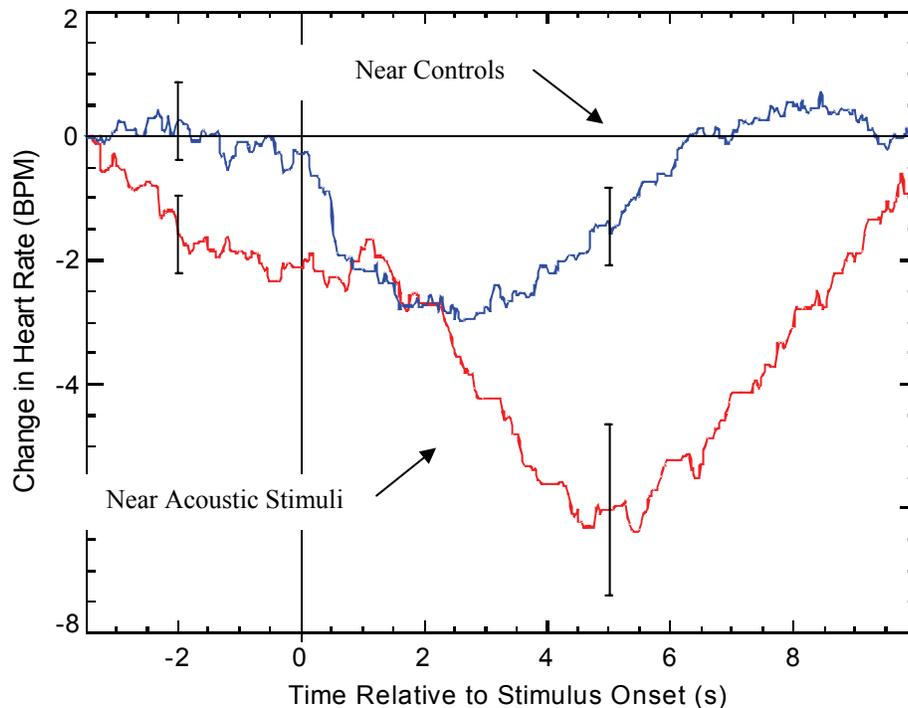


Figure 1. Ensemble Averages near Acoustic Stimuli and near Controls

Number of Participants: Except for the single participant shown above, there are no data available on which to base a proper power calculation. Therefore we propose to use the data from the first 25 participants to compute an effect size on which to base a power calculation. The total number of participants will be that required to reach 95% power in the study. We will place a 250-participant realistic cap on the total number of participants should the power calculation suggest more participants to reach a 95% power in the study. If this turns out to be the case, we will compute the expected power given 250 participants.

Data In-exclusion Criteria: We will exclude sessions where there is a technical failure of the hardware, electrodes work loose, dry up, or fall off. These conditions can be easily detected as discontinuous jumps in the raw ECG record. In addition, each participant has the option to quite the session in progress (i.e., a panic button) so these sessions will also not be included.⁴ All other data will be included.

CALL FOR PARTICIPANTS

At the meeting, we are seeking as many participants as possible. By the time of the convention, we will have set the maximum number of participants by the method described above. There is a sign-up sheet posted on the message board in blocks of 45 minutes. We are looking forward to expanding our participant base significantly at the meeting. The total results will be announced before we all adjourn.

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⁴ Note that no in-session heart-rate feedback is given to the participant so that the panic button cannot be used to differentially abort “bad” sessions.

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SELF-CONCEPT AND BODY INVESTMENT IN OUT-OF-BODY EXPERIENTS

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INTRODUCTION

Many people report having had an out-of-body experience (OBE) in which they felt as if their phenomenal self was separated in Cartesian space from their physical body. Irwin (2000) has argued that out-of-body experiences (OBEs) are in part the result of somatoform dissociation in which there can be a 'deficit symptom' such as numbness in a part of the body, or 'positive symptom' in which psychosomatic pain or tics are experienced. One rationale for studying somatoform dissociation in OBEs is that "at a phenomenological level the OBE appears to entail a dissociation between sensory processing of somatic (somaesthetic and kinaesthetic) events and the sense of self or identity" (Irwin, 2000, p.265). Irwin (2000) found scores obtained on the Somatoform Dissociation Questionnaire to be the only predictor variable (from a logistic regression analysis which included participants' data for dissociative experiences, absorption, gender and age) able to independently discriminate between people with and without a prior OBE, as well as the only independent variable which contributed significantly in predicting OBE frequency.

Irwin's (2000) theory for the occurrence of the OBE is that it is the result of the convergence of a number of dissociative factors. This includes high levels of 'absorption' (a psychological state in which the person is in a high state of engrossment in experience), as well as a simultaneous occurrence of dissociation from somatic input. This theory includes a reformulation of Irwin's earlier theory (1985) based upon his findings that people with prior OBEs exhibit a high capacity for psychological absorption, while people with high levels of psychological absorption were more susceptible to experimentally induced OBEs. These changes are posited to undermine the socially conditioned assumption that the body is the container of the self, and as a result to promote the feeling that the person's consciousness is no longer in the spatial confines of the body.

In previous work we built upon Irwin's (1985, 2000) work to argue that the daily bodily experiences of those who have experienced an OBE differ from those without this experience (Murray and Fox, 2004, Murray and Fox, 2005, Murray and Fox, in press). We interpreted Irwin's findings regarding Somatoform Dissociation as demonstrating a difference along one dimension of body image, and suggested affective and social dimensions of body image would also be implicated. In our work (Murray and Fox, 2004, Murray and Fox, in press) we found that respondents reporting a previous out-of-body experience (OBE) experienced higher levels of dissociation between their perceptual body and self, had a heightened self-awareness or self-consciousness, were more dissatisfied with their bodies, and had lower confidence in the presentation of their physical skills. However, the hypotheses that they would have a reduced belief in their physical ability, an objectified view of their bodies, and be more anxious at the prospect of having their physique evaluated by others were not supported (though see Murray and Fox, 2005).

The first of these findings was in agreement with Irwin's (2000) study, in which scores of somatoform dissociation (using the same scale) were found to independently discriminate between people with and without a prior OBE, as well as the only independent variable which contributed significantly in predicting OBE frequency. The heightened self-consciousness found in our OBE sample had been expected due to the theorized dissociation between the self and body that this sample was expected to have. In their development of the Self-consciousness Scale, Fenigstein et al. (1975) suggested people who scored high on this measure would be better able to take part in meditation. Whereas people without this psychological and phenomenological separation of self and body were expected to have a stronger sense of embodiment, the OBE sample was expected to have a weak sense of embodiment in part characterized

by an increased focus on the private or inner self. Indeed, when analyses were carried out on the sub-scales of the Self-Consciousness Scale, namely the Private Self-Consciousness, Public Self-Consciousness and Social Anxiety sub-scales, only the first of these remained statistically significant, that is the OBE group was higher in Private Self-Consciousness.

The higher levels of body dissatisfaction in the OBE sample had also been expected and were a feature which we theorized characterized a general dissociation between body and self by OBE experiencers. However, we had also expected that people with previous OBEs would score higher on social physique anxiety but, as stated earlier, there were no differences between the groups on this or on the Public Self-consciousness and Social Anxiety sub-scales on the Self-consciousness Scale, suggesting that as well as having no differences in social anxiety in relation to their physique, these groups did not differ in regards to public self-consciousness and social anxiety in general.

The present study is particularly interested in this latter finding. We have argued that a future avenue of research may be to examine OBE experiencers' (OBErs) and non-experiencers' (non-OBErs) levels of 'self-satisfaction', as well as looking at body dissatisfaction (Murray and Fox, in press). For instance, measures which examine peoples sense of personal worth apart from their body or social relationships exist which would help in this regard (e.g. Fitts, 1965). The inclusion of such a measure would allow the examination of an expected difference between body and self satisfaction which may contribute to dissociation between the body and the self. That is, although scoring higher than non-OBErs on a measure of body dissatisfaction, OBErs may maintain a positive self-concept. Two sub-scales of the Tennessee Self-Concept Scale (Fitts, 1965), namely the Moral-Ethical and the Personal Self-Concept sub-scales, seem well-suited to assess this. Another possibly related issue is that of body investment; namely OBErs may not have as much psychological investment in their bodies as non-OBErs, and this may account in part for why they do not demonstrate any social anxiety concerning their body dissatisfaction. Therefore, the present study hypothesises that:

1. OBErs will score significantly higher on measures of Moral-Ethical and Personal Self-concept
2. OBErs will score significantly lower on measures of body investment.

METHODS

Participants

A total of 59 participants (44 females, 15 males) completed a questionnaire regarding "self concept, body investment and the likelihood of experiencing an out-of-body experience". Of these 50 were Psychology undergraduates contacted through e-mail and poster advertisement at the University of Manchester. Questionnaires were also sent out to 28 people who had taken part in previous research on out-of-body experiences at the first author's prior academic institution, and 9 of these were returned. A total of 19 respondents reported a previous OBE (13 females, 6 males, with a mean age of 26.42, SD = 8.21). Forty participants did not report having a prior OBE (31 females, 9 males, mean age 21.52, SD = 6.58).

Materials

Respondents completed a questionnaire comprised of 2 validated scales and one item for assessing whether they had had a previous OBE. In the following we detail each of these questionnaire components in the order they were presented.

The Tennessee Self-Concept Scale (TS-CS): The TS-CS (Fitts, 1965) is a 100-item questionnaire instrument designed to measure self concept, and consists of five sub-scales: Physical Self (the person's view of their body, health, physical appearance, skills and sexuality); Moral-Ethical Self (e.g. feelings of being a 'good' or 'bad person'); Personal Self (the individual's sense of personal value or worth, feelings of adequacy, and evaluation of their personality apart from their body or relationships to others); Family

Self (the individual's feelings of adequacy, worth and value as a family member); and Social Self (the person's senses of adequacy and worth in relation to social interaction with other people in general). The items were presented as a 5-point interval scale ranging from *Completely false* (1) to *Completely true* (5). High scores indicate a more positive self-concept.

The Body Investment Scale (BIS): The BIS (Orbach and Mikulincer, 1998) consists of four subscales. The 'Feeling' subscale includes items related to body image feelings and attitudes (e.g., I am satisfied with my appearance). The 'Touch' subscale consists of items relating to comfort in touch (e.g., I enjoy physical contact with others). The 'Care' subscale is comprised of items about body care (e.g., Caring for my body will improve my well-being). The 'Protection' subscale includes items about body protection (e.g., It makes me feel good to do something dangerous). The items were presented as a 5-point interval scale ranging from *I do not agree at all* (1) to *Strongly agree* (5). A high score indicates a more positive feeling about the body, about touch, and more body care and protection.

Item for Assessing the Occurrence of Out-Of-Body Experiences: In order to ascertain whether participants had experienced an out-of-body experience, respondents were provided with the following *modified* statement from Palmer (1979) and asked to indicate 'yes' or 'no': "Have you ever had an out-of-body experience, that is, an experience in which you felt that 'you' were 'outside of' or 'away from' your physical body; one in which you felt that your consciousness, mind, or centre of awareness was at a different place than your physical body? (If in doubt, please answer 'no')." "

Procedure

Participants were provided with an information sheet and consent form prior to completing the questionnaire. If the participant was willing to continue they were then provided with the study questionnaire (these were mailed together to the 28 people who had taken part in previous research, and they were free to choose whether to respond or not). The first page of this asked for details regarding the participant's sex and gender. This was followed by the Body Investment Scale and the Tennessee Self-Concept Scale. The final section consisted of Palmer's (1979) modified item to assess whether the participant had had an out-of-body experience. Finally, participants were thanked for their participation.

