JP JOURNAL OF PARAPSYCHOLOGY

Volume 74 / Number 2 Fall 2010

We would like to thank the following persons for their work in translating abstracts for this issue of the Journal: Eberhard Bauer (German), Renaud Evrard (French) and Carlos Alvarado (Spanish).

GUEST EDITORIAL

Technical Challenges for the Way Forward

By Edwin C. May

We are, in some sense, victims of our own success. There is now incontrovertible evidence for a statistically based information transfer anomaly we currently do not understand.[1] Not everyone in our field agrees with that statement 100%, but it does raise a very important technical definitional question. The reason that some informed skeptics do agree with it is that the statement does not say or even imply that anomalous cognition (AC)[2] exists. Rather, it simply claims that some people have the capacity to acquire information (i.e., cognition) in ways we do not currently understand (i.e., anomalously).

On the other hand, this statement does raise an important question: What is anomalous cognition? This is one of the technical challenges we face. At this point in our discipline, we do not have a positive definition of AC. Many of us have our own versions of a definition, and here is mine: *The acquisition, by mental means alone, of information that is blocked from the ordinary senses by shielding, distance, or time.*

Definitional Problems

Essentially the definition above means that we define anything that happens when it shouldn't according to the known senses, as AC—a negative definition to be sure. Moreover, this definition has profound implications that are rarely discussed, at least directly, for experiments. It is rather straightforward and relatively inexpensive to design a protocol that meets the requirement in the above definition.[3] For example, the target material can be separated from the participant by hundreds or even thousands of kilometers, and the intended, randomly selected target can be generated in a blind fashion after the participant has completed her/his response—a precognition approach. This protocol will satisfy most of us as foolproof.

However, even here there is a significant problem that is lurking behind the scenes. It takes on many forms and is especially problematic for field research. That is, if we cannot think of a "normal" way to account for an observation, then it must have happened by "paranormal" means.

[1] In this editorial I will focus my remarks mostly upon the ESP part of psi and leave the discussions about the PK side to others.

[2] I will use the term anomalous cognition instead of the more familiar terms of ESP, remote viewing, and so forth, because in my view this term is a description of the observable and avoids an implication of mechanism.

[3] I will leave out of this discussion the issues of all types of fraud.

Unfortunately, this is more a comment about the researcher than it is about the phenomenon. I will illustrate the point where I personally had fallen into this seductive trap.

During the SRI International years of the psi project, I went undercover to a metal-bending workshop in South Lake Tahoe, California, that was organized and directed by a then-recognized name in metal-bending circles as a qualified practitioner. In advance of the workshop, I had gone to a local cutlery store and purchased a number of high quality soup spoons with shafts that were shaped in such a way as to make them especially difficult to bend. I was unable to do so mechanically beyond a slight curve. I asked an SRI technician to place a small surreptitious mark on the underside end of the handles so that I could be assured the spoons had not been replaced. Off I went to Lake Tahoe and arrived for a Friday evening session.

Friday evening passed, so did all day Saturday and Sunday, and there was no attempt to bend anything either by the group (about 10 people) or by the instructor. Rather, in my opinion, we were subjected to food, sleep, and logic deprivation. Each day's activity had hardly any food breaks and the sessions went far into the early mornings of the next day. The "instruction" included every possible new age idea, alien abductions, UFOs, and even weirder things. Remember that I am from Northern California, so for me to say that something is weird, it is *really* weird. A possible serious point here, however, is that all this activity put the participants in some kind of altered state and significantly depressed any tendency for logical analyses. Perhaps this is a requirement to allow PK to happen.

By 3 a.m. Monday, we finally began to bend forks and spoons. We were all seated on the floor with a large pile of cutlery that was easily reachable. By then, we had all been sitting for hours, and I was in a very strange state indeed. To begin with, my body had fallen "asleep" from the waist down and my knees ached from sitting cross-legged far too long. I was bending cutlery with no problem; I could weave the tines of forks as if they were made of soft candy. Somehow I had the presence of mind to pick up one of my special SRI soup spoons and hand it to the instructor. I told him that I could not bend it, and he said "no problem" and proceeded to rapidly wind the bowl around the handle in a tight knot. As a result, I was completely convinced of the reality of PK metal bending and that I had witnessed it first hand and up close. After all, I could not bend our spoons by any normal means that I was aware of.

Upon returning to SRI, I was telling the story to my colleagues, one of whom, as it turns out, was a metallurgist. He asked me to get one of the spoons and promptly wound the bowl around the handle by "normal" means, not PK. He taught me the simple secret behind how to accomplish this, and for years after I could be the hit of any party.[4]

[4] There is a substantial literature on what is called "shock deformation of metal" online. Shock deformation is the key; you conduct a quick snap of the bowl of the spoon and con-

I am not accusing the instructor from the workshop of fraud; he too fell into the same trap as I. We could not think of a way in which the bending could happen by normal means and thus assumed it happened by PK.

This is just one example of the consequences of a negative definition. In the PK world the problem is especially acute. Professor Robert Morris often taught about things that look like psi but aren't. PK may be a solid exemplar of this idea.

I will illustrate this problem further with a single example from a piezoelectric strain gauge experiment we conducted at SRI during a two-year period. We arrived at this experiment after a careful examination of the macro-PK literature which convinced us that this would be the best candidate to research the properties of macro-PK. We spent over $500,000 over two years on just this single experiment. Most of the money was spent on engineering design and labor costs. At the end of this effort, we did not see anything that would qualify as a PK effect, but we did see a host of things that could and did mimic PK.[5] For example, if a sensitive device is within a meter of a wall containing cables for the electric mains, then effects upon the device can easily result from very short power surges in the mains that radiate energy to the PK target device. Similar problems arise with acoustic pressure waves, even from a simple knock on a closed door, or micro-movements from the building shaking slightly, and so on.

One way to control for these things is to monitor potential normal effects directly, but then engineering costs grow rapidly, as they did in our experiment. Another way which is often done is to have randomly interspersed effort and control periods where it is assumed that external non-PK effects will appear on both conditions and cancel out in the analysis. But if the PK results require inferential statistics to demonstrate an effect, the alternative hypothesis to the cherished PK one is the potential of a psi-mediated experimenter effect (a.k.a., Decision Augmentation Theory).

Thus, until we can begin to define what anomalous cognition *is* rather than to provide a long list of things that it *is not*, and deal with the trap that we tend to ascribe to psi things we shouldn't, then our discipline has a fundamental structural problem that is difficult to resolve—at least in the PK domain.

When/Where/How Long Does Psi Happen?

As I said above, we are victims of our own success. Except for instructional purposes, there simply is no reason to conduct exclusively evidentiary experiments again with the ganzfeld, remote viewing, or with

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tinue pushing with mild force. The experience is that the metal feels soft. However, if there is a moment's hesitation of this force, then the metal "freezes" and will bend no further.

[5] It is important to realize that one cannot prove the null hypothesis, so just because this study failed to show evidence of PK does not imply that PK does not exist.

random number generators. Rather we must conduct process-oriented studies to figure out how psi works.

But here is the major challenge for us all. At this time in our understanding of psi, we have no confidence in knowing when psi happens, where it happens (physiologically speaking), or how long psi lasts when it does happen. As experimentalists, these are fatal problems in moving forward. For example, consider a complex, carefully designed but hypothetical EEG experiment designed to look for central nervous systems correlates to psi. You ask the world's leading participant to take part in the study. But what you are asking of this poor participant is to accomplish something that is currently beyond his/her skill level; that is, be psychic on demand in the effort period but not in the controls.

A properly designed psychophysiological study with a psi component must include an independent (of the psychophysiology) channel to assure the experimenter that psi actually happened in the trial. However, the problem is, as our talented participants say, that all the psi that is going to happen may have happened outside the laboratory setting, for example, in the parking lot. If this is the case, then the EEG experiment is a complete waste of time and resources. This is an example of the "when" question in this section.

The "where" question is equally problematic. If we extend the "where" question beyond the participants' physiology to include the experimenter, the problem is obvious. On whom should we paste the electrodes? Our own research of skin conductance prestimulus response to startling acoustic stimuli illustrates the point. As we have noted in our publications and conference presentations, even our $Z = 5$ result is most likely experimenter psi and not because the participant is responding in advance to a future surprise—our cherished hypothesis. Clearly, in this case the skin conductance electrodes should have been on the experimenter and not on the participant!

Fortunately, there are a number of ways in such experiments to sort out the issue of experimenter or participant precognitive effects from causal interaction effects. Except for those studies in which the participant initiates each trial—problematic in its own right on this question—few if any of the studies have incorporated a DAT protocol that could in principle address this question quantitatively.

How long does psi last? On the surface this sounds almost like a silly question. But if we are searching for correlates with either the autonomic nervous system or the central nervous system itself, it is a critical question that can drive what techniques should be used in such studies: fMRI studies, for example. That technique is based upon tracking hydrodynamic blood flow—an inherently unresponsive technique. For example, suppose a psi "insight" happens as a trigger lasting only 1/4th of a second. If that were true, fMRI studies would become a huge waste of resources. If it turns out that psi is by its very nature a fleeting

phenomenon, then most psychophysiology studies are nearly doomed at the onset.

What all this actually says is that unless we have some idea of the properties of psi itself, we are relying on luck to crack open this problem. It would be similar to understanding the thermal signatures of an ill medical patient by using a gamma-ray camera—clearly the wrong instrument for the job. At this juncture of our discipline, it is difficult to know what are the proper instruments for the job.

Since we do not know what the proper instruments are, we should look with as many of them as possible; however, that is extremely inefficient, but more to the point, it becomes prohibitively expensive.

Publications

If we are in agreement that evidentiary experiments are no longer needed, then the next steps for research are by their very nature much more complex and challenging to an interdisciplinary field such as ours. As far as publications are concerned, I will use myself to illustrate two problems.

Over the life of the U.S. government's Star Gate program, we had the luxury of having sufficient resources to carry out rather complex process-oriented studies. I am now in a position to write up these studies for publication in the peer-reviewed journals of our discipline. There are two challenges I face in attempting to submit up to 50 or more papers. First of all, let me admit, I write in a stiff, exceptionally geeky style that is difficult to follow even by trained experts in an appropriate discipline. In jest—sort of—one of my dear colleagues wanted to know who was it that writes my papers for me, given that this colleague thinks of me as an outgoing, casual person who presents complex things in an amusing and understandable way to general-audience conference attendees. The good news for this problem is that it is, in principle, fixable with a change of my writing style.

The second challenge is more structural and is a general problem in interdisciplinary studies of any kind. It is difficult, if not impossible, for me as a physicist to understand a complex psychology model of personality and its relationship to psi. What is clear to the authors of such models, and perhaps to other psychologists as well, may be a total mystery to me. Some of the model diagrams look to me like Google directions gone haywire! The reverse is also true. My writing on entropy and its relationship to psi is absolutely clear to physicists but causes others' eyes to glaze over.

As our experiments become more sophisticated and complex, which they must do if we are to make progress in understanding the mechanisms of psi, so too will their descriptions. For Dick Bierman to adequately describe the results of his most clever fMRI studies, he should not be required to "popularize" them for our journals. The same idea holds for all of us conducting experiments on the edges of physics, neuroscience, and psychology.

One solution I am trying with our backlog of papers is to write an executive summary that contains popular descriptions of the experiments with take-home, nontechnical messages of the study outcomes and with an implication that the nontechnical reader can stop there. This is not easy, but perhaps it is one approach to a solution to the problem.

However, as our experiments become more technical and sophisticated, the tendency will be to attempt to publish the results in journals of the appropriate disciplines rather than in the psi journals. This, of course, is a double-edged blessing. On the one hand, it portends the end of our own journals, but on the other hand, it will move our discipline directly into the mainstream where, perhaps, it should reside anyway.

Grant Proposals

Many of the challenges I outlined above for publishing carry over to our grant proposals. For the last several years, including 2010, I have served on the technical review committee for the BIAL Foundation—a major source of funding for our field. Over the last few biannual funding cycles, the BIAL Foundation has been accepting proposals for non-psi, mostly psychophysiology research. In the 10 or so proposals I review each cycle, about half are from the parapsychology research community and the other half mostly from mainstream scientists. I am terribly saddened to report that for the most part the psi proposals are far below standard and in some cases are absolutely dreadful. Part of the problem is that many of our psi research colleagues are simply not trained nor have experience in writing competitive proposals. This, of course, can be fixed with proper instructions and guidelines.

However, a deeper problem is revealed by the near amateurish ways in which the more complex studies are described, and when compared to the proposals from the "professionals" from the mainstream, it is very difficult for me to recommend that the BIAL Foundation provide much, if any, of their limited resources to my colleagues. Please understand that I am not saying that our psi research experimenters are incompetent. Rather, this is an understandable problem that is embedded within interdisciplinary research, especially when our colleagues do not have much access to researchers across these disciplinary boundaries, or to institutional resources.

There is a related problem that arises in grant writing which is more connected to the topic of psi rather than to some infrastructural problem. Let's face it; our discipline is primarily a hobby, at least in one respect. While there are a number of dedicated people in our field who have been more or less active in psi research for most of their careers, I may be the only one I know who has had a 20-year, full-time job at industrial-scale wages with full medical and retirement benefits and who has had no responsibilities in this job other than to study psi. I am not bragging; rather, I am illustrating

the problem. What young and talented graduate student would choose a full-time career in psi, where there are no jobs, no respect, and very little financial compensation?

As a result, some, if not many, of us are simply not trained in the necessary techniques in many disciplines to make progress. Those researchers who are good for such work choose "real" careers in the mainstream. Again, I will use myself to illustrate the point further. Ed May as a physicist, maybe even a talented one, should not be conducting psychophysiological experiments, developing complex psychological models of personality, or speculating upon matters of deep philosophy. But I have done them all, competent or not! I do not doubt that some of my written musings cause the skin to crawl of the researchers in these disciplines. But my skin crawls when I read the writing of my psychology colleagues about the quantum mechanical nature of consciousness or psi when they do not know even the basics of Quantum 101.

Discussion

I confess that I am pessimistic for the future of our field. At the Winchester PA conference, I suggested that perhaps parapsychology should lie fallow for some period of time to allow younger, more flexible minds to grapple with the most fascinating problem of understanding psi. I wish I could conclude with some specific solutions to the challenges I have outlined here, but beyond some of the obvious ones of writing and such, I cannot offer any advice. The when/where/how-long questions above have me stumped. It seems to me that the researchers who will shine light on the answers to these questions will be mighty damn lucky indeed. But if we stand back and examine the history of science, we learn that luck has had a major role to play, so maybe that is not such a bad thing after all.

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CONNECTING, DIVERGING, AND RECONNECTING: PUTTING THE PSI BACK INTO PSYCHEDELIC RESEARCH[1]

By David Luke

It's great to have so many wonderful characters here from the field. Were the great scientist Isaac Newton in my place now, he would say how he only got to this position by standing on the shoulders of giants. I rather regret that Isaac Newton isn't standing where I am now, because he would probably do a better job of it. Nevertheless, I have taken a few tips from him and read through many of the past presidential addresses.

In looking through them, I found a recurring suggestion that parapsychology can both gain something and give something to other fields of enquiry through its research activities. The fields highlighted to benefit from this cross-fertilisation are usually physics, biology, and of course, psychology. I would like to echo that sentiment but broaden the usual list and assert, or in some cases reassert, our valued interaction with other fields and branches of investigation such as anthropology, archaeology, ethnobotany, phytochemistry, neurobiology, psychopharmacology, and the closer branch of transpersonal psychology, along with its emerging ecological neighbour, ecopsychology.

One particular point of contact where each of these disciplines or subdisciplines connects with our own is in the study of consciousness and its altered states, the specific point of interaction being with the "re-emerging" area of psychedelic research. The relationship to parapsychology of this relatively uncharted region of investigation has been my main academic interest for several years and, if you will allow me to take you on a short journey down the metaphoric rabbit hole, I hope to show you why, like Alice, I grow forever curiouser and curiouser!

Some ancient origins of psi, as we all know, can be traced back in the historical record in one direction to the oracles of Delphi in ancient Greece. The seeresses would sit atop a stool and prophesise in delirious altered states, which some researchers have identified as being caused by psychoactive hydrocarbon gases issuing forth from the rock fissure (see, e.g., Devereux, 2008). Another theory holds that the psychedelic plant henbane (*Hyoscyamus niger*) was used in the temple, because the plant was once called "pythonian" by the ancient Greeks in honour of Python: the visionary serpent goddess venerated by the seeresses at the temple, who were themselves called the pythia (e.g., see Rudgley, 1998). That was until

[1] This article is the Presidential Address delivered at the 53rd Annual Convention of the Parapsychological Association, Paris, France, July 22–25, 2010.

the mythical Apollo slew the goddess and took her place, after which time henbane became sacred to Apollo as well (Hocking, 1947).

Spreading the net wider and further back, into prehistory even, we find remnants of shamanism going back millennia in all directions across the globe—though we cannot be certain that the magical practices we find in the historical and anthropological record mimic what our ancestors in prehistory did, but they certainly give us clues. What we do know of shamanism in more recent times is that practitioners of this art utilise techniques for altering consciousness apparently conducive to psychic diagnosis, clairvoyance, telepathy, precognition and spirit communication, which they do in the name of their community. The techniques they have used for entering altered states can be crudely summarised by the five Ds (though there are more techniques); drumming, dancing, dreaming, diet and drugs. It is with the last category, drugs, that I found reports of the intentional use of psychedelic plants for psychic experiences across all five continents, from the use of nicotine-rich pituri (*Duboisia hopwoodii*) by indigenous Australians (Australian Institute of Parapsychological Research, 2004) and datura (*Datura metel*) on the Indian subcontinent (Schultes & Hofmann, 1992), to the use of iboga (*Tabernanthe iboga*) in central Africa (Pinchbeck, 2002), Syrian rue (*Peganum harmala*) in north Africa and the Middle East (Rudgley, 1998), mandrake (*Mandragora officinarum*) in Europe (Müller-Ebeling, Rätsch, & Storl, 2003), and fly-agaric (*Amanita muscaria*) mushrooms in Siberia (Rudgley, 1998) and north America (Wasson, 1979). And then we have a whole medicine cabinet full of different "psi-chedelic" plants and fungi in Mexico alone, ranging from the use of peyote cacti (*Lophophora Williamsii*) by the Huichol Indians in the North (Slotkin, 1956), to teonanacatl (mushrooms of the *Psilocybe* genus) and ska pastora (*Salvia divinorum*) use by the Mazatecs in the South (Soutar, 2001; Wasson, 1962)—not to mention South America, where we find an enormous pharmacopeia of natural plant psychedelics that have been used traditionally for psychic purposes for millennia.

For instance, we heard earlier today about the Amazonian jungle decoction, ayahuasca (often a mixture of *Banisteriopsis caapi* and *Psychotria viridis*), which is used by some healers to diagnose illness by apparently enabling them to see inside the body of their patients in a manner like X-ray vision (Dobkin de Rios & Rumrrill, 2008). About a hundred years ago, early researchers investigating the alkaloids contained within the brew even named one of them "telepathine" (harmine) because of the apparently psychic experiences people typically had when taking it (Beyer, 2009).

Strictly speaking, of course, it would be a misnomer to call these substances "drugs" in the medical sense because their context of use does not fit well within the medical model. Imagine going to your doctor to find out what is wrong with you and instead of her prescribing you drugs for some physically defined illness she suspects you have, the doctor pops open the pills and takes them herself. She then diagnoses your illness by staring

into your organs without the aid of any mechanical devices and treats you directly by singing and blowing tobacco smoke over your head. For this reason, these substances have a number of different names depending upon which intellectual territory they occupy for those describing them.

For law enforcement agencies they are narcotics or drugs; for medics and traditional scientists they are hallucinogens, because they cause hallucinations—a term which conveniently obscures more than it explains—for therapists and those researching the potential benefits of these substances, they use the more neutral "psychedelic," simply meaning "mind manifesting" (Osmond, 1961). Finally, for those viewing their use through a spiritual lens, they are entheogens, meaning "making the divine within" (Ruck, Bigwood, Staples, Wasson, & Ott, 1979), indicating their capacity to induce mystical experiences and their propensity to be used as a sacramental. This sort of use can be found in shamanism and in the few organised religious movements that exist that use such plants, such as the Native American Church in the U.S. and the Santo Daime in Brazil.

Perhaps more accurately, Stan Krippner (2006) terms them "potential entheogens," for they do not automatically induce mystical or spiritual experiences, but may do so for some people when both the "set" and the "setting" are conducive to it, that is, when the person is in the right frame of mind and the right environment, as in the recent experiments with psilocybin and mystical experience at Johns Hopkins University (Griffiths, Richards, McCann, & Jesse, 2006). The rogue psychologist Timothy Leary's one unequivocally useful contribution to the study of psychedelics was the notion that set, setting *and* substance are all important determinants in the psychological outcome of a psychedelic trip (Leary, Litwin, & Metzner, 1963). But the "substance" could in fact be any state-altering technique, be that LSD, holotropic breathwork or the ganzfeld. And these same principles of set, setting, and substance can fruitfully be applied to a shamanic journey or a psi experiment employing altered states.

In journeying into these shamanic realms of other cultures, it's clear that a richer connection needs to be forged between our discipline and that of anthropology. Having recently conducted a review of the overlap between these two fields, I found that there still remained a clear divide between what anthropologists and parapsychologists did in their research of the paranormal in other cultures (Luke, 2010a).

Anthropologists, particularly further back in the past, tended not to consider the ontological basis of the apparently paranormal and so cared little for proving or disproving the validity of the phenomena they observed or, more often, the phenomena they were informed about. Commonly, until the formation of the *Society for the Anthropology of Consciousness* and its earlier incarnations in the 1970s, virtually all anthropologists were of the public opinion that the paranormal was merely delusional "primitive" thinking and that the only approach to the subject matter was to treat it merely as an irrational belief.

Fortunately, following the revolution started by the anthropologist Joseph Long at the 1974 meeting of the *American Anthropological Association* (Long, 1977), researchers in this field began taking a more open-minded approach to the study of magic and the paranormal in other cultures, although very few actually conducted controlled experiments. Some did, of course, notably Patric Giesler (1985) and Michael Winkelman (1979, 1981) in the late 1970s and early 1980s. However, this trend did not advance far despite the continuing growth of the anthropology of consciousness and, even now, very few anthropologists who study paranormal phenomena and transpersonal experiences are concerned with their ontology.

On the flip side, in the past we had parapsychologists who conducted cross-cultural research into the paranormal, but who generally attempted to do field psi experiments without applying any of the cultural insights that are only gained from years of ethnographic study and immersion in a different culture. I could give numerous examples from the literature, such as Robin Taylor (2000) honestly admitting his naïve assumption that rural Fijians would understand the principle of random number generators—but my own experience probably suffices. In attempting to persuade an Ecuadorian shaman that I had just met to let me conduct a computerised precognition experiment during his ceremony, I was promptly given a clear but indirect answer. He pointed me in the four directions and blew a large conch shell up my backside. Miles from civilization, this was the realm of Nature and there was to be no use of computers during his ceremonies, and that was that.

Back in the 1980s, Patric Giesler was well aware of this methodological disparity between the two fields and proposed a multimethod approach and a system of study he called "psi-in-process" (Giesler, 1984). The multiple methods involved using ethnography to inform experimental design, and the psi-in-process approach utilised naturally occurring variables so that no artificial factors became forced across the cultural divide. In this manner, Giesler began with a specific experimental design but gradually adapted it in the process of learning more about the culture, so that in the end his experiment resembled, in as many ways as possible, a client's consultation with a shaman to obtain knowledge about the location of a lost object (Giesler, 1985).

Very little "anthropological parapsychology," as Giesler (1984) called it, is actually conducted these days, though I would say that one of the few such attempts to adopt the in-depth Gieslerian method is that of Serena Roney-Dougal and her immersive approach to studying yogis and Tibetan Buddhist meditators (e.g., Roney-Dougal & Solfvin, 2006). One of the drawbacks of Giesler's enthographically informed experimental approach, however, is that it requires a long-term commitment to live among the people you study, often for several years. Roney-Dougal's extensive work is commendable in this regard in that she spent the best part of 6 years living in ashrams and monasteries in India conducting her psi research.

The psi-in-process approach can be usefully applied to our own indigenous research too, by looking for everyday occurrences of psi. The biologist Rupert Sheldrake has in recent years picked up this baton and has run far with it, with research into ordinary, everyday psi experiences like the sense of being stared at, and telephone, text message, and even e-mail telepathy (e.g., Sheldrake & Smart, 2003).

But the kinds of everyday psi experiences we have here in Europe often look rather pale compared to those bright and colourful ones occurring under the influence of psychedelics. To give an example, one year Stan Krippner was good enough to bring along the anthropologist Jeremy Narby as the PA after-dinner speaker, and he was able to give us some insight into his astonishing research with ayahuasca. Narby (1998) had been impressed with the inordinate number of times that people under the influence of ayahausca said that they saw two intertwined snakes, and he took this as a symbolic interpretation of seeing one's DNA, which some people do indeed claim they can do on ayahuasca. Now, unlike most anthropologists, certainly those of the past, Narby didn't just leave his speculation there but instead arranged to take three molecular biologists out to the Amazon jungle for their first trip there, and indeed their first ayahuasca trip too.

All three of the biologists beheld visions while on the psychedelic brew which helped them gain some insight into their research and which, ultimately, changed their worldview. Narby (2000, p. 302) writes: "The American biologist, who normally worked on deciphering the human genome, said she saw a chromosome from the perspective of a protein flying above a long strand of DNA."

Such phenomena also has its counterparts outside of anthropology. The biochemist Kary Mullis, who received the Nobel Prize for inventing the polymerase chain reaction (PCR), thereby significantly advancing DNA research, said that taking LSD had been invaluable to his discovery because it helped him to visualise sitting on a DNA molecule and watching the polymerase go by (Mullis, 1998). It has also recently been announced, amid some controversy (for this story may well be apocryphal), that the geneticist Francis Crick was under the influence of LSD when he had a vision of the double helix structure of DNA in 1953 (Rees, 2004), a discovery for which he was also jointly awarded the Nobel Prize.

Clearly the psychedelic-DNA evidence isn't conclusive, however, as it teeters on the divide between the paranormal and the power of the imagination stimulated by psychedelics. But, had Narby rejected the accounts of the shamans out of hand, as his academic background had trained him to do, he would never have attempted to even verify the shamans' claims, let alone defend them. As an aside, one case that would tend to support these scientists' visionary experiences of DNA is August Kekulé's (1890) experience while in a hypnogogic reverie, where he envisioned the undiscovered ring shape of the benzene molecule as a snake eating its own tail.

However, we suspect that there were no drugs involved this time because this was back in 1862, when virtually the only psychedelic substance available to scientists was nitrous oxide, of which William James made good use, of course. James came up with a lot of good stuff, and is to be respected for his psychical research and philosophy, but his experiences with nitrous oxide were unable to produce more benzene rings, but rather just a few circular attempts at bringing back the ineffable meaning of life and the universe—Rumsfeldian phrases like: "There are no differences but differences of degree between different degrees of difference and no difference" (James, 1882, p. 202), which James considered to be his most coherent and articulate sentence under the influence.

James aside, Kekulé wasn't the only one to make chemical discoveries in a reverie. The Swiss chemist Albert Hofmann had what he called "a peculiar presentiment" (Hofmann, 1983) and broke his strict laboratory protocol by going back to investigate an apparently medically ineffective chemical he had created 5 years earlier. The chemical in question, LSD-25, was just one of a number of ergot-derived compounds that Hofmann had created over the years. In 1943 he resynthesised the dormant chemical because, as he later confessed, he had heard it calling to him (Luke, 2006b), and upon accidentally ingesting a small amount, Albert found himself having the first-ever LSD trip, during which he also had the first ever LSD-induced out-of-body experience. I can now report that many, many people have had one since.

Incidentally, in an article published in the conservative English broadsheet newspaper the *Daily Telegraph* (2007) a few years ago, Albert Hofmann was voted the greatest living genius according to a random e-mail survey of 4,000 British people. And I think the profound and ostensibly paranormal effects of LSD may be why.

It's here at the dawning of the field of psychedelic research that we find that strong (one could say "covalent") bonds were forming with the study of parapsychology (Luke, 2006a). By 1950, just before LSD had found its way out of the Swiss laboratories, a medical doctor at Guys Hospital in London by the name of John Smythies had begun experimenting with mescaline (Smythies, 1987). Although it had been isolated from peyote in 1886, mescaline had remained under the radar for all but a handful of psychonautically curious scientists. One of the few accounts of its use until that time was reported in the *La Revue Métapsychique* here in Paris by the French researcher Rouhier (1925), who gave an extract of peyote to six participants, one of whom developed fairly compelling ESP for a brief period and was able to identify several objects in a nearby room.

In 1950, Smythies—who was a member of the *Society for Psychical Research* even then, and he still is now I believe—similarly conducted a clairvoyance experiment with moderate success (Smythies, 1987). About this time Smythies also gave mescaline to his medical colleague at Guys, Humphry Osmond, and the pair of them headed off to Saskatchewan, where

they could conduct their research more easily. By 1952, after some further experimentation, Osmond and Smythies published an article in the *Hibbert Journal* proposing that a new theory of mind was needed that could account for the extraordinary experiences that occur with mescaline and what they considered to be the scientifically proven fact of ESP. The English novelist Aldous Huxley read the article and requested that Osmond should visit Huxley in the United States and give him mescaline (see Stevens, 1988). Osmond, wishing to oblige, did just that, and in the wake of Huxley's now classic mescaline experience, the two men corresponded concerning which name they should give such substances, and settled on Osmond's term "psychedelic" (Osmond, 1961).

Leading from this experience, Huxley also catalysed the popularisation of psychedelics with the publication of *The Doors of Perception* in 1954. As well as describing his experiences of mescaline in this book, he also put forward a very simple neurochemical model of ESP, by suggesting that the French philosopher Henri Bergson was right to propose that the brain's primary function was to filter out all the excess sensory data that we do not attend to, data which would otherwise overwhelm the conscious mind with a mass of information—information, normally irrelevant for the organism's survival. Huxley (1954) also added to Bergson's notion by suggesting that substances such as mescaline serve to override the brain's "reducing valve" that inhibits this sensory data, thereby allowing the human being access to the entire information available in the universe, perhaps even forwards and backwards in time. Huxley thereby suggested that psychedelics could induce psi, and to illustrate this point he took the title of his book from a quote by the English mystic, William Blake—as also quoted by Russell Targ earlier—"If the doors of perception were cleansed, everything would appear to man as it is, infinite."

In 1953, just prior to the publication of Huxley's book, another landmark event occurred in psychedelic history. The American banker and amateur mycologist Gordon Wasson was fresh from his first trip to Mexico, where he had discovered both an active mushroom cult and the identity of *Psilocybe mexicana* as the sacramental. The Mazatec shaman Don Aurelio held a mushroom ceremony for Wasson and told him two important facts about his son in the U.S. that neither of them could otherwise have known—both of which were true, although one of which was still yet to happen, and later did so, thereby apparently demonstrating Don Aurelio's accurate clairvoyance *and* precognition under the influence of psilocybin (Wasson & Wasson, 1957).

A few years later, in 1961, after giving a lecture to the *Society for Psychical Research* in London, Arthur Koestler was advised to go and see both Timothy Leary at Harvard and J. B. Rhine at Duke, which he promptly did (Black, 2001). A year earlier, Leary had begun experimenting with psilocybin, one of the active principles in the mushrooms discovered by Wasson in Mexico, and with his colleague Richard Alpert, now known as

Ram Dass, they flew down to Duke in Alpert's private plane with Koestler on board and a bottle full of psilocybin. No fruitful ESP research came out of that visit, partially due to uncontrollable laughter during an attempted experiment I am told (Steve Abrams, personal communication, 14th June, 2006). Nevertheless, while Koestler had a bad trip and "lived through WWIII," J. B. Rhine wrote to Leary that his own experience had been "extremely illuminating." Nevertheless, Leary's "tune in, turn on, and drop out" antics soon alienated Rhine and other scientists from getting involved in research with him, although the two men maintained an ongoing correspondence.

The sixties continued, and a number of experimental psi research programmes utilising psychedelics popped up over the years, such as those by Karl Osis (1961), Walter Pahnke (1971), Ernesto Servadio (Cavanna & Servadio, 1964), Robert Masters and Jean Housten (Masters & Housten, 1966). Nevertheless, with the growing tide of the hippie counter-culture, the widespread public use of psychedelics, and the ensuing moral panic, psychedelics were condemned as illegal in the late 1960s, and scientific research giving such substances to human participants virtually ground to a halt the world over. Up until the turn of the millennium, when Dick Bierman conducted some interesting ganzfeld studies with cannabis and psilocybin—in Amsterdam of course—there were only 17 separately published reports of "psi-chedelic" experiments (for a review see Luke, 2008).

Apart from Bierman's research, nearly all of them lacked adequate controls and so are far from conclusive, or even evidential. Furthermore, most of those studies seemingly used participants who were inexperienced with psychedelics, and who often succumbed to the mystical rapture of their first trip, or else frequently complained that the repeated ESP card-guessing tasks were too boring whilst tripping (Luke, 2008). Nevertheless, those experiments using "experienced" participants and utilising better methodology generally gave better results, and on the whole, the findings of that research were at least promising and warrant further study. This assertion tends to be supported too when we look in the literature of personal reports of such "pharma-psi."

Such stories abound in the anthropological, ethnobotanical, and historical literature, and are also extremely prevalent among the reports of the many psychedelic psychotherapists operating during the 1950s and 60s. A review of the surveys conducted likewise consistently shows a positive relationship between the report of having had a paranormal experience and the reported use of psychedelics, with heavier users having more experiences. Overall, between 18% and a staggering 83% of those reporting the use of cannabis and/or other psychedelics also reported ESP experiences occurring *whilst actually under the influence* (Luke, 2008).

Unfortunately, since prohibition in the 1960s, survey research has been all that most researchers could do to investigate this area. All human research effectively ended in 1966 when LSD was criminalized and psychedelics suddenly became a dirty word in scientific and medical

research. It's at this point that parapsychology and psychedelic research parted company. Parapsychologists, long suffering the brunt of zealous critics anyway, could no longer risk tarnishing their brush even more by associating with the likes of Leary. The few tenacious psychedelic researchers who kept the torch burning in their field also felt that what little credibility they had left could not be risked further by "dabbling in psi." Both fields of research suddenly became too fringe for each other.

This situation remained throughout much of the following decades and it wasn't until the mid-1990s when a few brave researchers, such as the medical doctor Rick Strassman (2001), risked their careers to ask unaskable questions. Defying taboo, they persisted with ethics committees and government agencies for several years until they were given permission to once again conduct psychedelic research projects with humans. Initially, this occurred in only in a few very isolated pockets, but by the turn of the millennium there were a good number of psychedelic research projects that were starting to hatch, almost entirely for therapeutic purposes.

This feat was helped in part by the formation of organisations like the Multidisciplinary Association for Psychedelic Studies (acronym MAPS), based in the U.S., and the Beckley Foundation, based in Oxford in the UK. These organisations fund-raised millions of euros from sympathetic supporters and philanthropists and channelled it into conducting respectable ethically approved institutional research with substances such as psilocybin, MDMA, cannabis, and, for the first time in nearly 40 years, a project initiated by the Beckley Foundation is investigating the beneficial effects of LSD on creativity and brain activity in humans.

The current situation with human psychedelic research is such that it is experiencing the start of a complete renaissance, and there are currently projects running at several prestigious universities, including Harvard and Johns Hopkins, with a constant expansion of new institutions starting research (for a review, see Winkelman & Roberts, 2007). There's even a team now at Yale and research planned at Oxford. This is something truly remarkable! Substances that were demonised and prohibited for study for several decades are beginning to make a return to academia, and not by changing their name or their effects. Although some researchers urged adopting the name entheogens to gain respectability, the vanguard of advocates continued to use the term psychedelic, even though for decades it had been loaded with negative baggage. I perceive there were two major factors that helped bring about this positive change. The first was the passage of time and the gradual demise of the media hysteria generated in the sixties. The second was the persistent affirmation by serious scientists, academics, and therapists who worked with these substances directly that they were essentially safe and had many potential benefits to be gained if they were used in the right way.

The salient point here is that "at the length, truth will out!" Many people who had come into contact with psychedelics recognised their

beneficial aspects and were willing to risk their careers or donate money to see them researched for therapeutic purposes despite the lack of government approval or industry funding and the active resistance to them within the establishment. Clearly there are parallels with our own field and a valuable lesson can be learned here for parapsychology: We need not hide our interests by changing the names of what we do, or what we research, but rather "speak truth to power," and continue to persevere in spite of the opposition, and maintain our integrity as seekers of the truth—whatever and wherever that may be.

News in just this week is the results of a study into the benefits of MDMA for the treatment of long term PTSD (Mithoefer, Wagner, Mithoefer, Jerome, & Doblin, 2010). The findings, published in the prestigious *Journal of Psychopharmacology*, are highly positive, but this is the first paper to report the beneficial effects of MDMA since it was criminalized exactly 25 years ago. In that time there have been nearly 3,500 studies that have been published about MDMA, but none of which investigated the beneficial effects. So clearly, we are beginning to see the start of a renaissance, I believe, in the study of psychedelics.

As an out-and-out optimist I also think we are starting to see the beginnings of a renaissance in parapsychology too (Luke, 2010b). Certainly in the UK we have more university departments researching and teaching the psychology and sociology of the paranormal than there have ever been, the number of which has pretty much doubled in the last 10 years so that at last count there were 16 separate universities at it (Carr, 2008)! Parapsychology, admittedly under the title of anomalistic psychology, has also made it onto the preuniversity psychology syllabus in the UK too, and is now available as an option to tens of thousands of 16–18 year-old psychology students each year. I can only see that these trends are set to continue, not just in the UK either, but here in France, in the U.S., and elsewhere across the globe.

So if we are seeing the start of a new, more open-minded approach to science, then is there room in that equation for a return to a parapsychological investigation of psychedelics, shamanism, and other anthropological subject matter? I think there is. When the Multidisciplinary Association for Psychedelic Studies (MAPS) was started up by Rick Doblin 24 years ago in response to the criminalisation of MDMA, the organisation put in its mission statement that it believed that psychedelics could be beneficial to psychic research, among other things, and MAPS, true to its objectives, has since funded such research (Luke, 2004, 2005). This brings affairs full circle from the time in the early 1960s when the Parapsychology Foundation was funding Leary's research at Harvard into the use of psilocybin to rehabilitate prisoners. I believe our banquet speaker tomorrow, Paul Devereux, has something equally gratifying to say concerning the Beckley Foundation. Such reciprocity is timely, and I think it indicates that now is the time once again to begin asking questions about the relationship between psychedelic

substances and parapsychological phenomena as part of a broader research approach encompassing neurobiology, psychopharmacology, phytochemistry, ethnobotany, anthropology, archaeology, and eco- and transpersonal psychology.

I think the time for this is right and that we can cautiously cast aside old fears. I was recently asked to speak at a conference on psychedelics, which will be the first in decades to be held in a university in the Netherlands. The main organiser, however, was concerned that I would discuss parapsychology because it was too taboo a topic to be bringing up at a conference where psychedelic researchers were on show in the academic sphere of this country for the first time. I wrote back pointing out the long history associating the two areas of research and indicating that any conference wishing to bring about an open and honest approach to scientific enquiry should not start by hiding anything, and so the organiser changed his mind.

So what can be learned from such an enterprise, investigating what I like to mischievously call "para-psychopharmacology"? Well, perhaps we can learn something about the neurochemistry underlying parapsychological processes (Luke & Friedman, 2010), given that people generally report far more of them under the influence of psychedelics than when not (Luke, 2008). Any discoveries forthcoming about the neurochemistry of these processes equally applies whether these experiences are shown to be genuine or not, because we can learn something about the neurobiology of paranormal *experiences* at the very least. Nevertheless, the state of neurochemistry is a complex affair, and a sophisticated approach is needed to unravel the intricacies of human-chemical interaction. This includes an investigation of situation/person variables, such as in Nicola Holt and Chris Roe's recent work looking into person lability and task lability (e.g., Holt & Roe, 2006).

There are also a wealth of different psychedelic substances, which have been increasing in number since 1900 by a factor of 10 every 50 years according to expert psychedelic chemist Alexander Shulgin (2004), meaning that there will likely be a jump from 200 to 2,000 known psychedelic substances between the years 2000 and 2050. It must also be considered that there are a wealth of different exceptional experiences that people may have whilst on these substances; in this regard there is a lot to be learned from the lineage of shamans who have been using these substances for millennia and who are well practiced in navigating the altered states they produce. From direct research and from the literature, it seems that most every type of transpersonal experience can be had under the influence of psychedelics (e.g., Grof, 2001; Luke & Kittenis, 2005) and these may teach us something about the phenomena that are ordinarily studied in psychical research. For instance, the apparent contact with discarnate entities, particularly under the influence of one of the body's naturally occurring psychedelics, DMT, can inform studies into mediumship, apparitions, sleep paralysis, and alien abduction experiences (Luke, in press). However, the multitude of these

complex experiences means that a taxonomic approach is also required so that we can ultimately determine which substances, under which environmental conditions and for which people, best activate a particular sort of experience; that is, what experiences arise out of a combination of set, setting, and substance?

That is a lot of factors and a lot of questions to ask, so you see that this is a completely nascent field of study, and we are wise to admit that currently we know virtually nothing. One insight we might begin with is that Theophile de Gautier, the founder of the 19th century Le Club des Hachichins in Paris, not far from here, once had an experience outside of time in which 15 minutes passed by in what felt like just a couple of hundred years (Devereux, 2008). Perhaps an experience like that can begin to help us unravel some of the paradoxes of time that occur with precognition. This seems as good a starting point as any, and so, I thank you for your patience during the eons of this talk and hope that this short journey down the rabbit hole did not feel like a few centuries.

"Down, down, down," said Alice. "Would the fall *never* come to an end!"

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Acknowledgment

With thanks to Andreas Sommer for feedback on an earlier draft of this manuscript.

ABSTRACTS OF FULL PAPERS FROM THE PARAPSYCHOLOGICAL ASSOCIATION 53RD ANNUAL CONVENTION, PARIS, FRANCE JULY 22–25, 2010

ANOMALOUS SWITCHING OF THE BI-STABLE PERCEPT OF A NECKER CUBE

DICK J. BIERMAN

ABSTRACT: Psychophysiological research has shown anomalous correlations between unconscious states reflected by physiological fluctuations and random future conditions. Where the future conditions concerned emotional and neutral events, this anomalous effect has been called presentiment. In a previous study we showed that gender detection based on a picture of eyes alone was faster in the condition where this picture was followed by a complete face of the same person (congruent) compared with a condition where the eyes-only picture was followed by the face of a different person (incongruent condition). This effect was called retroactive priming. In the present research the domain of interest regarding apparent retrocausal effects is further extended to the visual experience of a so-called "transparent" Necker cube. When a picture of this cube is presented to subjects, their experience switches spontaneously between two viewpoints. In one perspective the cube is experienced as observed from "above," in the other it is experienced as observed from below. We measured switching times from the above to the below experience. Once the subject had indicated by pressing a button that this shift had taken place, the picture of the transparent cube changed into an opaque presentation of one of the two possible viewpoints. The choice of which perspective was presented, "from above" or "from below," was random. This created two conditions. When the opaque view was "from above" this corresponded to the view for which the duration was measured (congruent); the opaque view "from below" was the incongruent condition. Arguing that in the incongruent condition the opaque view would "retrocausally" interfere with the "top view" for which the duration was measured, we predicted that in that condition the duration would be shorter.

