Consciousness and Psi
(Can Consciousness be Real?)

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Abstract

What can psi do for the scientific understanding of consciousness? Simply put, I think research in parapsychology, that is, psi research, is a leading edge for several disciplines including physics and psychology. Though many mainstream scientists discount parapsychology, a vast majority of regular folks accept the possibilities and promise of the frontier sciences in general, based on common experiences. As most people working in psi research will agree, this background of personal experience has to be extended with sound scientific observation and experiments that amplify and clarify the phenomenological realities of psi. To the extent this is accomplished, we progressively develop an expanded, richer understanding of mind and its place in the world. This paper is a personal sketch that touches on selected examples showing the increasingly clear contributions of psi research to the search for a fuller understanding of human consciousness. The work of a small number of serious scientists over a century has produced a remarkable array of sound, independent observations looking at similar questions from several perspectives. The results comprise compelling convergent evidence for the reality of psi. There is a real entity in the world that isn't included in the best scientific models we have. Good evidence says these models must be expanded to accommodate consciousness phenomena. The primary focus in this paper is on research in which I have directly participated, thus combining personal experience with rigorous science. Based on this personal, participatory engagement as a scientist, augmenting the historical record, my view is optimistic. There are excellent prospects for a maturation of research in parapsychology to become a significant contributor to consciousness studies.

Introduction

My inquisitive group of high school friends, all science nerds, discovered JB Rhine's “60 Years” book, and were impressed with the careful methods and the simplicity of presentation (Rhine, et al., 1966). Taking nothing on faith, however, we conducted our own experiments, mini-replications. They gave just the sort of results needed to cause us deeper head scratching and for me, a lifelong respect for science at the edges. What we got in our experiments was nominal

significance; the results did not blow our socks off, but instead tantalized our budding scientific minds in the way that only happens when there is complete cognizance and control over the science. That was 50 years ago – almost a match for the 55 years since Utrecht I. Yet, already then we could see the ingredients that must lead to confidence in the outcome of studies at the margins of what we know: care, cognizance, and control over the experiment from its very conception. For someone trained in the strict scientific mode, it is most persuasive to be there when the question is asked, to be engaged in the design, to oversee the data collection, to participate in the analysis, and finally to search for a useful interpretation. These are the features of my good fortune as a psi researcher.

As a young professor of experimental psychology, I found that parapsychology was the frame for the most frequent proposals by students for their research projects. That's probably still the case, at least in terms of student interest, though rats and memory probes and illusions and clever ways to look at motivation may be more acceptable to today's young professors. In any case, psi experiments are an excellent testing ground for experimental design and statistics, and there are any number of interesting paradigms that can be implemented with little more than pen and paper – or the ubiquitous laptops of the 21st century. We had fun, and learned something, indeed a great deal. We learned not only the methods, but also came to understand replication and variability, we discovered the value of patience and perseverance, and we learned humility before the data and pride in doing it right. This was experiential, and I hope it provided for my students the value that I found. It was excellent preparation for my full time career as a psi researcher beginning some 28 years ago when I joined the Princeton Engineering Anomalies Research (PEAR) lab directed by Bob Jahn at Princeton University, studying the role of consciousness in the physical world. My work now is concerned with the Global Consciousness Project (GCP), about which I will say more later.

Definitions

Many correspondents ask, reasonably enough, how we define consciousness. Years ago, I came across a couple of insights about definitions that are worth recalling. One was a discussion by Ludwig Wittgenstein of the trouble we sometimes have understanding each other. I find it useful to remember his observations in a short paraphrase, “Language bewitches intelligence.” Alfred Korzybski was very specific in his tome, *Science and Sanity*, which contains several widely used, pithy expressions about the difficulties encountered if we are careless in our attempts to describe our experiences. He famously said, “The map is not the territory” and “the pencil I name is not the one in my hand.” Korzybski was the founder of an intellectual movement called General Semantics that has largely dissipated, to our considerable loss. Among many suggestions for achieving and maintaining clarity of communication was his colorful proposal to give all important words imaginal subscripts and superscripts to identify which of several meanings is intended, and contextual information like time and place. He thought it wise, if one says “love”, to somehow specify whether it is brotherly, platonic, romantic, carnal love, or a mere political expression. Context does that for us much of the time, but it is never easy or certain that our listeners will get the correct message. This bit of folk wisdom applies: “I know you think you

understand what I said, but I am not sure you realize that what you heard is not what I meant."