RESULTS

Respondents' mean scores for each measure along with the results of ANOVA significance tests are shown in Table 1. Participants reporting a previous out-of-body experience scored higher on the 'Moral-Ethical Self' and the 'Personal Self' subscales of the Tennessee Self Concept Scale. There were no differences between OBErs and non-OBErs on the Body Investment Scale or any of its subscales.

Table 1: Mean Scores (with Standard Deviations) and ANOVA Significance Values on the Study Measures

<i>Measure</i>	<i>Non-OBE Group (n=40)</i>	<i>OBE Group (n=19)</i>	<i>Sig.</i>
<i>Physical self</i>	59.40 (6.67)	61.53 (8.04)	.289
<i>Moral-ethical self</i>	68.48 (6.57)	73.63 (6.71)	.007
<i>Personal self</i>	66.90 (7.71)	71.47 (7.76)	.038
<i>Family self</i>	67.15 (8.21)	67.32 (8.81)	.944
<i>Social self</i>	67.82 (6.15)	71.16 (7.36)	.073
Body Investment Scale Total	89.35 (11.53)	94.84 (8.55)	.070
<i>Protection</i>	22.02 (3.39)	22.63 (4.27)	.584
<i>Care</i>	23.62 (3.75)	25.37 (3.77)	.102
<i>Touch</i>	19.22 (2.75)	19.68 (2.52)	.541
<i>Feeling</i>	24.47 (5.86)	27.16 (4.25)	.080

DISCUSSION

As predicted, respondents reporting a previous OBE were found to report higher levels of positive self-concept for the ‘Moral-Ethical Self’ and ‘Personal-Self’ subscale of the Tennessee Self-Concept Scale. These findings lend support to our argument that although OBErs score higher on a measure of body dissatisfaction (Murray and Fox, 2004; Murray and Fox, 2005), they maintain a positive self-image. Whereas for people in general scoring high in body dissatisfaction is usually accompanied by increased feelings of social anxiety and social physique anxiety, this relationship does not appear to be the case for OBErs.

No differences were found between OBE and non-OBE participants on the Body Investment Scale. We had expected OBErs to score lower on body investment, based upon our theorizing that a lack of body investment would help explain why OBErs score higher than non-OBErs in body dissatisfaction but do not differ on measures of social anxiety. In fact, although there were no significant difference between OBE and non-OBE participants on the complete scale or its subscales, our OBE sample scored higher (rather than lower as we expected) on all of these scales.

We feel the above findings are an important development in understanding the relationship between the self and body as experienced by the OBEr, and in aiding an understanding of how and why the OBE occurs. However, the present study has several limitations which should be acknowledged. First, the participants in this study were drawn largely from an academic sample, comprised of students and staff at two UK universities. This selection method means that there is a need to be cautious when interpreting the findings for samples which differ in significant ways to that in the present study. Therefore, alongside further work to address body image in OBErs, similar future work needs to be carried out using a random sampling strategy (in contrast to our focus on a self-selecting academic population). In addition, the broad delineation in the present study between those who responded ‘yes’ or ‘no’ to the item for assessing

whether an OBE had occurred should be replaced in future research by a more fine-grained analysis. The various forms of self-concept presented in this paper should be examined alongside body image in relation to different forms or types of OBEs, such as spontaneous versus deliberate OBEs, and those occurring as part of the related phenomenon of near-death experiences. Such analysis may reveal certain forms of self-concept and body image to be more characteristic of particular types of OBE.

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TELEPRESENCE AND TELEPATHY IN IMMERSIVE VIRTUAL REALITY

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INTRODUCTION

Telepathy and ganzfeld studies

The ganzfeld has become something of a flagship method for the assessment of general ESP performance, such as telepathy, in modern parapsychology (Milton, 1999; Bem, 1993). However, the current climate in parapsychology is one of an interim phase of self-assessment and evaluation regarding the future of the ganzfeld. This is in the wake of the publication of a meta-analysis of the results of recent ganzfeld experiments that found a null overall effect size in terms of ESP performance (Milton and Wiseman, 1997; 1999). The Milton and Wiseman (1997; 1999) findings challenge the results of several previous, meta-analyses undertaken on ganzfeld studies which yielded significant outcomes (e.g., Bem and Honorton, 1994; Honorton, 1985), and they argue that there is not a replicable psi ganzfeld effect. Certain authors conclude that there is a real effect (e.g., Navarro and Lawrence, 2002; Storm and Ertel, 2002) while others continue to assert that there is no real effect (e.g., Milton and Wiseman, 2002). Parker (2003) suggests that the ganzfeld controversy is currently unresolved and any resolution is difficult due to the unacceptability of the phenomena to mainstream psychology. Palmer (2003), on the other hand, reviewed the literature and concluded that when one considers the entire ganzfeld database there is statistical evidence that the ganzfeld has provided good evidence for ESP.

Target materials as employed in the ganzfeld have often been purely visual; most researchers have employed pictures or video clips, while some researchers have employed objects and geographical locations as targets (Milton, 1991). It has been suggested that psi-conductive targets are more dynamic and multi-sensory and may have a psychological impact on the receiver (Delanoy, 1989). Target types have comprised both dynamic and static stimuli. Honorton et al. (1990) described dynamic targets as comprising films, documentaries and cartoons, while static targets are comprised of art-work, photographs and magazine advertisements.

Several authors have found a relationship between psi-hitting and aspects of the target. For example, Parker, et al. (1998) found a suggestive relationship between emotionality and effects of change in emotional tone of target material and psi-hitting. Attempts to address the nature of a good target have demonstrated that there is a preference for dynamic target clips compared to static ones (Honorton et al, 1990), and a trend toward a preference for complex (colourful) target clips over simple (black and white) targets (Watt, 1996).

It is of interest that real events and locations were successfully employed as target in the “remote viewing” experiments conducted by Targ and Puthoff and other researchers in the 1970’s (c.f. Tart, Puthoff and Targ, 2000). The dream ESP series at Maimonides (e.g., Ullman, Krippner, and Vaughan, 1973) were also very successful in terms of ESP outcomes (see Sherwood and Roe (2003) for a review of dream ESP studies conducted since that time). It is of note that here the sender often attempted to act out aspects of the pictorial target material.

The above literature suggests a need to develop and employ more complex and ‘realistic’ target material in future assessments of ESP in the laboratory. Given that the standard ganzfeld recipe seems to be more successful (Bem, et al, 2001), one possible experimental scenario (to be outlined here) might be a ganzfeld-style ESP test using a virtual environment to enhance the target experience for the sender or to

increase the reality of the target experience for the receiver, particularly if ESP is working by clairvoyance or precognition.

The present research project is built upon a particular problem which can be identified with telepathy research and one which until relatively recently was impossible to overcome, namely the dislocation of sender (S) and receiver (R). In extant research S and R are separated by physical space, be they separate rooms or buildings in a research institution, or in their own homes several miles apart. S is required to try and transmit some information (a name, a picture, an emotion, etc.) and R is required to identify the target from a set of possible targets. If over the experimental period the number of correct 'guesses' is above chance then this is interpreted as support for the possibility of telepathy, ESP, or psi.

Much experimental research in psychology involves methodological choices about experimental control and ecological validity. Concern with the former arises from the importance placed on the precise manipulation of independent variables, while the latter emerges from an emphasis for experiments to approximate as close as possible situations which are experienced in day-to-day life (Aronson and Carlsmith, 1969). Optimal experimental designs which seek to control extraneous variables usually involve laboratory environments and stimuli which are simple and 'unrealistic'. This is because as the complexity of the experimental environment and stimuli increase the experimenter finds it more difficult to conduct precise manipulations of independent variables and to control extraneous variables.

However, one reason for increasing ecological validity or mundane realism in experiments is to aid participants' full engagement within experimental situations and to increase their sensitivity to manipulations of independent variables, and as a consequence increase the degree to which such manipulations affect participants as intended. However, one drawback of increasing mundane realism in experimental psychology is that this is accompanied by a loss of experimental control.

The experimental procedure has been argued to interfere with such abilities as telepathy (Fox, 2005), particular as it presents an unnatural technique for demonstrating this ability; telepathy is often experienced in a spontaneous and less 'clinical' manner. However, within psychology in general, laboratory studies, with their associated sense of control, continue to hold much more respect and prestige. This is particularly important for studies of psi, which academia in general and psychology in particular regards as 'unacceptable' and for whom only the consistent replicability of an effect would sway their opinion.

One way in which the unnaturalness of the experimental laboratory may be alleviated would be if S and R could experience the same environment within which the target is located. If they were allowed to interact with the target set (such as a book, a vase, a chair, etc.) this might also facilitate both the acts of sending and receiving. This would also go some way to addressing some of the problems with telepathy research identified by researchers such as Braude (1982), who argued against a purely visual transfer model of telepathy. This move to more complex (on a number of levels) target material would also seem supported by the literature reviewed earlier (e.g. Honorton et al., 1990; Watt, 1996). Personal handling of target pool objects by both S and R might be expected to add other aspects to the telepathic communication process usually absent in the methodological design of research on this topic. As the relationship between S, R and the target pool objects becomes more interactive this might facilitate the transfer of emotions, meanings and experiences that better convey what these are. An object which can be handled might be expected to make accessible the personal meanings, purposes of use, and so on, of the object for S and R than might possibly be achieved via a static (or even moving) image or written name (which are more commonly used in telepathy research studies).

However, there are a number of difficulties with the above proposal. First, having both S and R in the same place and time as when the target is available introduces the possibility of sensory leakage (e.g. fingerprints being left on handled objects). R could enter the room after S has left, but this still allows the possibility of fraud (e.g. collusion between S and R by some forms of visible traces (marking an object for example) that can act as a form of communication), and has the added drawback of separating the involvement of S and R in the experimental trial by time. One alternative would be to have two identical sets of physical targets in separate locations: one for the sender and one for the receiver. However, the environments in which S and R are respectively situated would still be different, as well as reintroducing potential problems of randomisation, degradation of target materials over the time-period of a study, and

possible contamination through other psi-communicative processes when targets have been physically handled by psi-conductive others (participants as well as experimenters) in previous (or subsequent) trials.¹ These problems may seem insurmountable; however we believe recent technological advances provide a remedy for these problems. Such a technological advance is Immersive Virtual Reality.

Immersive virtual reality and its potential for telepathy research

Virtual reality (VR) denotes the use of three-dimensional computer graphics technology to generate artificial environments that afford real-time interaction and exploration. These are intended to give the user an impression of being present or immersed in a computer-generated world. While virtual environments can be presented on desktop computer displays, a sense of immersion is often promoted through the use of head mounted displays (HMDs). These can present stereo images and sound, combined with haptic and vestibular displays, to create a perceptually encompassing computer environment. A sense of 'presence' or telepresence (presence-at-a-distance), of feeling 'there' in a virtual environment is, perhaps, the ultimate aim of Immersive Virtual Reality (IVR) research. This calls for a dampening of awareness in 'reality' and a heightened 'acceptance' of the surrounding virtuality (Sheridan, 1992).