In a pilot study (N = 6) we found suggestive evidence indeed that the mean stable percept duration was dependent on which of the two opaque representations would be presented in the future, after the switch had occurred. This predicted effect was quite clear after removal of one subject who produced many outliers in the perspective switching times.

The same procedure for removal of subjects with many outliers was used in two independent confirmatory studies, one at the University of

Groningen (N = 136) and one at the University of Amsterdam (N = 29). This process resulted in the removal of about 10% of the subjects. The switching-time effects found in both studies were in the same direction as in the pilot study, and the Amsterdam study was independently significant. The pooled results showed a mean difference in switching-time of 126 ms (N = 153, t = 1.97, p = .026, one-tailed). These results seem to fit in a growing database of anomalous correlations between conscious and unconscious behavior and random future conditions. It extends the domain of these anomalous correlations to other nonemotional events. Alternative possibilities, such as procedural errors, are discussed.

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OPERATIONAL CLOSURE AND PSI: EXPERIMENTING WITH THE TRIGGERED RANDOM EVENT GENERATOR (T.REG)

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ABSTRACT: We are reporting here for the first time the results of a series of experiments obtained with the Triggered Random Event Generator (T.REG), an electronic device that was conceived to fully integrate the observer-participant in the generation of binary events. What sounds contradictory at first to random data generation is an attempt to "close the loop" between the subject and the environment. The operational closure (OC) is present in a trigger-feedback-loop, where the trigger is controlled by the subject's physiological response to the outcome. Furthermore, a "Meaning-switch" (M-switch) allows the participant to willfully invert parts of the binary sequence. The idea behind this explicit loop structure is that anomalous sampling may be the result of self-organization of extrasensory information (psi). Thus the special arrangement provides a playground for psi, while the null hypothesis of 'uninformed' sampling is preserved.

Experiments have been conducted with 22 participants who performed in 10 trials of approximately 5-min duration each. Triggers were generated with variable frequency around 1 KHz modulated by the subjects' EEG voltage measured at the forehead. Participants were asked to increase the pitch in an acoustic feedback of the cumulative deviation scores. Three independent hypotheses about the endpoints of the sequences were tested: (1) The outcome in mean and variance is compatible with chance expectation (H_0); (2) M-switch gain correlates positively with trial number, indicative of individual learning (H_L); (3) M-switch gain correlates positively with participant number, indicative of "morphogenetic" learning (H_M). Further, the frequency and duration of M-switch application was analyzed to extract useful psychological variables. These were correlated with the physical outcome variables to test a hypothesis put forward by the Model of Pragmatic Information about the expected number of significant correlations (H_{MPI}).

Results did not show any indication of anomalous sampling or learning. However, subjects appeared to be generally more successful with a built-in pseudo

random event generator than with the sampling from the true random states. This may be explained by the finite length of the sequences and expectancy about the outcome. Psychological reaction to up- and down-runs of the feedback was observed in M-switch behavior. The observed statistically significant increase in correlation between physical and psychological variables has to be taken with caution as it is sensitive to the choice of variables.

We discuss the results in the light of the concept of operational closure and think that it is still valuable to explore this approach further. It may be important to improve the closure on the side of the feedback providing a higher degree of integration combined with a lower sampling rate to make the loop tighter and more appealing to the subject.

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AN IMPORTANT SUBJECT AT THE INSTITUT MÉTAPSYCHIQUE INTERNATIONAL: JEANNE LAPLACE

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ABSTRACT: Jeanne Laplace is a psychic subject who carried out her activity at the Institut Métapsychique International (IMI) in Paris. Further understanding of Laplace brings researchers a deeper understanding of the characteristics of ESP phenomena. Since childhood, she had remarkable abilities, possibly strengthened by two "nervous shocks" that occurred when she was twelve and eighteen years old. Her abilities were rather regular in their manifestation, though variable in their quality from one day to another, and they could be solicited at will.

Before her work at the IMI she had acted regularly for 7 years as medium at a spiritualist circle. Then, in 1926, a reader of *Révue Metapsychique* introduced her to Eugène Osty, director of the Parisian institute (IMI). After testing Jeanne Laplace, Osty became convinced of her abilities.

To obtain the paranormal knowledge, she had to feel a kind of "link" with the "target" person. The paranormal information occurred mainly through visions, that is, various hallucinations—vivid images that were objectified and projected seemingly outside herself on a "virtual screen." These were either black and white or in color, motionless or in motion, silent or involving voices (therefore including auditory hallucinations), and more or less allegorical. Laplace also had gustatory, olfactory, and tactile hallucinations. In order of importance, the receipt of paranormal information was experienced as visions and "impulsive words."

Often she used objects, which were put at her disposal by the consultants, and which acted as "support." According to Osty, who organized and carried out public and private séances with her for 8 years, such objects helped her concentration, acting like a sort of thread, and enabling knowledge of the "target" by paranormal means, irrespective of space and time.

Undoubtedly remarkable, two séances were done at the IMI in Paris with the English researcher Harry Price, who became convinced of Jeanne Laplace's clairvoyant abilities. It is very interesting to note that during the course of an experiment carried out in 1928 with Price, Miss Laplace made some predictions regarding the future of a Dr. R. J. Tylliard. She predicted his death due to a railway or car accident and that he would have just a few more years to live. In actuality, nearly 9 years later, Tylliard died in a car accident in Australia.

Under strict controls, and with the necessary cautions, Jeanne Laplace was also studied by Henri Desoille and Eugène Osty with regard to the paranormal diagnosis of disease. These investigations had some surprising outcomes, although often her diagnoses were marked by many kinds of mistakes and omissions. In any case, she always gave only simple advice, inviting the interested person to be visited by a specialist, without pretending to substitute for the official medicine. The outcomes obtained in this field are considered to be important by the current authors because they deepen our understanding of paranormal abilities, but they are less important from the point of view of everyday medical practice. In fact, a doctor was required to check the validity of Laplace's paranormal diagnoses and to add the precision and medical competence enabled by this professional practice.

Though she had acted previously for 7 years in a spiritual circle, adapting herself to its rites and beliefs, and attributing the produced "communications" to the deceased spirits, during her activity at the IMI, Laplace never attributed her abilities and manifestations of paranormal knowledge to disembodied spirits, "spirit guides," or similar entities—although in some rare moments the old habit to refer to deceased people appeared. Nevertheless, she kept the inner conviction that paranormal knowledge had proved the possibility of survival after death.

Jeanne Laplace showed herself to be a gifted subject, one who was open to be tested by experimenters and to the intrinsic aims of metapsychic research. She provided a huge quantity of reliable and heterogeneous information of paranormal origin and provided researchers with some precious and personal observations about the features and development of her abilities.

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PERFORMANCE IN GROUP TELEPATHY EXPERIMENTS AS RELATED TO TARGET PICTURE CHARACTERISTICS

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ABSTRACT: Analyses of previously published as well as new data on the telepathic group communication of emotions, as evoked by slide pictures, was performed with a view to identify picture characteristics that predict performance.

Performance data were collected as follows: When the participants (typically about 15 psychology students, who participated in the study as part

of course requirements) arrived at the laboratory, they were randomly divided into two groups, one sender group and one receiver group. The senders and the receivers were sequestered in two soundproof rooms, with one room in between. Each participant served both as a sender and as a receiver in two parts of a session. The senders' only task was to look at the pictures and to "hold on to" the feelings evoked by the respective pictures as long as they were shown. The receivers were instructed to guess whether a given picture was positive or negative. Performance was measured as the receivers' ability to discriminate among the 15 positive and the 15 negative target pictures, randomly shown to the senders. Each picture was shown for 20 s, with an inte-stimulus interval of about half a second.

In the present study, performance was analyzed as a function of psychological as well as psychophysiological properties of the target pictures.

Each of the 30 target pictures was rated by 66 undergraduate students, 24 males and 42 females, on six graphic scales. Four of the six scales measured purely emotional aspects of the pictures, namely how (a) pleasant/unpleasant, (b) involving, (c) compassion-arousing, and (d) repulsive they were. The two remaining scales measured (a) how well known and (b) how apprehensible the motifs were.

Two other studies were performed to measure physiological responses to the target pictures. In both studies participants were tested in small groups.

In the first study, electrodermal activity (EDA) was measured using an EDA monitor, with a software program for collecting and analyzing data. Sixty undergraduates, 32 females and 28 males, participated in the first study.

In the second study, heart-rate (HR) was measured using an electronic HR meter, consisting of two parts: (a) a belt with heart-beat sensors and (b) a "watch" for receiving and storing signals from the heart-beat sensors, which were analyzed using an associated software program. Fifty undergraduates, 36 females and 14 males, participated in the second study.

The eight picture scales and the two physiological scales were merged into a composite scale, interpreted as reflecting negative arousal.

In the present study, two different data sets were analyzed. The first dataset was based on previous studies, involving 845 participants, and the other came from a new study, involving 652 participants, yielding a total of 1,497 participants, who together provided almost 45,000 responses. The two data sets were analyzed both separately and together, with relative hit rate as the response measure (where hit rate was calculated by dividing a hit for a given participant and picture by the number of corresponding guesses, e.g., the number of negative guesses in the case of a hit for a negative picture).

A step-wise hierarchical strategy was used in the data analysis, comprising three major steps. In the first step, all of the 30 stimulus pictures were analyzed simultaneously. A significant Pearson correlation was obtained between EDA and relative hit rate (even when correction was made for multiple tests), but neither any of the remaining seven original scales nor the composite scale was significantly linearly related to relative hit rate.

In the second step, positive and negative pictures were analyzed separately based on inspection of a significant U-formed relationship between

relative hit rate and the composite scale (negative arousal). Different analyses indicated that no measurable discrimination had occurred among the positive pictures. However, there were several pieces of evidence suggesting that at least some of the negative pictures had been distinguished. For example, a one-way repeated measures ANOVA showed a significant picture effect for the total data set and a nearly significant picture effect for the new data set. Furthermore, original picture scales characterizing the pictures in terms of "unpleasant arousal" showed significant correlations with mean relative hit rate—in some cases even highly significant correlations. Accordingly, the composite scale showed a highly significant positive correlation with relative hit rate for the new data set and a more modest significant positive correlation for the total one.

In the third step of the analysis, the negative pictures were analyzed in more detail. All negative pictures were divided into two categories based on a median split of the composite scale. The sum of the relative hit rates of the seven pictures below the median and the sum of the relative hit rates for the seven pictures above the median were then calculated, to yield overall relative hit rate values for the two sets of pictures.

For the new as well as the total data set, the difference between high and low negative arousal level pictures in relative hit rate turned out to deviate significantly from MCE (= 0). A further analysis showed these deviations mainly to be attributable to lower-than-expected relative hit rates for the low negative arousal level pictures and only marginally to higher-than-expected relative hit rates for the high negative arousal level pictures.

For each of the three data sets, the difference between relative hit rate for high and low negative arousal pictures was correlated with 10 potential moderator variables: eight person- or situation-related variables (belief in telepathy, as measured before and after the experiment, respectively; age; gender; sender/receiver order; number of receivers; number of negative guesses and repetition aversion) and two physical variables (Ap-index and LST). For each of the three data sets, a significant negative correlation was found between the relative hit rate difference and one of the 10 variables: namely, number of receivers. This relationship was for the most part attributable to a positive correlation between the relative hit rate for the low negative arousal level pictures and number of receivers. Furthermore, a 2x2 mixed ANOVA was performed, with negative arousal level as the within-group factor, small sessions (N of receivers < 6) versus large sessions (N of receivers > 5) as the between-group factor, and mean relative hit rate as the dependent variable. The results showed a highly significant main effect for negative arousal level and an interaction effect at an even higher significance level. In line with this finding, re-examining the relationship between relative hit rate and the nine picture scales (including the composite scale) showed the results obtained for the sessions with small numbers of receivers to be stronger than the results obtained for all sessions.

Two major findings were discussed. Firstly, that arousal rather than pleasure-displeasure, which often appears as the most salient emotion dimension, was correlated with telepathic performance. Secondly, that number of receivers

appeared to be a critical moderator variable. Various "normal" explanations of the positive results—including experimental errors and statistical artifacts—were discussed and dismissed as less probable.

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THE DIVA AND THE NOBELISTS: WHEN PIERRE AND MARIE CURIE STUDIED EUSAPIA PALLADINO AT THE INSTITUT GÉNÉRAL PSYCHOLOGIQUE (1905-1908)

RENAUD EVRARD

ABSTRACT: The study of alleged physical phenomena of the medium Eusapia Palladino by the Institut Général Psychologique (IGP) from 1905 to 1908 was an important moment in the career of the "diva of scientists" (Alvarado, 1993; Blondel, 2002). The IGP, which was created in 1900, tried to integrate psychical research into the established sciences of the day, through alliances with the French scientific and political elite. Psychical research was included there as one of the various areas of psychology supported by the IGP. But the IGP had been divided since its beginning by two trends represented in the term *psychique* on the one hand and *psychologique* on the other, an issue that found resolution in the formation of specialized sections (Brower, 2005). This study of Palladino was the most important contribution to psychical research by the Groupe d'Etudes des Phénomènes Psychiques, which represented the parapsychological branch of the IGP. The experiments involved conditions that acknowledged idiosyncratic needs of the medium in terms of ecological validity (darkness, cabinet, etc.), but controls were applied through specially designed instruments such as scales, electrical sheaths that could detect movements of the legs of the table, and a number of physiological measurements. Over a 3-year period, Eusapia gave 43 sittings at the IGP and several other nonofficial séances for certain notables interested in studying the medium. This was a large-scale project with a specially equipped laboratory, half-public funding, and a research team composed of recognized intellectual authorities, including six Nobel laureates. Many of the team members were not suspected of being sympathetic to psychical science: Ballet, Bergson, Branly, Courtier, Pierre and Marie Curie, d'Arsonval, Duclaux, Langevin, Perrin, Richet, and so forth.

The final detailed report (Courtier, 1908) concluded ambiguously on the authenticity of the observed phenomena due to often imperfect conditions and the exposure of several minor frauds. The two major problems of this study were that it didn't include magicians amongst the experimenters, and that its methodology was very variable between and within the sittings. Nevertheless, many participants were individually convinced, having observed complete levitations of the table, as well as luminous and ectoplasmic phenomena. Despite contemporary criticisms, which held that the observations were mere illusions arising from suggestion or

were due to cheating by the medium (Le Bon, 1911), this study took place under exceptional conditions, which gives it a special significance in the history of parapsychology. The report received an award from the Academy of Sciences in 1913 and inspired later experiments.

We reconstruct some issues of this study by discussing the previously unexplored involvement of Pierre and Marie Curie. Several documents reveal the growing interest of Pierre Curie in parapsychology. He was one of the most diligent scientists at the eight sessions in which he seemed to have participated in 1905 and 1906. Yet he had to build his opinion on a limited number of observations. He began to apply direct controls of the medium's arms and legs but was quite doubtful of this method. He quickly developed ingenious devices to try to capture the "breath" apparently emanating from Eusapia's head and catch the "psychical force" in daylight. He observed a wide range of physical phenomena under controls he sometimes found excellent. He was especially impressed by the movement of a pedestal table whose trajectory seemed to follow intelligent guidance.

Before he died accidentally, he had entrusted his desire to focus on those studies to successfully explain the mechanisms behind these phenomena. He found this study not only scientifically legitimate, but of utmost importance. While he was skeptical about the observations of ectoplasm by Crookes and Richet—the latter being humiliated by the scandal of the villa Carmen's experiments in late 1905 (Le Maléfan, 2004)—he finally declared that his own research had confirmed their observations. Shortly before his death, April 14, 1906, he wrote to his friend and colleague Gouy (in Blanc, 2006, pp. 643–644; Curie's emphasis):

> The result is that these phenomena really exist, and I cannot possibly doubt this any longer. It is unlikely but still a fact *impossible to deny*, after the sittings we held under perfectly controlled conditions. The medium forms some kind of fluidic members (in addition to her normal arms and legs) and these more or less shapeless members are capable of grasping or strongly pushing objects (Richet calls this *ectoplasm*).

Marie Curie was less enthusiastic about Eusapia's study but continued to support foreign psychical research by becoming an honorary member of several societies. According to Youriévitch (1944, p. 23–24), a few days after her husband's death, she brought the clothes in which he had been killed to a private sitting with Eusapia. Marie Curie's initiative is surprising: Did she really believe that the medium Eusapia would allow her a last communication with her late husband? Marie had nowhere confessed a belief in the afterlife, and the previous experiments with Eusapia did not have the goal to obtain evidence for survival after death. Her reaction may have been due to personal distress, which was also revealed in the diary she began at the same time, in which she addressed her late husband for years. Nevertheless, she didn't end her participation in the research with Eusapia after this tragedy. She also wrote that she found some sittings with

her very convincing and that the question of physical mediumship was of the highest interest (letter to Countess Elisabeth Greffulhe, April 16, 1906, in: Blanc, 2009, p. 645) but she seems to have remained skeptical (Heuzé, 1921).

Pierre and Marie Curie's approach was based on an epistemology that encouraged experimental exploration of anomalous interactions between the physical, the biological, and the mental, which could dramatically change the face of the science of the time. Courtier (1929) integrated their observations in the form of subjective certainties separate from objective certainties, that is, as a kind of historical and elusive evidence. "I may have become *convinced*, but not, strictly speaking, *sure* [with certitude] based on objective evidence which would be valid for all" (Courtier, 1908, p. 563; his italics). Sometimes there were objective measures that correlated with these observations, such as when the medium became heavier or the exact weight of the table that seemed to levitate. But these various objective correlates are subordinate to the observations and do not confirm the paranormal hypothesis independently. Also, the photographs of complete levitation of the table do not clearly show the four legs of the table, making it impossible to analyze this kind of document without analyzing its historical context.

Courtier (1929, p. 188) described the collected evidence as repeate sensory observations which were combined with a critical analysis of th experiment's conditions. Thus formulated, it seemed clear to Courtier that th outcome of the Eusapia study was not zero, and that it would be wrong to assume fraud in the absence of any confirming observation, and despite contrary and positive observations and considerations. Pierre Curie's subjective certainty can be integrated into this category of proof. Before and after him, many distinguished scientists were also convinced of the reality of physical phenomena of mediumship and managed to convince others, but only those who had a personal contact with the phenomena may share their conviction. Was it due to the nature of the phenomena or to the nature of the experiments?

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INDRIDASON'S AND SWEDENBORG'S REMOTE DESCRIPTION OF FIRES IN COPENHAGEN AND STOCKHOLM: TRAVELING CLAIRVOYANCE, REMOTE VIEWING, OR SPIRIT-COMMUNICATION?

Erlendur Haraldsson

ABSTRACT: At a séance in Reykjavik on the evening of November 24, 1905, the medium Indridi Indridason (1883–1912) described through a drop-in-communicator speaking Danish a fire that had broken out in a factory in Copenhagen. About an hour later in the same sitting, he said that the fire had been brought under control. Many persons witnessed this description and a written account was deposited with the Bishop of Iceland, who was known to subscribe

to the leading Danish newspaper *Politiken*. There was no telephone or telegraph communication with Iceland in 1905. News arrived by ship from Copenhagen just before Christmas. An account of a factory fire was found in the November 25 issue of the Danish newspaper. The fire had started in a factory at Store Kongensgade 63, and was brought under control in an hour as had been stated at the séance. The author checked the account in *Politiken* and examined how frequent fires were in Copenhagen in 1905 that were large enough to be reported. During 2 weeks prior and 2 weeks after November 24, there were three additional fires. Only one of these fires was in the late evening, only one in a factory, and that fire caused the most damage. The other fires were quite minor.

At the sitting on November 24, 1905, the Danish communicator gave his name as Jensen and his profession as a manufacturer. The Experimental Society was founded to investigate Indridason's mediumship (Gissurarson & Haraldsson, 1989; Hannesson, 1924). Minute books were kept of their séances which took place from 1904 to 1909. They were lost for over half a century, until two of them unexpectedly turned up a few years ago. They are now kept in the manuscript department of the National Library in Reykjavik. In one of them it is recorded that on December 11, 1905, Jensen appeared again and the sitters questioned him. He responded that his full name was Emil Jensen, that he was unmarried and had no children, died not so young, had brothers and sisters, and that they were still living. No attempt was ever made to find out if manufacturer Jensen had been a real person and could be identified.

The author searched for him in Danish archives and census reports. One, and only one, Emil Jensen, who was a manufacturer, turned up in records from 1890. He lived at Store Kongensgade 67, the second house away from the fire on Store Kongensgade 63. Further searches showed that his father had run a shop or a company (F. Jensen og Sön) at Store Kongensgade 40 for 30 years. Emil Jensen had lived all his life on Store Kongensgade or on adjacent streets.

Records show that the manufacturer Emil Jensen died in 1898 at the age of 50 and was unmarried. He had four sisters and two brothers. The first died in 1908 and the last in 1936, hence they were all alive in December of 1905, as he had stated in the sitting on December 11. In the document that describes how his estate was dissolved after his death, it is stated that he had no children. Thereby everything that the communicator Emil Jensen had revealed about himself on December 11 has been verified. Could there be a normal explanation of the case? Could Indridason have known about Emil Jensen or his family? No evidence was found for that. No obituary was published in Danish newspapers about Emil Jensen. Besides, Indridi was only 15 when Emil Jensen died, and Indridi was living in a remote part of Iceland, while Emil Jensen was far away in Copenhagen.

It is rare to find a case that can be investigated and verified more than a century after it occurred because new documents turn up, in this case long-lost records of the sittings. They give interesting new insight into the mediumship of Indridi Indridason, and a detailed verifiable account of a remarkable mental phenomenon. Until now Indridason has been primarily known for his physical phenomena ranging from levitations of himself to movements of musical

instruments, which were being played upon as if by invisible hands, to light phenomena, and direct voices singing loudly together (Gissurarson & Haraldsson, 1989; Hannesson, 1924).

The unexpected finding that Jensen lived close to Store Kongensgade 63 adds a striking similarity to the famous case of Emanuel Swedenborg, who described in Gothenburg in 1759 a fire that raged near his home in Stockholm. The Indridason/Jensen case has the advantage over the Swedenborg case that it is much better documented. These two historical cases bear witness to extraordinary awareness of events taking place at great distances. Both display the importance of motivational factors as these events were highly relevant to the persons involved. Furthermore, the Indridason case opens up the important question, who is the percipient, the living Indridason or the deceased Jensen? Is this a case of traveling clairvoyance, remote viewing, or spirit-communication? The weight of the motivational factor tips the scale towards Emil Jensen rather than the medium Indridi Indridason.

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ARE THERE MEAN VALUES AND RELATIONSHIPS BETWEEN THEM IN STATISTICAL PARAPSYCHOLOGY?

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ABSTRACT: Statistical parapsychology is the modern experimental approach to anomalous effects such as psychokinesis (PK) and extrasensory perception (ESP). An effect is called anomalous or parapsychological (psi) if it is not mediated by any known physical mechanism. Today there is overwhelming evidence for a number of anomalous effects. Everybody is free to reject the evidence expressed by infinitesimal chance probabilities on the order of 10^{-10} or less, but then they must believe in a gigantic conspiracy involving hundreds of researchers.

Some ESP effects, such as dream psi, ganzfeld psi, and the sense of being stared at, are directly analyzed by plotting the cumulative hit rate as a function of time measured in years or number of studies. These rates turned out to assume rather stable values after inherently large initial fluctuations. The statistical significance of the dataset of a given psi effect is expressed by the z score. For large numbers of individual trials, it is the excess hit number, that is, the difference of the measured number of hits from its mean chance expectation (MCE) value, divided by the standard deviation of the number of hits. The chance probability of obtaining a z score at or above z is denoted by $p(z)$. For the three effects mentioned, dream psi, ganzfeld psi, and the sense of being stated at, the presently reached overall z scores are 6.5, 9.1, and 16.4, resulting in the chance probabilities $p \approx 10^{-10}$, 10^{-19}, and 10^{-59}, respectively. The limit of significance is often set at the chance probability $p(z) = .025$, which corresponds to $z = 1.96$. The effect size e (or z score per single trial) is defined as $e = z/\sqrt{N}$. If the psi-induced extra hit rate is independent of N, so is the effect size.

The most extensively studied psi effect is the influence of PK on binary random number generators (RNGs). They are designed to generate by chance, that is, in the absence of PK, zeros and ones without preference for either bit. In principle, RNGs are like coin flippers. However, they are automatic, thus allowing experiments consisting of rapid sequences of large numbers of bits (ca. 20 to 10^8) instead of single-trial experiments separated from each other. If they are "willed" to generate, say, more ones than zeros, they will do so on average though with erratic deviations.

The original plan to determine a characteristic psi-induced extra hit rate failed in the case of RNG experiments. Instead, what was found in the course of a few decades is a rather stable mean z score $\langle z \rangle \approx 0.6$ of apparently "isolated," that is, well separated, experiments that is indifferent to N, henceforward the number of bits making up an experiment. This situation requires a meta-analysis based on the individual analyses of the isolated experiments. Use of Stouffer's formula then leads to an up-to-date total z score of 16, corresponding to $p(16) \approx 10^{-59}$. Apart from shifting the Gaussian distribution of z scores, psi causes a considerable widening, that is, an increase of its variance, from 1 to 1.5

Stable hit rates and, in the case of RNGs, stable mean z scores seem to indicate that there is some system in psi effects. Comparison of the dataset of RNG experiments with that of single-trial dream psi experiments suggests that PK and ESP are about equally effective and independent of the number of trials in an experiment. This double conjecture is based on the following considerations: The mean z scores of isolated experiments, rapid sequences of bits in one case and single trials in the other, are similar, differing by a factor of less than 4. The factor can be halved if the effect size is assumed to be proportional to the inverse square root of the running number n rather than the total number N of bits in the experiment. At small N (say $N < 20$) the mean z score, which now is proportional to the sum of $1/\sqrt{n}$ over $n = 1,2,\ldots\ldots N$, decreases from a practically constant value at large N to half of it at $N = 1$. As a consequence, $\langle z \rangle \approx 0.3$ should hold for one-trial RNG experiments, which remains to be tested by measurements. In both types of experiments the MCE hit rate is $p = 0.5$ or, in other words, the multiplicity or number of equivalent random choices is $m = 2$. In the tests of the sense of being stared at, also of class $m = 2$, the extra hit rate is half as large as in the dream psi studies. This might be due to less perfect isolation, the interval between subsequent trials being 1 or 2 min instead of a whole day. The studies of ganzfeld psi belong to the class $m = 4$ and the interval between trials is a matter of a few hours. Their effect size is practically as large as that of dream psi.

By mathematical means, it is shown that the widening of the z-score distribution can most naturally be attributed to a Gaussian distribution of the effect size e. Hitherto, statistical fluctuations of the effect size have been ignored.

Two relationships, not containing m, between widening and shift of the Gaussian distribution of z scores as well as two formulas for the mean z score as a function of m are proposed. They are applied to the datasets of many-trial experiments with RNGs ($m = 2$), falling dice ($m = 6$), and numbered table tennis balls drawn from an opaque bag ($m = 5$). They can be checked only partially.

In the first case this is due to insufficient or missing data. In the second case, both formulas seem to fail because of a loss of equivalence of choices which are equivalent in the absence of psi.

The size of the mean z score of RNG experiments, $\langle z \rangle \approx 0.6$, would be appropriate to account for mind-brain interaction. A previous model of the interaction is revisited that views the neuron as an RNG with each of its ca. 10,000 synapses contributing a bit per decision on whether or not to fire an action potential. This time, single-trial switching and the widening of the Gaussian distribution of z scores are included in the treatment.

A close similarity of the psi effects at $m = 2$ in PK and ESP experiments would make unnecessary the often difficult distinction between the two kinds of effects. Moreover, an only weak dependence of their mean z scores on the number of trials in an experiment down to $N = 1$ would be in accordance with an often noted far-reaching indifference of psi experiments to distances in space and time and, in the case of PK, to the type of binary RNG. The order of magnitude of the mean z scores, which seems to emerge in such experiments, appears compatible with a possible role of psi in mind-neuron interaction and extrasensory communication. The conjecture that these two phenomena (of enormous philosophical and practical implications) do exist may be no more than fantasy, but there is preliminary support by the experimental results in statistical parapsychology.

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IS PSI-MEDIATED INFORMATION PROCESSED LIKE THE UNATTENDED STIMULUS IN LATENT INHIBITION STUDIES?

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ABSTRACT: Filter theories of psi postulate that psi-mediated information operates as a "weak stimulus" that is likely to be filtered out of conscious awareness in the waking state. This poster presents two studies in which an experimental paradigm developed to examine the efficacy of filtering mechanisms, Latent Inhibition (LI), was adapted to include a psi component. Latent Inhibition assesses the processing of irrelevant stimuli, where "weak filters" are indicated by the conscious processing of material that has previously been presented as inconsequential (rather than inhibiting this "irrelevant information" from consciousness, which is indicative of concentration on task demands and a "strong attentional filter"). We explored whether psi-mediated information might be processed akin to the irrelevant stimulus in LI. Further, as the processing of the irrelevant stimulus in LI has been shown to be modulated by creativity and schizotypy, it was hypothesised that these same variables would also modulate processing of psi-mediated information. Additionally, the predictive value of belief in the paranormal was examined.

In a typical LI experiment there are two conditions, where, during an initial masking task [a distracting task with which participants engage, the

nature of which is not directly relevant to the overall LI task], participants are either: (1) repeatedly exposed to a particular stimulus (the pre-exposure [PE] condition); or (2) not exposed to this stimulus (the nonpre-exposure [NPE] condition). The stimulus is irrelevant to this masking task and serves no function. In a subsequent task (the experimental task), this stimulus assumes relevant status; it must be attended to in order to solve a problem, that is, it must enter into cognitive associations. Typically, participants in the NPE condition, to whom the stimulus is novel, solve the problem faster, whereas participants who have been pre-exposed to the stimulus, without consequence, take longer to solve the problem. This is presumed to be because the "irrelevant stimulus" has been inhibited or filtered from awareness (Gray et al., 2002). In the current research a standard visual LI protocol (as described above) was replicated, and two conditions added: (1) psi-pre-exposure (ψPE), where a sender attempted to transmit the stimulus telepathically during the initial masking task; and (2) nonpsi-pre-exposure (NψPE). In this visual paradigm the inconsequential stimulus is the white outline of a triangle. Thus, in the PE condition this triangle was presented visually, and in the ψPE condition the triangle was sent telepathically by a physically remote sender. Hence, it was assessed whether psi-mediated information might be inhibited from awareness when it is irrelevant or not needed, by testing whether subsequent cognitive performance requiring the associability of this stimulus was affected. If so, this would provide support for the hypothesis that psi and perceptual stimuli are processed with the same attentional mechanisms.

Study One consisted of a direct comparison of the processing of a psi and a perceptual stimulus in an LI paradigm as described above. There were 80 participants (26 males, 54 females), recruited from staff and students at the authors' universities. A standard LI effect was obtained, but no overall psi-LI-like effect was obtained ($z = 1.02$, $p = .308$, two-tailed). However, a psi-LI-like effect was obtained for participants characterized by intrapersonal awareness ($z = 2.35$, $p = .019$, two-tailed). The results suggested that if psi does operate like LI, it does so with participants who score highly on intrapersonal awareness, characterized by emotional creativity and the use of nonlinear cognition in the creative process (e.g., intuition, hypnagogia, and sensed presence; Holt et al., 2004). This subsample appeared to process psi-mediated information in a way analogous to LI, unconsciously filtering it from conscious awareness when it was irrelevant, and continuing to inhibit its representation in awareness on a subsequent task, thus impairing its associability.

Study Two was a replication and extension of Study One. It tested whether the processing of an inconsequential psi-stimulus is subject to the same parameters as the processing of an inconsequential perceptual-stimulus. An optimal LI effect occurs when the masking task requires controlled processing but is not too demanding, thus enabling automatic processing of the inconsequential stimulus (Lubow & Gewirtz, 1995). When the masking task is complex, it is theorized, all attentional resources are allocated to it, preventing the inconsequential stimulus from being processed automatically, so that it does not need to be inhibited in

order to facilitate selective attention. Study Two examined whether a psi effect would likewise be attenuated by a complex masking task, which would suggest that psi-mediated information is processed with automatic attention in the same way. Thus, an extra condition was added: Masking Task Load, with two levels: Ordinary/Low Load (as in Study One) and High Load (following Braunstein-Bercovitz & Lubow, 1998). Eighty female participants took part in Study Two (to avoid complications in interpretation due to gender effects, which emerged in Study One). Naïve participants were recruited from university staff and students. This time an experienced meditator was chosen to act as the sender, it being reasoned that they would be better able to focus on the psi stimulus, producing a more stable stimulus.

In Study Two a significant LI effect was obtained only in the low cognitive load condition, as was predicted. The same pattern was found for across the psi conditions. A significant psi-LI-like effect was obtained only in the low load condition (low load: $z = -3.059$, $p = .002$, two-tailed; high load: $z = -1.952$, $p = .051$, two-tailed). The latter is so close to significance, however, that this outcome is difficult to interpret. Nevertheless, while a psi effect may be present in the high load condition, it appears that increased attentional demands reduced the strength of this psi-LI-like effect. Thus the same attentional effects were found with both psi and supraliminal unattended stimuli. However, in Study Two none of the personality and belief measures were associated with psi performance as in Study One.

In conclusion, this research suggests that the modeling of psi as an analogue of the inconsequential stimulus in attention is profitable and worthy of further consideration. The research provides support for the hypothesis that psi-mediated information may be automatically processed and unconsciously inhibited from attention when it is not needed. This interpretation accords with early and subsequent models of psi functioning, where psi-mediated information is described as a weak stimulus that is filtered out of conscious awareness due to the more pressing needs and demands of everyday life, and suggests that psi-mediated information may be present in the neurological/cognitive system at an unconscious level, and may thereby still affect behavior (e.g., Bergson, 1913; Stanford, 1990; Thalbourne et al., 1997; Bem, 2003). Our study implies that psi-mediated information might unconsciously affect cognitive processing. However, further replication and analysis of the parameters of this potential effect are required.

The authors gratefully acknowledge a bursary from the Bial Foundation (155/04) which has enabled this research.

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GAS MEASUREMENT METHOD FOR A QUANTITATIVE STUDY ON NONCONTACT HEALING: A NEW METHOD USING CUCUMBER AS A BIO-SENSOR

Hideyuki Kokubo[1,2], Osamu Takagi[1], Satoshi Koyama[2,1], & Mikio Yamamoto[1]

ABSTRACT: The authors show an outline of a gas measurement method developed recently by themselves. The method is a new quantitative measuring method for noncontact healing, *ki/qi* or bio-PK. *Cucumis sativus* ("white-spin-type" cucumber) was used as a bio-sensor.

Purpose of Development. Using biophotons from cucumbers, the authors previously developed a quantitative measurement method for noncontact healing. Our biophoton measurement method can estimate a healer's controlled healing power in just one or two trials. However, expensiveness of the equipment for biophoton measurements has obstructed widespread use of the method. An easy and inexpensive method was needed. The authors took notice of a gas being generated simultaneously with the emission of biophotons, and tried to develop an easy method in which this gas is measured by a gas-measuring detector tube.

Design. The gas method was based on the biophoton method. Four circular slices (thickness: 2 cm) were cut from a cucumber. Each slice was cut again and opened into two slices (thickness: 1 cm); this gave four paired pieces. One of each of the paired pieces was used as the experimental sample and the other (flower side) as the control. Four pairs were set into two glass petri dishes. Controls and experimental samples were placed symmetrically in dishes, which were wrapped beforehand with a plastic wrapping sheet. Each dish was labeled and all dishes were covered with glass lids. One measurement with the simultaneous calibration technique (SCAT) needs four cucumbers (16 pairs of pieces), and half of the pairs were used for a main test and the others were used for a simultaneous blank test for calibration. Each subject tried to increase the odor of the cucumber without direct touch for 30 min against experimental dishes. Next, all glass lids were removed and each Petri dish was set in a sealed container (2.2 L) and their gas emission was measured with the gas detector tube 24 h later. There is no specialized tube for cucumber gas, but the authors found that a short-term, quick-measuring detector tube for ethyl acetate (141 L, Gastec, Japan) could be used. The J value, which is the natural logarithm of the ratio of gas concentrations of experiment C_E and control C_C, was introduced as an index of the effect of noncontact healing.

Detectability. This was early equal to the biophoton method. Controlled healing power can be classified tentatively as: $J < 0.1$, novice; $0.1 < J < 0.2$, middle; $0.2 < J$, expert; $0.3 < J$, psychic.

Applicability and cost. Multiple-place measurement is possible. Special places, which are often claimed to show similar healing effects, could also be measured. The minimum initial cost is about €500.

Interpretations. Suggestive results were obtained through developing the gas method. A subject may make a "field" around his/her body during the task and

the "field" may spread to several meters from his/her body if he/she has strong power. A possibility was suggested that a background potential of anomalous phenomena exists and drifts slowly. The gas method is considered to be a useful method that can initiate and expand future research.

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SOMATIC PSI: HEART RATE CHANGES REFLECT FUTURE EVENTS, BUT DO THESE CHANGES IMPROVE OUR CHOICES?

EVA LOBACH & DICK BIERMAN

ABSTRACT: We define "somatic psi" as changes in physiological processes that are associated with events that are distant in (future) time, distant in place, or distant in both. There are various types of somatic psi, such as evidence from: DMILS (Direct Mental Interaction with Living Systems) studies, where correlations are found between somebody's intentions (to influence) and the physiology of someone else in a different room; or presentiment studies, where unpredictable, often emotionally charged future events are associated with physiological changes in people who sit passively in a chair. The present study focuses on somatic psi in a decision-making context.

Participants (N = 36) with and without yoga/meditation experience guessed which one of two sequentially presented pictures would later turn out to be the target, while heart rate was being registered continuously. The study aimed to explore whether any heart rate changes for targets and nontargets (a type of somatic psi) would be used in the actual decision-making process and looked for mediating factors. Included were gender, yoga and meditation experience, interoception (sensitivity to bodily processes) as measured with a heartbeat detection task, absorption (Absorption Scale, Tellegen & Atkinson, 1974) and intuition (Human Information Processing Survey, Taggart & Valenzi, 1990).

Results replicated those earlier reported by Tressoldi, Martinelli, Massaccesi, and Sartori (2005), showing that heart rate was increased while looking at the picture that would later be shown to be the target. Results suggested that, especially for women, these heart rate changes correlated with correct choices, but there was no evidence that these differences were actually used in their conscious choices. Although participants with more yoga and meditation experience did not have more hits, they showed marginally larger heart rate differences between target and nontarget pictures. This study found no relationship between the personality factors (absorption, intuition, interoception) and our measure of psi, and neither were these personality factors associated with yoga or meditation experience.

A potentially promising theoretical approach with which to interpret these results is Bierman's Consciousness Induced Restoration of Time-Symmetry

(CIRTS), which assumes that so-called "coherent" states of consciousness may create circumstances that allow time-symmetry of physical processes (Bierman, 2008). EEGs of advanced meditators have shown sustained synchronous firing, which may be an indication of the type of coherence that is proposed by CIRTS. Future research should further explore the relationship between different types of meditative states, EEG synchrony, and various manifestations of somatic psi.

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ALLAN KARDEC AND THE DEVELOPMENT OF SPIRITISM: A PIONEERING RESEARCH PROGRAM IN PSYCHICAL EXPERIENCES

Alexander Moreira-Almeida & Klaus Chaves Alberto

ABSTRACT: The French educator Allan Kardec (1804-1869) was one of the first researchers to propose the scientific investigation of psychical experiences and was an influential scholar in Europe during the second half of the 19th century. However, there is a long history of imprecise factual information and misunderstandings concerning Kardec's work with psychical experiences. The current paper is a continuation of a research enquiry about Kardec's research methods. Intending to grasp more directly Kardec's ideas and methods, and not others' opinions about him, we focused this paper, as much as possible, on primary sources, that is, Kardec's own writings. To compose this article the authors carefully read all of Kardec's available works: his books and the 12 volumes of *Revue Spirit* (*Spiritist Journal*), a monthly journal that he edited and published from 1858 until his death in 1869. This paper explores how Kardec actually worked on his research program in trying to obtain valid information regarding spirits and the spiritual world, that is, examining his empirical approach and how he raised and tested hypotheses. Although it is widely accepted by spiritists and many academic authors, Kardec was not a mere "compiler" or "codifier" of mediumistic messages. He developed a much more sophisticated research program. Kardec often stated the need for a wide and diversified empirical approach. He stressed that a researcher should try to collect all kinds of phenomena that could be related to one's subject of study. Several times Kardec compared mediums to microscopes or telescopes, that is, being a way to observe a world that cannot be detected using the naked eye. To enlarge the empirical basis of observation, he founded the Parisian Society of Spiritist Studies, where he developed most of his observations. But he also personally studied other mediums in Paris and in dozens of cities in France, Belgium, and Switzerland (Kardec 1864b; 1865b). During his field research he tried to observe all kinds of mediumistic manifestations, from different sorts of mediums. During Kardec's last 15 years, in which he devoted himself full-time to the investigation of psychical experiences, mainly mediumship, he developed a worldwide network of collaborators that exchanged reports of mediumistic studies with him. He received thousands of visitors from several countries who were looking for information regarding Spiritism, but many also brought reports

of their studies with mediums that were shared at the Parisian Society of Spiritist Studies. Kardec received reports of psychical phenomena from hundreds of spiritist groups all over the world. Based on all those observations, he developed a research program, including a comprehensive theory that he called "Spiritism." Kardec highlighted that in trying to explain some phenomena one should always look for a conventional explanation. If the anomalous phenomenon was attested and could not be explained by conventional theories, it would be necessary to look for a hypothesis to make sense of the empirical observation. The source for these theories could be Kardec himself, any other living person, or spirits that communicated their ideas through mediums. Kardec did not use the appeal to authority; he did not justify a theory based on its source, but on its logical consistency and empirical support. Kardec proposed several criteria to test a theory: logic and internal consistency; well-grounded scientific knowledge; support by empirical evidence; absence of falsifications; theoretical simplicity; and comprehensiveness. More studies based on in-depth studies of primary sources are urgently needed to provide a better understanding of Kardec's research program and the construction of Spiritism.

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NEUROIMAGING STUDY OF MEDIUMISTIC TRANCE

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ABSTRACT: Religious manifestations often involve dissociative states, but little research has been done on the mediumistic experience, in which an individual (the medium) is believed to be in communication with, or under the control of, the personality of a deceased person. We investigated whether psychography—writing of the soul—is associated with specific alterations in cerebral activity. Ten healthy Brazilian psychographers, free of mental disorders, were examined using single photon emission computed tomography (SPECT) during psychography and while writing an original text in a nontrance state. Five of those mediums were novices and five had substantial experience ranging from 2 to 40 years of psychography. The volunteers studied enjoyed a good quality of life and were well adjusted in terms of their family, social, and professional lives. The mediums that participated in this study did not know each other before the study, did not earn money from mediumship (all of them had regular jobs or were retired), and did not receive any financial incentive to participate. All mediums, one at a time, performed psychography for the SPECT study in the same conditions, in a quiet, dimly lit room of the laboratory, where exams were taken. Although they were semi-conscious during psychography, the written content was coherent and understandable. Our hypotheses were confirmed among the novice psychographers, since results showed that novices' regional cerebral blood flow (rCBF) in several

brain areas (particularly in the left culmen, left hippocampus, left inferior occipital gyrus, left anterior cingulate, right superior temporal gyrus and right precentral gyrus) during psychography were greater than during normal (nontrance) writing. However, experienced mediums, contrary to our hypothesis, showed consistently decreased rCBF in these regions during psychography compared to control writing. The written content produced by volunteers during both types of the task—with or without mediumistic trance—was original, meaning never written before. Results showed decreased activity in several cognitive-processing regions despite the trance-state text being more complex than the control-task text, which is consistent with the notion of automatic writing.