So, what do we mean by consciousness, and what do we mean by psi? The usual answers are lists of examples, or synonyms and correlates, like awareness, attention, being awake and mentally active. In some contexts, consciousness is said to be just the activity of brain (or of mind – with a very different meaning). Consciousness can be defined to include more than the self-observed qualities, and touch on dreaming and other levels of brain activity termed unconscious or subconscious. A flip, but effective definition is, "Consciousness is that which allows you to ask the question." However, for the clarity required in scientific research, we can use definitions in terms of the operations performed in the experiment. For example, in my current research, "global consciousness" is defined by identifying and specifying precisely an event in the world that will cause very large numbers of people to feel a shared state of mind and emotion. We say that a major terrorist attack will produce a common focus, or that New Year celebrations will coordinate millions of minds during a moment of consciousness that is clearly defined by the operations of watching the clock and waiting for a midnight hug. We generate a testable hypothesis that this special state of "consciousness" will have detectable effects in the corresponding data, as seen in precisely specified statistical operations.

Exactly in this way, psi in general – if we want to do science, or even just to communicate clearly – is best defined operationally. Yes, we know what we mean, and we can make lists of examples and paradigms, but for clarity, the procedures and relationships we use to elicit anomalous outcomes in an experiment cannot be bettered. When we describe what we do in detail sufficient at least for conceptual replication, we define the object of study, the psi we wish to register and understand.

Experience

A suggested topic for this talk was, "Can consciousness be real?" That seems likely to be a reference to the aging conundrum asking whether consciousness is non-material. I don't propose to answer it, but would like to point to some thoughtful perspectives. Of course we already have looked at the vulnerabilities of language and the transmission of meaning, but prior to any attempt to describe or communicate it, we have the personal experience of being conscious. That is hard to gainsay, but it is only a beginning point. Can we create a physical model, or any kind of objective modeling of consciousness? Over the last few decades, serious work has been undertaken, but I think it is correct to say there is no great success or widely accepted theory of mind that links that experiential consciousness to, say, physics. Susan Blackmore's recent book reporting conversations with 21 scientists and philosophers gives a good summary, which definitely does not answer the question, but does help to shape it in useful ways (Blackmore, 2007). She documents David Chalmer's "hard problem", the matter of "qualia", Hameroff and Penrose's gravitational collapse microtubule model, and thought experiments asking what would be the difference between a conscious being and "zombie" that was otherwise the same, but had no conscious experience. A survey of such attempts to deal with what consciousness is will leave most of us believing that we should make good use of operational definitions as described.

On the other hand, science progresses only if we keep working at the hard problems, attempting to form better and more precise questions. Ed Mitchell, the founder of the Institute for Noetic Sciences, writes about his 35 year quest to integrate science and spirituality into a model of reality that works for physics, but also can deal with the evidence from experience and research that establishes anomalous communication and nonlocal effects of consciousness (Mitchell, 2008). His "dyadic model" says that energy and information are both fundamental aspects of reality, with a common basis in the zero-point field (that is, outside our direct ken), and that they are dyadically coupled in the universe we experience. They are complementary, in the sense that while completely different, together they make a competent description – both are necessary elements in the equation. I think Mitchell is right, and if he is, we should be looking for the equivalent of an $E=MC^2$ defining this linkage with scientific precision. But there is no doubt that our world is made of energy and patterns of energy, which is to say information. Thus our awareness and intentionality can be seen as a part of nature with a role to play. Consciousness is real, and it does have direct effects in the world.