Parapsychologists have been at the forefront in embracing and incorporating into their research the developments and increased sophistication in technology (see Broughton (1993) for example). One example of this is the testing of general extrasensory perception (GESP) which began using Zenner cards, then photographs, video, and more recently computers and digital ganzfeld. Such technological developments have aided researchers in increasing mundane realism while minimising the negative impact to experimental control. IVR has been documented as providing participants with a compelling sense of personal, social, and environmental presence (Witmer and Singer, 1998). Blascovitch et al. (2002) outline how the use of IVR in experimental psychology circumvents a considerable amount of the problem involved in making choices about control versus mundane realism. The researcher gains optimal control over the experimental environment and actions that take place within it, while increasing the mundane realism of the experiment and the full engagement of the participant.

In support of the use of virtual environments for facilitating ESP performance, the environment around the target has often served as part of the target, even if this was not intended by the experimenter (Morris, 1978). This implies that the mind of the receiver may seek to put the target into the wider context; for example of the room in which the target material is being viewed. Real world ESP experiences often involve a sender and receiver and an event occurring in the real world for the sender that is experienced in some form by the receiver. These experiences are often meaningful or emotionally affective to the receiver and sender (c.f. Irwin, 1999). In modern ESP experiments free response methods have been adopted to increase the level of ecological validity with regard to every day psi experiences. Target materials still seem somewhat limited and may not often accurately mimic real world ESP. IVR, with its dynamic, three-dimensional representation of stimuli which can be simultaneously handled by both Sender (S) and Receiver (R) in identical virtual environments, would seem to offer an opportunity to address these issues.

In the following we outline a draft research protocol for a telepathy study using IVR. The objectives of the proposed work are (1) to create a virtual environment for the purpose of telepathy research, and (2) to conduct two telepathy experiments involving sufficient numbers of participants and trials to enable a reasonable test of the possibility of 'real' telepathy.

DRAFT RESEARCH PROTOCOL

In our first study we plan to conduct a study comprised of 200 trials and 100 participant pairs. Pairs of participants (obtained via advertising on the campus of Manchester University) previously known to each other (such as friends) will be invited to take part in a 1 hour study session, during which they will act first

¹ There is also a concern with replicability; that is with developing a study protocol with materials which can be replicated in entirety by others. Space constraints prevent us from developing this point further here.

as either a sender or receiver in a trial, swapping roles with their co-participant in the second part of the trial. A number of experimental measures will be completed (to be finalized) Hypothesis 1 states that participants acting as receiver will be able to identify the correct target significantly above that expected by chance (MCE = 25%). Hypotheses 2-n state that participants' 'success' (gaining a 'hit') in the telepathy trials will be significantly correlated to scores on each of the experimental measures.

The sender and receiver will be in separate rooms in the School of Psychological Sciences at the University of Manchester. Both S and R will experience the same virtual reality hardware (a V6 stereoscopic head-mounted display with built in headphones², an instrumented glove which allows the 'handling'³ of virtual objects) and software. The target materials for this study will consist of 8 sets of 4 items (virtual objects). The actual items are to be decided, but may include objects like a cup, a chair, a ball, and so on. In addition, each item will have associated a unique sound (for example picking up the ball might elicit a bouncing sound, the cup a pouring sound, and so on).

Participants will be briefed about the procedure prior to taking part. This briefing will involve explaining the virtual telepathy procedure to them and providing an information sheet that summarises this information. On the day of the trial the computers in the sender and receiver rooms will be started up and networked prior to their arrival. The participants will be greeted at the receiver's room and asked if they have any questions regarding the procedure. If they do these will be discussed, following which preparations for the trial will be made.

First participants will be asked to fill in a short questionnaire which will include details such as age and gender. Following this the procedure will be summarised once more with reference being made to the various pieces of equipment (e.g. the head-mounted display and instrumented glove). Following this, the 'tour' of equipment will be continued by visiting the sender's room and explaining that an experimenter will be present with both the sender and receiver throughout the trial. This 'tour' is to enable participants to have a good mental picture of their respective locations and the nature of the task at hand.

The first experimenter will remain with the sender, while the second experimenter will take the receiver back to their room. When the receiver is in place both participants will be fitted with the head-mounted display and instrumented glove. The trial will then begin, lasting for a 15 minute period. The sender's computer will choose a target pool at random, and a target from that pool at random. It is important to state how this randomisation will be implemented. There will be a total pool of 8 target sets each containing four objects. These target sets will be split into two pools of 4 target sets each (pool 1 and pool 2). The session consists of two trials. In the first the computer will choose a set from pool 1. After S and R swapping roles for the second trial, the second set will be selected from pool 2. This will prevent participants from being able to have the same target pool or target object in both the sender and receiver conditions. Each participant pair will have a code so that the computer is able to keep a record of which target pools have been used, and therefore prevent them from being used in future trials of the same pairs. Following an 'orientation' period in which S and R are instructed to look around their virtual environment, the trial will begin. A picture of the target object (e.g. 'chair') will be displayed in the visual field of the sender for several seconds, after which the sender will be required to interact exclusively with that object (e.g. looking at it, picking it up, etc., in the virtual environment) and attempting to 'send' this information to the receiver⁴. Meanwhile, the receiver's computer will present the virtual environment containing the four items in the target set, after which they will be required to interact with those objects and attempt to 'receive' any information regarding the target being sent by the sender.

Following the experimental period the receiver will be asked to make a choice regarding which of the items was actually being sent, along with a confidence rating in their choice (0-100%). They will also be asked to rate the likelihood (0-100%) that the target item was one of the other 3 items (they will do this for all four items). They will be asked to give a unique confidence rating for each item. They will also be

² This has a 640 x 480 (307,200 colour elements) pixel resolution per eye, and a 60° diagonal field-of-view.

³ The system currently in use employs a 5DT wireless dataglove. This will be used to enable participants to interact with virtual objects but does not provide tactile or haptic feedback. We intend to incorporate these forms of sensory feedback in future work.

⁴ Although the entire target pool will be available (in order to keep the environment of S and R the same), S will be instructed to ignore the non-target items.

asked to indicate any items that they feel certain could not have seen the target. Each participant will then complete a Presence questionnaire (Usoh, Catena, Arman and Slater, 2000), which assesses the degree to which participants feel immersed in the virtual environment. Following this the first experimenter will escort the sender to the receiver's room, collect the receiver and take them back to the sender's room, after which the experiment will begin once more in the same fashion, but with sender and receiver swapping roles. The number of correct guesses obtained will be compared to the mean chance expectation (MCE) of 25% correct guesses. Participants' virtual exploration and spoken mentation will be stored for presentation purposes and for later analysis. Following completion of the two trials participants will be given feedback as to their performance.

The 'success' of this first study relies in part on the assumption that, if telepathy is possible, then this ability is normally distributed in the population. Even if telepathy does exist, it might be restricted to certain people. Therefore, a second study is planned which would involve the most successful performers from experiment 1 (ideally pairs of participants who both scored a 'hit' or correct identification of the target object). If telepathy is more successfully demonstrated by particular persons this design might be expected to increase the likelihood of a significant effect being observed. The set-up of experiment 2 will be the same as for experiment 1, except for the following changes. The study will involve 60-90 trials and 20-30 participant pairs. Because the details of which target pools have been previously presented to participants will be stored by the computer, the random selection of the target pools in experiment two will take place from the six remaining target sets. Again, as each target pool is used it will be eliminated as a potential choice in subsequent trials. This means that participant pairs who take part in both experiments will use the entire target pool (either as a sender or a receiver).

Concluding comments

We argue that Immersive Virtual Reality is a technological advance which will enable advances in the study of general extrasensory perception. The proposed work here comes about as the synthesis of experience (CM) using IVR in a variety of experimental and applied settings with considerable experience in designing ganzfeld-related equipment and material and conducting ganzfeld studies (JF and CS). However, we anticipate some researchers would be dismissive of the approach outlined in this paper - assuming, for example, that we are using the latest technology for no other reason than its novelty value. In response we are reminded of the introduction of computerized ganzfeld experiments and its modification in the autoganzfeld procedure in parapsychology, which was just as novel at inception, and has arguably gone on to provide the strongest experimental evidence for psi.

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ASSESSING THE ROLES OF THE SENDER AND EXPERIMENTER IN DREAM ESP RESEARCH

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INTRODUCTION

J. B. Rhine's advice to those who hoped to study psi in the laboratory involved an analogy with making rabbit stew; "If you want to have rabbit stew, first catch the rabbit" (Stanford, 1993, p. 129). Thus if we are to study the action of psi in the laboratory we need to ensure that all aspects of the laboratory situation are arranged so as to facilitate (or at least not inhibit) its occurrence. Psi phenomena are not renowned for their experimental reliability (e.g., Beloff, 1983, Milton & Wiseman, 1999, see Shapin & Coly, 1985 for an extended discussion), and all too often we have been left to feed on scraps. It might be naïve to expect replication on demand given the effect sizes typically involved (cf. Utts, 1991), but nevertheless there must be a suspicion that psi is sensitive to some factors that have not been adequately explored or typically are not controlled for effectively. If different laboratories differ in these subtle respects it could lead superficially similar experiments to generate different outcomes, as some enjoy rabbit stew while others settle for vegetable broth. Efforts to identify potential confounding factors promise to inform us of the necessary conditions to capture psi more consistently as well as perhaps offering some insight into its *modus operandi*.

In looking to map these necessary conditions we have recently been especially concerned to consider the sender-receiver-experimenter dynamic as a factor (or collection of factors) that moderates psi performance in ganzfeld ESP trials (Roe, Sherwood & Holt, in press; Sherwood, Roe, Holt & Wilson, 2004). In the first of these studies (Roe et al., in press) we attempted to distinguish between the active contribution a sender might make and the positive effects of simply believing that a friend was viewing the target. The direct hit rate was exactly at chance (25%) and, although this was slightly better for sender trials than no sender trials (26.1% versus 23.5%) and better for trials on which a sender was expected than when the receiver believed there was no sender whether or not there was one (33.3% versus 18.2%), there were no significant differences between conditions based on z scores of target ratings (for sender status $p = .632$; for sender expectancy $p = .765$). In a subsequent study we explored whether participants' perceptions of the experimenter and of the experimenter's attempts to generate a warm social ambiance were predictive of performance (Sherwood et al., 2004). Here both participants and the experimenter completed an interaction questionnaire that asked about their mood, expectations of success and sense of rapport with the other participants. Responses on the interaction questionnaire suggested that participants were typically in a good mood, fairly relaxed, optimistic about the trial — though not confident of success — and had a positive perception of the experimenter, all of which were expected to be psi conducive features. Nevertheless, the direct hit rate for this study was nonsignificantly worse than chance (21.1%, $z = -.015$). However, although relationships between these variables and trial outcomes did not exhibit a clear pattern and tended to vary somewhat from experimenter to experimenter, they did offer some promising overall relationships, such as with receiver mood (negative-positive; $\rho = -.335$), sender optimism ($\rho = .432$) and confidence of success ($\rho = .398$) which we felt warranted further work.

We planned to follow up these findings by conducting a study that investigates the effects of both sender and experimenter upon the receiver's ability to identify a target video clip based on correspondences with their own mentation. However, using the ganzfeld as a method of eliciting psi has proved to be very labour intensive, and may have deterred some participants from volunteering because of the time commitment required and the coordination necessary when involving a sender and receiver. In

looking for an alternative method we were encouraged to reconsider dream ESP as a paradigm, since there is evidence of above chance scoring among post-Maimonides studies using experimental designs using a simplified method that does not require REM monitoring or access to sleep laboratories (e.g., Dalton, Steinkamp & Sherwood, 1999; see Sherwood & Roe, 2003, for a review).