We have drawn critical methodological lessons from this study that will be shared during the presentation in order to encourage further rigorous research in this field. This kind of mediumistic study requires us to bear in mind several methodological challenges concerning how to make volunteers feel at home during laboratorial procedures, as follows: (1) Having a good qualitative interview beforehand: "what is needed for the phenomenon to occur?"—volunteers in general want to be studied, not tested; (2) Respecting the volunteers' suggestions and showing them that their opinions are important. For instance, in our study the volunteers asked for both near and distant group support during psychography; (3) Theory of mind: deconstructing the fantasy of the volunteers concerning the researchers' expectations: "Your experience will be welcome just as it is!", minimizing expectations and dissolving fears of not performing well: "If nothing happens we can do further scans"; (4) Familiarizing volunteers with potential anxiety/distracting effects (hospital, scans, blood samples, injections, etc.) and starting the study with the most confident volunteers, who naturally transmit confidence to the group; (5) Avoiding methods that jeopardize the subjective experience. Concerning neuroimaging methods, SPECT, despite its low resolution, preserves the setting where the experience takes place and imaging acquisition occurs soon afterwards.

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RETRO-PRIMING AND DOUBLE TESTING

THOMAS RABEYRON AND CAROLINE WATT

ABSTRACT: In previous research (Rabeyron & Watt, 2010), we conducted a retro-priming study in which the response times of 162 participants were measured. In this first study, results on the retro-priming task were not significant ($r = 0.11$, *ns*). Nevertheless, we obtained a significant result with two subgroups (students and male participants) and we tried to replicate these findings in this second study. The aim of this new research was more generally to work only with the participants

who had the strongest retro-priming effect during the first study, in order to see if we were able to replicate the effect and select in this way "gifted" psi subjects. The objective was also to find correlations between psychological characteristics (paranormal experiences, mental health, mental boundaries, trauma and negative life events) and retro-priming results for the "best" participants. The retro-priming effect was also compared to performance on a classical priming task.

The retro-priming software used here was a version developed by Daryl Bem (2008), but we used pictures as primes instead of words. The response times of participants were measured in order to see if they were influenced by a prime (a pleasant or unpleasant emotional picture) which they would see not before but *after* the pleasant or unpleasant word. Participants were shown a word on each of 64 trials and were asked to press one of two keys on the keyboard as quickly as they could, to indicate whether the word was pleasant or unpleasant. The participant's response time in making this judgment was the major dependent variable, and the difference in mean response times between incongruent (pleasant-unpleasant) and congruent trials (pleasant-pleasant or unpleasant-unpleasant) was the index of a retro-priming effect, with positive differences denoting faster responses to congruent trials.

For this new study, 39 of the "best" participants from the first study were selected and only 28 were available to come back to the laboratory. The results, for the whole group, on the retro-priming task, were negative and nonsignificant (*es* = -.25, *ns*) but the results were significant on the priming task (*es* = .63, $p < .001$). We also found a negative and significant correlation between retro-priming results of the first and second study ($r = -.46$, $p < .05$) and positive but nonsignificant correlation between priming results of the first and second study ($r = .19$, *ns*). The correlation between priming and retro-priming results was nonsignificant ($r = -.045$, *ns*). We obtained overall negative effects on retro-priming results for all the groups (male, female, student, whole) but 10 participants were found to have positive results on the two retro-priming studies. No specific psychological variables were found for these 10 participants compared to the other participants.

Several hypotheses were considered in explaining these results. First of all, a skeptical hypothesis was proposed, in which the results from the first study were effects of randomness alone; this would explain why we had no significant result with the "best" participants. Several possible reasons why the retro-priming protocol may not have been efficient enough to get a significant result were also detailed. Finally, several interpretations about the results (using the Model of Pragmatic Information and the Consciousness Induced Restoration of Time-Symmetry) were also proposed in order to try to understand our negative results and more generally problems of reproducibility in psi research.

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A COMPARISON BETWEEN REMOTE VIEWING AND GANZFELD CONDITIONS IN A PRECOGNITION TASK

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ABSTRACT: Some of the early research on remote viewing has been criticized, particularly with respect to potential problems with the randomization and editing of transcripts that may have left cues to the order in which sites served as targets (Marks & Kamman, 1980). These concerns have been addressed in later, successful replications (e.g., Schlitz & Gruber, 1980; Schlitz & Haight, 1984; see also Schlitz & Gruber, 1981), which took great care to ensure that neither the order of target selection nor of the transcripts could be inferred from material they contained, but part of that solution involves either editing the transcripts, which itself can be grounds for criticism (e.g., Marks & Kamman, 1980, p. 16), or deferring feedback about target identities until the end of the series, which may be demotivating (see, e.g., Tart, 2007). These concerns only apply to studies in which the same participant serves as viewer for a number of trials in the series, and thus is potentially able to refer in his or her transcripts to earlier targets and later planned sessions. This would not be possible if one were to adopt a design in which a larger number of participants contributed just one trial each.

Militating against the use of a larger sample of participants is the difficulty in finding a sufficient number of able participants; for example, Utts (1996) estimated that only around 1% of those screened were suitable for RV work. In an earlier study (Roe & Flint, 2007) we suggested that this might be overcome if an induction procedure could be identified that facilitated the performance of novice participants. One such candidate is the ganzfeld induction procedure. Roe and Flint (2007) conducted a remote viewing study that incorporated ganzfeld stimulation and reported 12 binary hits across 14 trials, which gave a combined sum of ranks that was significant (SOR = 42, p = .008), suggesting that this approach might overcome the weaknesses just outlined.

However, it was not clear that this successful outcome was a consequence of incorporating a ganzfeld protocol for novice participants, since there was no comparison condition in which participants attempted to generate impressions about a target location without the assistance of ganzfeld stimulation. The present study, therefore, was intended to compare performance under remote viewing and ganzfeld conditions using a repeated measures design. We were also able to address concerns about possible judging biases in Roe and Flint's (2007) study by incorporating a much wider range of target locations and a larger number of trials (N = 40), and to improve precautions against fraud and sensory leakage by adopting a precognitive design. Finally, we extended the range of possible individual difference covariates of performance by including measures of personal psi experience, belief in the paranormal, practice of a mental discipline, Feeling-Perceiving personality type, extraversion and self-reported creativity. Subjective reactions

to ganzfeld stimulation were assessed using Pekala's (1991) *Phenomenology of Consciousness Inventory* (PCI).

A convenience sample of 40 volunteers (28 F, 12 M; age range 18–54 years) completed two precognitive remote viewing trials, one in an ordinary waking state (after Subbotsky & Ryan, 2009) and one involving ganzfeld stimulation. The order of conditions was counterbalanced across participants. In both conditions they were instructed to generate impressions that would relate to a geographical location that they would later be shown. During the waking condition participants were provided with unique but arbitrary coordinates that specified the target and then drew an ideogram before producing a list of adjectives that described features of the site (such as colors, tastes, and smells) and finally made sketches of the site. During the ganzfeld condition participants listened to relaxation instructions that included the suggestion that they would experience spontaneous imagery associated with their target location. The participant's experimenter (PE) produced a written record of their mentation. After 35 minutes of ganzfeld stimulation, participants completed the PCI.

Toward the end of a trial, a second experimenter, responsible for the target selection and presentation (Target Experimenter: TE) randomly selected a location from among a pool of 20 (five sets of four sites) using the random function in Excel. The location was set up in TE's office using Google Earth. On completion of a trial, PE photocopied the participant's description of the target and gave the copy to TE for safekeeping before being informed of the target identity. PE then brought the participant to TE's office to view and interact with the target location using Google Earth. This process was repeated for the second trial using a second target pool consisting of a further 20 locations.

An independent judge was provided with participants' descriptions of the target sites along with information about which set the target came from. The four locations in that set were rated for similarity on a 0–99 scale and rank ordered. As with previous research by the first author, the primary outcome measure was prespecified to be sum of ranks. By this measure, performance in the ganzfeld condition was significantly better than chance ($z = 1.768$, $p = .038$: HR = 35%) and performance in the remote viewing condition was suggestively better than chance ($z = 1.627$, $p = .052$: HR = 30%), allowing us to reject the null hypothesis. Performance was not significantly related to personality and individual difference measures. However, 3 of the 12 sub-dimensions of the PCI did correlate significantly with ganzfeld performance, with higher z scores for target sites being associated with greater absorption in their subjective experience, lower physiological arousal, and less internal dialogue. Associations with other sub-dimensions were small and did not approach significance.

We would like to thank the Society for Psychical Research's Research Grants Committee for their kind financial support for this project.

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EFFECTS OF PARTICIPANT AND TARGET SYSTEM LABILITY UPON PK PERFORMANCE USING AN I CHING TASK

CHRIS A. ROE, HANNAH MARTIN, & SOPHIE DRENNAN

ABSTRACT: Relatively few parapsychological experiments investigating micro-PK effects have been designed to consider psychological or individual differences factors, and those variables that have been considered have been subject to too few replications to give a clear indication of which persons may perform best under which conditions (Gissurarson & Morris, 1991; Roe, 2001). Previous research by the first author discovered and replicated an interaction effect between an individual differences factor, participant lability, and a situational factor, target system lability (Holt & Roe, 2006; Roe & Holt, 2006). The present study was designed to conceptually replicate that finding using a novel task so as to control for possible artifacts due to the computer program or task used there. An alternative task was built around the I Ching divination procedure, which it was felt retained important characteristics of being personally relevant for the participant and intuitively straightforward to understand. Methodological weaknesses in previous I Ching experiments were addressed here, in particular by automating the I Ching casting and by having participants rate all possible hexagram outcomes for applicability using the Q-sort method. An opportunity sample of 34 participants completed a battery of measures used to construct a metric of lability, along with a measure of absorption, and decided upon a personal question that the I Ching could help with. Participants were run individually and completed a Q-sort of all 64 hexagram descriptions based on their applicability to their question. Once completed they cast three hexagrams using a computer-based program that used a live random number generator (Live), the pseudorandom function of the computer (Pseudo), and a predetermined list of random numbers derived from published tables (Table). The order of conditions was randomized across participants, who remained blind as to the source of randomness in each case. The Q-sort positions were used to rate the applicability of the selected hexagrams. Although the general pattern of performance was in line with prediction, with the highest average ratings awarded to hexagrams selected by the most labile Live method, next highest for the moderately labile Pseudo method, and worst ratings for the most stabile Table method, the mean shifts were small and nonsignificant ($F_{2,58} = .571$, $p = .568$). Similarly, although the highest overall performance was achieved by the most labile participant group, an intermediate level of performance was recorded by the intermediate group, and worst performance was by the stabile group, the modest differences were not significant ($F_{2,29} = .099$, $p = .906$). Therefore, despite the pattern of performance being superficially similar to that reported in previous studies, this experiment was not able to replicate the interaction between participant and target system lability ($F_{4,58} = .896, p = .473$). Possible causes for this failure to replicate are considered, including that the original studies' findings reflect Type I errors, and that the sampling method was insufficiently sensitive to belief and expectancy factors. Suggestions are made for future research, particularly with

respect to identifying variables that might have contributed to the unexpectedly large variance in scores due to "error."

We would like to thank the Bial Foundation (award 104/08) for their kind financial support for this project.

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THE ATTENTION-FOCUSING FACILITATON PARADIGM: REMOTE HELPING FOR MEDITATION? A META-ANALYSIS

STEFAN SCHMIDT

ABSTRACT: The attention-focusing facilitation experiment operationalizes the question whether one participant can help remotely another participant in an attention task.

One participant has to focus his or her attention on a candle contained in a translucent glass holder. Whenever s/he notices that his or her mind is wandering, s/he is asked to return with his or her attention to the candle and to press a button. The frequency of button presses within a certain time interval is an indicator of mental distraction and serves as a behavioral dependent variable. A second participant is located in a distant and isolated room. No normal means of communication are possible between the two participants. This second person acts as a "remote helper." The helper has a monitor which displays either one of the two experimental conditions, that is, "Control" or "Help." During "Help" periods the helper is asked to focus his or her own attention on a similar candle and to maintain at the same time an intention for the distant participant to focus well on his or her object. During control periods the helper is asked to occupy his or her mind with other matters and should not think about the experiment.

Research of the relevant literature as well as personal communication with the active researchers involved yielded 12 such studies with almost identical design. They were conducted between 1993 and 2006 and a meta-analysis on this data set was performed. Unpublished studies were included in the analysis. One study was not eligible due to an artifact identified by the original author. Studies were coded and result parameters (N, t values, p values) were extracted. For each study an effect-size d for the difference between control and experimental condition was calculated. These effect sizes were combined by a weighted fixed effects model. Overall we found for 11 eligible experiments with 576 single sessions an effect size of $d = 0.11$ with $p = .009$. Regarding study quality, the sample of 11 studies can be separated into two larger groups and into two single studies. Separate analyses of the two larger subgroups showed more or less the same picture as the whole sample; none of these subgroups was solely responsible for the overall effect size or the amount unexplained variance. Thus it can be assumed that study quality is not a significant moderator.

The comparison of this finding with a meta-analysis on EDA-DMILS studies as well as remote staring studies applying electrodermal activity as dependent variable yielded almost identical results. The close similarity of these results can be regarded as mutual independent confirmation of each of the single meta-analyses. Therefore, it can be concluded that the three experimental designs are likely to test the same effect of distant intentionality. The operationalization of the attention-focusing facilitation experiment (i.e., sustained attention on an object) is very close to a standard meditation procedure. Thus we can furthermore assume that group meditation or directed helping of other meditation supports the ability to stay concentrated. We call this effect *sangha* effect, which is the Buddhist notion for meditation groups.

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INVESTIGATION OF ANOMALOUS PHYSIOLOGICAL STIMULUS DISCRIMINATION

TIM SCHÖNWETTER & WOLFGANG AMBACH

ABSTRACT: *Objectives*: A physiological reaction to a presented stimulus is influenced by stimulus novelty, significance, and intensity. This reaction, which is called orienting response (OR), consists of motor components, autonomic components (e.g., cardiovascular and skin conductance responses), electrocortical responses, and respiratory changes and should ensure an optimal perception of the stimulus.

When objects of the same object category are presented serially while measuring physiological data simultaneously, objects differing with respect to their intensity, novelty, and/or significance can be distinguished by means of the physiological responses they evoke. Anomalous stimulus discrimination refers to the occurrence of significant differences in physiological reactions to objects, although these objects do not differ obviously in intensity, novelty, and/or significance for the subject at that time.

In a forced-choice guessing task, Sartori et al. (2004) presented four calm pictures successively and measured heart rate simultaneously. After that, the subject had to guess which of the presented pictures the computer would randomly choose as a target later (precognition condition) or which picture the computer had already randomly chosen as a target (clairvoyance condition). Thereafter the correct target was presented to the subject. In both conditions a significantly higher heart rate occurred during the 10-s presentation of the target picture. The rate of correct choices was at chance level. The results of the precognition condition were replicated by Tressoldi et al. (2005).

This study aimed at investigating the above-mentioned effect in three ways. First, a replication of the effect was intended by using a similar forced-

choice guessing task and the same analysis of the heart rate, but with a different set of stimuli. Second, it was examined whether the effect can also be found in peripheral physiological measures other than heart rate (multi-channel physiological measurement). Third, correlations of behavioral and physiological data with personality traits were investigated.

Method: A sample of 48 subjects completed a forced-choice guessing task. In each of 14 blocks, four pictures of objects of a particular object category (e.g., household articles) were presented successively on a display screen, each for 10 seconds. Thereafter, the subject had to forecast which object the computer would randomly choose as target later. After the subject had made his or her choice, the randomly chosen target was presented. The sequence of the object-categories and of the objects within each category was balanced across subjects. Positions and objects of the targets within a block were not balanced across subjects because targets were chosen by the computer randomly and directly after the subject's choice.

Electrodermal activity (EDA), thoracic and abdominal respiration (RLL1 and RLL2), heart rate (tonic HR and phasic HR), and finger pulse waveform length (FPWL) were recorded. Furthermore, the subjects' scores on paranormal belief (Australian Sheep-Goat Scale), absorption (Tellegen Absorption Scale) and openness to experience (NEO-FFI) were collected.

For replicating the effect, found by Sartori et al. (2004) and Tressoldi et al. (2005), tonic HR was analyzed as in these studies. For analyzing the multi-channel physiological measurement, raw data was transformed into z scores and averaged for targets and nontargets for each subject.

Correlations were assessed between the numbers of subjects' correct choices, scores on personality scales, and physiological response differences between targets and nontargets.

For analyzing correct choices, a binomial test for proportions was used. For the physiological measures effect sizes (Cohen's d) were computed; p values were assessed by paired t tests.

Preliminary Results: The number of targets correctly identified across all subjects was at chance level (proportion = 0.263, $z = 0.738$, $p = .460$).

The replication analysis revealed no significant difference in HR between targets and nontargets when the whole interval of stimulus presentation was evaluated ($d = 0.003$, $t(6719) = 0.455$, $p = .649$). An exploratory inspection of the HR offered two separable time windows. The first 5 s after stimulus onset revealed a significantly stronger increase in HR for targets than for nontargets ($d = 0.017$, $t(3359) = 2.187$, $p = .029$). In the following 5 s HR decreased without a significant difference between targets and nontargets ($d = -0.011$, $t = -1.409$, $p = .159$).

The analysis of the multi-channel physiological measurement showed no response differences between targets and nontargets for EDA ($d = 0.196$, $t(36) = 0.655$, $p = .510$), RLL1 ($d = 0.288$, $t(47) = 1.116$, $p = .270$), RLL2 ($d = 0.321$, $t(47) = 1.241$, $p = .221$), pHR ($d = 0.289$, $t(47) = 1.119$, $p = .269$) and FPWL ($d = -0.026$, $t(39) = -0.093$, $p = .926$). An explorative investigation of the first 5 s after

stimulus onset revealed a significantly higher pHR (raw data was used because of a higher effect size) for targets than for nontargets ($d = 0.541$, $t(47) = 2.371$, $p = .022$). The difference in the following 5 s was not significant ($d = 0.096$, $t(47) = 0.583$, $p = .563$).

No significant correlations between scores on personality scales, number of correct choices, and physiological response differences between targets and nontargets occurred.

Discussion: The aim of this study was to investigate anomalous physiological stimulus discrimination as found in the studies of Sartori et al. (2004) and Tressoldi et al. (2005). This was intended by the attempt to replicate the effect, to use additional physiological measurement, and to examine correlations of physiological responses with scores on personality traits.

For the same time interval (10 s) and with the same method of data analysis as in the mentioned studies, no significant difference was found for HR between targets and nontargets. Effect sizes turned out to be small and fell behind the effect sizes of Sartori et al. (2004) and Tressoldi et al. (2005).

However, further and explorative investigation of HR revealed a significantly stronger increase within the first 5 s of stimulus presentation for targets than for nontargets. It is of interest whether this increase is similar to the effect found in earlier studies (Sartori et al., 2004; Tressoldi et al., 2005). For a clarification, time courses of HR might be compared between studies. Future studies should investigate the characteristics of HR for targets and nontargets during the stimulus presentation in this forced-choice guessing task.

The results of the multi-channel analysis did not reveal significant differences between targets and nontargets. However, an explorative analysis of pHR supported the above-mentioned finding of a possible effect during the first 5 s after stimulus presentation. Phasic HR increased significantly more for targets than for nontargets. Further studies should focus on this time period.

Subjects' scores on paranormal belief, level of absorption, and openness to experience did not correlate significantly with physiological response differences between targets and nontargets.

As above-mentioned, targets were chosen randomly by the computer. Hence, target positions were not balanced across subjects. In case of an unequal distribution of the target positions, a habituation of the physiological reactions within blocks could have influenced the results. A control for this distribution would be important for a concluding interpretation of the data. An attempt to control statistically for target positions is in preparation and will be discussed.

This study is a supplement to a project funded by the Bial Foundation, Portugal.

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AN EMPATHIC AGENT SYSTEM BASED ON FIELD CONSCIOUSNESS

TAKESHI SHIMIZU & MASATO ISHIKAWA

ABSTRACT: Is the development of a human-like agent (machine, robot, or PC software) with real emotions or empathy a possibility? Based on studies within the domain of field random-event generators and random-number generators (REG and RNG, respectively), which report that the outputs of RNGs demonstrated statistical biases when group consciousness was evoked by certain major events (Nelson et al., 2002), we created an emotional expression display system using a physical RNG.

Although several hypotheses have been proposed to explain the bias in RNG outputs, group emotion remains one of the dominant variables. A system that expressed emotions corresponding to field consciousness would be able to laugh, cry, or show anger, depending on the group emotions evoked by such events as a comedy or tragedy.

Emotional expression system: In psychology, human facial expressions are categorized primarily in terms of boredom, happiness, surprise, fear, anger, disgust, and sadness (Russell & Bullock, 1985). Using nonmetric multidimensional scaling (MDS) the facial expressions corresponding to these emotional categories have been plotted on two-dimensional space. Although some studies have differed with respect to the second axis, the first factor has generally been interpreted as "Pleasure-Displeasure" and the second as "Arousal." We explored the way in which these two axes correspond to statistics derived from RNG outputs.

We developed this system using software produced by the FDK Corporation that draws pictures of faces as field emotions using physical RNG, RPG 102/105 hardware. This system generates 512-bit random numbers, calculates the sum of bits produced in a second, and standardizes this value in terms of z scores (an approximately normal distribution with an expected mean of 256). The system next calculates Stouffer's Z and chi-square scores in real time using data from the most recent 600 s (10 min).

Pleasure-Displeasure: Stouffer's z scores, derived from the sum of the bits produced within 10 min, are assigned to the first axis. Our system displays faces reflecting the experience of pleasure when Stouffer's z scores increase and faces reflecting the experience of displeasure when these scores decrease. Although this assignment is partially different from the results of previous studies (Blasband, 2000; Lumsden-Cook, 2005a; 2005b), outputs of the RNG would be related to expectation or the hypotheses of researchers. The model is more or less based on our hypothesis.

Arousal: Previous field REG/RNG studies have reported that high chi-square values emerge when many people focus on the same event, such as the Olympic games, a terrifying disaster, and events that are covered by the mass media (Radin, 1996). Thus, our system assigns chi-square values to the second axis. Expressions of surprise or strong interest are displayed when the chi-squares

are higher than expected, whereas relaxed or bored expressions are displayed when these statistics are lower than expected.

This system produces nine types of faces that correspond to the two statistical measures. One, the default setting, is an emotionless face. When the total z score derived from the two kinds of z scores (Stouffer's Z and the z score calculated from the chi-squares) is greater than the threshold level (total z scores > 1.00), the system displays the appropriate emotional face based on the two-dimensional assignment (these assignments can be easily changed for the purpose of control experiments).

Purposes: Our system can be used in those field REG/RNG experiments in which group emotion arises in the context of comedy performances, funerals, and sports events. It can also be applied to PK experiments in which participants imagine an emotional face or an emotion itself. In addition, experiments on nonintentional PK using psychological measures can test correlations between the frequency with which each face appears and the emotions of participants.

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INFLUENCE OF GEOMAGNETIC ACTIVITY ON ARTIFICIAL INTUITION DEVICE PERFORMANCE

MARK ZILBERMAN

ABSTRACT: Multiple publications show that many psychological and parapsychological phenomena correlate with geomagnetic activity. A similar link with geomagnetic activity was also detected for the Artificial Intuition Device. The Artificial Intuition Device (AID) employs a hardware solution to the problem of artificial intuition and replicates some predictive abilities of human intuition on specially designed scientific equipment. During the public test of the Artificial Intuition Device started in 2008, the device was programmed to generate and post lottery predictions on the Internet *3 hours in advance* of a daily lottery draw (web page: www.intuitiontester.com/summary.html). To make testing 100% independent, these predictions were also downloaded and recorded onto an independent computer at the Anomalistic Psychology Research Unit located at the Goldsmiths College of London University (UK) before a daily lottery draw. Analysis of accumulated statistics shows that AID is able to generate profit and that its performance depends on geomagnetic activity (GA). Both observations "AID works better on the geomagnetic-quiet days" and "AID works better when geomagnetic activity decreases," which were detected during the private phase of this research, the results of which were published in 2008, were confirmed during this public testing period. Below is a summary of results.

(a) The separation of all predictions into two almost equal samples of days with an Ap-index of geomagnetic activity $Ap < 4$ and $Ap \geq 4$ produced samples with entirely different profit and Return on Investment (ROI). The 298

geomagnetic-quiet days with Ap < 4 produced ROI equal to +20.8% and generated profit of $930. (As per the null hypothesis, the ROI should be -10.0% and loss should be -$447.) In contrast, the 279 days with increased geomagnetic activity (Ap > =4) produced a negative ROI of -17.6% and a loss of $735.

(b) AID performance is related to geomagnetic activity changes across days. On the 262 days when the Ap-index was less than the Ap-index of the previous day, AID produced a ROI of +26% and generated profit of $1,020. In contrast, on the 315 days when the Ap-index was greater or equal to the Ap-index of the previous day, AID produced a ROI of -17.5% and a loss of $825.

(c) AID performance is also strongly related to geomagnetic activity changes within each day. On days when geomagnetic activity was decreasing, AID produced a ROI of +53.3% and a profit of $2,295. In contrast, when geomagnetic activity was increasing during the day, AID produced a ROI of -48.3% and a loss of $2,100.

The influence of geomagnetic activity changes within the day on AID performance was also found in data collected prior to the public test phase. On the days with decreasing geomagnetic activity, the Artificial Intuition Device has consistently (in all years: 2006–2009) generated a ROI above 40% and a profit above $1,000 (instead of losses as per the null hypothesis).

www.intuitiontester.com

PANEL: ANOMALOUS EXPERIENCES AND MENTAL HEALTH

CHAIR: NICOLA HOLT

ABSTRACT: This panel will explore recent developments in psychology, clinical psychology, and counseling with regard to anomalous experiences. Anomalous experiences can be associated with psychopathology, but they can also be associated with very good mental and physical well-being. Members of this panel include researchers on the psychology of anomalous experiences and those who are working in the applied field (clinical psychology and counseling). Discussion will include exploration of the differences between healthy and less healthy experiences and anomalous experiences and health within members of the nonpsychiatric normal population, the role of mindfulness and appraisal of anomalous experiences, and insights gained from clinical practice with those experiencing anomalous phenomena in France, the UK, and Germany.

COUNSELING WORK AT THE IGPP: AN OUTLINE

EBERHARD BAUER

ABSTRACT: The Institut für Grenzgebiete der Psychologie und Psychohygiene (IGPP) [Institute for Border Areas of Psychology and Mental Hygiene] in Freiburg (Germany) was founded in 1950 by Hans Bender (1907–1991), the most important

pioneer of German parapsychological research after WWII. Since its foundation, information, counseling, and education with regard to genuine or alleged "occult," "magical," "supernatural," and "paranormal" phenomena have been central tasks of the IGPP. They are combined under the umbrella of "mental hygiene." After substantial new funds became available in the early 1990s, the IGPP started, since 1996 in collaboration with the Institute for Psychology of Freiburg University, a special research project on "Counseling and Help for People Claiming Exceptional Experiences," which was directed between 1998 and 2001 by clinical psychologist Martina Belz. The goal of the project was to develop, implement, and evaluate a special counseling and treatment concept for people who felt distressed or burdened by exceptional experiences (ExE). In accordance with current regulations and standards of basic documentation in psychotherapy, a special documentation system ("DOKU") was developed by the IGPP counseling group to record systematically sociodemographic, anmnestic, and phenomenon-specific data. Using this documentary system, it was possible for the first time to record continuously and systematically, as well as to evaluate statistically, the number of IGPP counseling cases. There exists now a carefully documented database of cases ($N = 1615$) which can be used for different research strategies. One example: Using Metzinger's theory of mental representation, four basic categories of ExEs could be described: (1) internal phenomena, (2) external phenomena, (3) psychophysical dissociation, and (4) coincidence phenomena, which lead to a six-category phenomenological ExEs scheme (Internal Presence & Influence; Poltergeists & Apparitions; Extrasensory Perception; Meaningful Coincidence; Mediumship & Automatism; External Presence & Paralysis). At the moment, the IGPP counseling team consists of four licensed psychologists with a clinical-therapeutical background and a long-time experience with counseling in "Clinical Parapsychology" working part-time who meet each other on a weekly basis to discuss incoming cases. For clients, psychotherapeutic treatment can be offered. Twice a year, the IGPP counseling team is offering educational seminars on ExEs specifically directed toward psychological and medical psychotherapists as well as to counselors in psychosocial care. Also catamneses of the IGPP counseling clientele are being performed on a regular basis. In preparation is an IGPP project dealing with online ExE counseling and information services which are considered a useful supplement to and extension of the existing telephone, mail, and face-to-face counseling.

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DIFFERENTIAL CLINICAL PRACTICE OF ANOMALOUS EXPERIENCES

RENAUD EVRARD

ABSTRACT: The concept of schizophrenia in the DSM, inherited from Bleuler, postulates that every peculiar idea can be a sign of psychosis. Thus some items of psychiatric questionnaires detect psychosis by association with statements of

paranormal beliefs or anomalous experiences. This kind of pathologization of anomalous experiences is blind to certain nuances and has perverse effects on discourse about and types of care for these experiences (Schetsche, 2003). More recent work based on semistructured diagnostic interviews or questionnaires (Brett et al. 2007; Evrard, in preparation; Schofield & Claridge, 2007; Spriet, 2006; Zahradnik, 2007) reveal individual differences in the appraisal of anomalous experiences, differences that involve a differential diagnosis of peculiar experiences in their relation to mental health and to possible clinical practice.

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WHAT CAN CREATIVITY RESEARCH TELL US ABOUT HEALTHY ANOMALOUS EXPERIENTS?

NICOLA HOLT

ABSTRACT: Creativity (especially involvement in the arts) is related to reports of anomalous experiences (such as mystical experiences and lucid dreams) and to the unusual experiences subscale of schizotypy, with its focus on pseudo-hallucinations and paranormal experiences (Ayers et al., 1999; Holt, 2007; Nettle, 2006; O'Reilly et al., 2001). This talk will focus on models that have been used to explain this association, which are: (1) a medical model, contextualizing anomalous experiences within a disease framework and associating creativity with bipolar disorder and schizophrenia (Jamison, 1989); (2) a "controllable oddness" model, which suggests that creative people have a cognitive framework and/or personality that enables them to successfully navigate between anomalous and "ordinary" experience (Barron, 1993); and (3) a "healthy anomalous experiences" model, which suggests that creativity is associated with distinct types of anomalous experiences, those that are inherently healthy, positive, and meaningful, such as the "flow state" (Csikszmentmihalyi, 1996). Focus will be given to the latter two models and factors that might distinguish between anomaly-prone "creatives" and those labeled as suffering from schizophrenia will be discussed (such as ego-strength and attentional control). The unique role that artistic or creative expression might play in the processing of anomalous experiences will be briefly considered, in accordance with research showing that how anomalous experiences are interpreted is important for subsequent health (Kohls & Walach, 2007).

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APPROACHES TO COUNSELING THOSE WITH ANOMALOUS EXPERIENCES

STEFAN SCHMIDT

ABSTRACT: Counseling with clients who had anomalous experience is usually neglected in the general approaches to counseling and psychotherapy.

Nevertheless, we know from several surveys that a high amount of the population has had anomalous or exceptional experiences. The number of clients seeking either help or information who approach the few existing institutions dealing with these topics furthermore demonstrates the need for professional counselors to deal with these issues. Currently, several institutions have developed their own and often specific approaches to handle these cases. In order to benefit this field and broaden and generalize the knowledge about how to counsel clients seeking help regarding their exceptional experiences, several things may be needed. First is an overview and also a classification of the types of experiences people are reporting who seek a counseling office. This kind of data has been recently provided by two groups from Freiburg, Germany. Second is a somewhat coherent model of how to encounter problems reported by the clients (e.g., black magic against them, RSPK in their houses) or for all those seeking information on how to deal with this demand, especially in the cases where there is no easy explanation at hand. So far, only a very limited amount of models and/or explanations are available, and a systematic empirical validation of their predictions has not taken place yet. Third is a basic counseling approach that is appropriate for dealing with this specific type of clients and cases. Here many different methods are available from counseling and psychotherapy which are also validated empirically. I will argue that one specific approach named systemic counseling (or family counseling), which is theoretically based on a constructivist and system theory approach, offers a large set of advantages for this particular task.

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HOW MIGHT WE MANIPULATE ANOMALOUS EXPERIENCES FOR MENTAL HEALTH AND TRANSCENDENCE?

Christine Simmonds-Moore

ABSTRACT: Many people who have experienced subjective anomalous or paranormal phenomena contact academic institutions that undertake teaching or research on academic parapsychology. In addition, some people are intrigued by paranormal experiences and are interested in learning how to experience more psychic phenomena or undertake "psychic development." Other people report feeling overwhelmed and confused by their anomalous experiences and want to learn how to switch them off or gain control over them. At present there are no clear guidelines available to those working at the public face of parapsychology and psychic development. This presentation will introduce the ideas of trait and state anomaly proneness, focusing on the personality type, positive schizotypy, and sleep-related states of consciousness. It will summarize the differences between healthy and less healthy anomalous experiences, and suggestions will be made

with regard to the manipulation of anomaly-prone states, such that anomalous experiences may be experienced in a healthy way, or switched off.

Liverpool Hope University, UK

THERAPIST/COUNSELOR ATTITUDES TO PSI WHEN COUNSELING CERTAIN TYPES OF ANOMALOUS EXPERIENCE

IAN TIERNEY

ABSTRACT: The editors of the book *Varieties of Anomalous Experience* (Cardeña, Lynn, & Krippner, 2000) give four interpretations of the term anomalous experience, ranging from statistically uncommon experiences, through experiences that involve altered states of consciousness or statistically rare beliefs, to the experience of "unexplain(able)ed" events where the evidence for occurrence of "something" is strong.

When counseling individuals disturbed by experiences which fall into the first three interpretations, then standard psychotherapeutic approaches are appropriate. These experiences fall within the province of "established" psychology. Discussions of hallucinations, delusions, rare beliefs, mystical experiences, and other claims of parapsychological experience with absolutely no corroborating evidence are of this type. Therapy usually involves nondirective counseling, reflecting the experience back to the experient in various ways. The therapist's attitude or belief about the nature of the experience need not, and possibly should not, be part of the discussions.

However, when counseling individuals affected by events falling within the fourth interpretation of "anomalous" experience, this detached attitude cannot be sustained by the therapist. Most commonly, events of this type involve RSPK. At a minimum the therapist's attitude to such events, if asked, has to be that they can and do occur, in the common-sense use of the term, although causes are little understood. The alternative is to risk the experient/s believing that they are not believed, with consequent alienation from the therapist. A very recent event in Scotland is used as an illustration of this type of event.

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INVITED ADDRESS: WHY I AM ABSOLUTELY CONVINCED OF THE REALITY OF PSYCHIC ABILITIES, AND WHY YOU SHOULD BE, TOO

RUSSELL TARG
Outstanding Career Award, 2009

ABSTRACT: In May of 1956, I left my graduate studies in physics at Columbia University and prepared to begin work in plasma physics at the research

laboratories of Sperry Gyroscope Co., in Great Neck, NY. After a decade of reading the research literature of ESP and experiencing psi on the stage as a performing magician, I gave myself the summer of my 22nd year to go to Europe to look for psychics and visit ESP research labs. One of my first stops was the Society of Psychical Research in Adam and Eve Mews in London. There, Mrs. Goldney gave me a cup of tea and a copy of the *Proceedings of the CIBA Foundation Symposium on Extrasensory Perception,* which had been held the previous year. I read it with great disappointment. The conclusions of the world's leading researchers, A. S. Parkes and J. F. Nicol, were that, if ESP was ever shown to exist, it would be very important for mankind. ESP was thought to be either a "weak and unrepeatable artifact of a very few subjects, or a defect in our understanding of probability theory." Those words were repeated, almost exactly, by a distinguished U.S. researcher in 1982, at the 100th anniversary celebration of the SPR at Cambridge. Have we made any progress in the 55 years since the CIBA conference?

During my 40 years of association with the PA, I've seen many hopeful speakers ask the attendees for a show of hands with regard to how many members of the audience were absolutely convinced of the reality of ESP. Neither the past President Ed May nor I have seen even a 50% affirmative response. How can we make progress in understanding psi, if we are not even sure that it exists? Philosopher Stephen Braude, also a past President of the PA, discusses the issue of belief in his seminal book on survival of consciousness, *Immortal Remains*. He argues that superpsi is not a parsimonious description of the survival data.

He could just as well be arguing for the existence of psi. Braude says, in effect, that in order to try and explain away the century of data for psi (or survival) as a combination of "error and fraud," we would have to deal with "a crippling burden of complexity," with which one could argue against the existence of anything. Prof. Jessica Utts makes this point in her 1995 analysis of the ESP database, in the *American Institute of Research Evaluation of Remote Viewing* for the CIA. She says that the reality of psi has been established as well as any other statistical phenomena. As a physicist, I can agree that we don't understand the mechanism of psi. Among other things, the data for precognition convincingly show that we don't even understand the nature of causality. This is the most seriously misunderstood aspect of psi.

The following data which track my career at SRI have convinced me, without a doubt, that our awareness is nonlocal, our consciousness is limitless, psi is real, and its accuracy and reliability are independent of distance and time. I believe that who we are is a reflection of our extraordinary nonlocal (and probably eternal) consciousness. That is why I continue to teach remote viewing internationally. I cannot wait to see what the future holds!

In 1974, we at SRI worked with retired Burbank, CA, police commissioner Pat Price and carried out nine double-blind remote viewing trials in which Price was asked to describe Hal Puthoff's randomly chosen locations. From a pool of 60 possible locations, Price had seven first place matches ($p = 3 \times 10^{-5}$, effect size = 1.3).

In 1975, we were asked by the CIA to find an inexperienced "control" subject. I chose my good friend, photographer Hella Hammid. In nine double-blind trials of outdoor locations, she obtained five first place matches, and four second place matches (p = 2 x 10-6, effect size = 1.5). These two experiments were published in the March, 1976, *Proceedings of the IEEE.*

In 1972, Dr. Hal Puthoff and I co-founded the SRI remote viewing program. We began the applied SCANATE Program with painter Ingo Swann and Pat Price, successfully looking into and describing an NSA secret cryptographic site in Virginia. Pat named the site and read code words from the files, confirmed by both NSA and CIA. Reading anything is an exceptional feat in our remote viewing experiments.

1973: Price described, and drew to scale, a Soviet Siberian weapons factory at Semipalitinsk, with an enormous eight-wheeled gantry crane and a concealed 60-foot steel sphere under construction. This was all confirmed two years later by satellite photography.

1974: Price identified and named the kidnapper of Patricia Hearst from the large loose-leaf mug book with hundreds of photos, at the Berkeley California police department, two days after the kidnapping. He then located and led police to the kidnap car 50 miles to the north.

1974: Ingo Swann described a failed Chinese atom bomb test for the CIA, from geographic coordinates. He drew it with colored pencils showing a line of trucks and a pyrotechnic display of the failed test, precognized 3 days in advance of the actual test.

1974: We received a NASA contract called "Techniques to Enhance Man/Machine Communication." This was based on a four-choice ESP teaching machine that I had developed, and which offered feedback, reinforcement, and the option of a "pass." Users learned to recognize a "unique psychic feeling." Working with 150 subjects, we found that 11 of the people demonstrated significant learning, several at the $p < .01$ level. I have now made this four-choice game available as a free application for the iPhone. It is called *ESP Trainer.*

In 1978, Hal Puthoff and I were asked by the Army to choose six Army Intelligence officers from a group of 30, who were to learn remote viewing and set up a program similar to ours, at Fort Meade, MD. Working with these six officers, we carried out 36 trials. We obtained 18 first place matches, in which four people were each significant at p = .003. The probability for the whole experiment is $p = 3 \times 10^{-5}$, effect size = 0.67.

In 1982, I organized a precognition experiment with psychologist Keith Harary, to forecast silver commodity futures. We carried out nine trials to determine the change in the silver market five days in the future. We forecasted up or down, and > or < \$0.25 (p = ¼). We achieved nine out of nine first place matches ($p = 4 \times 10^{-6}$, effect size = 1.4) and we earned \$120,000. The following year we were not successful, possibly because we tried to accelerate the trial rate, with the viewer not receiving timely feedback from the previous trial.

In 1996, working with Jane Katra, two mathematicians, and a redundancy coding protocol, we obtained 11 hits out of 12 trials for silver futures, with six

passes. We each had different target pools, and agreement on direction (up or down) was necessary for the trial to go forward.

In 1978, Joe McMoneagle located a downed Soviet Backfire Bomber with code books on board. He psychically pinpointed the African site. President Carter confirmed the success.

1980: Keith Harary described the poor health of U.S. Vice Consul Richard Queen when Queen was held hostage in Iran. He told of Queen's imminent release in a double-blind trial.

1980: Joe McMoneagle described and detailed the unique, secret construction of a surprising 500-foot Soviet Typhoon class submarine being built in a concrete-block building ¼ mile from the sea, 6 months before its launch. About two thirds of our SRI trials looked like this.

These remote viewing successes continued for the 23-year program at SRI, 1972–1995, with $25 million funding from the CIA; DIA; NASA; and Navy, Air Force, and Army Intelligence. The scientific findings from this program were published in *Nature, Proc. IEEE, American Institute of Physics and the AAAS,* with replications conducted at Princeton, Edinburgh, and Utrecht universities.

I believe this summary shows the importance of working with gifted people, and also that highly improbable "applications," such as Pat Price decisively putting his finger on the photo of Patricia Hearst's kidnapper, should not be academically dismissed as anecdotes.

CONSCIOUSNESS INDUCED RESTORATION OF TIME SYMMETRY (CIRTS): A PSYCHOPHYSICAL THEORETICAL PERSPECTIVE

By Dick J. Bierman

ABSTRACT: A theoretical framework is proposed that starts from the assumption that information processing by a brain, while it is sustaining consciousness, is restoring the break in time symmetry in physics. No specifics are given with regard to which physical formalism, either quantum or classical, is the basis of the subsequent apparently anomalous consequences: "apparent" because the proposed model doesn't require a radical extension or modification of existing physics. Rather it is argued that time symmetry that is already present in current physics should be taken seriously, and a simple initial mathematical formulation is given that allows for specific quantitative predictions. The elusiveness of psi phenomena, the experimenter effect, and the relationship of psi to other theoretical frameworks like decision augmentation theory (DAT), observational theory, and several others, are discussed. One of the major advantages of CIRTS is that it offers handles to link this theory to psychological theories that might explain individual differences. Specific testable predictions are given.

Keywords: theory, retrocausality, presentiment, time symmetry, consciousness, brain coherence

According to Popper (1934), substantial progress in science is obtained if theories are rejected. This argument is often used to justify the study of anomalous phenomena. However, in practice, most research in most sciences follows a different path where probabilistic induction, often seeking support for a theory, is used. Although Popper has been harshly criticized, there is no doubt that seeking support of a theory does result in slower progress than refuting a theory, but this is only true if one can come up with a better theory accommodating the new data.