This is what psi research says, and it is a daunting statement that elicits serious skepticism, and unfortunately also outright dismissal, even including refusal to look at the evidence. What is missing? Why is a functional, effective consciousness that has reality and presence in the world so difficult to conceive? Most likely, it is simply a matter of observation, or rather the difficulty of subtle observation. While lifting a rock or talking to someone are acts that have obvious physical correlates (muscles, sound waves), psychokinesis or remote viewing do not. Without the immediate sensory feedback of causal relationships, we are not well equipped to recognize that mind has accomplished anything. Experience alone is not sufficient for any but the first, participatory observer and perhaps a few others who are able to vet the quality of the observation. For the rest of the world, more is required, and for that we depend on scientific study, experiment, analysis, and modeling.

Personal experience is nevertheless the first, and in some respects the most persuasive evidence that something is going on out past the boundaries of conventional psychology and physics. But ... how can it be accepted by others? Here is a low-level example, in a brief correspondence with an Egg host in the Global Consciousness Project who had been having technical problems:

> HOST: *The "kinky" cable in the neighborhood has been set on a straight path and Murphy has departed. The EGG is running. Using Debian and all is well:-).*
>
> RDN: *Marvelous. And I have a nice coincidence to report. While your (this) note was arriving, I was writing one to you --*
>
> *"Thanks for keeping me up to date. I hope you aren't completely bereft of connection. On the other hand, I sometimes think it would be good for me to "..."*
>
> *-- and at that juncture my connection broke. The word I was about to write was "disconnect". How cool is that, even if a bit of a pain?*

> HOST: *Yeah, I was scratching my head over the failure of the EGG and the internet at the same time...swapped out two routers before I finally called the cable company.*
>
> *The coincidences and synchronicities I have had in my life sometimes cause me to sit down and realize...something else "is" going on.*

That's personally impressive, but nothing to take to the bank. Here's another personal example, again nothing earth-shaking, but typically impressive (you had to be there): Peter Bancel, from Paris, and I were talking via Skype about presenting new findings. I said I'd like to include an analysis he had done two years ago in 2006 showing a daily variation in the GCP data that suggests just being awake is enough to make a faint global consciousness. We discussed that for a bit, and then Peter said he had "*this morning*" been thinking about the same analysis, and had decided it was time to update it. He's a cautious, even skeptical physicist, and I call myself 100% skeptical and 100% open minded, but we agreed we both were pondering this analysis independently at exactly the same time, an unlikely thing unless there is some kind of anomalous interconnection of minds.

Of course the usual criticism of such material as evidence applies – we do not know the base rate of coincidences of this nature, and they probably are much more frequent than we imagine.

However, we have more than a century of evidence, beginning with stories like this, and others much more impressive, including many so well documented they are hard to ignore or explain without something like psi (Feather, 2006). Observations and collections of best case reports made up the early stimulus to studies in a scientific mode. In the early 20th century this development continued with experimental and analytical research (Rhine, et al., 1966). By the 1980's, a large and complex array of experimental results had accumulated. Even in our relatively small field, the meaning and implications were difficult to see and understand in any comprehensive way. But, coincidentally, as it were, this could be alleviated by a newly developed approached to literature review, the quantitative meta-analysis (Utts, 1991). Over the last few decades, the accumulation of sound evidence for parapsychological phenomena has come to a level of richness and depth that I think begins to match the persuasiveness of personal experience – for those who will read and study the literature with care and an open mind.

Participation

Research with all the pieces in hand remains the best evidence because it combines as closely as possible the experiential and the scientific. I will give a few examples from the PEAR work, where for 22 years I participated in forming good research questions, designing the protocols and the statistical analyses, collecting the data (including data generated as a participant myself), analyzing and ultimately interpreting the results, all in cooperation with two or three or more others. We all knew the importance of getting it right. We had an extraordinary opportunity to do challenging research in a setting where we could invest the time necessary to do it well and to repeat experiments with variations that could inform and improve the work. We could and did look for what matters to consciousness interacting with physical systems, and we were able to learn important constraints in our efforts to capture anomalous information transfer. At PEAR

we had the luxury of expertise and resources, and we used them well because we all knew it was a precious opportunity to learn something. We did not want to waste our time or that of anybody who might look at our work. Here are some examples of what we learned.