In considering previous dream ESP research we can derive some encouragement for suggesting that sender and experimenter effects might be evident here too. For example, Ullman, Krippner and Vaughan (1973), in reflecting on the very successful Maimonides dream ESP series commented that “[T]he active involvement of the agent [sender] is an important ingredient for success.” (p. 212), and the majority of Maimonides studies investigated telepathy. However, Sherwood and Roe’s (2003) analysis suggested that overall the clairvoyance studies in this series had been more successful than those intended to study telepathy. A direct comparison within a single study should shed some light on this relationship.

There is also some suggestion in the database of post-Maimonides dream ESP studies that some groups of researchers have been markedly more successful than others (Sherwood & Roe, 2003, pp. 102-4). Given the diversity of approaches used in these studies it is difficult to attribute these differences to one particular cause, but it may be worthwhile to consider whether differences in experimenter-participant interaction have some effect.

STUDY AIMS

This study employs a repeated measures design to assess the role of the sender in dream ESP research, with each participant completing a sender and a no sender trial night. Participants remain blind as to which night is which but are asked to nominate on which night they felt there was a sender so as to allow us to consider expectancy effects. Potential psychological experimenter effects are assessed by correlating participant and experimenter ratings of their interaction against task performance. In all cases the dependent variable was pre-specified to be the z score of target clip ratings.

METHOD

Participants

Forty participants will be recruited from a variety of sources including the undergraduate population, appeals to the media and an established research database. Participants are to sleep in their own homes and come to the UCN Park campus for judging. Participants will not be selected on the basis of their gender or age.

Procedure

Once recruited for the experiment, participants are sent — either through the post or by email — a Personal Information Form (PIF), which records demographic information, as well as incorporating a belief in the paranormal questionnaire. Participants either return the PIF by post or email ahead of their trial or bring it in with them on the day of judging. Along with the PIF, participants are all sent a hard-copy of a dream diary (copies available on request). The dream diary contains instructions to clarify the procedure, information about confidentiality and the experimenter’s contact information, as well as space to record their dreams and their associations or comments on those dreams. They keep the dream diary for three nights; night one is a practice night and nights two and three are experimental nights.

On each night participants sleep at home, as normal. Upon waking, either during the night or in the morning, they complete the appropriate section of their dream diary, writing down as much detail about their dreams as possible. There is space in the diary for participants to write any associations they may identify between their waking lives and their dreams. Participants are also asked to indicate on which of the trials nights they believed there was a sender.

A sender (either SS or CR) is allocated to each participant. On the evening of Night 2 (the first experimental night) the sender flips a coin to determine whether Night 2 is a telepathy or a clairvoyance trial. If Night 2 is a telepathy trial then by default Night 3 is a clairvoyance trial, and vice versa. The experimenter is not informed about which trial night is which until after the participants' judgments have been made and recorded. On both experimental nights the sender initiates the experimental software (for a description of the program see Roe, Sherwood, Luke & Farrell, 2002) at his own home, where a randomly-selected target clip is played from 2:00am until 6:30am. On the telepathy trial only the sender watches the target clip between 6:00am and 6:30am and attempts to communicate its content to the participant by ESP. The sender has no contact with the experimenter concerning the experiment until the information is needed about the target sets used for the trial nights.

After keeping the dream diary for three nights the participant travels to the UCN campus to take part in the judging. Participants are requested to attend judging as early as possible on that day, but appointments are arranged at their convenience. On arrival they are met by LS, who takes them to our reception room where refreshments are available¹ and engages in an informal conversation incorporating a brief discussion of their experiences, followed by the participant reading out their dream diary content. This reading aloud is recorded to a digital voice recorder to ensure that a clear record of the dream content exists, should the participant's handwriting be difficult to transcribe.

After this discussion the participant is asked to complete a measure that asks them to rate the experimenter along a number of dimensions, such as warmth, spontaneity, and optimism (see Sherwood et al., 2004). LS also completes brief ratings of confidence about the trial and his assessment of the interaction with the participant. These forms are placed in a sealed envelope and sent to an independent researcher (IB). Participants are assured that we are only interested in their honest impressions and that at no time will the experimenter be aware of the ratings they have given.

The judging phase commences with the experimenter accessing an SMS text message from the sender that identifies the target sets for nights 2 and 3 (but not the identities of the target clips). The sender is shown via a laptop computer the four clips that make up the target set (consisting of the target clip and three decoys) for night 2, and these are rated and rank ordered for their degree of correspondence to the dream mentation for that night. This process is repeated for the target set and dream mentation for night 3. Once all judgements are recorded the experimenter contacts the sender via mobile phone to discover the identities of the two target clips. He then plays each target clip to the participant and they briefly discuss any correspondences between the target and their dream.

Once the series is completed IB will be provided with trial outcome data (but no personal information from participants) and will analyse the relationships between these and the interaction data sent to him. The other members of the team will only see the results of analyses conducted by IB and will not at any stage be provided with the raw data from the interaction measures.

PLANNED ANALYSES

Data collection is ongoing and will be completed in July. We expect to be able to report on the results of planned analyses at the convention.

The main planned analyses will consider the following hypotheses

- Participant performance, in terms of z score of target rating, will be significantly higher than chance expectation for each experimental night
- Participant performance in the actual sender condition will be significantly higher than that in the no sender condition
- Participant performance in trials for which the participant believed there was a sender will be significantly higher than for trials for which the participant believed there was not a sender

¹ On some trials, where access to the reception rooms has not been possible, judging has been conducted in the experimenter's own office.

Following Sherwood et al. (2004), we also plan to conduct exploratory analyses considering covariation of performance (using z-scores of target ratings) with experimenter interaction measures.

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EXCEPTIONAL EXPERIENCES, CRISIS, TRANSFORMATION OF REALITY

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INTRODUCTION

After conducting a number of mirror-gazing sessions in which apparitions were facilitated, I decided to try to have one myself. The result was a personal encounter that has totally changed my perspective on life. (...) one of the most life-changing events I have ever experienced. What happened altered my concept of reality almost totally

Moody (1993, p. 22 and 24).

The preceding quote gives a good example of statements of exceptional experiences (EE) that can be found in the scientific literature, in popular science, and in autobiographic narratives. Having an EE, like for example near death-experiences, apparitions of the dead or alien abduction, is said to have the force to change one's life. Besides changing the way one lives, these changes may also affect the perception of time, space, reality, and human existence. John E. Mack in his work on alien abduction (e.g., Mack, 1999) introduced the phrase "ontological shock". He uses the phrase to describe the experiences "that many abductees go through at the moment when they can no longer deny that what they have undergone is in some way real" (Mack, 1999, p. 52). Mack's definition of what an ontological shock is remains rather vague. However, in the context of citing reports of abductees, the phrase carries a negative connotation: Mack describes the moment in question as "fracture", "cutting through", or "breakdown of a world view" (Mack, 1999, p. 52). In contrast, Rhea A. White's conception of Exceptional Human Experiences (EHE) stresses the fact that EHEs "provide the insight and the dynamic to move humans from a lesser to a more consciously evolved state that expands human awareness of the nature of life" (White, 1997). In focussing on personal growth and development, the conception of EHE therefore carries a rather positive connotation.

From a different perspective, there have been studies using questionnaires to investigate the biographical relevance and the consequences of EEs. These studies point to changes that are described positively, e.g., reduced fear of death, stronger interest in religious and spiritual questions, or the feeling of reduced vulnerability. Changes to the negative, such as feelings of isolation and loneliness, depression, or fear, seem to be less frequent (cf., e.g., Gresser, 2004; Greyson & Stevenson, 1980; Kennedy & Kanthamani, 1995; Milton, 1992; Gieseke & van Quekelberghe, 1988; Raft & Andresen, 1986).

Thus we see that a number of different approaches to understanding the subjective and biographic import of EEs share the basic assumption that EEs have the power to trigger processes of transformation. Still, many questions regarding definition, relevant parameters, and course of events remain open. Milton (1992) makes that point with respect to "changes in perspective" as follows: "(...) it does seem to suggest that an experience that was frightening at the time can become a positive experience for some people. Unfortunately, there was not much indication of how these respondents had achieved this change in attitude; a face-to-face interview method is probably necessary to find out." (Milton, 1992, p. 319).

Therefore the central question of the current study is: *How do persons who had EEs integrate these experiences biographically, and how are possible resulting processes of transformation structured?* Here we rely upon qualitative studies investigating the communicative means and practices people use in their reports of EEs in order to constitute facticity, normality, and credibility, of their experience (e.g., Wooffitt, 1992). We also consider phenomenological, psychological, and ethnomethodological investigations into narrative aspects of exceptional experiences (e.g., Ellis, 2001; Kopolow, 1997; Powers, 1997; Remington, 2001). Using a qualitative and reconstructive approach based on interviews, we analyze how experiencers

construct their view of themselves, of reality, of human existence, and of possible processes of transformation resulting from EEs. The analysis is guided by the following key questions: What do the interviews reveal about forms of integration into the experiencers' received view of themselves and of the world? Is such a view constructed anew? Which meaning is assigned to the EEs for the question of what one has become, or what the personal future will bring? In which way are the EEs made responsible for biographical or social effects, and how are these effects used in the construction of the experiencers' narrative identity?

In order to answer these questions, a qualitative approach is the method of choice, since it is based on the principle of openness and is oriented towards subjectively relevant issues.

METHODS

Design

Our work is based on the paradigm of qualitative social research, following a reconstructive logic of investigation. This means that the aim of our research is to find issues and topics that are subjectively relevant to the interviewees. Accordingly, our analysis does not follow preassigned hypotheses or categories, but rather uses the empirical material to construct hypotheses and categories.

The guiding question is explored within this qualitative, reconstructive framework, using narrative autobiographical interviews with a relatively small number of experiencers (approx. 20).

Interviewees are recruited according to the principle of *theoretical sampling* (Glaser & Strauss, 1967): Data are collected and analyzed in parallel, allowing for mutual feed-back. Thus both the recruitment strategy and the set of key questions can be improved successively based on data and on theory.

Participants

Many experiencers report various kinds of EEs that are usually seen as aspects of a larger, meaningful context. As we are interested in general processes of coping with exceptional experiences, we aim at collecting a broad spectrum of EEs. Examples are near death-experiences, apparitions of the dead, alien abduction, memories of reincarnation, etc. These experiences may have occurred spontaneously or in the context of therapeutic techniques that induce altered states of consciousness.

Interviewees are recruited from a large number of contexts and backgrounds, such as: specific help-lines or scientists; therapists working with techniques inducing altered states of consciousness; relevant internet sites and discussion groups, or via advertisements on the internet and in print publications.

We have designed a flyer that is used to attract and inform prospective interviewees. In the flyer we address persons who have had exceptional experiences that they think have changed their life. Such persons are invited to contact us in case they are interested in an interview in which they can report their personal experiences.

Data collection

We collect data via face-to-face interviews that are conducted either at the institute (IGPP) or at the interviewees' homes.

The interviews are qualitative; more specifically, we use narrative autobiographic interviews (Schütze, 1987; Fischer-Rosenthal & Rosenthal, 1997). These interviews consist of two parts: first, by using an open biographic request, we ask for a spontaneous life story. This life story is not restricted to issues concerning EEs but may include all kinds of subjectively relevant themes and experiences. The second part consists of a semi-structured question-and-answer interview that centers on questions tangential to the spontaneous narrative and on questions laid down in a general interview guideline. The interviews are recorded digitally and are then transcribed before analysis.