The progress of parapsychology has been frustrated by the fact that after rejection of the mainstream theory that all "so-called paranormal" phenomena could be explained by errors, there were no generally accepted theories from which precise *falsifiable* psychological hypotheses could be derived. DAT predicted a relationship of effect size with number of observations, dependent on how many human decisions were involved in getting the end result. This prediction differed for RNG-PK from force-like models but did not in principle conflict with other information-based models like Observational Theories (OTs) that attributed the results to instances of (meaningful) observation. The ensuing discussion about what the data actually showed illustrates that these models lack specificity with regard to the underlying processes (Dobyns, 1993). The majority

of paranormal researchers, often psychologists, are oblivious to the specialized quarrels of a few physicists and continue to find *supporting* evidence for a kind of "magical" worldview where things happen that cannot happen, even when these researchers are doing process-oriented work. The processes that are investigated are generally based upon some intuitive notion or a haphazard finding in previous work and not on a theory.

Since psi phenomena are labeled anomalous because they *appear* to be in conflict with our present day physical worldview, any fundamental psi theory should be an extension or a modification of physics. Psychology is not in conflict with psi phenomena per se, so although psychological theories like Honorton's noise reduction model are useful when speculating how to optimize effect size, they do not touch upon the apparent anomalous character of psi.

Extension and modification of physical theories have been proposed by Walker (Walker, 1975); Millar and Hartwell (1979); Houtkooper (1983); Kornwachs and Lucadou (1985); Josephson and Pallikari (1991); May, Utts, and Spottiswoode (1995); and most notably for the present proposal, Donald and Martin's (1976) framework based upon time-symmetric thermodynamics. Although originally developed to explain the genesis of forms in biology, "morphogenetic field theory" can also be considered to assimilate (some) paranormal phenomena (Sheldrake, 1988).

The observational theories (Walker, 1975) assume that the act of observation "injects" information into the observed system, independent of time and space. This approach showed that it was possible to unify all psi phenomena in one theoretical framework. The correlations found in telepathy, clairvoyance, precognition, and PK experiments all were supposed to be produced via the observation of the correlation, that is, upon feedback. The OTs were based upon an especially unpopular solution of the measurement problem in physics, a position that gave special status to an observer. Thus these theories are intrinsically dualistic.

In the present proposal, the focus is upon "time" rather than "information" although the two are related through the second law of thermodynamics. Like the OTs, the present theory claims to unify all psi phenomena.

Based upon converging evidence from many different experimental paradigms, most notably presentiment, I propose to take seriously the fact that most physical formalisms—for instance, electromagnetic theories—are inherently time-symmetric. Although in physical systems time symmetry is not observed, I propose that conscious observation does remove part of the constraints that prohibit time symmetry to occur.

This framework results in straightforward hypotheses that can easily be tested.

The Data: Experimental Time Anomalies

Precognition

Many case reports in the old psi literature concern precognitive dreams (Gurney, Myers, & Podmore, 1886). Dunne (1927) wrote a book, *An Experiment with Time*, in which he not only described many experiences but also gave a theoretical framework. One of the most interesting cases in that book has hardly been noticed in the modern parapsychological literature. It concerns a dream in which a specific number of victims of a disaster appeared. This number was later confirmed in a report in a daily newspaper. Many years later, Dunne, while doing further research on the case, found out that the number mentioned in the newspaper was incorrect. The actual number of casualties was much larger. The conclusion Dunne drew was that the precognitive dream was not on the disaster itself but on the feedback he got from the newspaper! More recently, in a remote viewing trial, the psychic Pat Price described a target location as it was on the old picture that was given as feedback although the actual target had changed after this picture had been taken (Targ, personal communication).

Among the parapsychological meta-analyses databases there is a less well known but very significant meta-analysis concerning precognitive card guessing (Honorton & Ferrari, 1989). Precognition seems to violate one of the basic assumptions of western science, namely "causality." The temporal order of cause and effect appears to be reversed.

Retroactive PK

Immediately after the first publication of the original observational theory (Walker, 1975), it was realized that this theory unified all psi phenomena by introducing the idea of retroactive psychokinesis. ESP phenomena, including precognition, were then accommodated by assuming retroactive PK at the moment of feedback on the brain state back in time when it was producing a call. Psychokinetic effects were all retroactive PK effects directly on a system having some quantum randomness as a determinant of its behavior. The concept of retroactive psychokinesis was ill chosen and caused a lot of confusion because the label suggested that the past could be changed. Rather, there was a "spooky correlation at a distance (in time)" whereby future and past conditions seemed to participate in a handshake that would determine the present.

Such a process should have been described as the present being contingent on future conditions, these conditions mostly being future mental states. This phenomenon had been predicted by the observational theory before it ever was observed. This was the first sign that theory building in parapsychology had reached a mature state. Indeed, retroactive PK experiments were done and in a review of all this work, it was concluded that

the effects were as strong if not stronger than in real-time PK experiments (Bierman, 2004).

Presentiment and Ganzfeld

John Hartwell (1978) published the results of an experiment in which he measured EEG activity in a cued selection task where the random stimuli consisted of a happy or sad face. He found (nonsignificant) differences in the contingent negative variation (CNV) preceding feedback. Since the result was nonsignificant it took another 15 years before Dean Radin (1997) attempted a conceptual replication using skin conductance rather than EEG. The power in this replication was much larger and the results showed a clear and significant difference in psychophysiological behavior dependent on the future randomly chosen stimulus. The effect was labeled as "presentiment." Since then, many conceptual replications have been undertaken. Dependent variables that have been used are evoked potentials (EEG), continuous negative variation (EEG), BOLD (fMRI), inter-beat interval (ECG), eye movements, eye blinks, pupil dilation and blood pressure. Stimuli that have been used are emotional and neutral pictures from the International Affective Picture System, loud and pleasant sounds, and a winning or losing simulated slot machine. In all these cases significant results were obtained. There hasn't been a formal meta-analysis done yet but a good estimate is that significant results are obtained in 50% of the experiments.

Incidental observations of the noisy skin conductance at the trial level showed a remarkable form symmetry before and after the stimulus. For instance, if the response showed a double bump there appeared to be also a double bump, though smaller in amplitude, before the stimulus. Double response bumps may occur, for instance, when a picture shows a lot of redness but it takes some time to find out what really causes all that color (perhaps blood). Of course these anecdotal observations are just what they are, anecdotal, and therefore only have value for hypothesis or model generation (see Predictions section).

Other Time Reversal Paradigms

Presentiment can be seen as a simple time reversed stimulus-response paradigm. Actually one of the big advantages of this approach is that the experiments are identical to normal experiments in the field of emotion research with psychophysiological variables. This time reversal idea has been extended to other standard paradigms in experimental psychology. Thus, we have retropriming (de Boer & Bierman, 2005) where the prime is exposed after the response is recorded, but nonetheless this affects the response to the target. Time reversed habituation where habituation by repetitive exposure of a picture seems to affect the judgment of the same

picture at an earlier time (Bem, in press) has also been reported. In one of the most successful ganzfeld studies (Wezelman, Goerding, & Vanhoeven, 1997) an explicit retrostrategy was used. In this study there were no "senders." Rather, after the ganzfeld session was over, the receivers focused on the actual target trying to transfer the contents to their brain backward in time. Of course, judging was later performed by independent judges. Actually, normal ganzfeld experiments can also be interpreted in this way. In an early ganzfeld experiment, the hypothesis was that due to retroPK the original protocol produced by the "receiver" would contain elements of *all* targets in the target set that was observed later by that receiver. Indeed, it was found that independent judging of the whole target set against the protocol (compared with a randomly chosen control target set) provided suggestive evidence for psi on the whole set (Bierman, 1988).

Time Symmetry in Mainstream Data

As has been noted, the presentiment paradigm is identical to most mainstream stimulus-response experiments with psychophysiological variables, for instance, in emotion research. Thus it should be easy to locate similar effects in mainstream data. However, randomization in the mainstream is mostly "randomization without replacement" in order to keep some counterbalancing and have all cells in a design equally populated. This prevents strong conclusions when analyzing the data because "randomization with replacement" is required for that. Subjects generally pick up quickly on the distribution of trials over the conditions and start to guess what the condition of the forthcoming trial will be. One could say they fall into the trap of the gambler's fallacy, but alas, in the case of the generally used "randomization without replacement" this is no trap but gives the subject an above chance possibility of guessing the next stimulus condition. Nonetheless, two datasets of mainstream research could be analyzed, and in both, indicators of presentiment, cautiously called anomalous baselines, could be assessed, with the caveat that they could possibly be explained by weak randomization (Bechara, Damasio, H., Tranel, & Damasio, A., 1997; Bierman, 2000; Glöbisch, Hamm, Estevez, & Ehman, 1999). Recently, mainstream neuroscientists themselves point out that the brain behavior preceding stimuli or events seems to correlate with the type of event that will follow later. Although causal explanations are not totally excluded, these phenomena do puzzle these researchers, and one of them even "confessed" that time symmetry looked like a more natural explanation of his data (Lamme, 2008, personal communication). It concerns phenomena as diverse as: monkey brains indicating what the movement of an ambiguous stimulus will be (about 3 s before stimulus onset; Naotsugu, 2008), subjects performing a voluntary choice between two alternatives (about 10 s before decision; Soon, Brass, Heinze, and Haynes, 2008), Transcranial Magnetic Stimulation (TMS) induced percept doubling where the illusory percept seems to act as a prime

(Joly & Lamme, 2010). Other TMS-induced apparent retrocausal effects are in a Libet paradigm (Lau, Rogers, & Passingham, 2008) and pupil dilation (Einhauser, Stout, Koch, & Carter, 2008).

Time Symmetry in Physics

Almost all formalisms in physics are time-symmetric. Given specific initial conditions, solving the equations generally results in two solutions which are identical but reflected in time: $S(t) = S(-t)$. This holds for classical particle mechanics, electromagnetic theory, and depending on the type of formulation/interpretation, also for quantum physics. In the transactional formulation of quantum physics this is most obvious. Formulations of quantum physics that interpret the projection postulate as a collapse of the wave function possibly introduce a break of time symmetry at the point of collapse. It should be noted at this point that several authors (Bierman, 1988; Costa de Beauregard, 1998) have already argued that, due to this fundamental time symmetry, paranormal phenomena are natural and *should* be expected as a part of physics.

Thermodynamics, or more generally, formalisms that deal with ensembles like statistical mechanics, seem to be the only exception although several authors have argued this is only due to boundary conditions (Price, 1996). In thermodynamics it is postulated that closed dynamic systems always develop with time in such a way that the structure in the system becomes smaller.

Thus a film of the trajectory of a (frictionless) billiard ball can be played forward and backward without anyone being able to discriminate between the two. This certainly doesn't hold for solving a sugar cube in hot tea. Actually *if* time would run backward in a thermodynamic system, one would observe this as an increment in structure. For instance, one could observe a sugar cube arising from a sweet solution by just stirring that solution.

EM Theory, Wheeler, and Feynman

Although most physicists assume that the solution S(-t) of the physical formalisms is in some way forbidden, and in spite of the fact that this solution apparently has never been observed in physical systems, some theoretical physicists, most notably Wheeler and Feynman (1945), have tried to find a reason why this solution seems to be forbidden rather than impose the restriction ad hoc.

Wheeler and Feynman focused on classical electromagnetic theory because thermodynamic effects related to temperature are irrelevant there. So the question they tried to answer was "why do we observe a (retarded) wave going from an electromagnetic transmitter outward in space and forward in time, while we don't observe a collapsing (advanced) wave coming from afar to the transmitter (acting then as an absorber) going backward in time"?

After a thorough analysis they suggested that this asymmetry is due to the cosmos being far out of equilibrium. More specifically, they postulated that there was an extreme imbalance between the number of multiple particle coherent (quantum) transmitters, like lasers, and the equivalent multiple particle coherent absorbers (of EM radiation). Possibly a substrate known as Bose-Einstein condensate could be called a multiple particle coherent absorber. It should be noted that Price (1996) argues that the Wheeler-Feynman treatment of time symmetry was circular because by using the concepts of transmitter and absorber they subtly introduced some "preferred" time direction to begin with. Price also deconstructs suggestions in which the boundary condition of the Big Bang has been used to explain the fact that retarded solutions are totally dominant. The conclusion that this must be the reason for the breaking of time symmetry is still a controversial issue. However, the very reason that serious efforts have been made in theoretical physics to "explain" which conditions do result in this asymmetry suggest that there are also conditions under which the symmetry might partially be restored.

Consciousness Induced Restoration of Time Symmetry (CIRTS)

The Fundamental Speculation

The fundamental assumption of CIRTS is that the brain, when it sustains consciousness, is a special system that partially restores time symmetry and therefore allows "advanced" waves to occur.

It should be stressed that this fundamental assumption does *not* violate any physics as we currently know it. The only thing it does is to speculate that solutions allowed by the formalisms but never observed might be observed under special conditions involving consciousness. Note further that it is not the brain per se that is supposed to be a time symmetry restoring condition, but only the brain that sustains consciousness. One of the big mysteries in consciousness research has always been that different brain regions process different aspects of an object, like color, form, and movement. Nonetheless, the conscious percept is an inseparable whole. Global and *coherent* synchrony in firing has been proposed as a means to bind these different aspects again into a whole. Therefore, we propose that coherence is a crucial moderating variable.

The basic assumption can further be specified by assuming that the restoration of time symmetry is proportional to some global coherence measure that also incorporates the brain volume involved in this coherence (Singer, 1999).

Thus, as shown in Figure 1, if we present a stimulus to a subject, then the "normal" solution of the physics that eventually results in a skin conductance measure might yield a signal $S = f(t)$.

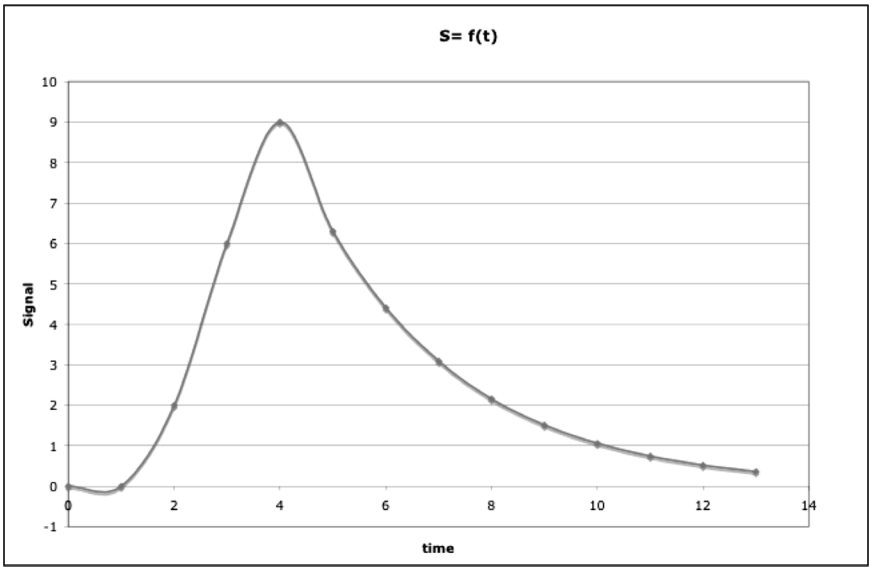

Figure 1. A typical skin conductance response. Time = 0 corresponds to stimulus onset.

However, if the stimulus is observed consciously, time symmetry will kick in and:

$$S = f(t) + A * f(-t) \quad [1]$$

$$A = \text{Relative coherence} * \text{Brain volume} / (\text{Total brain volume}) \quad [2]$$

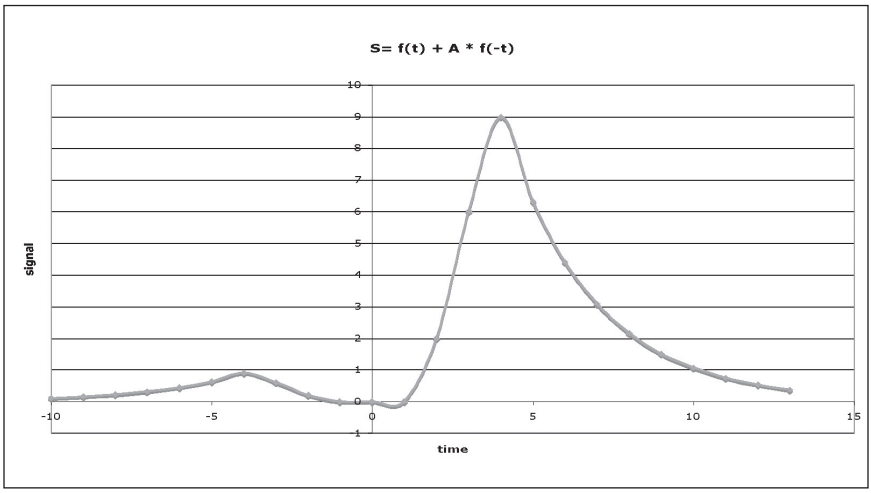

Figure 2. The theoretical skin conductance before stimulus onset is a weighted mirror image of the signal after stimulus onset. (A was set to 0.1)

This set of formulas reflects the fundamental assumption which results in a time-symmetric term in [1], basically the physical part. But [2] offers a link for psychological considerations. For simplicity, we assume that A is not very dynamic and does not change a lot over time. This is of course an oversimplification; most notably the effect of the stimulus might be a reduction in this coherence measure immediately upon the exposure of the stimulus to the subject. Coherence measures can be derived objectively from EEG measures while the brain volume involved can be assessed using fMRI. Thus this simple approach allows us to calculate the expected signal over time using objective measures. Also it generates a simple principle: *What happens after, happens before.*

The fact that we use skin conductance as an example might seem confusing because that type of signal is delayed with respect to neural functioning. However, the model that we propose where time symmetry is restored, is not limited to neural signals. All underlying physical processes are assumed to be susceptible, even if these processes are not neural at all. The neural aspect is brought in as the *source* of the restoration of time symmetry, a coherent conscious experience.

In general, we argue that the dynamic characteristics of the "advanced" part will mimic those of the "retarded." If we deal with a "slow" signal that peaks for instance 4 s after a conscious event, we might expect the retarded part to peak about 4 s before the conscious event. And if the "retarded" signal lasts a week, we might expect the "advanced" signal to start a week before the (consciously experienced) event, so it allows us to make precise predictions which will be discussed later.

Consciousness as the Crucial Variable

In an unpublished pilot study on presentiment with short exposure times of pictures using skin conductance it was found that no presentiment effects occurred with 100 ms masked exposures when the subject was unable to report the contents of the picture. This suggests that conscious experience is a crucial condition for presentiment to occur.

The Time-Symmetry Point

To arrive at more precise predictions we therefore add that the supposed time symmetry is not around the moment of exposure but around the moment of conscious experience. This is according to Libet's famous experiments about 400 ms later (Libet, 1979). The symmetry formula becomes: $S(t + 400) = S(-t + 400)$. The part of the original signal that is not experienced consciously ($0 < t < 400$) will not be reflected in time. The consequences for the example given above with the skin conductance are not dramatic. The presentiment peak shifts about 800 ms closer to exposure time. If the response peak is at 4000 ms then the presentiment peak is expected to be found around -3200 ms.

However for other faster psychophysiological signals using for instance t = 350 ms as mirror point has dramatic effects. In Figure 3a, a typical evoked potential is given. In Figure 3b the theoretical sum of the normal and the time-symmetric component, as calculated from the formula [1], is given.

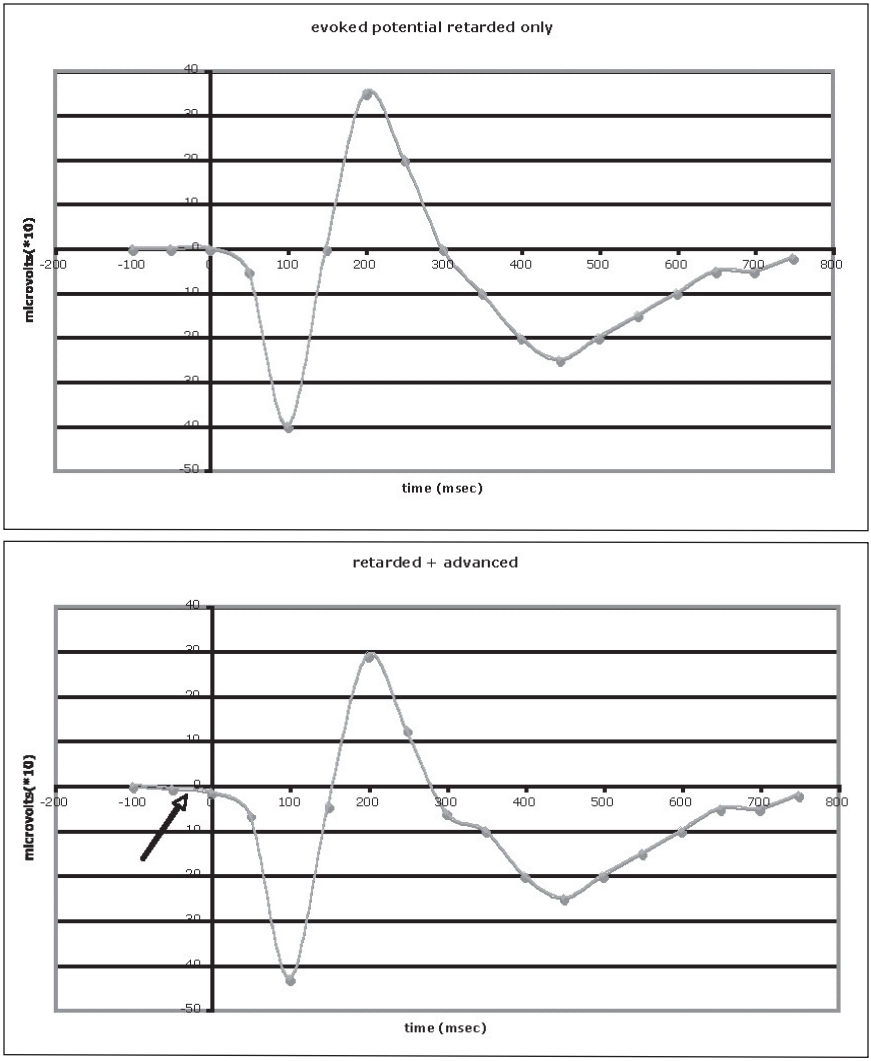

Figure 3. Example of evoked potential (a) and the same potential with the advanced component added (b).

The advanced part of that signal only contains a mirrored N350 component. Depending on the width of the N350 component and the difference between two stimulus conditions, we might expect a small effect

just preceding stimulus onset. The half width of the N350 has to be larger than 400 ms. In this evoked potential simulation, we used an "A" value of 0.3 rather than the value of 0.1 we used for skin conductance above. Even so, the effect of the advanced solution *before* stimulus onset (arrow) is hardly observable. Adding the advanced component does also change the form of the evoked potential as well as the peak amplitudes, but that is after stimulus onset and therefore is not analyzed when looking for presentiment.

Time Paradoxes: Does Time Symmetry Imply Retrocausation?

Time symmetry actually does not imply that one can "change the past." Rather, at any moment a signal has determinants that are from past as well as from future boundary conditions. Once the signal is there, one cannot use it to decide to change future boundary conditions. Conceptually this looks very much like the transactional interpretation of quantum physics where the present is determined by a kind of handshake between advanced and retarded waves (Cramer, 1986).

Time paradoxes are avoided and the negative time part of the solution cannot be used to transmit signals faster than light (negative time formally can be associated with faster-than-light speeds). Does this imply that the restoration of time symmetry is a useless phenomenon? Not quite. The advanced wave cannot be used to derive some behavior to prevent the retarded wave from occurring. So if we have a precognitive dream where candles are foreseen to set fire in the house the next day, it results in a paradox to remove all candles from the house in order to prevent the fire from happening. If the fire doesn't happen, we will not have a "retarded wave" associated with this fire and hence no "advanced wave." However, there might be a subtle way in which the restoration of time symmetry has helped us in evolution. If an emotional event, for instance the attack of a predator happens, the retarded part of the signal (in psychology called the *response*) will be strong, and hence also the advanced part. But that implies that the attacked animal is already aroused a few seconds before the attack, which might result in slightly superior survival changes. Of course this increased arousal only occurs if a real attack will actually occur in the (near) future because it hinges on the increased future arousal. Thus consciousness (induced restoration of time symmetry) offers an interesting evolutionary advantage.

Psychokinesis

The framework so far offers a neat unifying explanation of presentiment and precognition, and also all other GESP phenomena if they are conceptualized as precognition of eventual feedback.

Psychokinesis seems to fall outside the scope of the time symmetry framework but in fact fits in perfectly well. If in any thermodynamic system

time is running backward, this will result in an increase of structure. Random systems start to show patterns. It has been speculated (Bierman, 1983) that the increase in structure might occur in the genetic code and thereby augment the evolution of species beyond the mere evolution on the basis of random permutations. Macro-PK can be explained by the chaotic behavior of air molecules around objects that generally result in an average or equilibrium "pressure" on the object that cancels out in all directions. However, if the air molecules become coherent and start to behave in a nonrandom and coherent structured way, movement of the object might be induced. We realize that this aspect of the theoretical framework is in need of more detail and a more precise quantitative treatment. But globally we can predict that again brain coherence measures should correlate with psychokinetic phenomena.

The Elusiveness of Psi

Experimenter Effect

In a typical parapsychological experiment, correlations are established, not signals going from somewhere to somewhere. That signals seem to be transferred is an interpretation—an interpretation that is extremely strongly felt because causality is deeply ingrained in our experience. However, each psi experiment is actually a complex random number generator which, if perfectly random, should give no correlations. Experimenters who run an experiment can be conceptually represented as running a PK-RNG experiment where they try to "influence" the random system in such a way that correlations occur. In this case the experimenters are actually the subjects in their own experiment. Individual differences might arise again out of the differences in brain coherences, either short-term, for instance in altered states, or long-term, for instance related to personality or the effects of many years of meditation.

Declines

Declines have plagued the field of parapsychology ever since its inception. Rhine's original successful results evaporated more or less to chance levels after 60 years of experimentation (for a review of these declines: Bierman, 2001). It has been suggested that boredom of the experimenters might be the causal factor for these declines. This would indeed explain the decline within experimenters but this boredom argument seems not suitable to explain across experimenter declines. In order to understand these latter it should be realized that time anomalies are opening possibilities for paradoxes. This is most obvious for time travel. If it would be allowed for someone to travel back in time and to kill one's own grandfather there is a paradox. But a similar argument applies for

getting information from the future that can be acted upon so that the future event can be prevented from occurring. But if the future event is prevented it never could be the source of the future information. This ad hoc argument of nature preventing paradoxes has also been put forward by Hawking (1992) as chronology protection in his discussion of black holes and time reversal. The development of replicable experiments therefore poses a challenge because a replicable experiment opens possibilities for the creation of paradoxes. If this argument holds, replicable evidence for psi phenomena can only be obtained from experimental data that do not allow for such paradoxes to be created. Presentiment experiments are an example because the effects are nonconscious and so weak that they are only perceivable after averaging and thus cannot be used on an individual level. According to this type of reasoning, any attempt to increase the effect size such that one could act upon the presentiment signal would fail. Interestingly, such an attempt was undertaken by using 100 subjects simultaneously and then detecting presentiment "warnings" by averaging over these subjects per trial (Spottiswoode, 2006, personal communication). As predicted, this experiment yielded null results.

Relation of CIRTS to Other Theories

Physics-Inspired Theories

The observational theories (OTs). As in the OTs, in CIRTS observation does play a crucial role. The "absorption of information" by the coherent brain is thought to be the boundary condition that restores time symmetry. In the OTs, physics is kept intact except that observation is supposed not to be a passive process but also an active process by which information streams into the observed system, thereby allowing structure to arise in otherwise random systems. In CIRTS the creation of structure or information is indirect through consciousness-induced time reversal and the second law in reverse. The most obvious difference is that in CIRTS the required brain state for the anomalies to arise is explicit while in the original formulation of Walker (1972) this was implicit and related to a not well-specified concept called the "will channel." Interestingly, lab lore has it that "willing" and "striving" are not optimal conditions for anomalies to arise; rather the optimal attitude seems to be a passive expecting.

There are two formulations of the OTs that are worth considering further. In Millar and Hartwell's (1979) formulation, the interpretation that quantum physics is fundamentally a theory dealing with potentialities is extended to the OTs—not with actual observations playing a role but rather with potential observations. Although this extension is elegant and seems to fit with modern interpretations of quantum theory (Stapp, 1996), there is an intrinsic problem to assessing these potentialities. Because they are dynamic, they change over time, so when do you determine their values?

Millar and Hartwell's formulation would also predict that anomalies should relate to potentialities rather than actuality. Radin (1988) has done quite relevant precognition experiments comparing predicting the actual future with predicting the probable future. His experiments were inconclusive with one favoring the actual future as the target of prediction, the other the probable future. Targ (1998) asked the same question in the context of remote viewing experiments. This time the answer was an unequivocal "one can only foresee an actual future." This is of course what would be expected in CIRTS.

Balancing

The potentiality interpretation of quantum theory also makes explicit that in the end quantum theory can only be tested on the basis of distributions. Hence one could think that there is some freedom for individual events to become biased (as Walker proposes). In order to have nature's predicted distributions restored, it has been proposed (Pallikari, 1998) that an observed psi-induced bias in the long run should be compensated or balanced by another bias so that the quantum theory predicted distributions are not disturbed. However, quantum theory does predict distributions up to any order (variance, variance of variance, etc.) Any balancing mechanism would result in disturbing a higher order aspect of the distribution so that balancing seems not to be able to rescue standard physics. CIRTS, on the other hand, does not violate standard physics.

Hierarchical OT model. Houtkooper (1983) proposes a "hierarchical" specification of the OTs to avoid the apparent paradoxes that occur with unrestricted nonlocal time causing all future observers to participate in an experiment. He introduced "order of observation" converging effects. In CIRTS there is no unrestricted nonlocal time. Rather the classical time and the reversed time do behave in a symmetric way. If there are no problems in the forward direction, there aren't any in the backward direction.

If precognition is akin to remembering the future then we will expect the same time dependencies. For instance, the frequency of precognitive dreams will exponentially decrease with the time between dream and event just as memory exponentially decays. This was indeed the relation found in the analyses by Sondow (1988) of all her precognitive dreams over a period of many years.

The problem of who is (are) actually the one(s) that restore time symmetry, a problem that Houtkooper tried to solve in his hierarchical model, will be given for CIRTS in a separate paper.

Decision augmentation theory (DAT). According to this theory, all psi phenomena can be explained by assuming that at some point in the experimental procedure a selected part of a random series is biased because someone presses a button at the right time to select just that part of the random series that will result in the appearance of the desired correlations

(May, Utts, and Spottiswoode, 1995). Thus the basic mechanism is a kind of precognition on the part of the person, be it subject or experimenter, who hits a button that initiates directly or indirectly the random series acquisition.

The model seems a bit paradoxical because the authors want to explain away psychokinesis, especially micro PK, by assuming precognition. However, precognition presumably results in the biasing of a brain state (so that the button will be pressed at the magical moment) and if one assumes the brain is a physical system and its states have a random component then there is not much difference between biasing an RNG and biasing a brain state. Both should be labeled micro-PK.

Like the OTs, DAT is very explicitly an information-based, and not a force-based, model. As such, it fits with the psychokinesis integration of CIRTS. According to CIRTS there is a gain in information due to reversal of the second law when we allow time to run backward. This gain in information results in some structure in an otherwise random system. This gain in information might be expressed as correlations between two variables, although for all theoretical frameworks to date it is unclear why these correlations would correspond to some expected effect. Given the information-based character and the fundamental assumption of time reversal, it seems possible to accommodate some of the assumptions of DAT in CIRTS.

Systems theory and weak quantum theory. In Kornwachs and von Lucadou's system theoretical model of paranormal phenomena, anomalous (nonlocal) correlations that arise are due to an isomorphism of system theory with quantum physics (Kornwachs & von Lucadou, 1985; Lucadou 1995). If one formally introduces meaningful information, as information that can be acted upon, then systems theory produces formulae that are identical to those found in quantum mechanics but, of course, deal with other observables. Kornwachs and Lucadou's approach is a special case of the one that is undertaken in "weak quantum theory," which is identical to quantum theory but with Planck's constant being removed (Atmanspacher, Römer, & Walach, 2002), but these approaches do result in a similar position. The most notable consequence is that the correlations that arise cannot be used to transmit classical information. In CIRTS the situation with regard to signal transmission is subtle. The advanced wave of course carries information. This need not be quantum information, it could even be classical. Therefore it appears that signal transmission (back into the past) is allowed. However, the situation is such that the manipulation of the information source is restricted in order to avoid (binary logic) paradoxes, so it is forbidden to "use" the "advance wave" information to infer the future because that would allow avoiding the event that is "responsible" for that advanced wave. Thus the neoclassical signal theorem in systems theory and indeed in each quantum-based theory is replaced by a slightly less restrictive rule in CIRTS.

Time-symmetric thermodynamics. As early as 1976, Donald and Martin (1976) suggested that causality violation was an inherent property of time-symmetric thermodynamics. Basically they formulated there the foundations of CIRTS, especially with regard to psychokinesis. They did not, however, link this to the peculiar coherent aspect of our brain producing consciousness, nor did they work out predictions that could be challenged by experiments. Therefore, and possibly due to the fact that their work had been published in a European journal that was hardly read and referred to in the U.S., their theoretical framework was soon forgotten.

Many-world theories. Some authors, most notably J. B. Hasted (1981), have suggested that macroscopic psi phenomena, like metal bending and disappearance-reappearance phenomena, could only be accounted for if the many worlds that are proposed to be created upon each quantum event in Everett's solution of the measurement problem (Everett, 1957) could interact, that is, if an observer was able, by some yet unexplained "mechanism," to go from one parallel world to another one.

The OTs were also born out of a solution of the measurement problem, namely the radical subjective solution stating that human consciousness is the ultimate measurement device. In CIRTS, by virtue of not specifying quantum physics per se as the underlying time-symmetric formalism, there is no need to refer to the measurement problem. This is certainly an advantage because there seems to be growing consensus in the physics community that the whole measurement problem doesn't exist. On the other hand, phenomena where objects disappear in one place and reappear in another are difficult, if not impossible, to account for by CIRTS.

Morphogenetic fields. Sheldrake's (1988) formulation of the morphogenetic field theory was originally put forward to account for the development of forms in biology. One of the predictions was that forms, once created, would be easier to create in the future. In this formulation, the theory is essentially causal, which is even evident from the book title, *The Presence of the Past.* Indeed, Sheldrake, when suggesting that his "magic" fields could possibly also account for psi phenomena, focused on telepathy, and only recently has Sheldrake been considering precognition and other apparent violations of causality (Sheldrake, personal communication).

Physics without causality. Shoup (2006) has taken a more radical position by basically doing away with time at the most fundamental level. Just as in earlier work on Link theory, any physical formalism might be reframed in terms of reciprocal relations rather than in cause and effect. In such a framework, causality as well as retrocausality arises naturally. Although Shoup acknowledges the pervasive nature of time symmetry in physics, he focuses on time symmetry in quantum physics. His position is like CIRTS's, that in fact we do not need a radical alteration of physics to account for psi phenomena, but his theoretical thinking, unlike CIRTS, does not provide a link to psychologically relevant predictions.

Psychology-Inspired Theories

Noise reduction. Honorton put forward the idea that internal and external "noise" suppresses the detection of "psi" information. Implicit here is the assumption that this psi information becomes available at the nonconscious level, if this level is not too busy with other processing, and might become available to consciousness if there is not too much external input. The ganzfeld procedure was thought to produce better results because it would partly remove this unwanted noise. There haven't been many studies directly comparing the ganzfeld induction with other induction procedures, so it remains to be seen if even this assumption is correct. Rather, better performance in the ganzfeld might be explainable in terms of ritual and possibly the relaxation process that often is an integral part of the ganzfeld procedure. Nonetheless, with CIRTS as a guiding theoretical framework one can speculate if noise reduction might lead to more coherent brain states.

It should be noted that Honorton's model is limited to telepathy, clairvoyance, and precognition, and belongs to the class of perceptual psi models assuming some kind of perception-like scanning of the environment using a nonsensory channel for information that subsequently is used to drive the subject's behavior. The information processing requirements to scan everything everywhere in past, present, and future and subsequently select that which suits, are so incredibly large that these models can hardly be taken seriously.

Conformance behavior model. In Stanford's (1978) conformance behavior model, all psi phenomena are "explained" as the consequence of biasing of random events that eventually drive the phenomenon. This unifying proposition seems to be borrowed from the observational model developed a few years earlier by Walker (1975). Walker used the idea of "symmetry of information flow" originally formulated by the quantum physicist Eugene Wigner to argue that observation (getting information) about a random event should have a counterpart of information flowing into the observed system. Information input in a random system results inevitably in structure of the random behavior. However, psi-hitting as well as psi-missing can be the result of a structural difference from pure randomness. So what determines the direction of the effect? The direction-giving concept that Walker introduced was called the "will channel." Stanford introduced the "disposition" of the organism as the concept that directs the biasing of the random processes. Although Walker's concept of will channel rested on formal and physical arguments, the "disposition of an organism" remained a very fuzzy construct that has hampered any progress based upon the conformance behavior model. It should be noted that Stanford's discussion of information flow is naïve. Thus he maintains that his model is not based upon some flow of information. However, biasing of random events is identical to information input. Since Stanford explicitly

fails to indicate *how* the biasing of a random event occurs, but only "that it occurs," his model is based upon some unspecified flow of information driven by "disposition" into the to-be-biased system.

The current proposal, CIRTS, shares the unifying character of Walker's and Stanford's theories. However, it differs fundamentally on the core issue because no new physical principles, such as "reversed information flow" or "disposition driven biasing" are being introduced. Time symmetry is an accepted physical principle whereas "information flow symmetry" and "biasing according to disposition" are not generally accepted.

The issue of information flow itself is also different in CIRTS. For sake of convenience, let us restrict ourselves to the time symmetry that is occurring in the brain. Time symmetry gives rise to retarded and advanced waves. These waves, which in the brain might represent information, are highly correlated and hence they appear to produce information transfer (from the past to the present). That is because *practically* the retarded wave, where cause precedes effect, is the one that drives human behavior in almost all cases. Therefore we tend also *conceptually* to attribute primacy to the retarded wave and somehow see that wave as the (information) source for the advanced wave. This is, however, a conceptual error. There is no information transfer with a transmitter, a transmission channel, and a receiver of information. Past and future conspire together in the present. Since it is conceptually so difficult for us to abandon the idea of information flow and traditional causality, a mathematical framework for CIRTS is long overdue.

The comparison with these two theoretical approaches does point to a potential shortcoming in CIRTS, especially in the still undeveloped part concerning apparent physical anomalies. The global argument that the advanced solution corresponds to a breaking of the second law of thermodynamics can explain apparent anomalous structure in physical systems. For instance, temperature might *increase* whereas it should be stable in normal circumstances. But temperature *decrease* would also be anomalous in that case. What determines the direction, up or down?

Many experimental outcomes in the psi literature can only be accounted for in the CIRTS framework by assuming (retroactive) PK by the experimenter. In that view, the experimental system with equipment and subjects is considered to be one big random event generator run by the experimenter. In such a case, we can explain anomalous structure in the dataset by referring to the breaking of the second law, but why would the structure correspond to the experimenter's intentions? Within CIRTS, "intentions" at present do not play any role in getting anomalous effects. In CIRTS it is totally left open how intentional aspects of the subject eventually are reflected in the creation of anomalous correlations. The only psychological aspect that CIRTS deals with is the state of consciousness that would be optimal to create such a correlation. A model for "psi-missing," for instance, is far beyond the current scope of CIRTS, but CIRTS might be augmented by more psychologically founded models.

Altered states of consciousness. In general it has been argued on the basis of incidental observations but also on the basis of questionnaire data that psi might be stronger if subjects are in an altered state of consciousness. CIRTS gives a framework to discuss these "optimal states." For instance, assuming that some meditative practices might result in more coherent brain states, CIRTS would predict stronger effects with experienced meditators. Or if hypnosis were used to create a dissociative state, such as one in which pain is eliminated from the conscious experience, then we might expect smaller effects. For the more general state of hypnosis in which no explicit dissociative instructions are given, no specific predictions can be made. The dream state seems to be at least a receptive state for time anomalies to arise. We should make a clear distinction between the source of the advanced wave being a state that basically is the state during feedback or confirmation and the state where the effects of this advanced wave are strong. We suppose that for the latter (receptive) state, "lability" is a more important factor than "coherence."

Predictions

Physical

If the Wheeler and Feynman argument holds that time symmetry is broken due to the lack of multiple particle coherent absorbers, it might be worthwhile to see if time symmetry is restored when interactions occur with a physical system that is known as a Bose-Einstein condensate. These multiparticle systems are stable only at extreme low temperatures. They exhibit a total coherence in which the individual particles lose their individual character and behave as an indistinguishable whole. Interestingly enough, a few decades ago, Ian Marshall proposed that consciousness arose from a Bose-Einstein condensate in the brain (Zohar, 1990).

It seems that Bose-Einstein condensates also arise at cosmological scales. Thus one could expect time-symmetrical effects to arise in cosmology too. Possibly, cosmological correlations with psi effects, such as, for instance, reported by Spottiswoode (1997), might be related to cosmological time symmetry. Also, one could expect time symmetry to be restored if large scale (global) coherence of many people's minds would occur. This might happen during global meditation events or other events that seem to unite the world like those of 9/11. Thus we would predict time-symmetrical effects to be visible in the Global Consciousness Project data (see http://noosphere.princeton.edu).

Psychophysical

Form-time symmetry in presentiment. Presentiment experiments offer the most direct way to test time symmetry models. As was discussed in the

data section, incidental observations of double peaks in the response part of a simple stimulus-response experiment sometimes seem to have a double bumped counterpart before stimulus exposure. This can be tested formally by using sometimes one and (randomly) sometimes two stimuli separated by an interval of say 2–3 s (see Figure 4). It should be noted that it is not possible to test this hypothesis in already available data because potential increase in bump frequency before and after the stimulus can be caused by a common factor of increased lability, the tendency of the body to produce spontaneous bumps in the skin conductance.

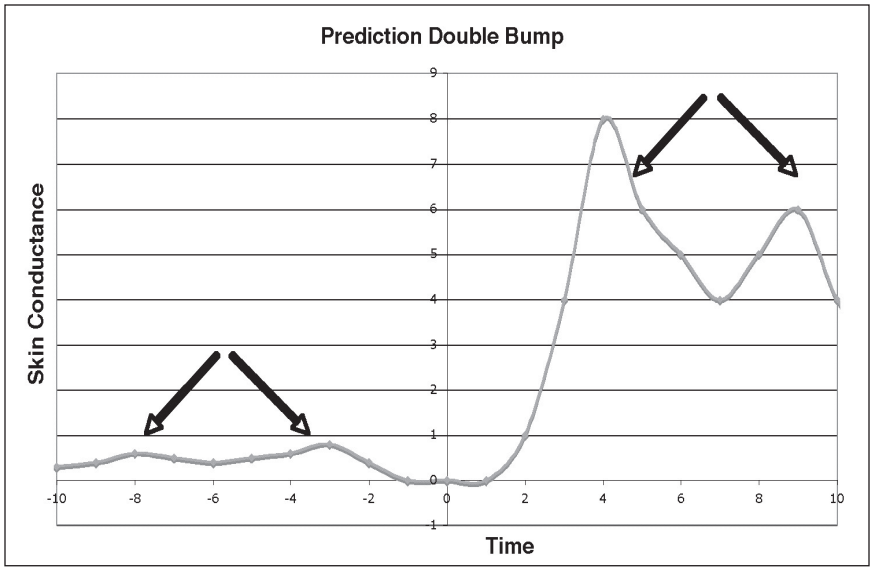

Figure 4. Predicted double bump presentiment effect if two arousing stimuli are exposed within a few seconds

Psychological

The predictions that can be made for psychological effects all have to do with the fundamental assumption that brain coherence is the crucial factor to restore time symmetry. Thus, effects of certain mental exercises or induction procedures might be predicted, as well as effects of specific personality traits insofar as these can be related to brain functioning.

One of the most promising avenues would be the effect of meditation on psi. Recently an fMRI study with experienced meditators showed stronger presentiment effects in meditators, as was predicted by CIRTS (Bierman, 2008). Radin (2008) did an experiment in which subjects were supposed to influence the passage of photons in an interferometer. Only the experienced meditators succeeded and did so with a very large effect size.

Discussion

Progress in science is fastest when a theory predicts phenomena that subsequently can be tested. Especially when the theory has some flexibility and when it cannot account for the phenomena, it can be updated according to new findings. It has been argued, mostly by skeptics, that parapsychology has no such theories. This is not quite true; there are many theoretical frameworks around but they are either purely physical in nature or they tend to be of a general psychological nature. The current theoretical framework, CIRTS, tries to bridge this gap in such a way that the multidisciplinary approach of psi phenomena finally gets a theoretical basis.

The impetus for this work was the remark by a mainstream researcher at the Bial symposium "Beyond and Behind the Brain" in 2008 that he was impressed with the psi data and the improvement in methodological quality but that the data were nothing more than a curious set of anomalies if there wasn't theoretical framework to accommodate those data. Often, similar remarks have been interpreted by the parapsychological community as an escape argument. However, mainstream researchers who find effects for which there is no theoretical framework have the very same difficulties in publishing as the parapsychological research community has.

A theory, albeit one in "statu nascendi," that makes explicit predictions about physical and psychological effects therefore could accelerate the acceptance of the field of parapsychology. Psi phenomena, rather than being defined as everything that we can't explain, could then be defined in a positive way as phenomena in which physical time symmetry is restored. The present author has no illusion that the current formulation of CIRTS is even close to a definitive model. There is still some considerable "hand waving" that there are too many loose ends, but rather than waiting for all these to be tied together, I have presented the current preliminary framework because already in its current formulation it produces several testable hypotheses. That is something the field of parapsychology needs in order to make progress.

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Acknowledgments

The theory presented here was the implicit background for Bial Grant proposal 34-04 and was further developed in the course of that project. I thank James Spottiswoode and Dean Radin for comments on an earlier draft. This article is dedicated to the memory of Evan Harris Walker.

Abstracts in Other Languages

German

BEWUSSTSEINSINDUZIERTE WIEDERHERSTELLUNG DER ZEITSYMMETRIE (BIWZS): EINE PSYCHOPHYSIKALISCHE THEORETISCHE PERSPEKTIVE

ZUSAMMENFASSUNG: Der hier vorgestellte theoretische Rahmen geht von der Voraussetzung aus, daß die in einem Gehirn vorgenommene

Informationsverarbeitung bei Aufrechterhaltung des Bewußtseins den Bruch in der Zeitsymmetrie in der Physik wiederherstellt. Keine Angaben werden in Bezug auf die Frage gemacht, welcher physikalische Formalismus, sei er quantenphysikalisch oder klassisch, die Grundlage für die daraus folgenden offensichtlichen anomalen Konsequenzen darstellt – "offensichtlich", weil das vorgeschlagene Modell keine radikale Erweiterung oder Modifkation der bereits vorhandenen Physik erforderlich macht. Vielmehr wird argumentiert, daß die Zeitsymmetrie, so wie sie die Physik von heute kennt, ernst genommen werden sollte, und ein einfacher mathematischer Formalismus wird vorgestellt, der spezifische quantitative Vorhersagen gestattet. Die Flüchtigkeit der Psi-Phänomene, der Versuchsleitereffekt und der Zusammenhang von Psi mit anderen theoretischen Modellen, wie der Theorie des Entscheidungszuwachses (decision augumentation theory, DAT), der Beobachter-Theorie und einigen anderen, werden diskutiert. Eine der wesentlichen Vorteile der BIWZS besteht darin, daß sie Ansätze bietet, um diese Theorie mit psychologischen Theorien zu verknüpfen, die individuelle Unterschiede erklären könnten. Spezifische überprüfbare Vorhersagen werden gemacht.

French

RESTAURATION DE LA SYMETRIE TEMPORELLE INDUITE PAR LA CONSCIENCE (CIRTS) : UNE PERSPECTIVE THEORIQUE PSYCHOPHYSIQUE

RESUME : Un référentiel théorique est proposé qui part de l'hypothèse que l'information traitée par un cerveau, lorsqu'elle soutient la conscience, permet de restaurer la brisure de la symétrie temporelle en physique. Aucune précision n'est donnée concernant le formalisme physique, soit quantique soit classique, qui serait à la base des conséquences apparemment anomales qui en découlent – "apparemment" parce que le modèle proposé ne requiert pas une extension radicale ou une modification de la physique existante. Au contraire, nous affirmons que la symétrie temporelle, qui est déjà présente dans la physique actuelle, doit être prise au sérieux, et une formulation mathématique initialement simple est donnée pour permettre de faire des prédictions quantitatives spécifiques. L'élusivité des phénomènes psi, l'effet expérimentateur, et la relation entre le psi et les autres référentiels théoriques comme la théorie de l'augmentation de la décision (DAT), la théorie observationnelle, et plusieurs autres, sont discutés. L'un des avantages majeurs de la CIRTS est qu'elle offre des moyens de lier cette théorie aux théories psychologiques qui peuvent expliquer les différences interindividuelles. Des prédictions spécifiques et testables sont réalisées.

Spanish

RESTAURACIÓN DE LA SIMETRÍA TEMPORAL (CIRTS) PRODUCIDA POR LA CONCIENCIA: UNA PERSPECTIVA TEÓRICA PSICOFISIOLÓGICA

RESUMEN: Se propone una idea teórica que comienza con la premisa que el procesamiento de información por un cerebro, mientras mantiene la conciencia, restaura las roturas de simetría temporal en la física. No se presenta información específica sobre cual formalismo físico, cuántico o clásico, es la base de las aparentes consecuencias anómalas—"aparentes" porque el modelo propuesto no require una extensión o modificación radical de la física existente. Se propone que la simetría temporal que está presente en la física actual debe ser tomada con seriedad, y se ofrece una formulación matemática simple e inicial que permite hacer predicciones cuantitativas específicas. La elusividad de los fenómenos psi, el efecto del experimentador, y la relación de psi con otras ideas teóricas tales como la teoría de aumento de decisiones (TAD), la teoría observacional, y varias otras, son discutidas. Una de las mayores ventajas de CIRTS es que ofrece posibilidades para conectar esta teoría a teorías psicológicas que pueden explicar diferencias individuales. Se presentan varias predicciones que son capaces de ponerse a prueba.

THE EFFECT OF PARANORMAL INVOLVEMENT ON GAME STRATEGY

By Erin C. Dupuis

ABSTRACT: This research examined the role of general and personal paranormal and religious beliefs in an online card game. Participants (N = 248) were required to choose a strategy (i.e., psychic choice or self choice) for target object selection. Participants in the low subjective probability condition were more likely to choose the psychic (M = 3.07, SD = 3.43) than participants in the high subjective probability condition (M = 1.07, SD = 1.76). Personal paranormal involvement was associated with less reliance on the psychic strategy whereas general paranormal involvement and religious involvement were associated with greater reliance on the psychic strategy. Further, participants who were more involved in their religious beliefs chose the psychic more often than participants who were less involved in their religious beliefs. Results from this study imply that researchers should differentiate between general and personal paranormal and religious beliefs.

Keywords: paranormal involvement, religion, beliefs, decision-making, individual behavior

The great philosophers in sociology, Marx, Durkheim, and Weber, theorized that as societies became modernized they would become more complex and rational. As a result of this "modernization," nonscientific beliefs such as religion and belief in the paranormal would eventually disappear (see Berger, 2008 for a discussion). Contrary to secularization theory, in the United States, an estimated 50% of Americans believe in extrasensory perception (as cited in Wiseman & Watt, 2006) and more than 73% of Americans believe in at least one paranormal phenomenon (Gallup, 2005). In the religious realm of beliefs, nearly 44% of Americans would classify themselves as frequent church attendees (Gallup, 2007) and 77% believe in Heaven, 63% believe in Hell, and 58% believe in the Devil (General Social Survey, 2004).

The Paranormal Construct

Definitions of paranormal beliefs have varied. Literally, the Latin prefix *para* means "outside of" or "beyond" (Goode, 2000). In other words, paranormal events are those that cannot be explained by scientific laws or natural forces (Broad, 1953; Goode, 2000). Paranormal refers both to phenomena (events or abilities) and to beliefs (that the events actually occurred) (Goode, 2000). The definition used in this research operationalizes paranormal beliefs as beliefs in psi phenomena (ESP, telepathy, psychokinesis, clairvoyance, and precognition), which violate

scientifically conceivable processes and lie outside the known realm of human capabilities (Irwin, 1993; Lawrence, 1995).

Examination of questionnaires measuring belief in paranormal abilities reveals that paranormal beliefs may be manifested in several cognitive forms, including self-belief, other-belief, and general-belief. First, individuals may believe that they have such abilities, for example, "I believe I am psychic" from the Australian Sheep-Goat Scale (ASGS) (Thalbourne & Delin, 1993). Second, they may believe that others have these abilities, for example, "Some people have the power to bend objects (e.g., spoons) with only their thoughts" from the Belief in the Paranormal Scale (Jones, Russell, & Nickel, 1977). They may also believe that such abilities exist in general, for example, "Mind reading is not possible" from the Revised Paranormal Belief Scale (RPBS) (Tobacyk, 2004). The focus of this research is to determine whether participants' beliefs in self or other paranormal ability predicts strategy choice in an online game paradigm.

Religion's Relation to Paranormal Beliefs

Another theory in the parapsychological research is that cultural influences may cause the endorsement of paranormal beliefs. Religion is one such powerful cultural influence, which may be related to belief in the paranormal. Religion is a powerful predictor of a wide range of behavior and social attitudes (Dillon & Wink, 2003). There are similar parallels between religion and paranormality, including, first, an emphasis on rejection of the material and acceptance of the spiritual and, second, a belief in nonempirical truths (Goode, 2000). Certain characteristics of Eastern religions are, in themselves, paranormal, including faith-healing, miracles, reincarnation, and visions (Goode, 2000; Wain & Spinella, 2007). Individuals who believe in paranormal phenomena are also more likely to accept a spiritual orientation to life (Goode, 2000).

Religious individuals and believers in the paranormal must believe in that which cannot be scientifically proven and must rely on faith in certain beliefs. Even in the face of irrefutable evidence, there is often a strong tendency to believe. For example, Singer and Benassi (1986) found that, even after informing participants that the "magic" they had witnessed was replicable and pretend, participants still strongly maintained their beliefs that an actor's performance was indicative of his psychic abilities. Interestingly, many students pointed to their religious beliefs as the explanation for their acceptance of the actor's psychic ability (e.g., "I am a Christian and I feel strongly that ESP or anything dealing with that is of Satan") (Singer & Benassi, 1986, p. 62).

The results of research that has examined the association between religious beliefs and paranormal beliefs has been mixed. Some researchers have found that religious participants more strongly endorse paranormal beliefs (Goode, 2000; Hergovich, Schott, & Arendasy, 2005; Thalbourne,

Dunbar, & Delin, 1995; Tobacyk & Milford, 1983; Wain & Spinella, 2007), whereas some researchers have found that "nonreligious" participants tend to endorse paranormal phenomena more strongly (Aarnio & Lindeman, 2007; Bainbridge & Stark, 1980; Beck & Miller, 2001). Other researchers have claimed that paranormal beliefs are a substitute for traditional religious beliefs (Emmons & Sobal, 1981; Harrold & Eve, 1986; Wuthnow, 1978). Results obtained by Hergovich et al. (2005) partially support the substitution hypothesis; however, they claim that paranormal belief can be, but is not necessarily, a substitute for traditional religion. Yamane and Polzer (1994) found that participants who were religiously involved (i.e., church attendance and prayer) were *more* likely to report paranormal experiences related to religion (such as ecstatic experiences).

Why is it important to study paranormal or religious beliefs? Putting aside the pervasiveness of these beliefs, one might consider the psychological advantages and disadvantages of endorsing nonscientific beliefs. Many studies have found that beliefs in the paranormal are associated with poor psychological adjustment, including irrational beliefs (Roig, Bridges, Renner, & Jackson, 1998), high trait anxiety (Wolfradt, 1997), psychopathology and dissociation (Dag, 1999; Gow, Lang & Chant, 2004), and low self-efficacy (Tobacyk & Shrader, 1991). However, other researchers have found that paranormal beliefs, guided by motivations and needs, are related to higher levels of well-being, happiness, confidence, and spirituality (Kennedy, Kanthamani, & Palmer, 1994). Goulding (2004, 2005) has argued that researchers examining schizotypy in relation to paranormal beliefs have not studied the full multidimensional construct; using the full dimensional construct results in neutral to healthy models of schizotypy associated with paranormal beliefs. Similarly, researchers in the field of religious beliefs have found that higher levels of religiosity are positively associated with greater levels of happiness (Abdel-Khalek, 2006), self-esteem (Keyes & Reitzes, 2007), optimism (Abdel-Khalek & Lester, 2007), physical health, and mental health (Abdel-Khalek & Lester, 2007). Religiosity has been found to be negatively associated with alcohol use (Rostosky, Danner, & Riggle, 2007), depression (Keyes & Reitzes, 2007), pessimism, and suicidal ideation (Abdel-Khalek & Lester, 2007). McCullough and Smith (2003) reported that individuals with high levels of religiousness reported lower levels of depression. Religious attendance has also been associated with lower "hazard of death" (McCullough & Smith, 2003, p. 194) from various causes, including suicide (Hummer, Rogers, Nam, & Ellison, 1999; Martin, 1984; Strawbridge, Cohen, Shema, & Kaplan, 1997). These results can also be partially attributed to the integrative capacities of religion in providing individuals with social networks that give a sense of belonging to and satisfaction with the community (Martinson, Wilkening, & Buttel, 1982).

This research sought to further examine the relation between paranormal beliefs and religious beliefs. Would religiously inclined individuals be more likely to strongly endorse paranormal beliefs? From a

narrower viewpoint, would personal or general paranormal beliefs be more strongly related to religious beliefs? Further, would religious believers (in relation to paranormal believers) also be more likely to rely on a paranormal strategy in a card-guessing task?

Reasoning Errors and the Paranormal Strategy Paradigm

One theory postulates that high believers in the paranormal make more reasoning errors than nonbelievers (Blackmore & Troscianko, 1985; Blagrove, French, & Jones, 2006; Brugger, Landis, & Regard, 1990; Dagnall, Parker, & Munley, 2007; Roberts & Seager, 1999; Wierzbicki, 1985) and are less able to think critically (Gray & Mill, 1990). According to the probability misjudgment theory, paranormal beliefs may actually make participants more likely to misjudge probabilities, which may lead believers to illusory predictions—believing they can predict random events (Blackmore & Troscianko, 1985; Blagrove et al., 2006; Matthews & Blackmore, 1995; Sutherland, 1992). The results of previous research have suggested that believers are less likely than nonbelievers to either incorrectly judge probability rates or to accept that repetitive events happen by chance (Brugger et al., 1990; Williams & Irwin, 1991). This latter suggestion is supported by research findings that participants who give self-reports of belief in ESP are more likely to underestimate chance baseline than are nonbelievers in a random game of chance (Blackmore & Troscianko, 1985).

However, the probability misjudgment theory has been contested. Roe (1999) failed to find any evidence that paranormal believers are deficient at critical thinking or reasoning. Instead, Roe (1999) argued that cognitive dissonance could account for participants' low ratings of research reports related to ESP or subliminal perception if they believed those reports to be incongruent with their attitudes. When cognitive abilities are controlled for in games of chance, often the relation between paranormal beliefs and errors in probabilistic judgments disappears; these results suggest that differences in cognitive ability can account for paranormal beliefs (Musch & Ehrenberg, 2002). Other research has supported the finding that probability misjudgments are negated once education and cognitive ability have been controlled (Bressan, 2002). Similarly, other research has supported the finding that probability misjudgments are not significant predictors of paranormal beliefs (Roberts & Seager, 1999). Dagnall et al. (2007) argued that the probability misjudgment hypothesis has only been studied in a partial way given the type of problems used to assess such misjudgments. They concluded that errors in probabilistic reasoning are conducive to paranormal beliefs, but only those errors related to misperception of randomness. Their results support the theory that high paranormal believers are more likely to discount the role of chance than nonbelievers (Brugger et al., 1990; Williams & Irwin, 1991). High paranormal believers, therefore, are more likely to believe that they can predict chance outcomes.

To investigate the concept of perceived control and reasoning errors in relation to paranormal or superstitious strategies, Case, Fitness, Cairns, and Stevenson (2004) researched whether superstitious strategies in a chance-determined card-guessing task were associated with primary or secondary control. Seventy-eight participants were permitted to use a psychic's, another student's, or an academic's card selections instead of making their own selections. The participants were told that a certain number of the cards were red and that they needed to choose a red card, for example, "7 of the 8 cards are red, pick a red card." The subjective probabilities were 7:8, 6:8, 4:8, 2:8, and 1:8. Participants' use of a superstitious strategy (a psychic's selections) increased significantly with the perceived likelihood of failure, regardless of belief in psychic ability.

As participants became aware that they had a low probability of guessing the correct card (i.e., the chances of correctly guessing were 1 out of 8 compared to 7 out of 8), the need to regain control became increasingly salient and, therefore, the use of superstitious strategies may have represented attempts at secondary control. The individuals chose superstitious strategies, not necessarily believing they would work (they rated the psychic's ability as low), but needing the comfort of a feeling of control when the probability of success was low (Case et al., 2004).

The experimental methodology designed by Case and colleagues was used in the following study. Although the purpose of the current study was not to investigate participants' illusions of control, it was hypothesized that participants would choose the psychic selection using a between-subjects design. We further wanted to determine whether participants' beliefs in their own paranormal abilities would affect card choice and result in errors in reasoning.

The Present Study

The basic purpose of this study was to evaluate whether the results from Case and colleagues would replicate using a between-subjects design. The second purpose was to investigate how individual differences (such as paranormal and religious beliefs and involvement) would affect participant strategy choice. It was hypothesized that (1) individuals with high personal paranormal involvement (i.e., performance of psychic services as well as the belief in own psychic abilities) would choose the psychic less often than individuals with low personal involvement. Further, it was hypothesized that (2) participants with only general paranormal involvement (i.e., having used a psychic in the past, but not being personally involved) would choose the psychic more often based upon past experience than participants with low general involvement.

In terms of religious beliefs, it was hypothesized that (3) religiosity would be positively related to belief in the paranormal (see MacDonald, 1995; Yamane & Polzer, 1994). Further, it was expected that (4) participants

who were higher in religious involvement (e.g., church attendance and religiosity) would rely less on the selections of a psychic. Past research has indicated that individuals with high religious involvement exhibit higher levels of perceived control, which should lead to more reliance on the self.

Method

Participants

The sample consisted of 248 participants (62% female). Participants were recruited using several different methods. First, every fifth group listed in each category of Yahoo Groups was selected, although selection was also dependent upon group rules (no spam postings) and the function of the group (only very specific topics allowed as postings). The moderators of these groups were emailed and asked if they could forward the link of the survey to their listserv. Second, the link was posted on several psychology websites. Each participant was given a unique ID, which was not linked to any personal information, ensuring complete anonymity of participants. Furthermore, the researcher opted not to collect IP addresses, which could be used to track participants. Third, students were recruited from the subject pool of a large public university in the Northeast and were given extra credit by their professors for their participation.

Of the participants, 64% were aged 18–24, 25% were aged 25–39, and 11% were older than 40. Further, 29% were Catholic, 29% were Protestant/Methodist/Baptist, and 32% had no religious affiliation or labeled themselves "spiritual." In terms of education, 39.5% had completed college (only 7% had stopped their education after high school). When participants were asked to rate their own psychic abilities (from 1 = "don't have any" to 10 = "excellent"), only 51% said they didn't have psychic abilities and 12.5% rated their psychic abilities above a 5 ($M = 2.29$, $SD = 1.85$). Additionally, 55.3% of participants had used a psychic service at least once and 31.9% had performed at least one psychic service such as tarot card or palm reading ($M = .65$, $SD = 1.26$).

Design

Study 1 used a between-subjects design based upon the paradigm developed by Case and colleagues (2004). Participants were given 10 trials and asked to select the correct card out of 8 cards. Due to concerns that participants would become suspicious about several high versus low probability trials, participants were placed in one of two conditions. The probability of success was either 1:8 (Condition 1 – Low Probability) or 7:8 (Condition 2 – High Probability). Participants were not able to compare probabilities from trial to trial, nor were they given feedback about their success or failure. On each trial, the participants were told they could

either pick a card themselves or have somebody else choose a card for them. The "psychic" was an individual reported as having been tested for and exhibiting psychic abilities. There was no "psychic" nor were there any previously existing selections. Participants were not given feedback about whether their choice was correct. The purpose of the study was less to assess whether participants actually could choose a correct card (in fact, there were no correct cards) and more to assess the role of personal and general paranormal and religious beliefs on selection strategy.

Questionnaires

Participants were also asked to complete several questionnaires. The 20-item Belief in the Paranormal Scale (Jones, Russell, & Nickel, 1977; modified by Presson & Benassi) was administered to assess paranormal beliefs. The range of possible scores is 20–100. The scale taps participants' beliefs about psychic phenomena in general, ESP, telepathy, and precognition. Seven of the questions were designed to tap self-paranormal abilities. Reliability of the scale was high ($\alpha = .94$), $M = 48.33$, $SD = 14.61$. The Belief in the Paranormal Scale was used over the ASGS and the RPBS because it allows for the evaluation of general as well as personal/self paranormal beliefs. To assess personal paranormal involvement, the self-paranormal ability subscale was used in addition to questions concerning whether participants had ever performed psychic services. Participants were also asked if they had ever used psychic services; these questions were totaled to develop a general involvement subscale (i.e., they had used paranormal services, but had not actually performed these services).

Religiosity was assessed using the 12-item Religiousness Scale (Strayhorn, Weidman, & Larson, 1990). The reliability of the scale was high ($\alpha = .93$), $M = 24.71$, $SD = 10.13$. All 12 items from the scale were given to participants; however, religious involvement was assessed by examining responses related to worship attendance and frequency of prayer. Past research examining religious involvement has used church attendance and prayer as measures of personal involvement in religious beliefs (Yamane & Polzer, 1994).

Additionally, to control for context effects, after completing the online experiment portion of this study, participants completed several distraction filler tasks including the Morally Debatable Behaviors Scale (Harding & Phillips, 1986) and several word jumble problems. Participants were also asked demographic information including age, education, gender, psychic services used, psychic services performed, and their own perceived psychic ability. Finally, participants were also asked to indicate their estimation of the actual probability of being personally able to select the correct target object. This variable "probability judgment" was coded according to whether participants' judgments were 1 = too low, 2 = correct, and 3 = too high.

Procedure

Participants were told they were participating in an experiment researching the cognitive processes involved in online decision-making. All participants were told they would be entered into a drawing to win a $25 online gift certificate. After completing the experiment (approximately 10–15 minutes), participants indicated their judgment of the probability they could choose a target object successfully, and then they completed the filler tasks, the Belief in the Paranormal Scale, Religiousness Scale, and then the demographic questions. When participants hit the "done" button, they were taken to a page that was separate from the experimental survey. This page included the debriefing form and a drawing entry form. Participants who wanted to enter the drawing were asked to fill in their personal information, including name and e-mail address.

Results

To evaluate if participants varied in their selection of the psychic based upon probability using a between-subjects design, an ANOVA was conducted with condition as the independent variable and total number of psychic selections as the dependent variable. There was a significant effect of condition, $F(1,239) = 29.86$, $p < .001$. Participants in the low subjective probability condition were more likely to choose the psychic ($M = 3.07$, $SD = 3.43$) than participants in the high subjective probability condition ($M = 1.07$, $SD = 1.76$).

To evaluate whether participant demographics (age, gender, education, and religious affiliation), the scales (paranormal beliefs and religiosity), and the subscales (general paranormal involvement, personal paranormal involvement, and religious involvement) as well as participants' probability judgments were related in the overall sample, Pearson's bivariate correlations were performed (Table 1, Bonferroni-corrected PC_{α} level .05/45 = .001 significant correlations are indicated). The paranormal involvement items were broken down into two subscale scores: the 7 self-belief items from the paranormal beliefs scale and the 8 items indicating performance of a psychic service were forced onto one subscale score labeled personal involvement ($\alpha = .84$) and the 8 items indicating general use of a psychic service in the past were forced onto one subscale score labeled general involvement ($\alpha = .62$). Religious involvement was assessed using the total score for frequency of worship attendance and frequency of prayer.

A few interesting correlations did emerge from the analysis. Age was negatively correlated with religiosity, as well as with religious involvement; younger participants were less likely to be religious and less likely to attend religious services or pray. There was a negative correlation between age and general paranormal beliefs; older participants were less likely to be generally involved (e.g., using a psychic service) than younger participants. Further,

Table 1
Bivariate Correlation Matrix of Demographics, Probability Judgment, and Scales

	1	2	3	4	5	6	7	8	9
1. Gender									
2. Age	-.13								
3. Education	-.16*	-.53***							
4. Affiliation	-.12	.28*	.22**						
5. Religiosity	.06	-.18**	-.11	-.44***					
6. Rel. involve	.07	-.17*	.02	-.39***	.88***				
7. Par. beliefs	.11	-.05	-.23***	-.12	.10	-.02			
8. PI	.10	.07	-.16*	.01	.09	-.04	.84***		
9. GI	.13	-.28***	.02	.04	.02	-.02	.29***	.57***	
10. Probability	-.07	.30***	.23***	.16*	-.01	-.05	.05	.12	.16*

Note: PI = personal paranormal involvement, GI = general paranormal involvement.
* $p < .05$. ** $p < .01$. ***Bonferroni corrected $p < .001$

a positive correlation emerged between age and probability judgment, indicating that older participants were more likely to overestimate the probability of choosing a correct object. However, one must be careful in drawing conclusions from the correlations related to age, not only because correlations are not causation, but also due to the large (64%) sample of participants between the ages of 18–24.

There was a negative correlation between education and paranormal beliefs; participants with more education were less likely to endorse paranormal beliefs. There was also a positive correlation between education and probability judgments; participants who were more educated were more likely to overestimate their probability of correctly choosing the target object. Finally, there was a positive correlation between general paranormal involvement and probability judgment. Participants who were generally involved in their paranormal beliefs were more likely to overestimate the probability of correctly guessing a target object.

A standard multiple regression was conducted to assess whether paranormal beliefs and paranormal involvement would predict total psychic selection (see Table 2). The total number of times the psychic was selected on the 10 trials (total psychic selection) was used as the predicted variable and the following variables were used as predictors: general paranormal beliefs (the total of the paranormal belief scale without the inclusion of the self-belief items), personal paranormal involvement (performing psychic services and belief in personal psychic ability), and general paranormal involvement (using a psychic service in the past). The high-probability condition lacked variability (the psychic was chosen on only 10% of the trials); therefore, it was excluded from analyses.

Table 2
Results of Standard Multiple Regression to Predict Total Psychic Selection From Paranormal Beliefs, Personal Involvement, and General Involvement

	TPS	GPB	PI	GI	b	β	sr^2_{unique}
GPB	.17				.14*	.417	.04
PI	.09	.84			-1.38*	-.382	.04
GI	.32	.34	.44		.69*	.248	.10
M	3.34	31.31	0.00	1.99			
SD	3.56	9.30	.96	1.84			
						$R^2 = .14$	
						$R^2_{adj} = .12$	
						$R = .38$	

Note. TPS = total psychic selection, GPB = general paranormal beliefs, PI = personal paranormal involvement, and GI = general paranormal involvement. TPS based upon selection out of 10 trials.
* $p < .05$

The overall regression for the low-probability condition was statistically significant, $R = .377$, $R^2 = .142$, adjusted $R^2 = .118$, $F(3,106) = 5.85$, $p = .001$. To assess the statistical significance of the contributions of individual predictors, the t ratios for the individual regression slopes were examined. The three predictors were all significantly predictive of total psychic selection (number of times the psychic was chosen out of 10 trials). Paranormal beliefs was statistically significant, $\beta = .36$, $t(106) = 2.20$, $p = .030$; as expected, the positive sign for the slope indicated that participants with higher scores on the paranormal belief scale chose the psychic more often than participants with lower scores. Personal paranormal involvement was statistically significant, $\beta = -.37$, $t(106) = -2.14$, $p = .034$; as expected, the negative sign for the slope indicated that participants who were more personally involved in their paranormal beliefs (i.e., believing they had their own psychic abilities as well as performing psychic services) relied on the psychic less often than participants with lower scores. Finally, general paranormal involvement was also statistically significant, $\beta = .36$, $t(106) = 3.55$, $p = .001$; as expected, the positive sign for the slope indicated that participants scoring higher on general paranormal involvement chose the psychic more often than participants scoring lower.

A standard multiple regression was conducted to assess whether religious beliefs and religious involvement would predict total psychic selection (see Table 3).

Table 3
Results of Standard Multiple Regression to Predict Total Psychic Selection From Religious Beliefs and Religious Involvement

	TPS	RB	RI	b	β	sr^2_{unique}
RB	-.01			-.06	-.18	.02
RI	.18	.59		2.01*	.28	.05
M	3.31	24.77	1.58			
SD	3.55	10.99	.50			
					$R^2 = .05$	
					$R^2_{adj} = .04$	
					$R = .29$	

Note. TPS = total psychic selection, RB = religious beliefs, RI = religious involvement. TPS based upon selection out of 10 trials.
* $p < .05$, ** $p < .01$

The total number of times the psychic was selected out of 10 trials was used as the predicted variable, and the following variables were used as predictor variables: religious beliefs and religious involvement (i.e., frequency of

worship attendance and frequency of prayer totaled and then median split into high and low based upon past research). The overall regression for the low-probability condition was not statistically significant, $R = .228$, $R^2 = .052$, adjusted $R^2 = .035$, $F\ (2, 108) = 2.97$, $p = .056$. Religious involvement did, however, emerge as a significant predictor variable, $t(108) = 2.43$, $p = .017$. The predictive nature of religious involvement to total psychic selection was not as expected; participants who were more religiously involved chose the psychic more often than participants who were less religiously involved.

Discussion

Participants in the low probability of success condition were more likely to choose the psychic strategy than participants in the high probability of success condition. This is supportive of the research conducted by Case and colleagues (2004). The hypothesis that participants with higher paranormal beliefs would choose the psychic more often than those with lower beliefs was supported. Further, both hypotheses related to paranormal involvement were supported; participants with more personal paranormal involvement chose the psychic less often than did participants with less involvement. These participants had performed a psychic service in the past and were also more likely to believe that they had their own psychic ability. It is not surprising that they would believe they could predict the hidden object's location. On the other hand, participants with more general paranormal involvement chose the psychic more often than those with less general involvement. These participants had used a psychic service in the past, and, thus, it is probable that they expected the psychic to be able to predict the object's location.

The hypothesis that higher paranormal beliefs would be positively associated with higher religious beliefs was not supported; there was no association between any of the paranormal variables and any of the religious variables. Although the overall regression to predict total psychic selection from the religious variables was not statistically significant, the hypothesis that higher religious involvement would be associated with choosing the psychic less often was supported, but in a direction opposite of that expected. Participants who were more religiously involved chose the psychic more often than participants who were less involved.

Younger participants were also more generally involved in their paranormal beliefs than older participants; this result was not expected, but may be due to the availability of psychic services at campus events and as campus entertainment. Age was not associated with personal paranormal involvement. These findings concerning age are important given that many past studies have been conducted using samples of college students. This research supports past research that younger individuals are less religious than older individuals; however, it also supports past research that age is not positively correlated with paranormal beliefs (Göritz & Schumacher, 2000; Haraldsson, 1981).

It might be argued that participants were simply deflecting responsibility to another individual (e.g., the psychic) when their probability of failure was high; however, Case and colleagues (2004) addressed this issue by including two other possible choices for selection strategy. In their study, participants were given the choice of a psychic's, academic's, or student's preexisting selections. Participants were still more likely to choose the psychic than the academic or student, indicating that participants were not simply responding based upon attributional biases (Case et al., 2004).

The results of this research further emphasize the need to consider paranormal involvement in studies of paranormal beliefs (Benassi, Sweeney, & Drevno, 1979; Irwin, 1993; McGarry & Newberry, 1981; Messer and Griggs, 1989). Participants with higher personal paranormal involvement and those with lower religious involvement chose the psychic less often than participants with lower paranormal or higher religious involvement. General paranormal involvement, however, was associated with choosing the psychic more often. Participants with higher personal paranormal involvement were those who believed that they possessed psychic ability; as such, it would not make sense for them to choose the psychic's selections.

Another implication of this research relates to the findings regarding age. Although age was not associated with paranormal beliefs, which supports past research (Göritz & Schumacher, 2000; Haraldsson, 1981), it was associated with religious beliefs and paranormal involvement. Younger participants were less religious and less likely to be personally involved in their paranormal beliefs; however, younger participants were more likely to be generally involved in their paranormal beliefs. Younger participants may have more opportunities to use psychic services on their college campuses. Campus activity boards often book psychic entertainment such as palm readers, fortunetellers, or mediums for small- and large-scale events. The results regarding age are important given that much of the data related to paranormal beliefs has been drawn from undergraduate college samples. These results support past research that involvement is an important variable and that undergraduates differ from the general population in their levels of involvement (McGarry & Newberry, 1981; Messer & Griggs, 1989).

There were limitations related to the studies conducted in this research. First, Internet research limited the available number of questions that could be asked in order to avoid participant dropout. It would have been useful to include a second measure of paranormal beliefs such as the revised Paranormal Belief Scale (PBS-R; Tobacyk, 1988). The PBS-R taps psi phenomena in addition to beliefs about witchcraft and traditional religious beliefs. There are also sample issues that must be taken into account with online research, such as repeat responders and nonserious responses. However, comparative analyses of traditional methods versus Internet methods indicate that nonserious and/or repeat responders do not affect

data significantly (Gosling, Vazire, Srivastava, & John, 2004). Gosling and colleagues (2004) argued that Internet findings are consistent with findings from traditional methods and pose no serious issues in validity or reliability beyond those found in traditional studies; however, Internet studies offer the additional advantage of a more diverse sample.

Another limitation involves the question about the psychic services used. The use of psychic services is not necessarily indicative of involvement in the paranormal. Many college campuses offer entertainment to students in the form of persons claiming to be psychics. It is not surprising that many participants had used at least one psychic service. It may have been more telling to ask participants how many services they had used in addition to how often they have used these services. Future research may also want to inquire as to how often participants watch television shows related to the paranormal, such as shows in which David Blaine or Criss Angel purport to be able to do extraordinary feats.

Future research should also examine paranormal strategy selection after positive affect mood inducements to determine if strategy and paranormal beliefs are related to the experiential system, especially given recent findings that paranormal believers are just as able as skeptics to regulate their emotional coping (Rogers, Qualter, Phelps, & Gardner, 2006). High paranormal believers may be individuals who have perceived paranormal phenomena and relied on the experiential/intuitive system to process these phenomena. This reliance on the experiential system may have caused them to label these events as valid (King, Burton, Hicks, & Drigotas, 2007); therefore, high believers might be even more likely to believe that the psychic is able to predict chance events.

In conclusion, this research contributes a wider body of research related to religious and paranormal beliefs. The findings support past research by emphasizing the need to consider paranormal and religious involvement in studies of paranormal and religious beliefs (Benassi et al., 1979; Irwin, 1993; McGarry & Newberry, 1981; Messer & Griggs, 1989; Shrauger & Silverman, 1971). Kennedy (2003) further emphasizes the need to examine psi effects as divine interventions versus human abilities for individuals high in religiosity. Future research may want to also consider religious involvement in terms of quality and quantity of prayer in addition to church attendance.

The results from these studies close some gaps in the literature concerning religion and decision-making. Participants who were more religiously involved were more likely to choose the psychic. This research also closes some gaps regarding the relation between involvement, beliefs, and decision-making. Past research has not differentiated between personal and general involvement in terms of paranormal beliefs. This research has shown that inclusion of personal paranormal involvement leads to very different results when compared to general paranormal involvement. Participants who were more personally involved chose the psychic less

often, whereas participants who were more generally involved chose the psychic more often.

During times of uncertainty (i.e., life seems unpredictable, or during times of negative life experiences), people may be particularly vulnerable to individuals who claim to have psychic abilities, such as psychic hotline operators or fortunetellers. Use of psychic hotlines and call numbers may not seem like an important facet of American life until one considers that the psychic industry earns well over a billion dollars every year (Nickel & Nisbett, 1998). Given the prevalence of religious and paranormal beliefs and the billion-dollar industries that have sprung up to take advantage of people's vulnerabilities based upon these beliefs, it is important that researchers study the errors in decision-making that result from nonscientific beliefs.

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Abstracts in Other Languages

German

DER EFFEKT EINER PARANORMALEN BETEILIGUNG AUF EINE SPIELSTRATEGIE

ZUSAMMENFASSUNG: Dieses Experiment untersuchte die Rolle allgemeiner und persönlicher paranormaler und religiöser Einstellungen bei einem Online-Kartenspiel. Die Teilnehmer (N = 248) sollten sich für eine Strategie in Bezug auf die Targetauswahl entscheiden (d. h. parapsychische Auswahl oder eigene Auswahl). Teilnehmer in der geringen subjektiven

Wahrscheinlichkeitsbedingung wählten mit größerer Wahrscheinlichkeit die parapsychische Variante (M = 3.07, SD = 3.43) als die Teilnehmer in der hohen subjektiven Wahrscheinlichkeitsbedingung (M = 1.07, SD = 1.76). Ein persönliches paranormales Beteiligtsein ging einher mit einem geringeren Vertrauen in die parapsychische Strategie, wohingegen ein allgemeines paranormales und religiöses Beteiligtsein mit einem größeren Vertrauen in die parapsychische Strategie einherging. Darüberhinaus entschieden sich Teilnehmer, die in ihrem religiösen Glauben stärker verankert waren, häufiger für die parapsychische Strategie als Teilnehmer, bei denen dies nicht so sehr der Fall war. Aus den Ergebnissen dieser Studie folgt, daß Untersucher zwischen allgemeinen und persönlichen paranormalen und religiösen Glaubenseinstellungen unterscheiden sollten.

French

L'EFFET DE L'IMPLICATION PARANORMALE
SUR LA STRATEGIE DE JEU

RESUME : Cette recherche examine le rôle des croyances paranormales et religieuses, générales et personnelles, dans un jeu de cartes en ligne. Les participants (N = 248) devaient choisir une stratégie (choix psi ou choix personnel) pour la sélection de l'objet cible. Les participants dans la condition de faible probabilité subjective étaient plus enclins de choisir le choix psi (M = 3.07, ET = 3.43) que les participants dans la condition de forte probabilité subjective (M = 1.07, ET = 1.76). L'implication personnelle dans le paranormal était associée avec moins de dépendance à la stratégie psi tandis que l'implication générale dans le paranormal et l'implication religieuse étaient associées avec une plus grande dépendance à la stratégie psi. De plus, les participants qui étaient les moins impliqués dans leurs croyances religieuses ont choisi le psi plus souvent que ceux qui étaient moins impliqués dans leurs croyances religieuses. Les résultats de cette étude impliquent que les chercheurs devraient différencier entre les croyances paranormales et religieuses générales et personnelles.

Spanish

EL EFECTO DE INVOLUCRAMIENTO PARANORMAL
EN LA ESTRATEGIA DE JUEGOS

RESUMEN: Esta investigación examinó el rol de creencias paranormales generales y personales y de creencias religiosas en un juego de cartas en la Red. Se le solicitó a los/las participantes (N = 248) que escogieran una estrategia (i.e., una alternativa psíquica o su propia selección) para escoger el objetivo. Los/las participantes en la condición de baja probabilidad subjetiva fueron más propensos a escoger la alternativa psíquica (M = 3.07,

SD = 3.43) que los/las participantes en la condición de alta probabilidad subjetiva (M = 1.07, SD = 1.76). El involucramiento paranormal personal fue asociado con menos uso de la estrategia psíquica mientras que el involucramiento paranormal general y religioso fue asociado con más uso de la estrategia psíquica. Por añadidura, los/las participantes que estaban más involucrados con sus creencias religiosas escogieron la estrategia psíquica más frecuentemente que los/las participantes que estaban menos involucrados en sus creencias religiosas. Los resultados de este estudio implican que se debe diferenciar entre ceencias paranormales y religiosas generales y personales.

HIGHER ANTICIPATORY RESPONSE AT 13.5 ± 1 H LOCAL SIDEREAL TIME IN ZEBRA FINCHES

By Fernando Alvarez

ABSTRACT: The ability for precognition in relation to local sidereal time (LST) was explored in 25 adult female zebra finches, *Taeniopygia guttata*. Their anticipatory response to a startle sound stimulus was tested in 2-hour segments at 13.5 ± 1 h LST, a period found by Spottiswoode (1997a) to correlate with maximum success in anomalous responses of humans, and at 18 ± 1 h LST, a period of low success. Birds were put individually in a testing cage, and after an accustoming period of 20 min, 10 randomly ordered "stimuli" were presented at 3-min intervals: 5 audio startle stimuli and 5 control moments of silence. Subjects were filmed and, in a double-blind fashion, the frequency of their behavior (change of gaze direction and locomotion) was registered 0-6 seconds immediately before stimulus presentation and before the controls. The results showed that at 13.5 ± 1 h LST, during the prestimulation period, the frequency of change of gaze direction was significantly higher and that of locomotion was significantly lower than their frequencies during the controls. At 18 ± 1 h LST the trend was the same as during 13.5 ± 1 h, although the difference in prestimulation versus control of gaze direction was slight and nonsignificant, and that of locomotion was only marginally significant.

Keywords: birds, gaze, locomotion, precognition, sidereal time

While trying to understand the physical mechanisms of information transfer in anomalous cognition (AC), I analyzed published information on remote viewing and ganzfeld responses in relation to local sidereal time (LST), that is, the position of the subjects on the earth relative to the fixed stars in the sky. In a first study, using a database of 2,483 free response trials, Spottiswoode (1997a) obtained a high effect size for trials within one hour of 13.5 LST. On the other hand, the results of a second analysis (Sturrock & Spottiswoode, 2007) of an expanded database (842 new trials were added to the earlier ones) were ambivalent. Although the feature of higher effect size at 13.5 ± 1 h LST was evident, the application of the running-wave power spectrum analysis (that can potentially differentiate real from spurious LST effects, Sturrock, 2004) did not produce significant evidence of an LST effect.