The larger part of the planned interviews has already been recorded. Presently we are analysing the data according to the method explained in the next section.

ANALYSIS

General

Our analysis is based on the methodological approach towards reconstructing narrative identity that was developed by Lucius-Hoene & Deppermann (2002). That hermeneutic, interpretative approach integrates narrative theory, basic aspects of discursive psychology (e.g., Edwards & Potter, 1992), conversational analysis (e.g., Hutchby & Wooffitt, 1998; Ten Have, 1998), and positioning analysis (e.g., Bamberg 1997; Wortham, 2001).

The analysis (employing both the transcribed interviews and the digitally recorded interviews) focusses on subjective experiencing and the formation of meaningfulness. These processes are accessible through the way in which the interviewees use the current communicative setting during the interview to reflect on their memories and experiences, thereby both creating a view of themselves and of the world with narrative means and transporting that view in the narrative, making the view plausible for themselves and for the interviewer.

The first stage of analysis is transcription. The analysis proceeds further in three stages, based on transcripts and voice recordings: structural analysis of the entire interview, detailed analysis of selected passages, and comprehensive analysis across all cases.

Structural analysis

The broad structure is extracted by following linguistic cues and the content of the interview. We are interested in story lines and central topics of the interviewee and in how these are structured, which perspective is taken towards narrated persons and events, and how connections between events and further developments are drawn.

Detailed analysis

Based on the results of the structural analysis, short passages (key sequences) are selected for further detailed analysis. Usually, these include the beginning of the autobiographic narrative, reports of exceptional experiences, self-theoretical comments on these experiences or on EEs in general, but also sequences from different contexts that are marked as key sequences (either by linguistic features or through their content).

In accordance with general procedures and for reasons of intersubjective validity, detailed analysis is conducted by a group of 3-6 persons who have been trained in the methodology.

In detailed analysis, the short textual passages are analyzed sequentially with respect to the linguistic means through which the interviewee presents herself and her world view. This first step of analysis focuses on the following questions: What is said? How is it said? And why is it said right now in this specific way?

Guiding questions for further analysis and interpretation include the following: At which place in the autobiographic narrative does the interviewee refer to EEs? What is the thematic and structural context of these passages? What meaning does the interviewee assign implicitly to the EEs by presenting them in that specific way? Which conflicts or problems relevant to the constitution of identity does he or she address, and how does he or she resolve these conflicts? How does the interviewee construct an experience as normal and/or paranormal? Which strategies of normalization or de-normalization are employed? Does the interviewee report processes of transformation? If so, how are these processes structured?

Comprehensive analysis

In an intermediate step, the results of structural and detailed analysis are summed up in a “case structure” for each interview separately. The last step of analysis integrates the results of all single cases, leading to a comprehensive, abstract conceptualization.

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DIGITAL AND PHYSIOLOGICAL GANZFELD: LOOKING FOR A MORE OBJECTIVE MEASURE OF PSI

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ABSTRACT

This study is based on our manual Ganzfeld research in which qualitative data were evaluated showing two points to be improved: a) the quality analysis of mentation related to the targets and/or situations linked to the senders should be more objective. The Real Time Digital Ganzfeld System developed by Dr. Adrian Parker and Dr. Joakim Westerlund, University of Gothenburg, from Sweden provides tools for this; b) the conventional methodology used to evaluate psi, or, the choice of the correct targets among the false ones should be more objective since the qualitative data seem to show mistakes more suggestive of psi than of several hits. Based on these points, we will verify if the integration of the Digital Ganzfeld Technique (real time system to evaluate the cognitive aspects of psi) with DMILS - Direct Mental Interactions with Living Systems - Technique (measuring the electrodermal activities [EDA] as the psi physiological measurement) produces a more objective measure of psi. We will also evaluate other variables related to the targets, researchers, experimental environment, sender and receiver. The entire experiment will be controlled by computers, from the target randomization and showing to the experimental data record. The sender will watch a video and try to send it to the receiver, who will be located 63 meters away. Researchers and subjects will hear a 20-minute relaxation induction. The receiver's eyes will be covered with halved Ping-Pong balls, upon which two red lights will be projected, and they will listen to "white noise" during the experimental session. At the end of the sending/receiving period (23 min.) the receiver will watch four videos and try to identify which one was sent. The digital videos (targets) of 1'30" will be projected to the sender and the receiver on two 120 inch screens by two multimedia projectors. Two 5.1 surround sound systems will also be used to create a great involvement with the targets. During the experimental sessions the rooms of the researcher, sender and receiver will be filmed. During the sending/receiving period the reports of the receiver will be recorded. During the target evaluation (judging process) the receiver will be able to listen to his/her mentation while watching each target in a synchronized way. This will facilitate the receiver's perception of the moments during which he/she described the target in real time. We hope to obtain more synchronism between the mentation and the correct targets than between the mentation and the false ones. In addition, the sender and the receiver's EDA - Electrodermal Activity - will be measured hoping that a major correlation will be obtained during the quality hits sessions.

INTRODUCTION

This study is a continuity of our previous research (Silva, Pilato, Hiraoka, 2003), a manual-type Ganzfeld investigation with dynamic targets to test GESP. This and previous research indicated the value of qualitative results. In comparing the subjects' reports of the targets' identity, the assertiveness of the reports varied. We called "quality hits" those trials in which the contents of the reports strongly matched (directly or indirectly) the characteristics of the transmitted target. In those cases, we said that the subjects "hit" the targets. On the other hand we called a "quality miss" those cases when the subjects' reports were also accurate, but matched one or more of the non-transmitted targets. During their judging session, those subjects chose an incorrect target. Other researchers have found similar data. (Alexander, personal communication, 21 August 2002; Dalton, personal communication, 23 July 2002; Parker, Persson, 1999; Parker, Persson, Haler, 2000; Kreiman, 2001; Parker, 2004)

Based on the qualitative analyses, we verified that two aspects needed to be improved: a) the qualitative analyses of the reports linked to the targets or to the sender's or researcher's activities needed to be more objective. The Real Time Digital Ganzfeld system developed by Dr. Adrian Parker and Dr.

Joakim Westerlund of the University of Gothenburg, Sweden, supply tools for that analysis. b) the conventional methodology used to evaluate psi, or the choice of the correct target among the false ones, should have been more objective, since the qualitative data often showed misses more suggestive of psi than did several hits.

Therefore we are developing a methodology that registers "everything" in real time, i.e., the images, sounds, and physiological data. All of these aspects will allow for a strategic confrontation of the data that could be important to the understanding of the evidence for psi. The methodology needs to include the conventional methodology of misses and hits, but not limit itself to it. Knowing that similar works were already being developed in Liverpool Hope University College, University College Northampton, and the University of Gothenburg (Dalton, 2002 personal communication, 23 July 2002; Parker, 2001; Goulding, Westerlund, Parker, Wackermann, 2001; Smith, Fox, Williams, 2000; Smith; Savva, 2004; Roe, Holt, Simmonds, 2003) confirmed the choice of this research methodology and the research goals.

Based on this we intend to join the Digital Ganzfeld technique (a real time system to evaluate the cognitive aspects of psi) with the DMILS -Direct Mental Interactions with living Systems- technique, (using a measurement of the electrodermal activity as a physiological measure of psi). This combination will maybe provide a more objective measurement for psi. The software can be given to any interested researcher. It is an open source using free software working in Linux, allowing anybody to modify it according to his or her needs.

METHOD

The forthcoming study is composed of two phases. The first one contains a) reconstruction of the set of targets (digitals); b) Digital Ganzfeld pilots; c) Digital Ganzfeld testing (100 trials); d) subjects' pre-selection; e) Physiological Digital Ganzfeld pilots. During the second phase the Physiological Digital Ganzfeld technique with the best performing subjects of the first phase will be tested (30 trials).

During the Training and Familiarization condition the participants will have the opportunity to participate in a lab test and to have a training session with the Digital Ganzfeld technique. There will be a special emphasis in learning the judging process. Beside the complimentary snack they will be offered, the participant will be asked to fill out a questionnaire on the computer that is part of the Ganzfeld system.

In the Digital Ganzfeld condition the sender will repeatedly watch a video (in between watching the video he or she will watch different static images of the video itself) and try to send it to the receiver, who will be located 63 meters away. Researchers and subjects will hear a 20-minute relaxation induction. The receiver's eyes will be covered with halved Ping-Pong balls, upon which two red lights will be projected, and they will listen to "white noise" during the experimental session. At the end of the sending-receiving period (23 min.), the receiver will watch four videos and try to identify which one was sent. The digital videos (1'30" targets) will be projected to the sender and the receiver on 120-inch screens by multimedia projectors. 5.1 surround sound systems (5 speakers and 1 subwoofer) will also be used to create a greater involvement with the targets. During the experimental sessions the rooms of the researcher, sender, and receiver will be filmed. During the sending-receiving period the reports of the receiver will be recorded. During the target evaluation (judging process) the receiver will be able to listen to his/her mentation while watching each target in a synchronized way. This will facilitate the receiver's perception of the moments during which he/she will describe the target in real time. We expect to obtain more synchronization between the mentation and the correct targets than between the mentation and the false ones.

In the Physiological Ganzfeld condition the system registers the EDA data (BioDerm Skin Conductance Level Meter - model 2701) of the sender and receiver during the relaxation and sending/receiving periods and records them on a CD at the end of the trial. The electrodes are installed on the subjects, which gives them less mobility since abrupt movements could make the electrodes come off or produce sudden changes in the electrodermal activity.

Almost all the activities are controlled by the automatic system including: a)the automatic randomizing through an Orion-type RNG plugged into one of the computers; b)the digital targets; c)filling in the general information and psychological test forms; d)recording data from the experimental sessions:

researcher evaluation and subject judging, the receiver's and the researcher's voices, EDA data, interruptions or flaws and their explanations; e) managing the sessions activities which are: giving both the visual and the oral instructions to the subjects, showing the trial status to the researcher, inducing the relaxation session, playing the white noise, choosing the target set and the specific target to be used, executing the judging process with the real time methodology, target evaluation from both the sender and receiver, aborting the session in case of violation of the system or procedures; f) after session data recording of: the experiment evaluation from the subjects and researchers, the subjects' interviews, and g) recording of the CDs and DVDs of trial's data.

As for configuration versatility the system is set to allow: a) different types of targets (video, audio, static images and a combination of each); b) different types and time presentation of the targets including a possibility of subliminal exposition; c) variation of experimental conditions: with or without relaxation, the type of relaxation, with or without white noise and controlling the execution time; d) variation of phenomena studied: 1) cognitive (GESP, clairvoyance, precognition.); 2) physiological ("presentiment" or unconscious precognition, DMILS - classic and remote staring) and 3) mixed (GESP + DMILS).

In the real time judging system the receiver first watches 4 static targets on screen (randomized set), which is divided into 4 groups for this showing. Then they watch the 4 video clips, one after the other, randomly ordered. Third, they are shown them once more in a static way. Then, the subject chooses the targets and they are showed simultaneously with the recording of their mentation allowing the subject to observe possible matches between the video and their mentation regarding one or more of the targets. As they are watching, they can mark passages in which they find matches with their mentation by making small pauses while watching.