The question is complicated by the coincidence at approximately 13 h LST of the enhanced AC performance (Spottiswoode, 1997a) and a large increase in the magnitude of the negative correlation between AC performance and geomagnetic fluctuations (Spottiswoode, 1997b).

The ability for short-term precognition toward the presentation of a disturbing visual stimulus (a video clip of a crawling snake) has been

detected in the Bengalese finch, *Lonchura striata* (Alvarez, in press). Here I shall try to replicate that study, using as subject another estrildine bird, namely the zebra finch, *Taeniopygia guttata*, testing its response towards a less idiosyncratic stimulus (an artificial sound). In an effort to replicate the LST studies, as well as to extend the focus of research to nonhumans, I will also explore the relationship between precognition and LST, taking advantage of the narrowness of the peak found by Spottiswoode (1997a) for humans.

The zebra finch is native to Australia and the South Pacific, and breeds exceptionally well in captivity. Today it is one of the most common subjects of research, being widely used in many scientific disciplines, ranging from anatomy to evolutionary ecology, both in the wild and in the laboratory (Zann, 1996), serving also as a model for research in neurology, genetics of behavior development and other biological processes and environmental variables that impact human health. The zebra finch is the second avian species (after the chicken) whose genome has been sequenced (Ensembyl, 2009; Mossman, Birkhead, & Slate, 2006).

Method

The methods of the present paper are inspired by those of Radin (1997), Spottiswoode and May (2003), and May, Paulinyi, and Vassy (2005), dealing with electrodermal activity and presentiment in humans. All subjects (25 adult female zebra finches) lived in a unisexual adult group of conspecifics in a 1.5 x 3 x 2 m aviarium near Seville, Spain (37º 17' 2" N, 6º 3' 58" W), and were fed a varied diet of seeds and vegetables. The experiments were carried out between October 29, 2009, and February 10, 2010. The choice of only females as subjects was done to avoid introducing the gender variable in the analysis.

Starting between 07:30 h and 11:00 h UT (again, to limit the potential effects of the UT time variable), the subjects (one at a time) were taken from their group and put into the 70 x 35 x 35 cm testing cage with transparent glass at one end (to film through it), and two external loudspeakers (see Figure 1), in a compartment out of sight from other birds. During each experimental session, after an accustoming period of 20 min and at 3-min intervals, 10 randomly ordered (order determined immediately before each presentation by a true random number generator by Orion Electronics) "stimuli" were presented: 5 audio startle stimuli (gunshot of 44100 Hz and 0.03 s duration, downloaded from internet) and 5 control stimuli of zero signal, or silence. The computer was located in an adjacent compartment and was connected to the loudspeakers by a long cable.

In order to detect a potential enhanced ability to predict the presentation of the startle stimuli during the period of maximum success found by Spottiswoode (1997a) in humans, each of the 25 subjects was tested twice, between October 29 and December 3, 2009, in the 2-hour window at 13.5 ± 1 h LST and, for comparison, between January 18 and

February 10, 2010, at 18 ± 1 h LST, a time segment of very low effect size in Spottiswoode's report.

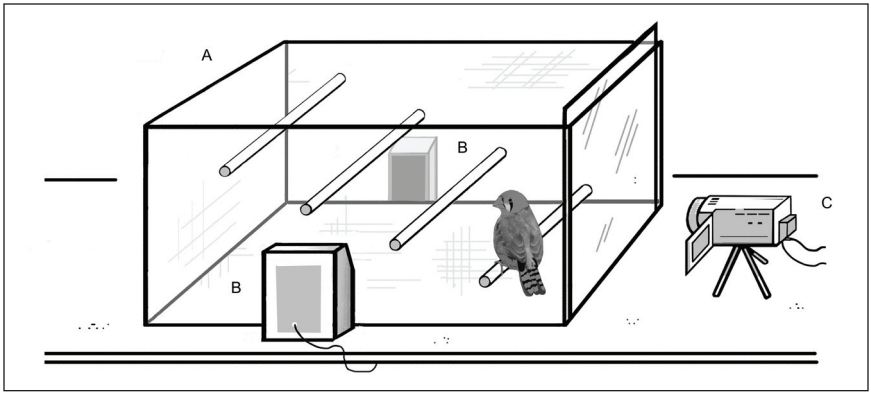

Figure 1. Testing situation. A: testing cage, B: loudspeaker, C: video camera.

Conversion from UTC to LST date and time was done with Calendar Date and Time to Julian Day and Sidereal Times (version 7.2.7), available at internet (http://www.csgnetwork.com/siderealjuliantimecalc.html).

Starting 1 min before the end of the 20 min accustoming period and during the whole trial, each subject was filmed with a 25 frames per second video camera (a Sony DCR-SR72E), located outside the testing cage (see Figure 1), and controlled by the experimenter from a hidden location in an adjacent compartment.

Video analysis was concentrated on quantifying the frequency of two patterns of behavior: the change in the direction of each bird's gaze and the number of acts of locomotion. Change in gaze direction is a form of environment exploration; in the zebra finch it can be estimated from head orientation (Eckmeier et al., 2008), and in this study was registered only when the birds were in standing position. This behavior can be easily recorded, since the birds move the whole head to fixate the eye from one point to the next, and due to the finches' characteristic jerky behavior, each orientation of the head is clearly separated from the next (see Figure 2), its observation being also facilitated by the conspicuous beak and head color markings. The characteristic down movement of the head immediately before flying was not considered, nor while the birds were either walking or jumping. Locomotion included jumping on the perch, walking on perch or cage floor, and flying between perches or toward the floor or walls of the cage. The number of jumps, steps, and flights were recorded.

The frequency of both behaviors in the 6-s period immediately before the presentation of the startle and control stimuli for each subject was counted (analyzing the video records frame by frame with an accuracy of 0.04 s, by using VirtualDubMod 1.5.10.2 computer program), and stimuli and control totals were obtained for each subject.

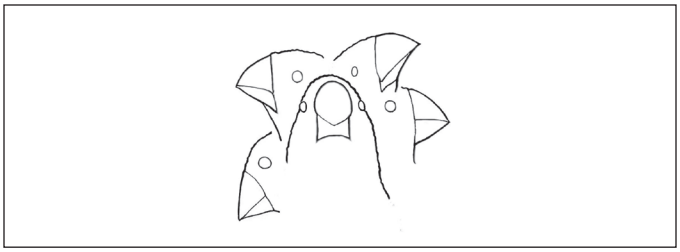

Figure 2. Changes in the direction of zebra finches' gaze.

To prevent experimenter subjective bias, a third person registered the time of initiation and order of the 5 startle sounds and the 5 controls in each session and provided me with the 10 times of initiation without telling whether each belonged to a stimulus or a control until I had analyzed the video clips without listening to the sounds and all trials had ended.

Statistical analysis

Frequency distributions for all variables did not deviate significantly from normality ($p > .20$, Kolmogorov-Smirnov test). The repeated measures ANOVA was used to test the null hypothesis that total frequencies before the startle stimuli and before the controls for the same subjects tested at 13.5 ± 1 h and 18 ± 1 h LST were drawn from the same population. For post hoc two-variables comparisons, the *t* test for dependent samples was applied (Sokal & Rohlf, 1995; Zar, 1996).

Data analysis was done using the STATISTICA 6.0 computer program. All reported *p* values are two-tailed.

Results

When total individual frequencies of the two behaviors for the four conditions of prestimulus and control at 13.5 ± 1 h LST and 18 ± 1 h LST were compared, they were found not to belong to the same population: gaze direction: $F(3,72) = 9.42$, $p < .0001$; locomotion: $F(3,72) = 2.98$, $p = .037$ (repeated-measures ANOVAs). Frequencies for both behaviors are presented in Table 1.

The post hoc two-variables comparisons of change of gaze direction, carried out to detect a potentially anticipatory response at each of the two LST time segments, yielded a significant result at 13.5 ± 1 h LST, prestimulation frequencies being systematically higher than their controls, $t(24) = 3.11$, $p = .005$ (dependent samples). On the other hand, prestimulation frequencies at 18 ± 1 h LST were only slightly higher, and nonsignificantly different than their controls, $t(24) = 0.54$, $p = .596$ (see Figure 3).

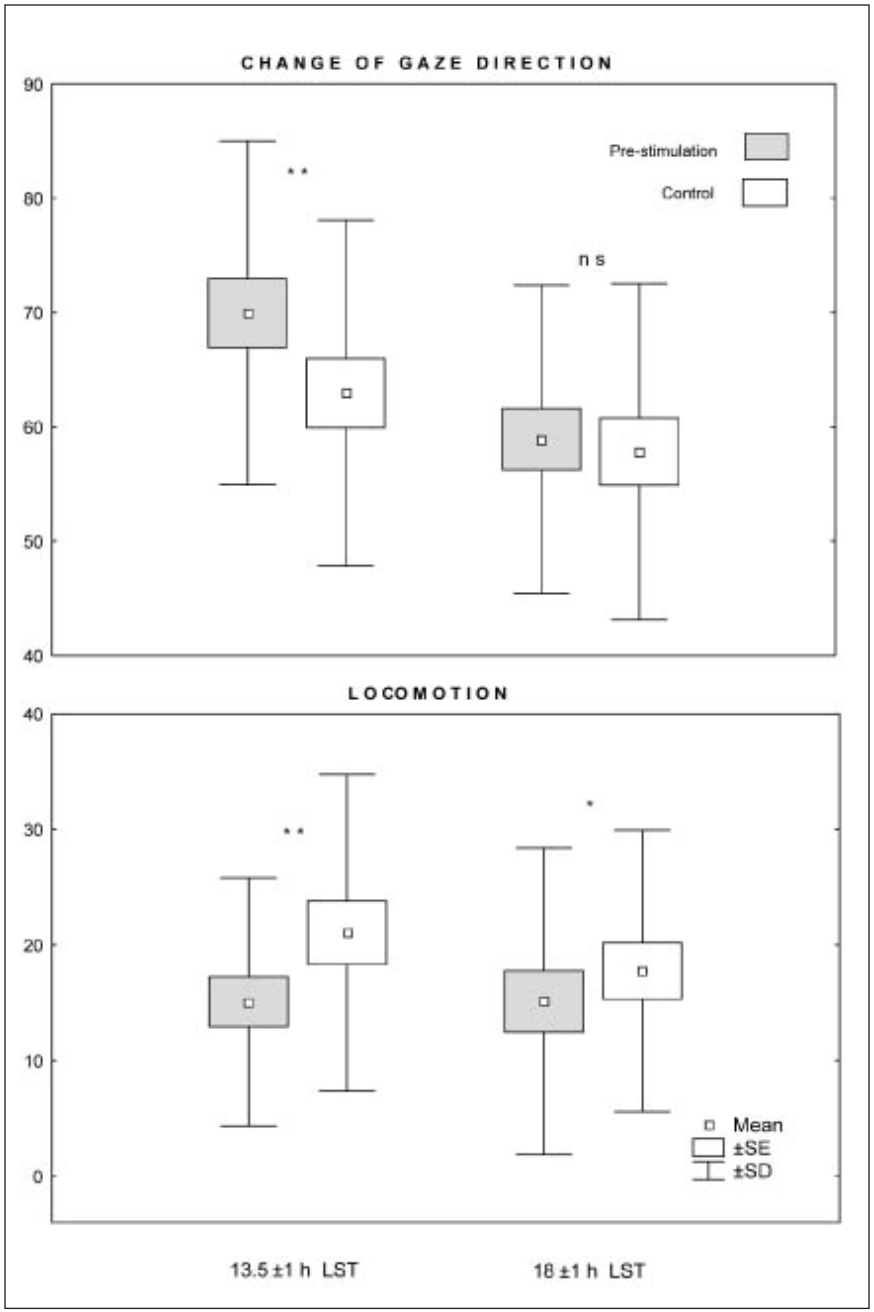

Figure 3. Frequencies of change of gaze direction and of locomotion of zebra finches in the 6-s blocks immediately preceding stimulation and control at 13.5 ± 1 h and 18 ± 1 h LST (*p = .053, **p = .005, *ns*: not significant).

Table 1
Frequency (Mean and Standard Deviation) of Change of Gaze Direction and of Locomotion of Female Zebra Finches in the 6-s Period Immediately Before Presentation of the Startle and Control Stimuli

	Change of gaze direction			Locomotion		
	M	*SD*	*N*	*M*	*SD*	*N*
13.5 ± 1 h LST						
Prestimulation	69.7	15.0	25	15.1	10.7	25
Control	63.0	15.1	25	21.1	13.7	25
18 ± 1 h LST						
Prestimulation	58.9	13.5	25	15.1	13.3	25
Control	57.8	14.7	25	17.8	12.2	25

Post hoc two-variables comparisons of frequency of locomotion also produced a significant result at 13.5 ± 1 h LST, although in the opposite direction from the change in gaze direction: previous to stimulation, the birds' frequency of locomotion became depressed, as compared to control, $t(24) = 3.08$, $p = .005$. At 18 ± 1 h LST the frequency distribution during prestimulation was only slightly lower than that during the control, and only marginally significant, $t(24) = 2.04$, $p = .053$. (see Figure 3).

The results of the comparisons of prestimulation frequencies for both criteria of precognition between the two LST conditions provided a significant difference for change of gaze direction (13.5 ± 1 h LST: X ± SD = 11.66 ± 2.51 per minute, $N = 25$; 18 ± 1 h LST: 9.82 ± 2.24 per minute, $N = 25$; $t(24) = 4.10$, $p = .0004$, and a nonsignificant one for locomotion (13.5 ± 1 h LST: $M = 2.51$, $SD = 1.79$ per min, $N = 25$; 18 ± 1 h LST: $M = 2.52$, $SD = 2.21$ per min, $N = 25$), $t(24) = 0.02$, $p = .988$.

Discussion

The outcome of this study shows that the zebra finch is able to anticipate the occurrence of an alarm sound stimulus, in the same way as the Bengalese finch does toward a disturbing visual stimulus (Alvarez, in press). Also, the significant differences between prestimulation and control frequencies of the zebra finches' behavior at 13.5 ± 1 h LST, as compared to their controls, and the reduced size of this effect at 18 ± 1 h LST appear to agree with the relationship reported by Spottiswoode (1997a) between human anomalous cognition (AC) and local sidereal time.

However, we must be cautious in reaching conclusions about the relationship of precognition ability and local sidereal time before other possibilities are ruled out. Other potential factors affecting the results

could be seasonal changes in the birds' predilection to exploration and locomotion, or a modulation of the birds' precognitive ability by environmental variables such as geomagnetic activity. On the other hand, the successful initial experimentation (at 13.5 ± 1 h LST) followed by unsuccessful subsequent experimentation (at 18 ± 1 h LST) could be viewed as a "decline effect" in psychic performance, commonly observed in humans, and attributed to a variety of causes, from individual psychology, social attitudes, electromagnetic fields, and experimental artifacts to psi properties (Colborn, 2007).

A plausible effect put forward by Ryan (2008) on the observed correlation of AC and LST might be caused by the regular fluctuations in the geomagnetic field known as geomagnetic pulsations, which exhibit seasonal and/or seasonal/daily variation. Since, as in the present study, most of the experiments in Spottiswoode's (1997a) database were carried out in daylight hours, an influencing factor with seasonal variation, as found by Sturrock and Spottiswoode (2007) in Spottiswoode's former database, would generate an apparent variation of AC effect by LST.

One possible reason for the opposite direction of change of gaze direction and locomotion, when comparing frequencies before the startling stimulus and before the control in the 13.5 ± 1 h LST condition, could be the need to visually explore what is about to happen, and at the same time stopping locomotion, in this way reducing unwanted detection by potential predators. Since optimal visual recognition of objects is attained when animals are not locomoting (Gibson, 1979), they usually intersperse movement with pauses, which provide the opportunity for the sensory systems to detect relevant stimuli, adapting this intermittent behavior to changing circumstances (Kramer & McLaughlin, 2001).

Whether the zebra finch and other animal species show an effect of local sidereal time on AC performance will have to be definitely determined in future studies, preferably using a variety of subject species of different nervous system complexity and of more remote common ancestry than finches and humans. Some good candidate topics could be precognition in earthworms (Wildey, 2001) and dogs (Sheldrake & Smart, 2000), psychokinesis in insects (Metta, 1972) and chicks (Peoc'h, 1995), ESP and reinforcement in insects and rodents (Duval & Montredon, 1968; Parker, 1974; Schmidt, 1970), and homing and trailing in dogs and pigeons (Rhine & Feather, 1962; Sheldrake, 2002).

At first sight on inspecting Spottiswoode's (1997a) results, an enhancing influence (or signal) on AC performance could originate from the strip of sky with Right Ascension (RA, the cosmic equivalent of longitude) of 13.5 ± 1 h, and unknown declination (akin to latitude in the celestial sphere), an influence whose source could be outside the solar system.

Since we do not understand the nature of anomalous cognition and the processes related to it, it would be ideal to try to identify how

the presumed signal would act. On the other hand, this signal, if finally demonstrated to exist, does not have to be of the same nature as AC, and therefore may not be subject to the same rules. For instance, both AC performance and the presumed signal may not decrease with distance, while the latter appears to be at least partially blocked by the earth (Spottiswoode, 1997a), but the former is not.

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Acknowledgments

I thank M. Vázquez Castro for help in finch maintenance, to E. Collado for preparing the computer program for random stimuli presentation, and to A. Ryan for helpful comments. Part of the material used was obtained through project CGL2005-03620 of the Ministry of Science and Innovation - Spain.

Abstracts in Foreign Languages

German

HÖHERE ANTIZIPATORISCHE REAKTION UM 13.5 ± 1 H LOKALER STERNZEIT BEI ZEBRAFINKEN

ZUSAMMENFASSUNG: Die Fähigkeit zur Präkognition in Bezug auf die lokale Sternzeit (local sideral time, LST) wurde bei 25 erwachsenen weiblichen Zebrafinken, *Taeniopygia guttata*, untersucht. Ihre antizipatorische Reaktion auf einen Schreckreiz wurde in 2-stündigen Abständen um 13.5 ±1 h LST getestet, ein von Spottiswoode gefundener Zeitraum, während dessen Versuchspersonen bei anomalen Reaktionen am besten abschnitten, und um 18 ± 1 h LST, einem Zeitraum mit nur mäßigem Erfolg. Die Vögel wurden einzeln in Testkäfige gesetzt, und nach einer Eingewöhnungsphase von 20 min wurden ihnen im Abstand von 3 min in einer Zufallsabfolge 10 "Reize" dargeboten: 5 akustische Schreckreize und 5 Schweigeperioden zur Kontrolle. Die Versuchstiere wurden gefilmt, und unter Doppelblindbedingung wurde die Häufigkeit von Verhaltensweisen (Änderung der Blickrichtung und Fortbewegung) im Abstand von 0–6 s unmittelbar vor der Reizpräsentation und vor den Kontrollen aufgezeichnet. Die Ergebnisse zeigten, daß um 13.5 ± 1 h LST während der Prästimulationsperiode die Häufigkeit in der Änderung der Blickrichtung signifikant höher und diejenige der Fortbewegung signifikant geringer ausfielen als die Häufigkeiten während der Kontrollperioden. Um 18 ± 1 h LST zeigte sich der gleiche Trend wie während 13.5 ± 1 h, obwohl der Unterschied in der Prästimulation verglichen mit der Kontrolle der Blickrichtung nur gering und nichtsignifikant ausfiel und in Bezug auf die Fortbewegung nur schwach signifikant.

French

REACTION ANTICIPATOIRE AUGMENTEE A 13.5 ± 1 H TEMPS SIDERAL LOCAL AVEC DES DIAMANTS MANDARINS

RESUME : La capacité de précognition en relation avec le temps sidéral local (LST) a été explorée chez 25 adultes femelles de l'espèce diamants mandarins, *Taeniopygia guttata*. Leur réaction anticipatoire à un stimulus sonore brusque a été testée durant des segments de 2h à 13.5 ± 1 h LST, une période que Spottiswoode a trouvé en corrélation avec un succès maximal dans les réactions humaines anomales, et à 18 ± 1 h LST, une période associée à un faible succès. Les oiseaux étaient placés individuellement dans une cage de test, et après d'une période d'acclimatation de 20 min, 10 "stimuli" en ordre aléatoire étaient présentés dans des intervalles de 3 min: 5 stimulus audio brusque et 5 moments contrôles de silence. Les sujets étaient filmés et, dans le cadre d'un double aveugle, la fréquence de leur comportement (changement de la direction du regard et de la locomotion) était enregistrée de 0 à 6s avant la présentation du stimulus et avant les contrôles.

A 18 ± 1 h LST, la tendance était la même que durant la période 13.5 ± 1 h, bien qu'il y ait une différence entre les essais en préstimulation et les essais contrôle sur le plan de la direction du regard, différence légère et non-significative, et sur le plan de la locomotion, différence alors marginalement significative.

Spanish

RESPUESTA ANTICIPATORIA DE ALTA MAGNITUD DURANTE TIEMPO SIDERAL LOCAL EN 13.5 ± 1 H EN MANDARIN LISTADO

RESUMEN: La habilidad de precognición fue explorada en relación al tiempo sideral local (TSL) con 25 mandarines listados adultos de sexo femenino, *Taeniopygia guttata*. Su respuesta anticipatoria a un sonido repentino fue estudiada en segmentos de 2 horas a 13.5 ± 1 h TSL, un período que Spottiswoode encontró que estaba correlacionado con el mayor éxito en respuestas anómalas con seres humanos, y en 18 ± 1 h TSL, un período de bajo éxito. Los pájaros fueron colocados individualmente en la jaula experimental y después de un período de tiempo de 20 minutos para acostumbrarse, se les presentaron 10 "estímulos" seleccionados al azar en intervalos de 3 minutos: 5 estímulos repentinos auditivos y 5 momentos de silencio control. Los sujetos fueron filmados y la frecuencia de su comportamiento (cambio en la dirección de su mirada y locomoción) fue anotado a doble ciego de 0–6 segundos inmediatamente antes de la presentación del estímulo y antes de los controles. Los resultados mostraron que en 13.5 ± 1 h TSL, durante la presentación del período de preestimulación, la frecuencia de cambios de dirección de la mirada fue significativamente mayor y de locomoción fueron significativamente menores que las frecuencias durante los controles. Durante 18 ± 1 h TSL la tendencia fue la misma que durante 13.5 ± 1 h, aunque la diferencia entre prestimulación versus control de la dirección de la mirada fue leve y no-significativa, y la de locomoción sólo fue marginalmente significativa.

THE EVOLUTION OF BELIEFS IN GOD, SPIRIT, AND THE PARANORMAL. I: TERROR MANAGEMENT AND RITUAL HEALING THEORIES

By Michael P. Kelley

ABSTRACT: It has been suggested that nearly universal beliefs in God, spirit, and paranormal phenomena evolved because such beliefs alleviate death anxiety. The terror management theory of religion is reviewed. Evidence for an association between lowered death anxiety and religious/paranormal beliefs is extensive, though perhaps somewhat inconsistent, and limited to particular facets of death anxiety, particular aspects of religiosity, and restricted ranges of belief conviction. There is no evidence to support the prediction that death anxiety should be associated with lowered fecundity. Paranormal beliefs are associated with religious beliefs, and the relationship between paranormal beliefs and death anxiety is similarly inconsistent. Ritual healing theory proposes that anomalous experiences occurring in the context of altered states of consciousness during shamanic rituals were the experiential source of beliefs in God, spirit, and the paranormal. Individuals high in hypnotizability were more susceptible to the beneficial health effects of shamanic healing rituals, resulting in selection for this heritable trait, facilitating the evolution of religious and paranormal experiences and beliefs.

Keywords: terror management, ritual healing, evolution, paranormal belief

Belief in God (or a spiritual dimension to existence) is extremely widespread and persistent throughout human history (Armstrong, 1993; Comings, 2007; Jordon, 2002; Zuckerman, 2005). Beliefs in the paranormal and anomalous experiences such as apparitions, extrasensory perception, psychokinesis, synchronicities, out-of-body experiences, and near death experiences are also universal (e.g., McClenon, 1994, 2002a). According to experiential source theory, anomalous experiences are the source of beliefs in spirits, souls, life after death, and magical abilities (e.g., McClenon, 1994, 2002a). With the transition from hunter-gatherer to settled agrarian society, shamanistic ritual and belief systems evolved into highly elaborated religious myth and ritual, including theistic beliefs. It has been suggested that God beliefs and beliefs in the paranormal evolved because such beliefs reduce death anxiety (e.g., Persinger, 1987, 2009). Persinger's evolutionary account of the ubiquity of beliefs in God, the paranormal, and spiritual phenomena hinges on the assumptions that death anxiety is inversely related to religiosity and belief in the paranormal, and that death anxiety compromises fecundity or reproductive success. While there is empirical

support for the first of these assumptions, evidence concerning the second is lacking.

This article, the first in a series of three, will review the evidence concerning the terror management theory of religion, as well as an alternative evolutionary account, the ritual healing theory, which proposes that anomalous experiences occurring in the context of altered states of consciousness during shamanic rituals were the experiential source of beliefs in God, spirit, and the paranormal. Individuals high in hypnotizability were more susceptible to the beneficial health effects of shamanic healing rituals, resulting in selection for this heritable trait, facilitating the evolution of religious and paranormal experiences and beliefs. The second article in the series will review evidence that hypnotizability is one component of a superordinate trait dimension, transliminality, which is comprised of traits highly correlated with hypnotizability, including paranormal belief and experience, positive schizotypy, fantasy-proneness, and creativity. A revision of the ritual healing theory is proposed, replacing hypnotizability with transliminality as the mediating factor. The third article in the series reviews the genetic balanced polymorphism model, suggesting that the disadvantageous effects of psychosis on fertility are balanced by the advantageous effects of less extreme manifestations of the underlying trait dimension of schizotypy/transliminality. Paranormal beliefs are related to paranormal experiences as well as paranormal abilities, which, if veridical, would have direct adaptive advantage. Correlates of paranormal abilities overlap with component characteristics of transliminality. The direct benefits theory suggests that beliefs in spiritual and paranormal phenomena may have evolved simply because such beliefs are in some manner true, and the associated traits and abilities are highly adaptive.

Religiosity and Death Anxiety

Freud (1927/1961) suggested that religion serves as a coping mechanism against anxiety-related experiences (e.g., Pargament, 1990). Others have also suggested that religion addresses existential concerns inevitably arising from human awareness of mortality (Becker, 1973; Burkert, 1996). Terror management theory (reviews by Greenberg, Pyszczynski, & Solomon, 1986; Greenberg, Solomon, & Pyszczynski, 1997; Solomon, Greenberg, & Pyszczynski, 1991) posits that one of the primary functions of religious belief is to alleviate the potentially overwhelming terror or anxiety that results from awareness of death. There is considerable empirical support for the basic tenets of terror management theory (reviews by Greenberg, Solomon, & Arndt, 2008; Vail et al., 2010). Threats to self-esteem or one's worldview increase death thought accessibility, and enhancing self-esteem or faith in one's worldview decreases death thought accessibility and anxiety (e.g., Harmon-Jones et al., 1997; for a comprehensive review of

death thought accessibility research see Hayes, Schimel, Arndt, & Faucher, 2010). Reminders of death (increases in morality salience) increase confidence in belief in an afterlife (Osarchuk & Tatz, 1973; Schoenrade, 1989), and faith in supernatural agency (Norenzayan & Hansen, 2006). The effects of mortality salience on self-esteem and worldview defense are eliminated by presentation of ostensible scientific evidence for an afterlife (Dechesne et al., 2003). Mortality salience increases anxiety about using a religious symbol in a disrespectful way (Greenberg et al., 1995). Challenges to religious beliefs increase death anxiety but not other types of negative thoughts among religiously devout persons (Friedman & Rholes, 2007; Schimel, Hayes, Williams, & Jahrig, 2007). Death thought accessibility increases following exposure to creaturely aspects of human existence (Arndt, Cook, Goldenberg, & Cox., 2007; Cox, Goldenberg, J. L., Pyszczynski, T., & Weise, 2007). Some proponents of terror management theory acknowledge that religion serves other psychological functions, including providing understanding of the world, a sense of control, and enhanced social solidarity (e.g., Vail et al., 2010), but suggest that belief in an afterlife controlled by an all-powerful deity facilitates these other functions (Diamond, 1997). Reminders of death increase the pursuit of structure, meaning, certainty, and social support (review by Greenberg et al., 2008). Religious conflicts may be partly rooted in protection from death anxiety, as reminders of death lead people to prefer members of their own religious group more strongly, to more harshly evaluate adherents of other religions, and to advocate violence toward outgroup members (e.g., Greenberg et al., 1990; Pyszczynski, Greenberg, J., Solomon, S., & Maxfield, 2006), and the death of out-group members alleviates death anxiety and the defensive responses it generates (Hayes, Schimel, & Williams, 2008). The relationship between death anxiety and religious belief may also extend to secular cultural worldviews, as threats to a person's secular worldview increase death thought accessibility (Schimel et al., 2007), increasing mortality salience increases discomfort about using secular symbols (e.g., a national flag) in a disrespectful manner (Greenberg et al., 1995) and increases militaristic attitudes toward out-groups (Routledge & Arndt, 2008). Many studies have reported the predicted inverse relationship between death anxiety and religiosity or traditional religious beliefs in samples of American and European young adults (e.g., Aday, 1984–1985; Alvarado, Templer, Bresler, & Thomas-Dobson, 1995; Florian & Kravetz, 1983; Harding, Flannelly, Weaver, & Costa, 2005; Richardson, Berman, & Piwowarski, 1983; Spilka, Stout, Minton, & Sizemore, 1977; Templer, 1970; Young & Daniels, 1980), Indians (Parsuram & Gandhi, 1994), Iranians (Roshdieh, Templer, Cannon, & Canfield, 1998–1999), Pakistani Muslims (Suhail & Akram, 2002), and Arabic students (Al-Sabwah & Abdel-Khalek, 2006). Low death anxiety is associated with greater strength of belief conviction (Alvarado et al., 1995), and individuals with more pronounced religious convictions are significantly more likely than average believers to

report low or no fear of death (Koenig, 1988; Kraft, Litwin, & Barber, 1987; Templer, 1970).

Religiosity and Mental Health

People committed to religious doctrines tend to live longer and are better adjusted psychologically (e.g., Pargament, 1997; Smith, McCullough, & Poll, 2003). There is considerable evidence that religion and religiosity are associated with a wide range of physical and mental health benefits (e.g., Koenig, 1998; Moreira-Almeida, Neto & Koenig, 2006), although this relationship depends on the nature of the spiritual/religious experience involved (Koenig, 2010). A significant inverse relationship was found between belief in life after death and severity of psychiatric symptoms in anxiety, depression, obsession-compulsion, paranoia, phobia, and somatization (Flannelly et al., 2006). It has yet to be demonstrated that these beneficial effects of religious belief are mediated by reduced death anxiety. Several studies have reported that subjects with fewer somatic symptoms had lower death anxiety (Abdel-Khalek & Lester, 2009b; Abdel-Khalek & El-Nayal, 2006; Lonetto & Templer, 1986). Others have found that greater religiosity is associated with more severe psychopathology. Extant research on the relationship between religiosity and mental health suffers from the near universal lack of atheist control samples (Hwang, Hammer, & Cragun, 2009), and although many studies include samples of individuals classified as "low spirituality" or as having no religious preference, these groups are heterogeneous and contain only a fraction of individuals who would be considered truly secular or atheist.

Inconsistent Findings

Research concerning the association between religiosity and death anxiety is inconclusive (review by Fortner & Neimeyer, 1999). Some studies have found that there was no significant association between death anxiety and religiosity in young adults (Abdel-Khalek & Lester, 2009a; Donahue, 1985; Ens & Bond, 2007; Lester, 1967; Lester & Abdel-Khalek, 2008; Long & Elghanemi, 1987; Martin & Wrightsman, 1965; Templer & Dotson, 1970; Thorson, Powell, Abdel-Khalek, & Beshai, 1997). There was no significant association between religiosity and existential anxiety, of which death anxiety is one component (Westman, 1992). Others have found that high religiosity was associated with greater death anxiety (Beg & Zilli, 1982; Feifel & Branscomb, 1973; Swanson & Byrd, 1998; Templer, Cappelletty, & Kauffman, 1990–1991). Yet others have reported a curvilinear relationship with moderate religiosity associated with higher levels of death anxiety than low or high religiosity (Downey, 1984; McMordie, 1981; Neimeyer & Van Brunt, 1995). The inconsistency of findings concerning the relationship

between religiosity and death anxiety may be due to the treatment of both religiosity (e.g., Cicirelli, 2002; Williams, 1994) and death anxiety (e.g., Aday, 1984–1985) as unidimensional constructs (Vail et al., 2010; Wittkowski, 1988).

Intrinsic Versus Extrinsic Religiosity

The Religious Orientation Scale (Allport & Ross, 1967) distinguishes between two religious orientations: extrinsic religiousness, engaging in religious activities as a means to ends such as desired social or emotional consequences, and intrinsic religiousness, which refers to engagement in religious activities as ends in themselves (using vs. living one's religion). Death anxiety was unrelated to intrinsic religiosity and was positively and significantly correlated with extrinsic religiousness across several studies (e.g., Cole, 1978–1979; Leming, 1979–1980; review by Donahue, 1985). Subsequent studies have found that extrinsic religiosity is positively related to death anxiety (Cohen et al., 2005; Maltby & Day, 2000; Swanson & Byrd, 1998). Swanson and Byrd (1998) found that death anxiety was significantly and positively correlated with extrinsic religiousness, fear of punishment, and separation-individuation conflict, all of which predicted death anxiety individually. These findings suggest that, far from protecting against death anxiety, extrinsic religiousness and belief in an afterlife in which one will be punished for transgressions exacerbate death anxiety. Several studies have found that subjects who were higher in intrinsic religiosity had significantly lower death anxiety (Clement, 1998; Hui & Feng, 2009; Roshdieh et al., 1998–1999; Suhail & Akram, 2002). Mortality salience increased secular worldview defense for extrinsically religious subjects but not for those high in intrinsic religiousness who were allowed to affirm their religious beliefs (Jonas & Fischer, 2006), suggesting that intrinsic religiosity is more effective than extrinsic religiosity for terror management. Others have found that death anxiety was not associated with intrinsic religiosity (Abdel-Khalek & Lester, 2009a; Thorson & Powell, 1989, 1990).

Multidimensional Nature of Death Anxiety

Death anxiety is multifaceted. Deeken (2009) described nine types of fears and anxieties about death: fear of pain, fear of loneliness; fear of unpleasant experiences, fear of becoming a burden to the family and to society, anxiety towards the unknown, fear of death resulting from fear of life, fear of death as a feeling that one's life task is still incomplete, fear of death as fear of personal extinction, and fear of death as fear of judgment and punishment after death. Lester (1994) distinguished between fears of the death state and fears of the dying process, and between fears of one's own death and fears of the death of loved ones, suggesting four types of death anxiety: personal death anxiety, personal dying anxiety, anxiety

concerning the death of someone close, and anxiety concerning the dying of someone close. Hui and Feng (2009) found that all four types of death anxiety were significantly intercorrelated, and all four were inversely related to intrinsic religiosity. The association between intrinsic religiosity and anxiety toward one's own death were partially mediated by a sense of purpose in life afforded by intrinsic religiosity. Lithuanian participants who expressed higher levels of intrinsic religiosity also expressed less fear of the unknown, but no other independent, linear relationships existed among the various dimensions of religiosity and death anxiety (Roff, Butkeviciene, & Klemmack, 2002). Others have found positive correlations between religiosity and some components of death anxiety but not others (Hoelter & Eppley, 1979; Wittkowski, 1988), or with only the most fearful element of death (Diggory & Rothman, 1961).

Taoist Orientation

Scores on a measure of having a Taoist orientation were associated with less death anxiety and existential anxiety (Lester & Abdel-Khalek, 2007b; Park, Zeyrek, & Lester, 2007). Subjective life expectancy was associated with a Taoist orientation and existential anxiety in American students and with death anxiety in the Kuwaiti students (Lester & Abdel-Khalek, 2007a). Others have reported that there was no significant association between Taoist orientation and death anxiety in Southeast Asian students (McCollaum, Zeyrek, & Lester, 2006) or Turkish students (Zeyrek & Lester, 2009). Lower death anxiety was associated with a Taoist orientation in American but not Turkish students (Zeyrek, Lester, & Alpan, 2006).

Paranormal Beliefs and Religiosity

Traditional religious beliefs, such as the notion of a "heaven" and survival of bodily death, are associated with a belief in the paranormal (e.g., Thalbourne, 1995b). Paranormal beliefs may function as surrogate religious beliefs (Becker, 1973; Persinger & Makarec, 1990). Some studies suggest that there is an inverse relationship between traditional religious beliefs and paranormal beliefs, suggesting that paranormal belief may function as a substitute for traditional religious beliefs. Strong belief in and commitment to Christian doctrines (particularly Protestant) was found to be associated with less likelihood of endorsing beliefs in reincarnation, contact with the dead, UFOs, telepathy, prophecy, psychokinesis, or healing, compared to nonbelievers (Hillstrom & Strachan, 2000). Most studies have found negative relationships between paranormal beliefs and traditional Christian beliefs, with small to moderate effect sizes (Beck & Miller, 2001; Duncan, Donnelly, & Nicholson, 1992; Ellis, 1988; Emmons & Sobal, 1981; Persinger & Makarec, 1990; Skirda & Persinger, 1993; Tobacyk & Milford, 1983; Tobacyk & Wilkinson, 1990). The inverse relationship between paranormal

belief and traditional religious belief may be due to explicit rejection of at least some paranormal beliefs (e.g., precognition and superstition) by the Catholic church and many Protestant denominations (Goode, 2000; Sparks, 2001). Persinger and Makarec (1990) found that subjects who did not attend church endorsed more exotic beliefs (e.g., telepathy, reincarnation, UFOs) than traditional religious beliefs, whereas those who attend church endorse more religious than exotic beliefs, suggesting that exotic beliefs may substitute for religious beliefs. Immortality and a source of omnipotence, major themes of religious beliefs, are conceptually similar to reincarnation and superior alien intelligence. Religious subjects were skeptical of paranormal phenomena but were accepting of supernatural phenomena, and while increased reports of negative affect over the preceding year appeared to attenuate belief in the supernatural for religious subjects, for nonreligious subjects, increased belief in both the supernatural and paranormal was predicted by high negative affect (Beck & Miller, 2001).

In contrast to the inverse relationship between paranormal and traditional religious beliefs, some investigators have suggested that people who believe in angels and wondrous healings may also be more likely to believe in other paranormal phenomena such as ghosts, voodoo, and witchcraft (Irwin, 1993; Rice, 2003). Paranormal beliefs and religious beliefs share a common worldview involving belief in phenomena that cannot be explained by classical science (Zusne & Jones, 1989). A few studies have found positive relationships between traditional Christian beliefs and beliefs in the paranormal (Buhrmann & Zaugg, 1983; Goode, 2000; Haraldsson, 1981; Irwin, 1985; Rudski, 2003; Schumaker, 1987; Thalbourne, 1995a, 2003). Several studies have reported that paranormal belief has low but significant positive correlations with measures of religiosity, particularly intrinsic religiosity (Goode, 2000; Haraldsson, 1981; Hergovich, Schott, & Arendsay, 2005; Irwin, 1985; Thalbourne, 2003; Thalbourne & Hensley, 2001), although the nature of this relationship depends on the particular measurements employed (Thalbourne & O'Brien, 1999). In males, but not females, there was a significant association between preoccupation with religious beliefs and a measure of magical ideation (Diduca & Joseph, 1997). Functionally, both religious and exotic beliefs may serve to reduce death anxiety (Persinger, 1985). Thalbourne (2003) found positive correlations between paranormal belief and religiosity in seven out of nine studies, with correlation coefficients ranging from $r = .20$ to $r = .55$. For example, Thalbourne and Houtkooper (2002) found a correlation of $r = .55$ between the Australian Sheep-Goat Scale and religiosity in a German sample. Thalbourne and O'Brien (1999) found an almost significant negative correlation ($r = -.17$) between the Australian Sheep-Goat Scale (Thalbourne & Delin, 1993) and the Religion-Puritanism Scale from the Wilson-Patterson Attitude Scale (Wilson, 1975), a correlation close to zero with the subscale traditional religiosity ($r = .07$) from the Paranormal Belief Scale (PBS,

Tobacyk & Milford, 1983), and a significant and positive coefficient with the religiosity scale of Haraldsson (derived from Haraldsson, 1981), indicating that the relationship between paranormal belief and religiosity depends on the measure of religiosity used. Hergovich, Schott, and Arendsay (2005) found low but significant correlations between paranormal belief and religiosity. Intrinsic religiosity and self-reported religiosity were much more strongly related to paranormal belief than was extrinsic religiosity. For subjects without religious affiliation, the relationship between religiosity and paranormal belief was higher than for Catholics and Protestants, suggesting that paranormal belief can be, but is not necessarily, a substitute for traditional religion.

Thus, while paranormal beliefs and experiences may serve some of the same psychological needs as traditional religious beliefs, paranormal beliefs (e.g., witchcraft and UFOs) are differentiated from traditional religious beliefs with respect to the extent to which the belief conforms to the mainstream societal zeitgeist. Paranormal beliefs are more likely to be espoused by individuals belonging to groups that are politically or economically disenfranchised, marginalized, or oppressed (e.g., the young, females, minorities) than by those in the mainstream more likely to hold positions of power (e.g., older white males) (e.g., Fox, 1992; Greeley, 1975; Heintz & Baruss, 2001; MacDonald, 1992, 1995). These same cultural subgroups are also more likely to be characterized by a greater degree of right hemisphericity according to TenHouten's "neurosociological theory" (Kaplan & TenHouten, 1973; TenHouten, 1985). Pizzagalli, Lehmann, and Brugger (2001) found that believers in the paranormal showed stronger indirect semantic priming effects than disbelievers after left (but not right) visual field stimulation, indicating faster appreciation of distant semantic relations specifically by the right hemisphere. These findings suggest that disinhibition of right hemispheric semantic networks may underlie the formation of paranormal belief. Pizzagalli et al. (2000) suggested that "both schizotypal and paranormal ideation are based on an overreliance on the right hemisphere, whose coarse rather than focused semantic processing may favor the emergence of 'loose' and 'uncommon' associations." They reported that, compared to subjects who did not believe in the paranormal, believers showed more right-located sources of the beta2 frequency band (18.5–21 Hz) in the EEG.

Lange and Houran (1997) found a significant negative correlation between death anxiety, measured by Lester's (1991) Attitude Toward Death Scale, and paranormal beliefs measured by the Anomalous Experiences Inventory (Gallagher, Kumar, & Pekala, 1994), but this relationship obtained only at higher levels of conviction of belief in the paranormal. Thorson (1991) found that religiosity and death anxiety had a significant, negative correlation for subjects high in religiosity and those low in death anxiety, but there was no relationship for either those high in death anxiety or those low in religiosity. Houran (1997) reported that scores on the Death Anxiety Scale

were not significantly related to either Belief in the Paranormal or Paranormal Experiences. Thus evidence for an association between lowered death anxiety and beliefs in God, spiritual, and paranormal phenomena is somewhat inconsistent, and perhaps limited to particular facets of death anxiety, particular aspects of religiosity, and restricted ranges of belief conviction.

Paranormal Beliefs and Reproductive Capacity: Search for Mediating Factors

Critical assumptions for an evolutionary account of belief in religion, spirit, and the paranormal involve the influence of beliefs on reproductive success or fecundity, and mortality during the reproductive age span. Evolution involves the selection of certain traits and the genes associated with them, as a consequence of adaptive advantages conferred by the traits that enhance health, survival, and reproductive success (fertility or fecundity), leading to an increase over time of the frequency of those genes in the gene pool. Death anxiety should increase mortality during reproductive years, and believers should have lower mortality during reproductive years than atheists. Death anxiety should reduce fecundity, and believers should have greater fecundity than atheists. For example, Vail et al. (2010) suggested that the terror management function of religion mitigates existential distress, which is "beneficial for staying alive and reproducing," although no evidence or arguments to support this key supposition were presented. This author is unaware of any empirical studies directly supporting an inverse association between death anxiety and fecundity. However, indirect evidence does suggest that belief in paranormal or spiritual phenomena (magical ideation) may be associated with greater fecundity. A positive association between belief in the spiritual or paranormal and reproductive success may be due to mediating factors other than reduced death anxiety, including enhanced transliminality and closely associated traits such as hypnotizability, schizotypy, hypomania, and creativity. Other evolutionary and functional accounts of religion have emphasized the adaptive value of various aspects of religion, including fostering implicit self-regulation (Koole, McCullough, Kuhl, & Roelofsma, 2010), promoting socially desirable responding or "self-enhancement" (Sekkides & Gebauer, 2010), or binding individuals into a moral community (Graham & Haidt, 2010), promoting social identity (Ysseldyk, Matheson, & Anishman, 2010), compensation for feelings of lower personal control (Kay, Gaucher, McGregor, & Nash, 2010), reduction of feelings of self-uncertainty (Hogg, Adelman, & Blagg, 2010), explaining human suffering (Gray & Wegner, 2010), and enhancing coping with bereavement through continued attachment (Benore & Park, 2004; Granqvist & Hagekull, 2000; Granqvist, Mikulincer, & Shaver, 2010). Others consider religion to be the by-product of the evolution of ordinary cognitive capacities rather than an evolutionary adaptation in itself (Atran & Norenzayan, 2004).

Ritual Healing Theory

McClenon (1994, 1997, 2000a, 2000b) has argued for a "ritual healing theory" of religion which posits that anomalous experiences have a physiological basis, are universal, and give rise to beliefs that have shaped folk religions throughout the world and across history and prehistory. The practice of shamanic ritual over millennia of human evolution resulted in an increased frequency of such anomalous experiences and associated beliefs. Shamanic practices involving chanting, singing, drumming, dancing, and other repetitive behaviors produce altered states of consciousness, that is, trance states (Neher, 1962; Schumaker, 1995). Faith healing and institutionalized altered states of consciousness are universal (Bourguignon, 1973; Eliade, 1974; Murdock, 1945). Because shamanic practices coupling altered states of consciousness (ASCs) with suggestion were effective with some individuals, such rituals selected for genotypes associated with positive responses to the ritual healing practices. Genes underlying hypnotizability, suggestibility, and placebo effects allowed some individuals to benefit more from shamanic healing rituals, enhancing their health, survival, and fertility, thus becoming more prevalent over time. The combination of anomalous experiences facilitated by ASCs and hypnotic suggestibility allowed the development and acceptance of ideologies supporting shamanic and religious ritual (Schumaker, 1990, 1995). Shamanic practices and associated beliefs may represent the universal proto-religion from which more complex and elaborated religious traditions evolved (Winkelman, 1986, 1992). Elements of shamanic healing and mythology were "present in all regions of the world at some time in their hunting and gathering past" (Winkelman, 1992, p. 50). Religious altered states of consciousness continue to provide benefits, as health outcomes are highly correlated with spiritual experience (Kass et al., 1991). Meditation, a widespread and ancient religious practice, has a wide range of health benefits, and the therapeutic benefits appear to be greatest for highly hypnotizable individuals (Heide, Waddington, & Lundy, 1980). Meditative prayer (Poloma, 1993) and mystical experience (Greeley, 1975) are predictive of existential well-being. McClenon (1997) reviewed evidence supporting five testable features of the ritual healing theory: (1) shamanic/hypnotic rituals increase survival and fertility; (2) the efficacy of shamanic ritual is correlated with hypnotizability; (3) hypnotizability has a genetic component; (4) shamanic rituals were practiced for many tens of thousands of years, sufficient time to have a meaningful impact on gene frequencies; and (5) hypnotizability affects the frequency and characteristics of anomalous, paranormal, and religious experiences. The suggested connection to survival and fertility is a critical strength for an evolutionary theory. In the following review, an extension of McClenon's theory will be suggested, replacing hypnotizability as the mediating psychological factor with the superordinate trait dimension of transliminality.

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Abstracts in Other Languages

German

DIE EVOLUTION DES GLAUBENS AN GOTT, GEIST UND DAS PARANORMALE, I: THEORIEN DER ANGSTBEWÄLTIGUNG UND RITUELLEN HEILUNG

ZUSAMMENFASSUNG: Es wurde die Vermutung geäußert, der beinahe universell verbreitete Glaube an Gott, Geist und paranormale Phänomene hätte sich entwickelt, weil ein solcher Glaube die Angst vor dem Tod verringern würde. Die Theorie von der Religion als Angstbewältigung wird dargestellt. Das Beweismaterial für den Zusammenhang zwischen verringerter Todesangst und religiös/paranormalen Einstellungen ist beträchtlich, wenn auch vielleicht etwas inkonsistent und auf vereinzelte Facetten der Todesangst, vereinzelte Aspekte der Religiosität und begrenzte Bereiche der Glaubensüberzeugung beschränkt. Es gibt keinen Hinweis, der die Vorhersage unterstützen würde, daß Todesangst mit verringerter Fruchtbarkeit einhergeht. Paranormale Einstellungen sind mit religiösen Einstellungen assoziiert, und der Zusammenhang zwischen paranormalen Einstellungen und Todesangst ist in ähnlicher Weise inkonsistent. Die Theorie der rituellen Heilung nimmt an, daß anomale Erfahrungen, die im Kontext veränderter Bewußtseinszustände während schamanistischer Rituale auftreten, die Erfahrungsquelle für den Glauben an Gott, Geist und das

Paranormale darstellen. Personen mit hoher Hypnotisierbarkeit sind mehr für die positiven Heileffekte schamanistischer Heilungsrituale empfänglich, was die Selektion für dieses vererbbare Merkmal begünstigt und die Evolution religiöser und paranormaler Erfahrungen und Einstellungen erleichtert.

French

L'EVOLUTION DES CROYANCES EN DIEU, L'ESPRIT, ET LE PARANORMAL, I: THEORIES DE LA GESTION DE LA TERREUR ET DE LA GUÉRISON RITUELLE

RESUME : Il a été suggéré que presque toutes les croyances universelles en Dieu, l'esprit, et les phénomènes paranormaux ont évolué car de telles croyances apaisent l'angoisse de la mort. La théorie de religion comme gestion de la terreur est analysée. Les preuves pour une association entre une angoisse de la mort diminuée et des croyances religieuses / paranormales sont vastes, bien que quelque peu inconsistantes et limitées à des facettes particulières de l'angoisse de la mort, à des aspects particuliers de la religiosité, et à des zones restreintes de la conviction croyante. Il n'y a pas de preuves supportant la prédiction que l'angoisse de la mort devrait être associée avec une fécondité diminuée. Les croyances paranormales sont associées avec des croyances religieuses, et la relation entre les croyances paranormales et l'angoisse pour la mort est, de la même manière, inconsistante. La théorie de la guérison rituelle propose que les expériences anomales se produisant dans le contexte des états modifiés de conscience durant les rituels chamaniques étaient les sources expérientielles des théories de Dieu, de l'esprit et du paranormal. Les individus ayant une hypnotisabilité élevée étaient plus susceptibles de bénéficier des effets curatifs des rituels de guérison chamanique, ce qui résulta dans la sélection de ce trait héréditaire, facilitant l'évolution des expériences et croyances religieuses et paranormales.

Spanish

LA EVOLUCIÓN DE CREENCIAS EN DIOS, EL ESPÍRITU, Y LO PARANORMAL, I: MANEJO DE TERROR Y TEORÍAS RITUALES DE CURACIÓN

RESUMEN: Se ha sugerido que las casi universales creencias en Dios, el espíritu, y fenómenos paranormales evolucionaron porque tales creencias calman la ansiedad a la muerte. La teoría de manejo del terror de la religión es discutida. Existe una extensa evidencia de una asociación entre baja ansiedad a la muerte y creencias religioso/paranormales, aunque quizás un poco inconsistente y limitada a aspectos específicos de la ansiedad a la muerte, aspectos particulares de religiosidad, y un rango limitado de convicción de creencias. No hay evidencia que apoye que la ansiedad a la muerte debe estar asociada con baja fecundidad. Las creencias paranormales están sociadas con creencias religiosas, y la relación

entre creencias paranormales y la ansiedad a la muerte también es inconsistente. La teoría ritual de la curación propone que las experiencias anómalas ocurren en el contexto de estados de conciencia alterada durante rituales chamánicos que son el origen experiencial de creencias en Dios, el espíritu y lo paranormal. Individuos que son altos en susceptibilidad hipnótica son más susceptibles a los beneficios de salud de los rituales chamánicos, lo cual resulta en la selección de este rasgo heredable, y facilita la evolución de experiencias y creencias religiosas y paranormales.

THE EVOLUTION OF BELIEFS IN GOD, SPIRIT, AND THE PARANORMAL. II: TRANSLIMINALITY AS THE MEDIATING FACTOR

By Michael P. Kelley

ABSTRACT: Ritual healing theory proposes that the evolution of beliefs in paranormal and spiritual phenomena was the result of selection for genes related to the trait of hypnotizability, as hypnotizable individuals were more likely to benefit from shamanic healing rituals. Hypnotizability is one component of a superordinate trait dimension, transliminality, which also includes positive schizotypy, paranormal beliefs, creativity, fantasy-proneness, absorption, and sleep-related anomalous experiences. Measures of each of these traits are highly correlated with each of the others, and factor analyses reveal a single underlying dimension. A revision of ritual healing theory is proposed in which hypnotizability is replaced by the broader construct of transliminality as the critical mediating factor.

Keywords: evolution, paranormal belief, hypnotizability, schizotypy, transliminality

Ritual healing theory (e.g., McClenon, 1997) proposes that beliefs in God, spirit, and the paranormal are derived from anomalous experiences occurring in the context of altered states of consciousness induced by shamanic healing ritual. Individuals with high levels of trait hypnotizability were more susceptible to the healing benefits of shamanic ritual, so the genetic factors contributing to hypnotizability were selected during the course of human evolution, leading to more widespread anomalous experiences, and promoting the development and maintenance of beliefs in paranormal and spiritual phenomena. Hypnotizability is highly correlated with paranormal belief and experience, positive schizotypy, fantasy-proneness, and creativity, which are also highly intercorrelated. These traits comprise a superordinate trait dimension, termed "transliminality" (Thalbourne, 2000b). A revision of ritual healing theory is proposed, replacing hypnotizability with transliminality as the mediating factor.

Paranormal Belief

Popular belief in the paranormal is highly prevalent (Diaz-Vilela & Alvarez-Gonzales, 2004; Ede, 2000; Eve & Dunn, 1990; Gallup & Newport, 1991; Greeley, 1975; Kallery, 2001; Musella, 2005; Newport & Strausberg, 2001; Orenstein, 2002; Rice, 2003; Vyse, 1997; Yates & Chandler, 2000; Zusne & Jones, 1989). Paranormal experiences such as precognition and telepathy are also frequently reported by members of the general population (Blackmore & Troscianko, 1985; Hearne, 1984; Jones, Russell,

& Nickell, 1977; Rattet & Bursik, 2001; Ryback & Switzer, 1989; West, 1995; Zusne & Jones, 1989). Although there is no definition of "paranormal" which yet shares a wide consensus, many assessments of paranormal beliefs (e.g., Newport & Strausberg, 2001) commonly operationalize the concept of paranormal in terms of a wide variety of phenomena, including telepathy; clairvoyance; psychokinesis; precognition (these four are referred to as "psi" phenomena in the parapsychological literature); ESP; mental or spiritual healing; other psychic, "shamanic," or "siddhi" powers, including levitation, pyrokinesis, distant healing, soul travel (or astral projection, associated with out-of-body experience), transubstantiation or transmutation of matter (e.g., changing water to wine), teleportation, prophecy, control of weather, communication with animals and plants, shapechanging; as well as beliefs in the survival of consciousness after physical death (i.e., life after death), reincarnation, communication with the dead, channeling; apparitions or ghosts; hauntings; poltergeists; the reality of spiritual entities such as angels, demons, spirits, gods, and goddesses, meeting God in the afterlife, the reality of a spiritual dimension of existence; intelligent life elsewhere in the universe, UFOs, alien abduction or contact, extraordinary or cryptozoologic lifeforms; extraordinary human lifeforms endowed with magical powers such as witches, wizards, vampires, werewolves, zombies or other "living dead"; common superstitions regarding black cats, spilled salt, breaking mirrors, walking under ladders; astrology, palmistry, Tarot reading, *I Ching*, crystal gazing, other forms of divination, crystal healing, et cetera. Lindeman (Lindeman & Aarnio, 2007; Lindeman et al., 2008) proposed the following definition: "paranormal beliefs are beliefs in physical, biological, or psychological phenomena that contain core ontological attributes of one of the other two categories [e.g., a stone (physical) having thoughts (psychological)]." Many researches have adopted Broad's (1953) conceptualization of paranormality as a phenomenon which violates the fundamental and scientifically founded principles of nature. However, scientific claims depend on an existing body of knowledge at any given moment in time or history (Kurtz, 1992; Bolton, Dearsley, Madronal-Luque, & Baron-Cohen, 2002), and it is not the case that every "non-scientific" idea would be considered as being paranormal, or even that most paranormal phenomena violate the most current physical theories.

Paranormal Beliefs/Experiences and Schizotypy

Belief in the paranormal is consistently associated with positive schizotypy (Farias, Claridge, & Lalljee, 2005; Gallagher, Kumar, & Pekala, 1994; Genovese, 2005; Goulding, 2004, 2005; Hergovich, Schott, & Arendsay, 2008; Hergovich, Willenger, & Arendsay, 2005; Houran, Irwin, & Lange, 2001; Peltzer, 2003; Thalbourne, 1994, 1999; Thalbourne et al., 1997; Thalbourne & Delin, 1994; Thalbourne, Dunbar, & Delin, 1995; Thalbourne & French, 1995; Tobacyk & Wilkinson, 1990; Williams, 1995; Williams & Irwin, 1991;

Wolfradt et al., 1999; Wolfradt & Watzke, 1999), a constellation of personality traits related to vulnerability to psychotic spectrum disorders. There are at least three dimensions of schizotypy: reality distortion or positive schizotypy, interpersonal deficits, and disorganization. The positive of reality distortion dimension, also referred to as the cognitive-perceptual dimension, consists of attenuated or subclinical positive symptoms of psychosis, that is, magical ideation (subclinical delusions) and unusual perceptual experiences (subclinical hallucinations). Schizotypy is also associated with paranormal experiences, such as out-of-body experiences and apparition experiences (McCreery & Claridge, 1995, 1996, 2002; Parra, 2006). Paranormal beliefs and anomalous experiences are included in the definition of the reality distortion or positive symptom dimension of schizotypy.

Like schizotypy, paranormal belief is a multifaceted construct. There are a number of different measures of paranormal belief, and factor analyses of these scales have reported two or more factors (e.g., Dagnall, Parker, & Munley, 2009; Smith & Karmin, 2002; Tobacyk & Milford, 1983). There is debate concerning the specific dimensional structure of paranormal belief and its measurement (e.g., Lawrence, 1995a, 1995b; Tobacyk, 1995a, 1995b), but there is evidence that the multiple dimensions of paranormal belief are intercorrelated; for example, for Tobacyk's Paranormal Beliefs Scale, the most widely used measure (oblique factors: Lawrence, 1995a; Lawrence & De Cicco, 1997; Lawrence, Roe, & Williams, 1997), and the total PBS has high internal reliability, indicating that there is a high level of intercorrelation among items. Top-down purification of items in Tobacyk's Revised Paranormal Beliefs Scale (Tobacyk, 1998) in order to remove items with differential item functioning related to subjects' age and gender yielded two clusters of items: New Age Philosophy, consisting of beliefs in psi, spiritualism, astrology, and reincarnation items; and Traditional Paranormal Belief, consisting of items referring to traditional religious beliefs, witchcraft, extraordinary lifeforms, and superstitions (Lange, Irwin & Houran, 2000). Houran, Irwin, and Lange (2001) found that the New Age Philosophy factor was significantly correlated with the Dissociative Experiences Scale and the Cognitive-Perceptual and Disorganized subscales of the SPQ-Brief, whereas the Traditional Paranormal Beliefs factor was significantly correlated only with the Cognitive-Perceptual subscale of the SPQ-B. New Age beliefs and practices comprise a loose form of religiosity including yoga, meditation, aromatherapy, astrology, Tarot, channeling, energy healing, and so forth, which have been found to be significantly associated with higher scores on the Magical Ideation and STA schizotypy scales (Farias, Claridge & Lalljee, 2005). Structural equation modeling supported a model separating paranormal beliefs into two groups or latent factors: (1) Paranormal Beliefs (corresponding to the New Age Philosophy factor of Houran et al., 2001), consisting of RPBS subscales measuring beliefs in precognition, psi, spiritualism, and witchcraft; and (2) Superstition (corresponding to the Traditional Paranormal Belief factor

of Houran et al. 2001), consisting of RPBS subscales measuring beliefs in traditional religiosity, extraordinary lifeforms, and superstition, as well as items from the Magical Ideation Scale referring to superstition. A latent factor of schizotypy consisting of the three subscales of the SPQ-B (with the Cognitive-Perceptual dimension showing the strongest association) and Magical Ideation Scale items referring to ideas of reference was significantly related to both latent factors of Paranormal Belief and Superstition, but with a much stronger relationship to the Paranormal Belief latent factor, which mediated much of the effect of schizotypy on superstition. Thus, the cognitive-perceptual (reality distortion or positive) dimension of schizotypy is associated with paranormal belief generally, not just with one component of paranormal belief.

Scores on the Magical Ideation Scale were significantly correlated with total scores on Tobacyk's Paranormal Beliefs Scale, and with scores on five of the seven subscales: Superstition, Witchcraft, Extraordinary Lifeforms, Spiritualism, and Traditional Religious beliefs in a sample of high school students (Peltzer, 2003). The younger high school students scored higher than the university students on both Magical Ideation and the Paranormal Beliefs Scales. A cluster analysis based on subscales of the O-LIFE Cognitive Disorganization scale yielded three clusters: one with high scores on the Cognitive Disorganization and Introvertive Anhedonia subscales (CD/IA), another with high scores on the Unusual Experiences scale (UE), and a third with low scores on all three scales (LS; Goulding, 2004). The UE cluster scored significantly higher than the LS cluster on the Australian Sheep-Goat Scale, a measure of paranormal belief, whereas these clusters did not differ significantly on the Sense of Coherence Scale, a health-related measure. There was a significant correlation between the ASGS and the UE subscale of the O-LIFE in the total sample. These findings were interpreted as supporting a fully dimensional model of schizotypy with belief in the paranormal and unusual experiences considered as nonpathological manifestations of "healthy schizotypy." Goulding (2005) used the same methodology in a study of paranormal experients and believers, and found three schizotypy clusters, one with high scores on the Introvertive Anhedonia scale, one with high scores on the Disorganization scale, and one with low scores on both of these scales. The clusters did not differ significantly in paranormal beliefs measured by the ASGS, as all three groups had high scores (all were paranormal experients). The "low schizotypy" cluster (corresponding to the high Unusual Experiences cluster from the previous study) scored significantly higher than the other two clusters on the Sense of Coherence scale, suggesting that this cluster consisted of "healthy schizotypes." Genovese (2005) found that paranormal belief assessed by an eight-item scale was significantly correlated with scores on the Cognitive-Perceptual (i.e., Reality Distortion) and Disorganized dimensions of the SPQ-Brief in a sample of teachers and teacher trainees. Paranormal belief was also significantly correlated with an intuitive

thinking style as measured by the Rational-Experiential Inventory, although disorganized schizotypy was inversely correlated with an intuitive thinking style. Hergovich, Willenger, and Arendsay (2005) found that paranormal belief was significantly correlated with the cognitive-perceptual dimension of schizotypy. In a large Australian sample of adolescents, scores on the Revised Paranormal Beliefs Scale (RPBS) were significantly correlated with total scores on the SPQ-Brief, as well as scores on the Cognitive-Perceptual, Interpersonal, and Disorganized subscales of the SPQ-B, and the Magical Ideation Scale (Hergovich, Schott & Arendsay, 2008). The SPQ-B Cognitive-Perceptual dimension had a much stronger association with paranormal beliefs than the Interpersonal or Disorganized dimensions. Structural equation modeling supported a model separating paranormal beliefs into two groups or latent factors: (1) Paranormal Beliefs (corresponding to the New Age Philosophy factor of Houran et al., 2001), consisting of RPBS subscales measuring beliefs in precognition, psi, spiritualism, and witchcraft; and (2) Superstition (corresponding to the Traditional Paranormal Belief factor of Houran et al. 2001), consisting of RPBS subscales measuring beliefs in traditional religiosity, extraordinary lifeforms, and superstition, as well as items from the Magical Ideation Scale referring to superstition. A latent factor of schizotypy consisting of the three subscales of the SPQ-B (with the Cognitive-Perceptual dimension showing the strongest association) and Magical Ideation Scale items referring to ideas of reference was significantly related to both latent factors of Paranormal Belief and Superstition, but with a much stronger relationship to the Paranormal Belief latent factor, which mediated much of the effect of schizotypy on superstition.

The association between paranormal beliefs and experiences on the one hand and schizotypy on the other is often interpreted in terms of psychopathology, based on the assumption that schizotypy represents a subclinical form of schizophrenia spectrum psychopathology. Factor analyses of schizotypy measures have consistently yielded three factors paralleling the factor structure of schizophrenic symptomatology: (1) reality distortion or aberrant perceptions and beliefs (cognitive-perceptual or positive symptom dimension consisting of magical ideation, perceptual aberrations, ideas of reference, and suspiciousness), (2) cognitive disorganization (odd speech, odd behavior), and (3) negative symptoms or interpersonal deficit (no close friends, flattened affect, social anxiety) (e.g., Badcock & Dragovic, 2006; Chen, Hsiao, & Lin, 1997; Fossati et al., 2003; Gruzelier, 1994, 1995, 1996; Gruzelier et al., 1995; Raine et al., 1994; Reynolds et al., 2000; Rossi & Daneluzzo, 2002; Vollema & Hoijtink, 2000). McCreery and Claridge (2002) found four factors, with the negative symptoms factor described in other studies splitting into introvertive anhedonia and asocial schizotypy factors. Subjects who reported at least one out-of-body experience scored significantly higher than non-OBErs on the aberrant perceptions and beliefs factor, but the groups did not differ significantly on the disorganization, introvertive anhedonia, and asocial schizotypy factors. McCreery and

Claridge (1995, 1996) had previously reported that OBE experients scored higher than nonexperients on measures of positive schizotypy (Perceptual Aberration, Luanay-Slade Hallucination Scale, STA, Hypomania) and significantly lower on a measure of negative schizotypy (the Physical Anhedonia Scale), suggesting that, "far from being anhedonic, they were particularly enjoying life." It is possible that among "healthy schizotypes" unusual ideas may reflect creativity and unconventional thinking associated with high Openness to Experience, whereas among subjects with schizotypal personality disorder, the same sorts of unusual beliefs may be the result of cognitive rigidity and poor reality contact. They interpreted these findings as supporting the notion of "healthy schizotypes" who are functional despite, or even in part because of, their anomalous perceptual and other experiences. This interpretation is consistent with the fully dimensional model of schizotypy proposed by Claridge (1997, 1999; Claridge & Beech, 1995), which posits that schizotypy is a continuously distributed trait, associated with normal functioning for most of its extent, and playing a causal role in the etiology of psychosis only at the upper extreme. Thus, out-of-body experiences and other paranormal experiences are not necessarily pathological, and associations with schizotypy, particularly reality distortion or positive schizotypy, do not necessarily imply psychopathology.

The concept of healthy schizotypy suggests that paranormal beliefs and experiences may serve adaptive or protective functions in some individuals. It has been proposed that belief in the paranormal serves a psychodynamic coping function (Irwin, 1992, 2004). Lange and Houran (1997) found that participants with paranormal experiences had lower levels of death anxiety. Kennedy, Kanthamami, and Palmer (1994) found that paranormal experiences (not beliefs) were associated with an increased sense of meaning in life, and Kennedy and Kanthamami (1995a) reported a relationship between paranormal experiences and optimism and well-being. Wuthnow (1978) found that people who experienced "contact with the sacred" and "harmony with the universe" found life meaningful, knew the purpose of life, and were more self-assured than those who did not have these anomalous experiences. There is an association between religious experience, or belief in the influence of God or spiritual forces, and a sense of well-being (Hay & Morisy (1978). Greeley (1975) found an association between mystical experiences and life satisfaction. On average, people report that their peculiar beliefs had adaptive value, specifically that their beliefs were important to them, had a positive impact on their lives, and that they were more likely to make their lives more clear and less confusing (Boden & Berenbaum, 2004).

Schofield and Claridge (2007) suggested that possessing a framework of paranormal beliefs may result in paranormal experiences being adaptive and associated with less depression, anxiety, and anhedonia, whereas lack of a paranormal beliefs framework might render paranormal experiences frightening, intrusive, and disturbing. In subjects with low scores

on the O-LIFE Cognitive Disorganization scale, high scores on the Unusual Experiences scale were associated with more positive or pleasant subjective evaluations of paranormal experiences, whereas among subjects with high levels of cognitive disorganization, higher levels of introvertive anhedonia were significantly associated with more negative subjective evaluations of paranormal experiences (Schofield & Claridge, 2007). These authors suggested that magical thinking provides an effective and imaginative framework to account for odd experiences, whereas in individuals with high levels of introvertive anhedonia, such experiences may be seen as strange and overwhelming, and are associated with distress and anhedonia.

Hypnotizability, Paranormal Beliefs/Experiences, and Schizotypy

Hypnotic susceptibility is associated with frequency of claimed paranormal experiences (Dixon, Labelle, & Laurence, 1996; Jamieson, 1987; Nadon & Kihlstrom, 1987; Pekala, Kumar, & Cummings, 1992; Richards, 1990; Wagner & Ratzeburg, 1987; Wickramasekara, 1988; Wilson & Barber, 1983), belief in paranormal or supernatural phenomena (Diamond & Taft, 1975; Hergovich, 2003; Irwin, 1993; Nadon, Laurence & Perry, 1987; Pekala, Kumar, & Cummings, 1992; Wagner & Ratzeburg, 1987), spiritual but not formal aspects of religious belief (Atkinson, 1989), a greater number of religious experiences (Argyle & Beit-Hallahmi, 1975; Gibbons & de Jarnette, 1972; Hood, 1973; Schumaker, 1995), and greater religious involvement for high than low hypnotizables (Hilgard, 1979). Hypnotic susceptibility has also been associated with ability to form vivid mental images or other fantasies (Priebe & Wallace, 1986; Sheehan, 1979, 1982), capacity to suspend normal reality testing during hypnosis (Bowers & Bowers, 1972; Gill & Brenman, 1959), and tendencies toward fantasy proneness (Lynn & Rhue, 1986; Rhue & Lynn, 1989), all of which seem to be involved in paranormal belief. Hypnotizability is significantly related to psychometric measures of schizotypy (Gruzelier et al., 2004; Jamieson & Gruzelier, 2001). Like schizotypy, hypnosis is thought to involve a priming of wider networks of association between cortical representational networks (Shames & Bowers, 1992). The Altered Experience subscale of the PCS (which includes items referring to alterations on body image, meaning, perception, and time sense) was significantly correlated with hypnotizability measured by the Harvard scale (Pekala & Nagler, 1989). High hypnotic susceptibility is also associated with increased susceptibility to visual illusions, such as autokinetic movement, the Ponzo illusion, the Necker Cube, and the Schroeder Staircase illusion (Crawford, Brown, & Moon, 1993; Nadon, Laurence, & Perry, 1987; Spanos et al., 1989; Wallace, 1986, 1988; Wallace, Garrett, & Anstadt, 1974; Wallace, Knight, & Garrett, 1976), which may provide experimental analogues to the magical ideation and perceptual aberrations of schizotypy. Physical anhedonia was negatively correlated with hypnotizability (McCloskey, Kumar, & Pekala, 1999), suggesting that it is

particularly "happy schizotypes," that is, those low in anhedonia, who are highly hypnotizable. The disorganized component of schizotypy and high hypnotizability were both significantly related to low scores on the Self-Directedness scale of Cloninger's Temperment and Character Inventory (Laidlaw et al., 2005). High self-transcendence was also associated with the cognitive activation (disorganization) dimension of schizotypy, higher absorption, and hypnotizability.

Paranormal Beliefs, Schizotypy, and Creativity

Studies of other personality trait correlates of paranormal belief have reported that believers are likely to be slightly extraverted but balanced by a strong interest in their subjective experience, with high levels of creativity, imaginativeness, and hypnotic susceptibility (Irwin, 1993). Several studies have reported significant relationships between measures of schizotypic personality traits and measures of creativity in normal subjects (review by Brod, 1997). Creativity may be an adaptive aspect of positive schizotypy that contributes to selection of genetic factors contributing to this trait.

Transliminality

Transliminality is a hypothesized tendency for psychological material to cross thresholds into or out of consciousness. The concept of transliminality was suggested by the research of Thalbourne and Delin (1994), who found that believers/experients of the paranormal scored higher on measures of creative personality, mystical experiences, magical ideation, a history of manic-like experience, and a history of depressive experience. Principal components analysis confirmed the presence of a single factor underlying all six variables, which were all highly intercorrelated. Subsequent studies have confirmed these findings and broadened the construct of transliminality to include general religiosity, the cognitive-perceptual dimension of schizotypy, a propensity to experience altered states of consciousness, fantasy-proneness (a lifelong tendency to deep involvement in fantasy, including daydreaming), absorption (extremely focused or "total" attention), openness to experience (active imagination, aesthetic sensitivity, attentiveness to inner feelings, preference for variety, and intellectual curiosity), extraversion, hyperaesthesia, synesthesia, frequency of dream-interpretation, sleep-related experiences (e.g., frequent dream recall, lucid dreams, hypnagocic/hypnopompic hallucinations, sleep paralysis), and temporal lobe lability (Houran, Thalbourne, & Lange, 2003; Jones, Fernyhough, & Meads, 2009; Kumar & Pekala, 1992; Kumar, Pekala, & Cummings, 1993; Lange, Thalbourne, Houran, & Storm, 2000; Pekala, Kumar, & Cummings, 1992; Soffer-Dudek & Shahar, 2009; Thalbourne, 1998, 2000a, 2000b, 2001; Thalbourne, Crawley,

& Houran, 2003; Thalbourne & Delin, 1999; Thalbourne & Houran, 2000; Thalbourne, Keogh, & Crawley, 1999; Thalbourne, Keogh, & Witt, 2005; Thalbourne & Maltby, 2008; Thalbourne et al., 1997, 2001, 2003; Watson, 2001, 2003). Studies cited above, as well as many others, report significant intercorrelations among the various components of transliminality. For example, there is a significant correlation between mystical experience and other paranormal experiences (Kennedy & Kanthamani, 1995a, 1995b; Kennedy, Kanthamani, & Palmer, 1994; Thalbourne, 1998–1999), both of which have high loadings on the transliminality factor.

Fantasy proneness, absorption, and openness to experience, all constituents of transliminality, are also correlates of hypnotizability, suggesting that hypnotizability is also a component of transliminality. A direct association between hypnotizability and transliminality has yet to be reported. Fantasy proneness is a personality trait involving a lifelong tendency to deep involvement in fantasy, including daydreaming, spending a large amount of time fantasizing, experiencing strong bodily concomitants of fantasies, and experiencing rich everyday fantasies of hallucinatory intensity, such as dolls and toys as alive and speaking to them, and having imaginary companions (Wilson & Barber, 1981, 1983). Fantasy proneness is associated with greater hypnotizability, creativity, waking suggestibility, and absorption (Council & Huff, 1990; Crawford, 1982; Kirsch & Council, 1992; Lynn & Dudley, 1987; Lynn & Rhue, 1986, 1988; Lynn, Rhue, & Green, 1988; Merckelbach, Horselenberg, & Muris, 2001; Merckelbach et al., 2000a; Persinger & DeSano, 1986; Poulsen & Matthews, 2003; Rauschenberg & Lynn, 1995; Rhue & Lynn, 1987a, 1987b, 1989; Silva, Bridges, & Metzger, 2005; Silva & Kirsch, 1992; Wilson & Barber, 1983). Fantasy proneness is associated with psychosis-proneness or positive schizotypy (Giesbrecht, Merckenbach, Kater, & Sluis, 2007; Kilhstrom, Glisky, & Anguilo, 1994; Klinger, Henning, & Janssen, 2009; Lynn & Dudley, 1987; Merckelbach, Horselenberg, & Muris, 2001; Merckelbach, Rassin, & Muris, 2000b; Van de Ven & Merckelbach, 2003). Hypnotizability is also significantly correlated with three of the six facets of Openness to Experience: fantasy, aesthetics, and feelings (Glisky et al., 1991). Of three orthogonal dimensions comprising Openness (absorption, intellectance, and liberalism), only absorption was significantly correlated with hypnotizability (Kihlstrom, Glisky, & Trapnell, 1992). Others have also reported that openness to experience was significantly correlated with paranormal belief (McCrae & Costa, 1997) and with paranormal experience (Zingrone, Alvarado, & Dalton, 1998–1999). The association between hypnotizability and schizotypy discussed previously also suggests that hypnotizability is a component of transliminality. The association between transliminality and mystical experiences, sleep-related experiences, and possibly hypnotizability suggests that transliminality is associated with a general susceptibility to altered states of consciousness. Individual differences in transliminality might be predictive of sensitivity

to the effects of minor and major hallucinogens, such as cannabis, mescaline, psilocybin, and LSD, and may be related to levels as well as circadian and ultradian rhythmicity of endogenous hallucinogens such as DMT. More extensive evidence supporting ritual healing theory may be marshaled by replacing hypnotizability with the superordinate trait of transliminality as the mediating factor.

There is an extensive body of literature linking transliminality and its constituent characteristics, including positive schizotypy, REM sleep-related experiences (dreams, hypnagogic hallucinations, sensed presence experiences), hypnotizability, and creativity to a characteristic preference for the mode of processing of the right hemisphere, that is, right "hemisphericity." Hemisphericity remains a controversial construct, but there is extensive and growing evidence of stable trait-like individual differences in hemispheric activation asymmetries, indicated by asymmetries in frontal EEG alpha, other EEG indices, evoked potentials (e.g., P300), cerebral blood flow, and metabolism, fMRI BOLD response, electrodermal activity, conjugate lateral eye movements, smooth pursuit eye movements, performance on lateralized cognitive tasks, dichotic listening, visual half-field studies of lateralized lexical decision, emotional face processing, and so forth, motoric asymmetries including performance on manual skill tasks, handedness and other dimensions of lateral preference, turning tendencies, asymmetric biases in the allocation of spatial attention measured by line-bisection, greyscales, cancellations, covert orienting of visual attention, and chimeric faces tasks, and even neuroantomical asymmetries, all related to individual differences in personality, affective and cognitive style, particularly to transliminality and its constituent characteristics. There is also a large body of literature linking dissociation to many of the constituent characteristics of transliminality, including paranormal belief and experience, hypnotizability, fantasy-proneness, and schizotypy, as well as many studies linking these characteristics to a self-reported history of childhood trauma.

Conclusion

Ritual healing theory proposes that the evolution of beliefs in paranormal and spiritual phenomena was the result of selection for genes related to the trait of hypnotizability, as hypnotizable individuals were more likely to benefit from shamanic healing rituals. Hypnotizability is one component of a superordinate trait dimension, transliminality, which also includes positive schizotypy, paranormal beliefs, creativity, fantasy-proneness, absorption, and sleep-related anomalous experiences. A revision of ritual healing theory is proposed in which hypnotizability is replaced by the broader construct of transliminality as the critical mediating factor.

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Abstracts in Other Languages

German

DIE EVOLUTION DES GLAUBENS AN GOTT, GEIST UND DAS PARANORMALE, II: TRANSLIMINALITÄT ALS DER VERMITTELNDE FAKTOR

ZUSAMMENFASSUNG: Die Theorie der rituellen Heilung geht davon aus, daß die Evolution von Glaubensvorstellungen an paranormale und spirituelle Phänomene das Ergebnis einer genetischen Selektion in Bezug auf das Merkmal Hypnotisierbarkeit darstellt, da hypnotisierbare Personen mit größerer Wahrscheinlichkeit von schamanistischen Heilungsritualen profitieren. Hypnotisierbarkeit ist eine Komponente des übergeordneten Persönlichkeitsmerkmals Transliminalität, das auch positive Schizotypie,

paranormale Einstellungen, Kreativität, Phantasieneigung, Absorption und mit dem Schlafzustand auftretende anomale Erfahrungen umfaßt. Fragebogenwerte dieser Eigenschaften sind untereinander hochkorreliert, und Faktorenanalysen ergeben eine einzige zugrundeliegende Dimension. Eine revidierte Fassung der Theorie der rituellen Heilung wird vorgestellt, bei der Hypnotisierbarkeit durch das umfassendere Konstrukt Transliminalität als dem entscheidenden vermittelnden Faktor ersetzt wird.

French

L'EVOLUTION DES CROYANCES EN DIEU, L'ESPRIT, ET LE PARANORMAL, II: LA TRANSLIMINALITE COMME FACTEUR MODERATEUR PREMIER

RESUME : La théorie de la guérison rituelle propose que l'évolution des croyances dans les phénomènes paranormaux et spirituels fut le résultat de la sélection de gènes liés au trait d'hypnotisabilité, car les individus hypnotisables étaient plus enclins à bénéficier des rituels de guérison chamanique. L'hypnotisabilité est une composante d'une dimension de la personnalité d'un ordre supérieur, la transliminalité, qui inclut aussi la schizotypie positive, les croyances paranormales, la créativité, l'enclin à l'imaginaire, l'absorption, et les expériences anomales relatives au sommeil. Les mesures de chacun de ces traits sont fortement corrélées entre elles, et l'analyse factorielle révèle une unique dimension sous-jacente. Une révision de la théorie de la guérison rituelle est proposée dans laquelle l'hypnotisabilité est remplacée par la notion plus large de transliminalité en tant que facteur modérateur premier.

Spanish

LA EVOLUCIÓN DE CREENCIAS EN DIOS, EL ESPÍRITU Y LO PARANORMAL, II. TRANSLIMINALIDAD COMO UN FACTOR MEDIADOR

RESUMEN: La teoría ritual de la curación propone que la evolución de creencias en lo paranormal y en fenómenos espirituales ha sido el resultado de la selección de genes relacionados a el rasgo de hipnotizabilidad, pues individuos hipnotizables se benefician más de los rituales de curación chamánicos. La hipnotizabilidad es un componente de una dimensión de rasgos superordinados, la transliminalidad, la cual también incluye esquizotipia positiva, creencias paranormales, creatividad, propensidad a la fantasía, absorción, y experiencias anómalas relacionadas a el sueño. Las medidas de cada uno de estos rasgos están altamente correlacionadas con cada una de las otras, y los análisis de factores muestran una sola dimensión de trasfondo. Se propone una revisión de la teoría ritual de curación en la cual la hipnotizabilidad es reemplazada por el más amplio concepto de transliminalidad como el factor crítico mediador.

OBITUARY

MICHAEL A. THALBOURNE
1955–2010

By Peter R. Phillips

The Editor has asked me to write this obituary for Michael Thalbourne, who was well known throughout the parapsychological community, because I worked with him during a critical period in his career. I am not a parapsychologist myself, and would have been quite unsuited for this task were it not for the help I have received from friends and colleagues of Michael, notably Carlos Alvarado, William Braud, and Lance Storm. Michael himself wrote a short autobiography that can be found at http://www.pflyceum.org/143.html.

Michael died on May 4, 2010, in hospital in Adelaide, Australia, at the age of 55. For more than 20 years he had suffered from bipolar disorder, and his constant struggle with that terrible affliction probably contributed to his early death, though the actual cause remains uncertain.

He first came across parapsychology during his years in high school, while going through a personal crisis of religious faith. During his undergraduate years at the University of Adelaide, he was able to design and carry out experiments in parapsychology, and his honors thesis based on that research earned him a prize in social psychology.

After a number of difficulties, all too familiar to parapsychologists, Michael went to the University of Edinburgh for graduate study. His supervisor was John Beloff, who welcomed him but also warned him about career difficulties that would surely follow if he persisted in the field. Michael had his mind made up, however, and continued with drawing reproduction experiments for his dissertation.

Following his PhD, Michael worked with Erlendur Haraldsson in Iceland and India, where he spent some time investigating the alleged paranormal phenomena associated with Sai Baba. He then moved to the McDonnell Laboratory at Washington University in St. Louis, which is where I first met him.

The McDonnell Laboratory was set up for a 5-year term at the request of J. S. McDonnell, the founder of the aircraft company, and a major influence on Washington University. He had hoped for a large research center, but the most eminent scientists at the university, predictably, refused to have anything to do with such an enterprise. In the end, only one faculty member, myself, a physicist, was willing to take on the task of directing the laboratory, and most of the funds that were intended for parapsychology were reassigned at that time to general use. It seemed quite likely to me that McDonnell, being 81 years of age, would die during the 5-year period, and the laboratory would then close, as I had no plans myself to devote my life to parapsychology. That is, in fact, just what happened.

For a man as self-motivated and hard working as Michael, this situation in St. Louis was perfect. But as many readers will remember, the laboratory was the main focus of James Randi's Project Alpha, in which two young magicians were sent to us claiming to have PK ability, but in fact to simulate such effects by trickery. By the time Michael arrived, only formal experiments with strict controls were under way, and he never saw anything that seemed to him to be paranormal. Randi went public with this project in 1983, judging, quite correctly, that the public would be fascinated by the hoax, but largely uninterested in the serious science.

When the laboratory closed in 1985, most of us left parapsychology and went our separate ways, putting Project Alpha behind us. This was not possible for Michael, who had long been committed to a career in parapsychology. He was deeply offended by the way Randi concentrated on our initial mistakes, and paid less attention to the process of science, by which errors are corrected. He recognized, as all of us at the laboratory did, that Randi was determined to attempt to discredit parapsychology by ridicule rather than by making a serious effort to confront the best data. Michael's article in JASPR, "Science versus Showmanship" (Thalbourne, 1995), was his first attempt to redress the balance. It infuriated Randi, who informed us that henceforth he felt under no obligation to mention that we had ever done any good work. This made Michael even more determined to bring all the facts before the public. At the end of his life, he was planning on publishing a collection of articles about Project Alpha, giving both sides of the controversy, so that readers could make up their own minds about it. Unfortunately he did not live to complete this project.

Michael returned to Australia in 1987 and took a position as tutor in psychology at the University of Adelaide. This suited him quite well, but after a few years, according to his own account, he first became aware of the bipolar disorder that was to disrupt the rest of his life. It may seem strange that he did not recognize this condition earlier, but there was no obvious sign of trouble during the years I knew him, from 1982 to 1985.