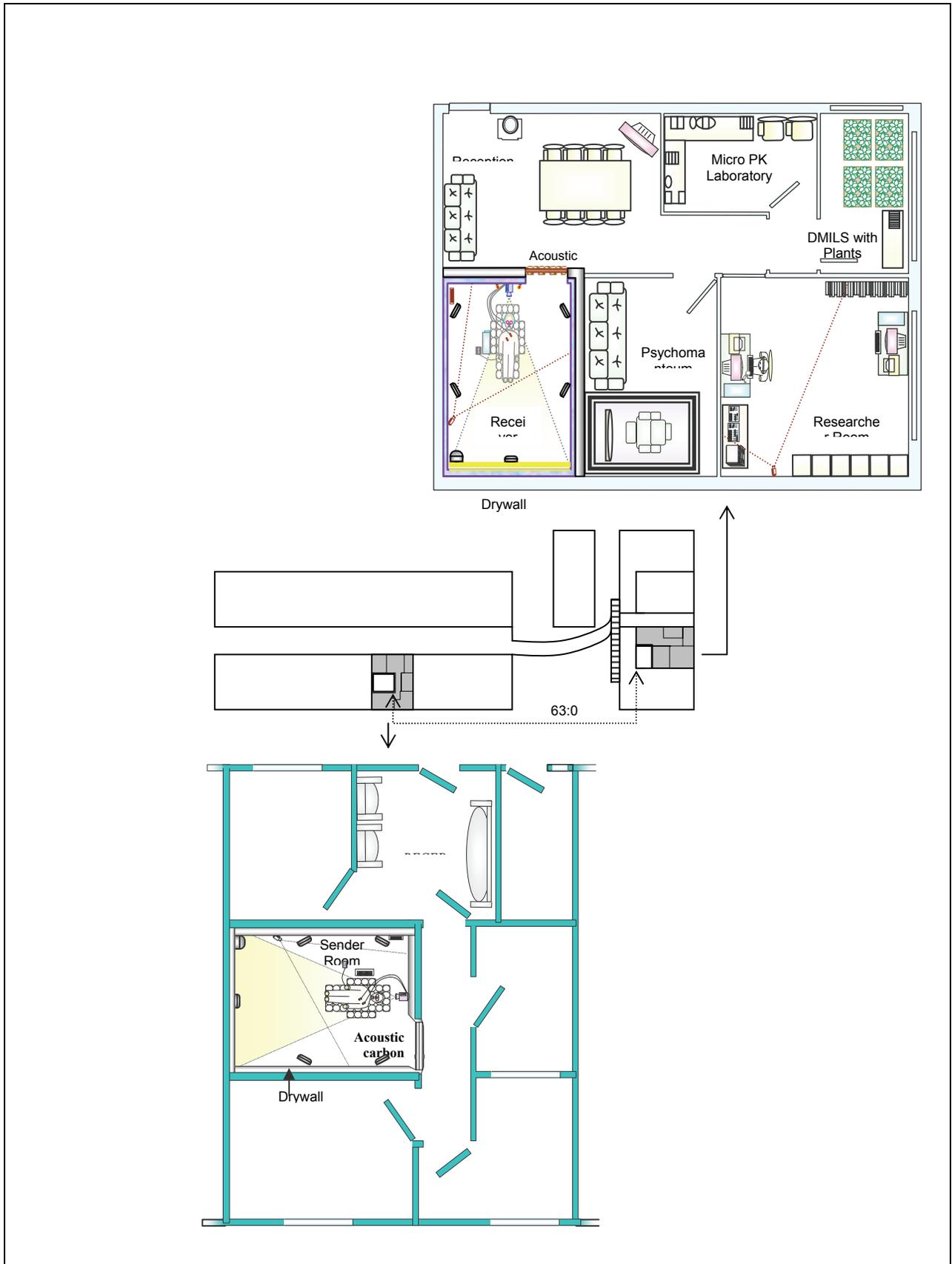
The subject will watch the 4 targets but he or she must choose and watch two of them completely or synchronized with all of his or her mentation report, one after the other (watching every part of the target, both the video and the intervals with static images taken from the video). They must also watch the two other targets partially or only with the beginning of his or her report by watching at least one viewing and one interval.

The system also informs the total of watching time for the chosen targets that are to be watched completely. This time is calculated by the sum of the viewings as well as the intervals marked by the researcher. In the sending/receiving phase, while listening to the receiver, the researcher marks the videos as well as the intervals during which the receiver speaks. Then, the system can identify the parts during which the receiver was speaking (marked by the researcher), matching them with the target viewings as well as the intervals (with the static images).

The receiver can stop the viewing at any moment but the judging is only finalized if at least 2 targets are watched thoroughly. In between evaluations the system prompts the subject to evaluate how they are. After having watched all the targets, the subject rates each target from 1 to 100. To do so they can look at the marks they made for each target. The value basically is a measure of match between the mentation and the target material.

In order to prevent fraud on the part of the subjects or the researchers, the experiment security system is composed of 4 mini-color cameras filming the activities of the 3 rooms where the experiment takes place (the sender, receiver, and researcher rooms). However, none of the images taken by these cameras are shown during the experiment. They are automatically converted into digital signals and recorded on the hard disk of one of the computers. The cameras are turned on when the system is turned on and are only turned off after the end of the judging and the final evaluations made by the subject. By registering everything from each session they inhibit any unscheduled initiatives and verify possible synchronicity between the sender or researcher and the mentation of the receiver. There are also sensors on the doors that automatically interrupt and abort the session if any door is opened.

There is a well-being security system, since the subjects remain alone in their rooms. It allows the researcher to hear the receiver at all times, and to allow the receiver to inform the researcher if they are not feeling well. The researcher only contacts the receiver in case of emergency in which case the experiment is automatically cancelled. During the sending/receiving and judging, the system prompts the receiver every 10 minutes to evaluate how they are and if they are willing to proceed.



The researcher does not have any contact with the sender. The senders' well being is evaluated by their continuous interaction (every 4 or 5 minutes) with the system as well as the prompt to evaluate how they are feeling and if they are willing to proceed. In case they choose not to proceed this is communicated to the researcher (through the monitoring of the experiment phases) who aborts the experiment. The subjects may also automatically abort the session by pushing a red button on their armchair or by opening a door.

Hypotheses and proposed analysis

For both phases one and two we predict that “the total number of hits will be significantly higher than chance expectation”, that is our **first hypothesis**. To evaluate it we'll use the Direct Hit Z Score based on binomial with $p=0,25$ and $q=0,75$. We also plan to evaluate the effect size by Rosenthal's π . (Rosenthal, 1989).

In our **second hypothesis** we also predict that the subjects classified as Extroverts, Feeling (in the main function) and Intuition (in the auxiliary function) in the QUATI (*Questionário de Avaliação Tipológica - Typological Evaluation Questionnaire*) will obtain higher ESP scores than those without such classification. The QUATI is a Brazilian inventory of Jungian orientation similar to the Myers Briggs Type Indicator. (Zacharias, 1999, 2000). The above classification on the QUATI predicted to produce higher ESP scores is equivalent to the ENF (Extrovert/Intuition/Feeling) type on the MBTI. Ganzfeld researchers have been exploring the correlation of MBTI poles with psi results and some recent studies have indicated the importance of the Feeling pole (Parker, Grams, 1997; Parker, Grams, Pettersson, 1998; Parker, 2000) and Intuition/Feeling pole. (Alexander, Broughton, 2001). In exploratory analyses this classification showed the highest hit rate in our first Ganzfeld study. To evaluate the scores' differences we are going to use the Z score of difference (RC dif). (Zingrone, in preparation).

Our **third hypothesis** is related to the evaluation of the targets by subjects: The average of the scores of preference and meaning (personal preference x personal meaning) will be significantly higher for the targets that are hits than for the targets that were misses. This evaluation will be collected at the end of the Judgment period and before the revelation of the correct target. To evaluate the difference of the scores' average a *t test* for different sizes of average will be used. (Levin, 1978)

Considering the EDA data (collected at the phase two) we have two **hypotheses**: During the sessions with "quality hits" (as described above) that show real time synchronization between the correct subjects' mentation and the characteristics of the target there will be a significant correlation between sender and receiver's EDA data. We also expect this correlation during the sessions in which the receiver describes in real time the sender's activities. This correlation will be evaluated by Pearson's *r* (Levin, 1978).

In terms of **exploratory analysis** of physiological data we will be considering: a) Real time changes in the receiver's physiological state that match to the sudden changes in the targets (some surprises or emotional changes included in the content of some targets affecting directly the receiver physiology); b) The same correlation indicated in item “a” but related to the moments immediately before the sudden changes in the targets (“presentiment” or unconscious precognition); c) Real time changes in the receiver's physiological state that match the sender's response to the target, especially for the sudden changes in the targets (the changes in the targets affecting the sender's physiology that affect the receiver's physiology); d) Physiological changes during judging that suggest an unconscious recognition of the target even when consciously the receiver selects another;

Relating to the real time judging system we also hope to obtain more synchronism between the mentation and the correct targets than between the mentation and the false ones.

Other variables related to the targets, i.e., characteristics of researchers, research environment, senders, and receivers, will also be evaluated.

We hope that this design will enable us to reach a deeper understanding of psi or a more objective measure of psi, because of the various perspectives taken to the psi task that allow the integration and contrast of the philological and cognitive data.

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EXPERIMENTER DIFFERENCES IN A REMOTE STARING STUDY¹

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INTRODUCTION

In their most recent joint study, neither Marilyn Schlitz (MS) nor Richard Wiseman (RW) obtained significant evidence for remote staring detection (Schlitz, Wiseman, Radin, & Watt, 2005). This did not replicate MS's previous positive results (Schlitz & LaBerge, 1994; Wiseman & Schlitz, 1997; Wiseman & Schlitz, 1999). Based on video ratings of the greeter-participant interaction, and participant and sender questionnaire measures from the Schlitz et al. (2005) study, this paper explores whether the lack of replication is because: 1. When MS greeted participants, she did not facilitate a "psi-conductive" state due to low rapport; or, 2. When MS was the starrer, she did not "send" psi, for example because she was distracted or had low expectations of a positive session outcome. We also present exploratory analyses describing the characteristics of MS and RW, and how these related to session outcome.

METHOD

Dependent measure

Participants' electrodermal activity (EDA, in the form of skin conductance level) was recorded while the "sender" (MS or RW) either viewed a live image of the participant on a TV monitor, or did not, according to a randomised counterbalanced schedule. The dependent measure consisted of a per-session z-score calculated from the difference in participants' mean skin conductance level for stare and no-stare periods².

Questionnaires

1. The three-item Pre-Session questionnaire recorded participants' beliefs about the existence of psi, their own psi experiences, and their estimate of whether they would demonstrate psi in the experiment (seven-point scale, scores could range from 1-7). 2. The five-item Post-Session questionnaire recorded participants' willingness to do further research, whether they felt they could detect remote staring (yes, unsure, no, scores could range from 3-1), rapport with the greeter, greeter's belief in remote staring, and whether participants felt the session would demonstrate a positive session outcome (i.e., a remote staring effect; seven-point scale, scores could range from 1-7). 3. The Sender questionnaire had one pre-sending item asking whether there would be a positive session outcome. Two post-sending items recorded the degree to which the sender felt focused during the sending period, and felt there would be a positive session outcome (percentage between 0 and 100).

¹ CW gratefully acknowledges the Perrott-Warrick Fund for providing financial support, and thanks the two independent raters for this study: Suzan Tokdemir and Ashlie-Jayne Allcock.

² See Schlitz et al. (2005) for full details of design, equipment, participants, procedure, and analysis in the main study.