In view of Michael's illness, the psychology department at Adelaide was unwilling to continue his contract, and suggested instead that he take a disability support pension and the position of honorary research fellow. This paid no salary, and limited Michael's teaching responsibilities to Honors students and postgraduates, so he had plenty of time for research. Michael held this position at the University of Adelaide for about 20 years. During this time, in addition to publishing many articles, he supervised the Honors thesis, and later the PhD, of Lance Storm, who became his close collaborator.

Michael continued to be fascinated by religious and mystical experience, and its possible connection to psi, as well as his own condition. This is indicated by the title of an article from 1994: "A common thread underlying belief in the paranormal, creative personality, mystical experience, and psychopathology" (Thalbourne & Delin, 1994). From this time we see a steady stream of articles concerned with the notion of transliminality. Michael coined this word from

"trans," meaning "across," and "limen," meaning "threshold," without realising that the same word had been used, with very similar intent, as far back as 1909. He conjectured that everyone has a threshold, or barrier, between conscious and preconscious mental processes, and that with some people this barrier is more easily and frequently crossed. Such people are said to have high transliminality, and Michael suspected they also tend to rank high on other measures, such as creativity, openness to mystical experience, susceptibility to manic-depression and psychosis, and belief in psi. Using factor analysis Michael was able to show from surveys that this single factor was the most significant one. We can see here how Michael's own experience directed his interests in parapsychology.

Notice that Michael did not suggest (at least publicly) that people of high transliminality were more likely to experience psi, only that they were more likely to believe in it. He discussed this distinction in his autobiography, and it seems to me that he restricted the interpretation of transliminality in this way in large part to get around the resistance of many editors of mainstream journals to the possibility that psi might really exist. At the same time he recognized that studies of belief might shed little light on the psi process itself.

Michael later became fascinated by the apparent goal-directed nature of psi, and in developing these ideas coined the term "psychopraxia," as presented in his article in *Parapsychology in the Twenty-First Century*, edited by him and Lance Storm (Thalbourne, 2005). I think it is fair to say that this new word has not gained wide acceptance. Many parapsychologists consider it to mean essentially the same thing as teleological causation, which itself is an idea that not everyone believes is useful.

In 2001, Michael (with Robb Tilley's assistance) launched the peer-reviewed *Australian Journal of Parapsychology*. At that time Michael had already taken on the role of President of the Australian Institute of Parapsychology, Inc. (AIPR), and his first task was to consolidate the AIPR (founded in 1977) as the leading institute in parapsychological research in Australia, providing an environment for academic research and collaborating with parapsychological communities on the international scene. For 5 years, Michael edited the journal before handing over this task to Lance Storm in 2006.

Eventually, to his great distress, Michael was pressured to give up his position at Adelaide. I do not know the details, but the process is all too familiar to parapsychologists. The opposition, even hostility, to parapsychology in the academic community seems to be as high now as ever. When Michael resigned his post, he lost his main contact with the university and the academic life that suited him so well. In semiretirement, he continued to publish, in spite of the restrictions forced on him by not having the resources of the university behind him.

Michael's legacy lies in his vast *oeuvre*. He wrote or cowrote a great many peer-reviewed articles, papers, and letters; coedited two books on parapsychology; compiled his glossary of terms used in parapsychology (Thalbourne, 2003); and wrote a monograph for the Parapsychological Foundation, "The Common Thread Between ESP and PK" (Thalbourne, 2004).

Those of us who counted Michael among our friends will miss his gentle personality, his honesty, his encyclopedic knowledge of parapsychology, his capacity for hard scholarly work, and his courage in the face of great difficulties and disappointments.

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BOOK REVIEWS

SYNCHRONICITY: MULTIPLE PERSPECTIVES ON MEANINGFUL COINCIDENCE, edited by Lance Storm. Grosseto, Italy: Pari Publishing, 2008. Pp. xxii + 316. $18.95 (paperback). ISBN 978-88-95604-02-2.

Meaningful coincidences have captured the public imagination, reflected in a growing number of new books on the subject. Many of these books consist largely of anecdotal accounts that make for interesting reading but do not directly contribute to the advancement of scientific thinking in this area. In contrast, Storm's book is a treasure trove for those with a serious scholarly interest in this topic. In his foreword, Robert Aziz notes that "moving through the material and chapters of this work, one will have the feeling of being an attendee at an International conference on synchronicity, perhaps the first international conference on synchronicity. A circle has been drawn and a roundtable discussion has been convened" (p. xix). Aziz's comments are right on the mark. The collection of essays in Storm's book tackles the very bones of Jung and Pauli's conceptualizations of synchronicity, addressing such fundamental issues as the role played by archetypes, explorations of the concepts o causality and acausality, and perhaps of most interest to parapsychologists, the relationship between psi and synchronicity. The different perspectives offered by the various contributors blend to form a rich mix. However, potential readers should be forewarned that this is not an "easy read." This book demands to be read slowly, in order to fully appreciate the scope of each contribution.

The book consists of 18 essays, divided into six parts. Part I, "The History and Philosophy of Synchronicity," provides insights into how the respective backgrounds and interests of Jung and Pauli contributed to the construction of their theory of synchronicity, with papers provided by Kenower Weimar Bash, F. David Peat, Roderick Main, and Marialuisa Donati.

Part II, "Synchronicity in Practice," turns to real-life applications of synchronicity, with examples provided from a clinical psychiatric practice (Berthold Eric Schwartz), *I Ching* consultation (Shantena Augusto Sabbadini), and attempts to quantify meaningful coincidences experimentally (William Braud).

In Part III, "The Ontology of Synchronicity," the concept of acausality (and archetypal involvement, especially as it relates to psi phenomena) is challenged by John Beloff, followed by a paper by Charles Tart in which he proposes various types of causality and their potential relationship to synchronicity (including "paranormal causality," which he distinguishes as different from "absolute synchronicity").

The relationship between psi and synchronicity as defined by Jung is further explored and contrasted in Part IV, "The Synchronicity Debate," with contributions by Mansfield et al., Storm, and Palmer. Victor Mansfield, Sally Rhine Feather, and James Hall shed light on the relationship between J. B. Rhine and C. G. Jung, drawing upon the "Rhine-Jung Letters," a 27-year correspondence between the two men. Of note, they present an excerpt from a 1951 letter in which Jung (referring to his synchronicity paper) states "I have been able to finish a paper that is largely based upon your ESP experiment...." (p. 130). The authors note that this "startling revelation ... cannot be found in Jung's Collected Works, his published letters, or his autobiography" (p. 130). However, they go on to question whether psi phenomena can really be viewed as examples of synchronicity, critiquing the notions of acausality (that Rhine himself was not yet ready to concede) and archetypal meaning promoting individuation, as applied to parapsychological experiments. The authors also stress that while parapsychological phenomena can be studied empirically and exhibit "scientific" causality, synchronicity experiences are more difficult to capture and study in a laboratory setting (although their paper does end with discussion of a possible experiment suggested by Jung).

Lance Storm presents a different perspective, seeing psi and synchronicity as more alike than dissimilar. He questions the assumption that archetypal meaning is not active in psi experiments, and deviating from a classical Jungian perspective, states that "synchronicity appears to be more causal than Jung imagined" (p. 167). Storm suggests that both synchronicity and psi may be viewed as scientifically causal, in part because each has metacauses (psi-permissive and psi-conducive conditions in the case of psi; and archetypal contingence in the case of synchronicity). He goes on to cite the work of Braud and Jung to support his contention that synchronicity can, indeed, be studied using careful empirical investigation.

John Palmer's contribution adds yet another perspective to the mix. He points out that Jung's definition of synchronicity as a correspondence between a subjective and an objective event, automatically rules out examples of pure telepathy from being considered synchronicities. However, he goes on to note other similarities between synchronicity and psi, observing for example, that psi experiences also occur sporadically in nature, and that "there is no 'repeatability on demand' in parapsychology" (p. 181). Palmer ultimately concludes that "there is indeed some overlap between synchronistic and psychic correspondences, but the overlap is not total. There are some synchronistic correspondences that are not psychic, and there are some psychic correspondences that are not synchronistic" (p. 183). Palmer's contribution continues with a discussion of the theories used to explain synchronicity and psi, and ends by addressing the issue of whether synchronicity can be tested empirically by suggesting a collaborative research approach testing whether deliberate archetypal activation prior to a psi task (that also meets criteria for synchronicity) is reflected in better psi scoring.

Part V, "New Conceptions in Synchronicity," leads the reader into novel territory with contributions by Lila Gatlin, Joseph Cambray, and George Hogenson. Drawing upon information theory, Gatlin introduces the idea of evaluating synchronicity (and to some extent, psi phenomena) from the perspective of meaningful information creation (as contrasted with information transmission or causality). She states, "we may regard the process of meaningful information creation in the real world as the expression of a symmetry principle which complements and completes the second law of thermodynamics and operates through the mechanism of meaningful coincidence, or synchronicity" and goes on to note that "meaningful coincidence is the basis of all life, and is in essence Darwin's (1889) evolutionary principle" (p. 200).

Cambray introduces another perspective in his analysis of synchronicity in light of complex adaptive systems (CAS), an idea stemming from the work of Nobel Laureate Ilya Prigogine and related exploration of chaos and complexity theories. Cambray notes that CASs have "'emergent properties,' that is, self-organizing features arising in response to environmental, competitive pressures" (p. 217). He extends this view to the clinical setting, suggesting that "synchronicities can be explored as a form of emergence of the Self and have a central role in individuation or psychological maturation...." (p. 219), and goes on to provide clinical examples of synchronicities arising at "the edge of chaos and order" (p. 224).

Building upon ideas related to self-organizing systems and the work of Harvard linguist George Kingsley Zipf, Hogenson proposes that synchronicity does not lend itself to statistical testing because it is best understood in terms of power law analyses, which have been applied to "a wide variety of phenomena, from ion transfers in the brain, to word frequencies in text, to volcano eruptions and earthquakes" (p. 238). He states, "Jung's entire system, insofar as it is a system based on the nature and function of the symbol, can be viewed as a continuum of self-similar (i.e., fractal) structures, distributed along a power law distribution. Furthermore, the variant elements of the system, namely the association, the complex, the archetype, the synchronistic event and the emergence of the Self, become evident as the system transitions through a series of self-organized critical moments that result in phase transitions within the symbolic system as a whole" (p. 241). According to Hogenson's theory, it is at moments of "symbolic density" that phase transitions and synchronicities manifest.

In Part VI, "Summing Up Synchronicity," Storm concludes the book with summary chapters on "Synchronicity, Science, and Religion," "Archetypes, Causality, and Meaning," and "Synchronicity and Psi."

Storm's final chapter brings us back to the "synchronicity debate." Following up on Palmer's paper, Storm questions whether a test of pure telepathy is even possible, given the possible confound with clairvoyance. He then goes on to build a case underscoring the importance of

recognizing possible shared underpinnings between synchronicity and psi. For example, he discusses the confound of "displacement" to meaningful (but incorrect) targets in psi research, drawing a parallel to the meaning associated with synchronistic events, and suggests controlling for this by "[allowing] participants to preselect meaningful items over meaningless ones, and then [testing] their psi capacity to generate hits within the meaningful set only"(p. 280). He adds, "if psi were regarded as synchronicity, and tested as such, things might start to improve for parapsychology" (p. 281).

Storm also reports intriguing research by Norman Don and his associates, who applied signal processing techniques to psi datasets and noted "periodicities in the correlation of guesses with targets" (p. 283), which they termed "correlation waves." Storm interprets these correlation waves (which according to Don "seamlessly joined the beginning and end of the experiments" (p. 284) and "[were] present throughout the entire structure of the data" (p. 286) as evidence for archetypal involvement "once again indicating a common factor shared by synchronicity and psi" (p. 287). Storm also suggests that since these correlation waves reflect both hits and misses they cannot be the simple consequence of egoic volition, per se, but rather, they reflect "activation of the totality of the Self system" (p. 287). (However, there are other possible interpretations as well—one possibility presumably being that the correlation wave could be a reflection of the multiple sources of intention in an experiment—including experimenter and participant effects.)

Storm's book concludes with an appendix containing an interesting discussion of a somewhat unorthodox series of *I Ching* studies that he conducted with Michael Thalbourne in which they explored whether having participants "preselect 16 two-word descriptors out of the complete set of 64 descriptors that corresponded to 64 *I Ching* readings" (p. 293) was associated with a greater frequency of attaining hexagrams corresponding to the pre-selected descriptors. Significant effects were noted in two of six studies, with the "overall trend [being] towards above-chance hitting" (p. 294). Storm interprets these mixed findings in light of possible confounds related to not meeting sufficient criteria for synchronicity to manifest.

If it is not already apparent, the reader should be aware that much of the discourse in Storm's book centers on how various perspectives agree or deviate from the Jungian perspective. Since the term synchronicity was, after all, coined by Jung, this should perhaps not come as a surprise. However, it is worth noting that we are still in the infancy of understanding the factors that may be at play when meaningful coincidences occur, and that Jung and Pauli's conceptualization, while certainly impressive, is one theory. For example, it may be that meaningful coincidences and psi phenomena are telling us something fundamental about the nature of consciousness and the structure of what we call reality, that goes beyond

archetypes, and (as acknowledged by Storm) may not be strictly acausal. In this light, the question of whether psi phenomena meet Jung's requirements for "synchronicity," albeit theoretically interesting, becomes somewhat of a moot point. A more relevant question would be the broader issue of whether psi phenomena and meaningful coincidence experiences reflect the same or related phenomena. Of course, this is not to suggest that the discussions regarding synchronicity and psi in Storm's book cannot be applied to this broader discussion; indeed they can, and by exploring such fundamental ideas as causality, meaning, and intentionality, they shed light on important issues to consider.

In the end, Storm has provided an excellent exploration of meaningful coincidence as contrasted through the lens of Jung and Pauli's theory of synchronicity. He also provides several interesting ideas for how a consideration of Jungian requirements for synchronicity might be applied to potentially enhance psi effects in research. His book is a must read for the serious thinker in this field, and he has done his readers a tremendous service by compiling these wonderful papers together in one volume.

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THE ESP ENIGMA: THE SCIENTIFIC CASE FOR PSYCHIC PHENOMENA by Diane Hennacy Powell. New York: Walker, 2009. Pp. 280. $25.00 (hardcover). ISBN-13: 978-0-8027-1606-4.

The inside sleeve of this book establishes the scientific credentials of author Diane Hennacy Powell: trained in medicine, neurology, and psychiatry; former member of Harvard Medical School's faculty; published articles in neuroscience and psychiatry journals. Perhaps since those early days she has become less interested in mainstream medical practice, as her website biography states she currently "has a solo practice in Medford, Oregon and incorporates psychotherapy, psychopharmacology, and pet therapy into her compassionate healing of people who want personalized care" (www.dianehennacypowell.com). She is a peace activist (it runs in the family, as she is great-niece of Ammon Hennacy) and is also active in human rights.

The brief introduction argues for taking psychic phenomena seriously—this is to be expected given the book's subtitle. Powell claims that "if one wants to prove whether or not telepathy can exist, one strong convincing case for its existence should be sufficient" (p. 5). With apologies to William James, this is a naïve claim. Although such a "white crow"

argument may be true in the so-called "hard" sciences, in research with human participants (who come into the lab with varying expectations, moods, personalities, and hangovers), and when we are dealing with phenomena that appear to have small and inconsistent effects under laboratory conditions, we have to use inferential statistics and rely on an accumulation of consistent findings to build a convincing case.

Toward the end of the introduction, Powell describes a life-changing experience when a patient claiming to be psychic told her several accurate details of her life and made predictions that (eventually) came true. This stimulated Powell's interest in the paranormal to the extent that she "decided to systematically investigate psychic phenomena" (p. 8), and it seems that she has been doing this for the past 20 years. Oddly, given her two decades of systematic research, if Powell *has* published any of her work in peer-reviewed journals, she does not reference it in her own book.

Chapter 1 ("Consciousness and the Brain") sets the context by, again briefly, introducing different philosophical models of consciousness: monism versus dualism; materialism; and the so-called "hard problem" of consciousness. The hard problem was introduced by philosopher David Chalmers (1994) and is paraphrased by Powell as "how something as nonmaterial as consciousness could arise from the brain" (p. 19). This paraphrasing makes rather more assumptions than the more prosaic phrasing more commonly associated with Chalmers: "how physical processes in the brain give rise to subjective experience." But Powell does not explore her assumptions or indicate to the reader that the hard problem may be differently conceptualized.

Chapter 1 closes with a line of reasoning so naïve that I was left gaping: "The brain is composed of atoms and therefore the principles of quantum physics are operating in our brains" (p. 24); the same goes for all other particles in the universe, if quantum physics is correct. Powell seems unaware that different levels of explanation are appropriate for different physical systems. Most physicists do not take seriously the idea that the quantum level is the most appropriate for psychological or neuroscientific questions. Powell then makes another giant leap in the following sentence: "A model that recognizes that quantum physics also operates in our brains might explain many of consciousness's 'unsolved mysteries'" (p. 24). Because a rationale for this line of reasoning is absent from the chapter, the reader is left hoping that all will be revealed in subsequent chapters.

Next, a large chunk of the book consists of six chapters providing a selective review of the parapsychological literature: telepathy, identical twins and "coupled consciousness," clairvoyance, precognition, PK, and OBEs. Most of these chapters follow the same basic format, with an initial description of anecdotal and historical material, followed by an account of some more recent laboratory research that supports the general argument of the book (that psychic phenomena are genuine). Readers of this journal

will already be quite familiar with the ground that is covered in these chapters, so I won't tread on it again.

The final part of the book sees Powell ambitiously developing a "new theory of consciousness" based on her understanding of quantum physics, of the nature of psychic phenomena, and of the (assumed) nonmaterial nature of consciousness. This latter assumption pervades the entire book, and reveals in my view a misidentification of "subjective experience" with "nonmaterial."

Despite her previous life in medicine, neurology, and psychiatry, Powell doesn't seem to have consulted the modern-day psychological and neuroscience literature on consciousness. No reference is made to the models of consciousness that prevail in this literature. Roughly put, these models arise out of research suggesting that subjective experience gives the misleading impression of a "self" that is making conscious decisions, and that neural activity *precedes* our subjective experiences. Benjamin Libet's (1985) seminal paper entitled "Unconscious Cerebral Initiative and the Role of Conscious Will in Voluntary Action" (the first three words of the title give it away) is not mentioned by Powell. Likewise for Daniel Wegner's (2002) hugely influential book *The Illusion of Conscious Will* (again, the title gives it away). For those readers who would like to acquaint themselves with this literature, Sue Blackmore's (2010) textbook is an accessible and comprehensive source (and includes chapters on the paranorma and exceptional human experience). This extensive literature builds an empirically derived model of consciousness that undermines the basic assumptions of Powell's work.

To end this review on a more positive note, when Powell covers territory with which she is presumably more familiar, I found her ideas more interesting and insightful. For instance, in the chapter on OBEs, she proposes a role for the angular gyrus and the temporal lobe in accessing psychic information via an OBE. This proposal is based on her recalling an MRI paper describing how, for schizophrenic subjects, the angular gyrus was larger on the right hemisphere than on the left. As Powell states: "Since 42 percent of people with schizophrenia report OBEs, an abnormality of the angular gyrus may be the reason schizophrenia and OBEs commonly occur together" (p. 114). As the angular gyrus is also implicated with dreams, Powell proposes that "heightened activity in the angular gyrus may cause OBEs, which may be 'waking dreams'" (p. 116). This, she observes, would align with suggestions made by lucid dream expert Stephen LaBerge.

Some readers may be disappointed that little consideration is given in *The ESP Enigma* to alternative interpretations of the literature, or unsupportive findings. However, readers whose minds are already made up on the topic will find that their ideological feathers remain pleasingly unruffled.

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THE SPIRITUAL ANATOMY OF EMOTION: HOW FEELINGS LINK THE BRAIN, THE BODY, AND THE SIXTH SENSE by Michael A. Jawer with Marc S. Micozzi. Rochester, VT: Park Street Press, 2009. Pp. ix. + 558. $24.95 (paperback). ISBN 978-1-59477-288-7.

To what extent does the body (not the brain) create the mind? Can suppressed emotions lead to independently verifiable anomalous phenomena such as precognition, telepathy, and the appearance of apparitions? Are particular personality types more prone to producing and perceiving such phenomena? These are several of the intriguing questions that Jawer and Micozzi propose to address in this comprehensive book. As a researcher in cognitive neuroscience who is also open to the possibility that anomalous phenomena are demonstrations of how much we have yet to learn about space and time, I was enthusiastic to learn how these issues would be approached by an emotion researcher and expert on sick-building syndrome (Jawer) and a physiology professor and editor of an alternative medicine textbook (Micozzi).

My enthusiasm waned somewhat throughout the poorly edited volume, but after I made it through 458 pages of anecdotes and research findings taken from the fields of neuroimmunology, music cognition, clinical psychology, energy medicine, post-traumatic stress disorder and many more, I had a difficult insight. On the one hand, I am very sympathetic to many of the authors' precepts, most especially that the brain and body (not just the brain) make up the "self," that anomalous phenomena are deserving of scientific examination as are any other phenomena we don't understand, that the expression of feeling gives human life meaning and the suppression of feeling is an important cause of disease, and that people vary

academic researcher who is intrigued by its premise. Unfortunately, I would be sympathetic with this dismissal.

Much of my time spent reading this book was also spent wondering whether I was being an academic snob. The authors make the generalization that neuroscientists are mostly men who are resistant to the idea of the body being involved in the evolution and experience of human awareness. As a female cognitive psychologist/neuroscientist who passionately believes that the body is integral to everything human, neither attribute applies to me, so I thought maybe I was being critical of the book just based on the breadth of the generalization. In addition, the primary author (Jawer) doesn't list any academic credentials. I spent days wondering if I was resentful of him because he felt comfortable putting forth some very strident opinions about controversial scientific issues without the academic credentials to back them up; meanwhile I feel sheepish about having written a self-help book that claims no scientific import. After extensive self-examination, I decided that my academic snobbery and possible resentment were real, but not to blame for my opinion of the book. Several other scientific explorations written by nonacademics have struck me as compelling, easy to read, and relatively well researched. For example, whatever academic snobbery or resentment I might have did not intrude into my appreciation of Malcom Gladwell's *Blink* (Gladwell, 2007).

Following this analysis, I tried to delineate what exactly would have to be altered to make this book acceptable to researchers with open hearts and discerning minds. Here is my best attempt at some fair answers to that question.

Fact checking. The book contains several false statements that should have been caught by an editor familiar with basic high school biology and physics. For example, on page 109, the authors state, "No question will ever be more basic to medicine, religion, philosophy, or science" than that of why "living organisms evidently defy the second law of thermodynamics." The second law of thermodynamics is stated thus: "as the molecules of something randomly interact, their arrangement will, over time, become less and less ordered." This statement is close enough, but it leaves out one critical point, which is that entropy (often conceived of as disorder) decreases over time *in a closed system.* I know of no doctor, theologian, philosopher, or scientist who wonders why living organisms defy the second law of thermodynamics, because we don't. We're not closed systems; we eat so we can use the energy from food to keep ourselves from falling into disarray. Another discouraging example of a basic misunderstanding is found in a discussion of sex hormones. Contrasting androgens with sex hormones, a move that makes little sense because testosterone is a sex hormone that is also an androgen, the authors state, "Androgens emanate not from the testes or ovaries, but from the adrenal gland" (p. 100). The adrenal cortex produces some androgens, while the most well-known androgen (testosterone) is produced in both the testes and ovaries. Finally, a recurrent problem is

that the authors seem to believe that electromagnetic radiation requires an atmosphere to "convey" it. "The earth's atmosphere conducts a good deal of electromagnetic radiation" (p. 175), "...electromagnetic radiation of extremely low frequency in the earth's atmosphere..." (p. 181), "the earth's atmosphere, which seems to our eyes invisible, is actually a conveyance for electromagnetic radiation..." (p. 441). In summary, these errors were gross enough that they made me wonder what other false statements were presented as truths from fields with which I am unfamiliar. This concern wasn't assisted by the frequency with which popular news reports and websites were used as references for scientific claims that would have better been served by support from existing peer-reviewed journal articles.

Logical consistency. The prose seemed meandering; it appeared to contain many digressions. However, upon completing the book, it occurred to me that if the authors had laid out a logical path from the beginning, or if an editor had insisted on such, then the proper places in the argument for each of the many discussions would have been clear. The authors made a gargantuan effort to cast a broad net over multiple intersecting fields in order to make their many points, and this kind of work is much needed, especially now that further specialization among researchers is destroying appreciation of the art of synthesis in scientific thought. However, it is not acceptable to early in the book put forth good evidence that women are beset by syndromes that may be traceable to a lack of expression of emotions (pp. 283, 297) and later to idealize women as if they are highly sensitive beings who excel at understanding and processing emotions (pp. 297, 451). Another example: in a discussion of presentiment, the authors include well-known work by Bechara, Damasio, and others dealing with subconscious awareness of a stacked card deck that precedes conscious awareness that the deck is stacked against the participants in a card game. These results do not provide evidence for any anomalous phenomenon, because exposure to the decks allowed participants to subconsciously determine which deck was "bad." Though the authors describe the experiment accurately, later in that section they group Bechara's results with those from presentiment work showing physiological changes that precede randomized and unpredictable stimuli, such as Radin's well-known findings (Radin, 1997, 2004; Radin & Lobach, 2007). Instead of making the obvious distinction that in one case the subconscious is working on information available through known means and in the other case something unknown may be at play, they make the following distinction between the two types of studies: "Damasio and colleagues concluded that intuition must be a brain-based phenomenon ... I suspect this model makes sense when the stimulus—in this case, a card game—is primarily mental. When the stimulus is physical, my intuition is that the body acts first, with feeling-tinged information leading the brain to decide." It was just too difficult for me to make the logical leap that the most fundamental difference between these two types of experiment was whether the stimuli were mental or physical rather than whether information was

available to the participants about the content of the stimuli.

Clarity. Jawer and Micozzi put years of effort into this book, and that effort shows. I appreciated the many threads they connected to make their very important claim that neuroscientists need to include all of the body in our understanding of what creates the mind, and I was grateful that the authors highlighted the importance of keeping an open mind toward the possibility that anomalous phenomena are real events that are not yet understood. Unfortunately, these two important and yet controversial ideas would have been much better served had the authors been clearer about their definitions. For instance, the authors repeatedly seem to confuse awareness with conscious awareness, and make the claim that neuroscientists are only interested in conscious awareness. For example: "What we know, the neuroscientists assert, is shaped, focused, and brought into definition by the brain. Therefore the brain must know all. But, as I have contended, the brain does not know all. Some types of sensory influence operate beyond the threshold of awareness" (p. 427). A clarifying statement indicating that the authors believe that the brain is only responsible for conscious awareness, if that is indeed the case, would perhaps help make their point more coherent. Further, especially intriguing to anyone interested in the mechanisms underlying anomalous phenomena is that the authors state that they have a controversial yet compelling new approach to understanding the interplay between emotions and anomalous events. The authors assert that anomalous phenomena result from intense feelings, especially those that are repressed, being transmitted in space and time via electromagnetism. These controversial assertions are clearly stated as conjectures, but later in the book when a discussion of mechanism should occur, the impending discussion is seemingly waylaid. In a summary paragraph (p. 397), the authors discuss the controversial nature of their previous assertions. "More problematic is the notion that intense feelings can be transmitted to others in nonordinary ways and can be harbored in the electromagnetic environment. What studies have inquired into these possibilities?" Which indeed? But this line of questioning is sadly followed by: "Indeed, what research pertains to other key questions relevant to the thesis of this book...." Research pertaining to the other key questions is then described, and some research about the ability to sense electromagnetic energy. Perhaps because I like the idea that emotions are key to our understanding of anomalous phenomena, it disturbs me that a key question—how do emotions (or emotional suppression) transmit themselves across space and time and result in anomalous events?—is not answered with any degree of rigor, unless one is satisfied with a vague discussion of undefined "energy" being put into an "electromagnetic environment." Again, I would like to point out that this idea is intriguing to me. It's just that the idea will gain no footing, and may even be perceived as reduced in merit among academic researchers, unless it is presented with some clarity.

In summary, any lay reader of this book will learn a lot about the body, brain, and mind, as well as a little about anomalous phenomena, particularly apparitions. The book is a starting point for thinking about these ideas, a place to go for new thoughts and interesting insights. However, it is not for those hoping to find a well-informed and clear discussion of controversial and very important issues in present-day neuroscientific research.

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CHICO XAVIER: MEDIUM OF THE CENTURY by Guy Lyon Playfair. London: Roundtable Publishing (International Spiritist Council), 2010. Pp. 98. £6.99 [approximately $11.33] (paperback). ISBN 978-0-956449- 31-3

Francisco Candido (Chico) Xavier (1910–2002), the most famous and influential medium in Brazil's history, has been celebrated in his homeland in a number of ways. He was named "The Minas Citizen of the

20th Century," beating even arguably the best soccer player in history, Pelé, and a special postage stamp, two feature films (there are also previous documentaries), and former president Fernando Henrique Cardoso also honored his life. In this slim book, Guy Lyon Playfair calls Chico Xavier the medium of the century and introduces him and his work to the English-speaking public. This lofty claim for a century that also produced the likes of Mrs. Piper, Mrs. Leonard, Eileen Garrett, and other extraordinary mediums is based on Xavier's automatic writing of hundreds of books and the apparently anomalous information he conveyed to many people. Also, although this would not qualify him as a great medium but definitely as a great person, reference is made in the book to his having helped millions of people through projects to help disadvantaged youth, leprosy patients, and others, funded with the money from his publications.

Xavier said that his automatic writing came from various sources, including many dead Brazilian poets and scientists. Playfair makes the case that he could not possibly have had the knowledge or linguistic ability himself to produce this vast oeuvre and that the quality of the material thus produced cannot be explained in ordinary ways. At one point, he hyperbolically equates one of the plots of Xavier's books to "any Greek drama or Rossini opera" (p. 40) although the summary he provides reads like a soap-opera but with actual rather than fake deaths, and reincarnations rather than amnesia-producing accidents. That Chico Xavier's style, at least in some books, was probably not of very high caliber is suggested by mention of a critic who counted no less than 617 adjectives in 20 pages of a novel (p. 46). Style issues aside, the most important part of this channeled material is the content, which describes the nature of the interaction between matter and spirit and the afterlife, among other lofty subjects. Here I part company with Playfair, who evidently holds in very high regard the material produced. Although, of course, I could be wrong and may be taught otherwise after my death, I found that assertions of an afterlife in which there is food, only of better taste, along with governments, cinemas, and concerts, exemplify the same silliness and denial of death as the recent film version of *The Lovely Bones*, in which a raped and killed teenage girl ends up in a world with a nicer high school without acne or bullies and with gaudier pink colors. Similarly, descriptions of spiritual microbes, corpuscles, and otherworldly genetic engineers somehow affecting reincarnations did not exactly provide me with insight as to what the relationship may be between conscious phenomena and material states, or what survival may be like. Philosophically I also disagree with the messages that sexuality and sensuality are somehow base instincts that prevent spiritual development, or that individuals choose the handicaps with which they will be reborn so as to help them with their development (I just have to wonder what purpose someone stillborn or born with a horrible condition like hydrocephaly would have in inflicting that pain to his/her parents or how that would allow any kind of development).

I imagine that most of the readers of the *JP* will be most interested in the purported psi capabilities of Xavier. Playfair mentions that a number of Spiritists (the religion founded by Allan Kardec which Chico Xavier followed) and a Brazilian parapsychologist did a follow-up of some of the messages purportedly from dead individuals as channeled by Xavier to surviving relatives. The book states that "there was not a single statement that was found to be incorrect" in a session where apparently anomalous communication came through. However, neither specific information on the methodology of this analysis, which of course would require safeguards for the accuracy and impartiality of the evaluations, nor a reference is provided. So on this most interesting of points, the book remains tantalizingly vague.

Finally, some words on the opinions of Guy Lyon Playfair himself: I found that he lacked a critical perspective to evaluate much of the material to which he referred, including the scientific sophistication of Xavier's discussion of anatomy, embryology, and so on, which struck me as being very possibly the product of someone with very good memory (as Xavier was known to have), some reading of medicine textbooks, along with a generous syncretic serving of "kardecism" and other esoteric traditions. Playfair also summarily dismisses any nonanomalous alternative explanations. For example, he writes that a nephew of Xavier asserted that the latter was consciously the author of the materials and that he had always had a facility to copy the literary styles of others. This is a reasonable hypothesis, yet Playfair dismisses it with "no allegation could have been more absurd" and states that no shred of evidence was offered for it, yet produces what sound like farfetched and ungrounded charges for the nephew's accusation: his "hoping to impress a Catholic girl friend, or ...[being] bribed by a local priest" (p. 30). Playfair also mentions as somewhat premonitory the fact that Chico Xavier wrote of psychic surgery in 1954 before "anyone" had heard of the famous psychic surgeon Arigó, yet the latter started practicing somewhere around 1950. He also makes simple mistakes such as stating in perfect present tense that Xavier "has never married" (p. 68), something that Playfair likely wrote earlier but that is no longer applicable unless he is somehow in contact with the still single spirit of Xavier.

But what I found most grating about Playfair was what I would characterize as his condescension to both Brazil and those not having had much formal education. He repeatedly states that an elementary student dropout could not have produced the material that Chico Xavier did, dismissing the fact that some of the best literature in the world (the reader need only consider Homer—or the oral tradition covered by that name—and Shakespeare) has been produced by exceptional individuals without much formal education. As to the assertion that Xavier's near blindness would prevent him from reading or writing, I offer not only John Milton but also, closer to Brazil, perhaps the best short story writer of the second half of the 20th century, Jorge Luis Borges.

With regard to Brazil, Playfair underlines how bad its elementary school system must have been at the time of Xavier's upbringing without offering any evidence that it was actually as bad as or worse than, say, the school system in the UK. Having grown up in México and visited many countries in the Americas, I would choose not only the street-smarts but also the multilinguistic abilities of a typical Haitian youngster over those of a typical university graduate from a mono-linguistic country any day of the week. Also, to state as Playfair does that the quality of Xavier's writing is typical of what Brazilians want and produce is to disregard writers of international stature in the 20th century such as Guimarães Rosa. Unless, of course, Playfair also means that 20th century English literature could be defined by Danielle Steel, who also happens to be an enormously successful and prolific popular writer...

After having read this introduction to Chico Xavier, I do remain impressed by the amount and apparent facility of his automatic writing, surpassing in quantity even Pearl Curran, the person who wrote the Patience Worth material (Prince, 1927/1964), but I remain skeptical as to its literary quality and evidential importance for survival. The reference to Xavier's psi abilities is intriguing but would require far more information than that provided in this book. Also, at the end of the book I knew almost nothing about Chico Xavier's life other than his literary output (for instance, who were the important people in his life, and why is there no reference to the discovery of his abilities after his sister was treated with an exorcism, or to other episodes in his life?).

That Xavier displayed an extraordinary proclivity for automatic writing and that he seems to have done it in different styles is remarkable, although not unique. For instance, Fernando Pessoa, arguably the best 20th century Portuguese poet, wrote in markedly different styles according to his various heteronyms or selves, although he did not do so automatically. As to Chico Xavier's marginalization as a writer, I suspect that he was not recognized by the Brazilian literary establishment not because of the apparent provenance of his work but because, judging by the prose samples in the book, he was an articulate and prolific but far from exceptional writer. We not only have the counterexample of Pessoa's enormous recognition in Portugal, but that of James Merrill, whose masterwork *The Changing Light at Sandover,* partly produced with the help of communications obtained through a Ouija board, got him the National Book Critics Circle Award in 1983.

Having become acquainted now with the cases of Chico Xavier and Pearl Curran, I offer an alternative to the anomalous explanation: an overevaluation of the literary and philosophical (and in the case of Xavier also scientific) merits of the work, alongside with an underestimation of ordinary human capabilities. Yes, it is remarkable for most people to be able to write coherently and rapidly without paying much attention to the paper, but is such performance really that different from that of an

experienced jazz musician who can improvise sophisticated riffs while holding a conversation?

Another piece of the puzzle might be found in Pearl Curran's short story "Rosa Alvaro, Entrante," ignored in the otherwise seemingly thorough analysis by Prince (Diliberto, 2010). It is the chronicle of a lonely salesperson who ends up persuading herself of the reality of a spirit guide mentioned by a fortune teller so that she can fully express herself. It may be that, independently of the issue of survival, some people may need to invoke spirits to liberate talents that would otherwise remain hidden; they can then create a new reality for themselves and for others (cf. Cardeña & Beard, 1996). Although I was not persuaded that Chico Xavier was the medium of the century, Playfair makes a good case that he must have been a genial and enormously altruistic person, and that is always worth celebrating.

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CORRESPONDENCE

To the Editor:

I am honored that a trained philosopher like Michael Potts has reviewed my *The End of Materialism: How Evidence of the Paranormal Is Bringing Science and Spirit Together* (EoM) so favorably, applying more demanding standards of philosophy in general and philosophy of science in particular than I used as guidelines in writing. Every one of his suggestions for expanding the depth of inquiry in the text is a worthwhile direction for philosophers and scientists to explore in. While honored, though, I do want to remind the nonphilosopher reader that EoM is not a philosophy book, it's a psychology book, aimed at troubled, as well as curious, readers. Because it wasn't particularly aimed at professionals, I kept my science and philosophy basic and light.

Publishers like catchy titles, of course, hoping they tempt readers to pick the book up, read, and buy, but if I wanted to be very technically accurate, I would have called the book something like *Psychological and Empirical/Scientific Considerations Concerning the Psychological Syndrome of "Dismissive Materialism," Its Potentially Harmful Effects on Ordinary People, and Evidence for the Rejection of Dismissive Materialism as a Complete Psychological and Philosophical Stance Toward Life.* But who would care about reading such a tome?

Ordinary people seldom draw fine distinctions between various kinds of materialistic/physicalist worldviews, as opposed to various religious/spiritual worldviews. The latter views basically say there is much more to life than material gratification in a meaningless physical world, there's a "higher" aspect of existence that is just as "real" as the physical; the former views that reality is nothing but material objects, bounced around by physical forces, it has no inherent meaning, and in the end we just die, and none of that means anything in any real sense.

I wrote primarily as a psychologist and scientist, though, and as a psychologist, especially a transpersonal psychologist, I have many reasons to believe that *people need meaning in their lives,* meaning on a much bigger scale than what's the best way to get my next bite to eat. Without such meaning, various kinds of psychopathologies and maladaptive behaviors develop.

When I lecture in this area, I often start, after establishing some friendly rapport with my audience, by asking for a show of hands: who has had some sort of religious, spiritual, or mystical experiences that mean a lot to them? For the kinds of audiences I draw, most hands go up. I then announce that, moving into the role of Mainstream Scientist (I've published in prestigious mainstream journals, I can pull that off for a moment), I must

tell them that basically *they are stupid and or nuts.* Their precious experiences are delusions, examples of brain malfunctions. If I want to push even harder to make my point, I can add that it is clinging to delusory spiritual and religious beliefs like this, like they do, that keep us from rationally solving the problems of the world, so they are hurting everybody as well as being stupid themselves.

I make it clear very quickly that this was a didactic ploy to remind them of the highly prevalent attitudes of Scientistic Materialism and its effects, not my actual, personal evaluation of them—I don't like to hurt people, even for worthwhile educational experiences. But I know from the hundreds and hundreds of people who have contacted me over the years that there are many, many people in the world who have been cowed and invalidated by what they think of as *the facts of science,* dismissing and pathologizing their personal experiences, and have had unnecessary struggles with their spiritual lives or tried to suppress them as a result. In EoM and my other work, I try to get people to see that it is not essential science per se (we need not be concerned with various philosophical variations of science at this level) that has told them they are stupid and crazy, it is an attitude of people caught up in what I technically call the attitude of Dismissive Materialism.

Dismissive Materialism is a cognitive and emotional stance that says all religion and spirituality (except, perhaps, for the social benefits of belonging to a supportive organization) are stupid nonsense, and automatically dismisses any data or arguments to the contrary without bothering to really evaluate them. After all, such alleged "data" and "beliefs" would just be the misperceptions and rationalizations of deluded people, so why waste time thinking about them? Every parapsychologist has had many encounters with Dismissive Materialism, the "ESP means error some place" attitude, don't bother me with your data.

Again, the many philosophical and scientific variations suggested by Potts, which I am familiar with, are indeed rich directions to explore for professional philosophers and scientists, but my purpose in writing EoM was to make those who have suppressed their spirituality or have conflicts within their spiritual life because they think science has disproved it, more aware that actual, essential science is *not* the same thing as Dismissive Materialism, as Scientism. Indeed, in looking at the data of parapsychology, I argue that it is reasonable to be *both* scientific *and* spiritual in outlook, not to automatically reject or suppress one or the other. Of course there is lots of nonsense labeled spiritual and religious, as there is in all areas of life, and we need to always be as discriminative as possible. But if you are sincerely interested in the spiritual, or your life has spiritual experiences, I am telling you, as a scientist, you are *not* necessarily stupid or crazy! I know I've helped many people in the past by educating them this way, and hope EoM will continue to do that.

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To the Editor:

I am grateful for Professor Tart's gracious letter in reference to my review of his book *The End of Materialism.* My initial response is that I recognize that *The End of Materialism* was written for a "lay audience" and that its approach was from the standpoint of psychology. However, since I was writing a review for a scholarly journal, it was my responsibility to write the review from a scholarly point of view. Such a viewpoint required a discussion of areas that I believed would be helped by further clarification and elaboration.

Tart emphasizes the fact that his book was written for the general public. As such, *The End of Materialism* does an outstanding job of encouraging people to understand both the dogmatism of scientistic materialism and the anomie resulting from it. I agree with Professor Tart's point that a loss of transpersonal meaning leads to both psychological and behavioral problems. For example, it may be the case that the extent of alcohol and drug abuse in Western culture is, in part, linked to an existential emptiness stemming from an ethic of shallow self-fulfillment through pleasure. Although in a university setting materialist professors may accept a non-self-centered ethic, for the average person, hedonistic pleasure may be all that remains in a world stripped of a spiritual component.

As an academic myself, I have heard both colleagues and students espouse the attitude of "dismissive materialism" mentioned by Professor Tart. A colleague once compared my belief in a nonmaterialistic realm (specifically, my belief in a transcendent God) to belief in "witch doctors." Although I could have replied that there may be more to "witch doctors" than he believed, I understood that he was being dismissive of the possibility of any kind of spiritual realm. Thus I have experienced first-hand how rabid skeptical materialists are every bit as dogmatic as religious Fundamentalists—they are really *secular* Fundamentalists. Sadly, they strive to convince students that spirituality and the contemporary world, especially the scientific world, do not mix. Some students are convinced—they leave their classes with their faith shattered and their lives stripped of any belief in the transcendent and of any belief in a meaning beyond the self.

The End of Materialism serves its purpose well—to convince the average person that science is not opposed to spirituality. And it does that in a "subversive" way—by showing how the very science that society worships reveals, at the very least, the possibility that there is more to reality than mere matter. Parapsychology is the science that reverses the destructiveness

of the earlier scientistic faith in materialism, and that carves out a space for spiritual reality. My sincere hope is that Professor Tart's book will be successful in its goal of convincing people that in the world of contemporary science there remains room for belief in such a spiritual realm.

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