Video recording and rating procedure

At the start of each session, RW or MS greeted the participant and the pair sat in a reception area. A video camera unobtrusively filmed as they chatted, the greeter described the procedure, and administered the consent form, Pre-Session questionnaire, and attached the electrodes for EDA recording.

Following study completion, CW transferred the session tapes to twelve different video tapes (containing 3-10 sessions³), and two independent raters viewed and coded each tape in a random order on six items (each with a seven-point scale, scores could range from 1-7): rapport; greeter expresses psi belief; greeter suggests a positive session outcome; greeter encourages participant to talk about psi experiences; physical proximity (excluding when applying electrodes); and eye contact. The raters also recorded session duration (from when the pair sat down until they stood up to go to the experimental chamber).

Raters were unaware of the identity of the two experimenters, and when this identity was revealed after coding, they reported no prior knowledge of either MS or RW.

Inter-rater reliability. There was sufficient inter-rater agreement on session duration ($r = .997$), rapport ($r_s = .652$), and greeter's suggesting positive session outcome ($r_s = .667$) to justify combining these ratings for further analysis (see table 1). Low agreement meant that further analyses could not be completed for the experimenter encouraging the participant to talk about psi experiences ($r_s = .343$); proximity ($r_s = .326$) eye contact ($r_s = .459$); or experimenter's psi belief ($r_s = .172$).

RESULTS AND DISCUSSION

Planned analyses

Three planned analyses⁴ investigated MS's non-significant results. Relevant post hoc analyses are also reported.

1. Video ratings (see Table 1). To test the hypothesis that MS may not have facilitated a psi-conductive state in participants, a planned analysis correlated session outcome with mean video rapport ratings from MS's greeter sessions. No relationship was found ($r_s = -.028$, $p = .865$, $N = 40$).

Post hoc: MS was judged to have higher rapport with participants than RW (Mann-Whitney $Z = 4.375$, $p < .001$, $df = 78$); and rapport was unrelated to session outcome ($r_s = -.159$, $p = .159$, $N = 80$). MS was also judged to make more suggestions of a positive session outcome than RW ($Z = 2.803$, $p = .005$, $N = 80$); these ratings were also unrelated to session outcome ($r_s = .029$, $p = .802$, $N = 80$). MS spent significantly longer with participants than RW ($t[78] = 2.242$, $p = .028$). This may have been because some of MS's participants were her colleagues and acquaintances so she engaged in more social conversation than RW, which may also account for MS having higher rapport ratings. Session duration was unrelated to session outcome ($r = .007$, $p = .952$, $N = 80$).

2. Sender questionnaire (see Table 2). To test the hypothesis that MS did not send psi when she was sender, for example because she was distracted or did not expect a positive session outcome, planned analyses correlated MS's post-sending questionnaire responses with session outcome. There was no correlation between session outcome and MS's degree of focus ($r_s = -.061$, $p = .688$, $N = 46$) or expectation of a positive session outcome ($r_s = -.126$, $p = .405$, $N = 46$).

Post hoc: MS's pre-sending expectation of a positive session outcome was also unrelated to actual session outcome ($r_s = .117$, $p = .439$, $N = 46$). Compared to RW, MS had considerably higher pre-sending expectations of demonstrating psi in the session (Mann-Whitney $Z = 5.19$, $p < .001$, $df = 86$), reported better focusing ($Z = 6.64$, $p < .001$, $df = 86$), and reported higher expectations of positive session outcome

³ There was no video recording for the first 13 sessions because CW was not present to arrange filming, and 7 other sessions did not record properly due to equipment malfunction, therefore the total number of sessions rated was 80. Throughout, r =Pearson correlation, r_s =Spearman correlation.

⁴ These were planned as one-tailed predictions, but because the results are in the direction opposite to that expected, two-tailed p-values are reported.

after sending compared to RW ($Z = 6.45, p < .001, df = 86$). However, there was no relationship between these

Table 1: mean, SD (in parentheses), and range [in square brackets] of video ratings for session duration, rapport, and degree to which greeter suggests session will have a positive outcome.

	<i>RW greeter</i>	<i>MS greeter</i>
Video coding item		
Session duration	7mins 15secs (184secs) [200secs-1061secs]	9mins 28secs (328secs) [204secs-1815secs]
Rapport	4.45 (0.89) [2.5-6.0]	5.4 (0.86) [3.0-7.0]
Greeter suggests positive session outcome	4.02 (0.11) [4.0-4.5]	4.26 (0.48) [4.0-5.5]

Table 2: descriptive statistics (mean, SD in parentheses, and range in square brackets) for the participant and sender questionnaire measures. Statistically significant differences are highlighted in bold.

	<i>RW greeter</i>	<i>MS greeter</i>	<i>RW sender</i>	<i>MS sender</i>
Participant's Pre-Session questionnaire				
Existence of psi	6.59 (0.98) [1-7]	6.68 (0.63) [4-7]	6.49 (1.06) [1-7]	6.78 (0.47) [5-7]
Participant's psi abilities – general	5.33 (1.38) [1-7]	5.36 (0.90) [4-7]	5.24 (1.18) [1-7]	5.45 (1.16) [1-7]
Participant's psi abilities – in experiment	4.76 (1.07) [2-7]	5.38 (0.97) [4-7]	5.08 (1.10) [2-7]	5.04 (1.04) [3-7]
Participant's Post-Session questionnaire				
Detect staring	2.30 (0.55) [1-3]	2.36 (0.66) [1-3]	2.33 (0.68) [1-3]	2.33 (0.52) [1-3]
Rapport with greeter	5.70 (1.30) [1-7]	5.52 (1.49) [2-7]	5.63 (1.20) [3-7]	5.61 (1.56) [1-7]
Greeter's belief in remote staring	5.36 (1.67) [1-7]	6.02 (1.30) [3-7]	5.49 (1.40) [1-7]	5.85 (1.65) [1-7]
Expectancy of positive session outcome	5.13 (1.23) [1-7]	5.64 (1.14) [2-7]	5.26 (1.20) [1-7]	5.48 (1.22) [2-7]
Sender questionnaire				
Pre-sending expected positive session outcome	39.52 (21.42) [0-80]	39.80 (21.87) [5-75]	26.79 (22.16) [0-80]	51.39 (12.27) [10-75]
Post-sending degree of focus	36.15 (20.50) [5-75]	35.50 (24.88) [5-80]	19.05 (14.07) [5-65]	51.20 (17.07) [5-80]
Post-sending expected positive session outcome	40.85 (21.11) [5-80]	34.68 (21.42) [5-70]	22.02 (17.18) [5-70]	52.67 (12.41) [10-80]

factors and session outcome (pre-sending expected positive session outcome, $r_s = -.035$, $p = .747$, $N = 88$; post-sending degree of focus, $r_s = -.104$, $p = .333$, $N = 88$; post-sending expected positive session outcome, $r_s = -.140$, $p = .193$, $N = 88$).

These planned and post hoc analyses suggest that MS's null results are not due to a lack of rapport with participants or to her being distracted or having low expectations as a sender.

Further exploratory analyses

Experimenter effects may be partly due to the experimenter's influence on the participant's belief in psi, and on the participant's confidence and expectations of success in the study. Exploratory analyses therefore investigated how these factors differed between the experimenters and how they related to session outcome. Changes in experimenter behaviour and session outcome over time were explored, and gender effects were investigated.

1. Participant's pre-session questionnaire. As table 2 shows, compared to when RW was greeter, MS's participants reported more pre-session confidence of demonstrating psi in the experiment (Mann-Whitney $Z = 2.867$, $p = .004$, $df = 96$); this confidence was unrelated to session outcome ($r_s = -.095$, $p = .350$, $N = 98$).

2. Participant's post-session questionnaire. Compared to when RW was greeter, table 2 shows that MS's participants indicated their greeter had slightly greater belief in remote staring ($Z = 1.957$, $p = .05$, $df = 87$), and reported more confidence that the session would demonstrate remote staring ($Z = 2.185$, $p = .029$, $df = 87$). These measures were unrelated to session outcome (greeter's belief, $r_s = -.088$, $p = .413$, $N = 89$; confidence that session would demonstrate remote staring, $r_s = .088$, $p = .414$, $N = 89$).

Perhaps what is most interesting about the post-session questionnaire data is that although RW is reputedly considerably more skeptical about the existence of psi than MS, this did not seem to be strongly conveyed to the participants. RW was reported as having only marginally lower belief in remote staring than MS, and both scored above point five on the seven-point scale.

3. Changes over time. This study took place in one- to two-week intensive blocks of testing over a two-year period. In order to explore whether study length may have affected the experimenters, session number was correlated with the video and sender questionnaire measures. As *greeter*, MS appeared unaffected by the passage of time (session duration $r = .062$, $p = .705$, $N = 40$; rapport $r_s = -.004$, $p = .978$, $N = 40$; suggestions of a positive session outcome $r_s = .055$, $p = .737$, $N = 40$). In contrast, RW's sessions got shorter over time ($r = -.431$, $p = .005$, $N = 40$), and his rapport scores declined ($r_s = -.424$, $p = .006$, $N = 40$). Neither greeter showed a change in session outcome over time (MS $r = -.014$, $p = .925$, $N = 49$; RW $r = .067$, $p = .643$, $N = 51$).

On the question of change in *sender's* performance over time, MS appeared to become slightly more optimistic for post-sending perceived session outcome ($r_s = .301$, $p = .042$, $N = 46$). RW showed strong declines, in pre-sending expected session outcome ($r_s = -.521$, $p < .001$, $N = 42$), in degree of focusing ($r_s = -.524$, $p < .001$, $N = 42$), and in post-sending expected session outcome ($r_s = -.553$, $p < .001$, $N = 42$). Neither sender showed a change in actual session outcome over time (MS $r = -.037$, $p = .801$, $N = 50$; RW $r = .086$, $p = .550$, $N = 50$).

4. Participant's gender. A significant interaction was found between the gender of the participant and the sender (ANCOVA: $F[1,91] = 9.55$, $p = .003$). This was due to MS having a distant calming effect on male but not female participants, whereas RW did not calm or arouse either male or female participants. Gender effects were not reported in the previous RW/MS joint studies, but these could now be investigated to see if any consistent trend emerges.

CONCLUSION

This study's findings suggest that the failure to replicate MS's previous positive remote staring results is due neither to MS having low rapport with participants, nor to her having a lack of focus or low expectations of positive session outcome as a sender. Exploratory analyses question some preconceptions about experimenter effects. We found relatively small differences between participants' ratings of the two experimenters, despite RW and MS having contrasting beliefs about psi, having contrasting findings in their remote staring studies, and in interview expressing contrasting attitudes to the experiment (Watt, Wiseman, & Schlitz, 2002). In this study, the experimenters did not seem to be strongly conveying their beliefs to participants. Furthermore, contrary to "lab lore" on how to generate a psi-conducive context (Delanoy, 1997), participants' psi belief, rapport with experimenter, experimenter's suggestions for psi success, and having positive expectations as a sender, were all unrelated to session outcome.

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PANEL: REMEMBERING ROBERT L. MORRIS

CHAIR: DEBORAH DELANOY

Jim Carpenter, Deborah Delanoy, Hoyt Edge, Edwin May, Caroline Watt

MEMORIES OF A FORTY YEAR FRIENDSHIP

Jim Carpenter
Rhine Research Center

I recount memories and impressions of Bob Morris over a period ranging from our meeting in 1964 at the Duke Parapsychology Laboratory to our work together on the board of directors of the Rhine Research Center which ended with Bob's death. Bob was so personally unassuming that it was sometimes a little hard in the moment to understand the enormity of his contributions, or the deeply intelligent planfulness with which he pursued them. In fact, his contributions were such that, if parapsychology has a future, it is primarily because of him.

Additionally an overview is offered of the main emphases of Morris' published work up to the time he accepted the Koestler Chair at Edinburgh in 1985. Major areas include psi in animals, testing of psi in special subjects, study of methods to heighten PK and ESP effects, a construction of psi in terms of human abilities, a growing appreciation for an honestly skeptical approach, and a conception of how to place the study of parapsychological questions in a useful social and intellectual context.

The panel will close with a slide-show montage that I put together of photographs of Bob over the years.

ADVANCING PARAPSYCHOLOGY IN THE UK, EUROPE AND BEYOND: BOB MORRIS'S CONTRIBUTIONS

Deborah L. Delanoy
University College Northampton

This presentation will summarise the contributions that Professor Robert L. Morris made to advancing the well-being of parapsychology, focusing on how his endeavors had a significant impact far beyond the 'boundaries' of the Koestler Chair of Parapsychology and the University of Edinburgh. The presentation will start with an overview of how he directly contributed to advancing the position of parapsychology in British universities over the last two decades. It will then briefly consider his role in furthering the presence of parapsychology in other European countries and beyond. His role in bringing research funding to the field will be discussed as will some of his most notable research contributions. Finally, some observations about his thoughts on the future of parapsychology will be presented.

BOB IN BALI

Hoyt Edge
Rollins College, Florida

My comments will begin with my recollection of first meeting Bob. I will then transition to our collaboration on the text, *Foundations of Parapsychology*, giving some background and a discussion of his contrition. Finally, Bob had a growing interest in cross-cultural aspects of parapsychology. Psychology had recently begun to focus in this area (calling it Cultural Psychology, or Psychological Anthropology, or Indigenous Psychologies), and Bob thought that parapsychology could contribute to this literature. His work in Bali with me on a project on Volition, as well as two projects on cognitive DMILS, was a focus of his work in this area. As always, Bob showed insight and creativity in the theoretical aspects of this work, but his personality made him an ideal contributor in Bali.

STARGATE: BOB'S CONTRIBUTION TO THE US GOVERNMENT'S SECRET PROGRAM

Edwin C. May
*Laboratories for Fundamental Research
Palo Alto, California*

Beginning in 1985, the US Government's formerly SECRET program not only included research and applications of ESP to US National problems, but also involved a number of specialized oversight committees; among these was the Scientific Oversight Committee. It had a four-fold mission: (1) review proposed protocols prior to any experiment, (2) drop in privilege, unannounced, to witness on-going activity, (3) critically review, in writing, the reports that were generated as the major output of the project; and (4) attend a two-day conference of the Committee to argue the critical points. Bob was the only parapsychologist in the group of 12 which included Nobel laureates, senior scientists from various government agencies, and academic department chairs. Bob was one of the most rigorous reviewers, but also among the kindest. We will report further on the function of the Scientific Oversight Committee and outline two examples where Bob argued against the research team (e.g., Decision Augmentation Theory) and for it (e.g., rank-order analysis of remote viewing).

THE KOESTLER CHAIR OF PARAPSYCHOLOGY: BOB MORRIS'S AIMS AND ACHIEVEMENTS

Caroline Watt
University of Edinburgh

This presentation will survey the aims and achievements of Professor Robert Morris during the nearly two decades that he spent as the Koestler Professor of Parapsychology at Edinburgh University. Three "Landmarks" will be used to allow Bob's own words to express his opinions about parapsychology at the Koestler Chair. First, the press statement that he gave on appointment in September 1985 will be examined. In this statement he outlines his aims for his Professorship, and the approach he would take to studying parapsychology. Secondly, in an article he wrote a decade later for a University of Edinburgh

magazine, he highlights some of the research findings emerging from the first ten years at the Chair. Thirdly, in 2001, he gave an interview to *New Scientist* magazine in which he made some of his strongest and frankest public statements yet about his beliefs and his involvement in parapsychology. In addition to Bob's own comments about the Koestler Chair, I will go on to present what in my view are some of his main achievements at Edinburgh, most notably: integrating parapsychological research into the ongoing academic activities of the University; and "seeding" new parapsychology research units elsewhere in the UK, which will be further discussed in another panel presentation.

PANEL: PARAPSYCHOLOGY AND TRANSPERSONAL PSYCHOLOGY

CHAIR: CHARLES TART

Charles Tart, Stanley Krippner, Arthur Hastings, Marilyn Schlitz, Rhea White

CONCEPTUAL AND EVIDENTIAL CONVERGENCE OF PARAPSYCHOLOGY AND TRANSPERSONAL PSYCHOLOGY

Arthur Hastings

Institute of Transpersonal Psychology

Transpersonal psychology takes an expanded view of personality, human development, and identity, and focuses on the nature and integration of experiences such as mystical and unitive awareness, personal transformation, higher values, alternative and expanded consciousness, non-ordinary perception, and transcendence.

Transpersonal psychology assumes that these aspects of human experience are natural and healthy (they need not be pathological nor fantasy), and they can be conceptualized and researched scientifically with both conventional methods and innovative approaches. Transpersonal psychology studies these topics with open minded inquiry and with critical thinking. The field uses both quantitative and qualitative methods of research. Five peer reviewed journals are oriented toward transpersonal articles and research, and publications also appear in mainstream journals.

Transpersonal psychology accepts subjective awareness as an integral part of human reality, and subjective ways of knowing as including valid epistemologies. Transpersonal psychology is teleological, and less reductionistic compared to most psychologies. In its world view, transpersonal psychology is more organic and context oriented than most schools of psychology. It provides a bridge between psychology and spiritual traditions.

Several advantages can emerge from a conceptual conversation between parapsychologists and transpersonal psychologists. The transpersonal side can provide insights from theories and data about states of consciousness (e.g. James, Wilber, LeShan, Tart, Baruss), and qualitative methods for researching subjective states, which can inform correlations and dynamics of psi. It can inform about processes developed in spiritual psychologies for altering and deploying attention.

Transpersonal psychology suggests a wider context for psi phenomena in spiritual traditions and in some indigenous cultures.

The parapsychological side contributes objective research methods which investigate transpersonal phenomena such as direct knowing, consciousness alterations, kriyas, subtle energy, OBEs, experiential transcendence of time, and trans-sensory modes of knowing. These methods can establish the empirical reality of phenomena found in transpersonal psychology. Clinically, the two fields together offer ways to address emotional and disturbed reactions from apparent psychic phenomena, and conditions in which there are mixtures of psychotic and psychic experience. Both can bring critical thinking to these areas of human experience which are reported in science and in the popular media.

Some concerns about transpersonal psychology that may come from parapsychologists are dangers of religious true belief about spiritual claims, the ambiguities of subjective data, and the open value orientation of transpersonal perspectives. The paradigm of transpersonal psychology may appear ungrounded. From the transpersonal side, the objective methods of parapsychologists may appear to open

doors of ability without values to guide them. Parapsychologists may be seen as avoiding paradigms that accept apparent spiritual experiences (however they may be interpreted) with some claim to reality. There are also differences of temperament; inevitably some individuals prefer to engage in the study of parapsychological phenomena per se, and others are drawn equally to transpersonal interests. Some professionals have found both fields to be of value in their work, and perhaps we can learn from their approaches. The goal is to enable conversation between the two fields where there can be mutual benefit.

LASZLO'S AKASHIC FIELD MODEL, PSI, AND TRANSPERSONAL PSYCHOLOGY

Stanley Krippner

Saybrook Graduate School and Research Center,

Laszlo's recent Akashic field model focuses our attention on the least likely aspect of the physical cosmos, the vacuum that surrounds, embraces, and permeates all that is. Rather than the empty void of Democritus, this is an incredibly dense super-fluid medium with properties much like those of liquid helium at absolute zero. Wavelets in this medium travel virtually instantaneously throughout space and time, creating cross-hatched holographic interference patterns that record the memory of the cosmos as information at both the micro and macro scales. Like Bohm's earlier model of a holographic universe, it posits information-rich fields that permeate the cosmos. Both models have profound implications, not only for understanding the nature of physical reality, but for conceptualizing human reality as well. The most obvious of the latter is the possibility that the feelings of nearness we share with others, as well as with non-human animals and transcendent agencies, may actually be more than productions of imagination. There is sufficient evidence from parapsychological studies on the validity of intimate human connections beyond the ordinary channels of communication. Transpersonal psychology is usually defined as the study of experiences in which one's sense of identity extends beyond the individual to encompass wider aspects of humankind, life, and cosmos. This framework is congruent with parapsychological data. Laszlo's Akashic field model could serve several purposes, among them serving as a bridge between transpersonal psychology and parapsychology, widening a dialog that is too often muted by suspicion and misunderstanding on both sides.

THE CONTRIBUTION OF PSI RESEARCH TO OUR UNDERSTANDING OF CONSCIOUSNESS AND HEALING

Marilyn Schlitz

Institute of Noetic Sciences

One of the important ways in which psi research has made a practical contribution is in the realm of healing research. Our methods and our approaches have been useful as evidence-based medicine has been directed toward studies of complementary and alternative medicines (CAM). The work involving direct mental intention between living systems (DMILS), for example, represents a significant body of data that lends support for some of the claims made by CAM practitioners (ie., consciousness is causal; intention may create changes in the physical world; intuition and direct knowing are useful in the diagnosis of others). But as we think of our application to healing, we may also consider the implications of our studies

for broader transpersonal issues. How do the data from psi research inform our understanding of the ontologies and epistemologies of different belief systems and world views? How do our findings help inform an expanded view of consciousness and the nature of human capacities? To what extent are we bridge-builders between science and the world's wisdom and spiritual traditions? How do our explorations address deep existential issues of identity, death, and the possible survival of consciousness? These are the questions I will consider in my contribution to the panel, drawing on my own research on healing from both the laboratory and clinical perspective as well as in the context of my studies of cross-cultural healing practices.

WHO IS THE EXPERIMENTER? TRANSPERSONAL ASPECTS OF PARAPSYCHOLOGICAL METHODOLOGY

Charles T. Tart

*Institute of Transpersonal Psychology
& University of California at Davis*

Parapsychology, literally “alongside psychology,” has adopted the methods of psychology and the physical sciences generally in almost all of its studies. These include assumptions, usually implicit and therefore hard to question, that experimental outcomes are determined by the will of the rational experimenter interacting with the nature of the psychological and physical world, and so if these factors are understood well enough, experimental outcomes will be predictable and controllable. While early psychical research was interested in “spirits,” as part of the survival problem, and partly accepted the idea that the intentions of such spirits might be an important determinant of experimental outcome, this idea is largely denied, indeed perhaps repressed, in modern parapsychological research, for perhaps largely political reasons about gaining acceptance in the general scientific community rather than for logical reasons. This paper will begin some exploration of questions about who the experimenter really is in our experiments and how openness to the idea of “spirit co-experimenters” could be put on a more objective footing, rather than a subjective one. Issues of experimenter bias and the centrality of the experimenter in psi experiments will be raised. Transpersonal psychology is relevant for it studies experiences of people who have “contact” with areas of life that ostensibly go beyond the material and personal, and so may provide a broader perspective for parapsychological work.