Remote Perception

One focus at the PEAR lab was a long series of experiments looking at anomalous information transfer we called “remote perception” or “precognitive remote perception” (PRP). The paradigm is similar to the free response remote viewing work developed by Targ and Puthoff at SRI in the 1970's (Targ and Puthoff, 1977), and related as well to the the Ganzfeld work developed to a high point by Honorton (Honorton, 1990; Bem & Honorton, 1994). At PEAR we focused on quantitative assessment, using a set of 30 binary questions to represent the free response – is the scene hectic or calm; is it characterized more by straight lines or curves; are there people or not? Using the resulting performance measures, we sought to determine what the constraints and necessary conditions were for successful remote perception. We asked whether the effect was diminished by greater distances between the agent at the scene and the percipient, and whether the scores were different for perception attempted before the target was visited or after the visit, compared with on-time viewing. We studied whether people were more successful when the target was determined by volitional selection at the appointed time by the agent at the scene, or by random selection from a pool. We also explored variations of the quantification process, gradually increasing the number of descriptors in the questionnaire from two, to four, to a quasi-continuous scale with nine options. I can give here only a very brief overview of the results of this program over about two decades of work (Dunne & Jahn, 2003).

The most important outcome was a confirmation of the primary hypothesis: percipients can acquire information about distant targets without normal sensory channels. The effect is subtle, but over hundreds of trials, the odds against chance explanations go to millions or hundreds of millions to one. The scores for precognitive and retrocognitive trials are similar those for concurrent trials, with no evidence for regression over a range of several days. And distance also seems not to matter; the perception of targets at international distances is indistinguishable from relatively local targets. But some variations in the experimental conditions do have a clear effect. As we developed more refined scoring procedures, the ability to capture information about the distant target seemed to decrease. The effort to provide more nuance and flexibility to our participants turned out to be not a boon, but something of a boondoggle. Brenda Dunne, who led the PRP program, had misgivings about the quantification from the beginning because it shifted focus from experience to assessment. But it was a necessary experimental investigation, with an answer that is important. The ability to “far see” is fragile, and its requirements must be respected. It cannot be forced into an arbitrary mold for the sake of the scientific question. Instead, we must shape our scientific approach to study anomalous perception without sacrificing the free movement of the mind that enables it.

This is a critical point for research on psi and consciousness in general, and it is one we should understand well enough to make it clear to outside observers, both proponents and skeptics. The

core understanding is that we must respect the unique character of what we observe. The answers we obtain are in part determined by the questions we ask (a photon will be seen as a particle or a wave depending on the way we observe it). We cannot squeeze or stretch a subtle talent or an ephemeral phenomenon into any arbitrary form, but must accommodate its native dimensions.

Mind-Machine Interaction

The second major experimental program at PEAR was mind machine interactions, or MMI. We began with random event generator (REG) experiments asking participants, whom we called operators, to change the random output to higher or lower numbers, compared with baselines (Jahn, et al., 1997). We had an engineering mission, which was to find out whether human consciousness in special states might affect sensitive electronic equipment. Given that context, it will be no surprise that we were dedicated to precision and accuracy, and to a thorough and wide-ranging assessment. Ultimately, we created several unique experiments addressing similar questions using electronic, mechanical, hydrodynamic, and thermodynamic systems. Some of these were so beautiful as to deserve a place in a fine gallery or museum, but this was to help create conditions conducive to the “impossible” tasks we set our operators. Again, we were attempting to provide space and opportunity for creative consciousness, and support for the subtle requirements of interactions between intention and effects in the world.

All the experiments were technically sophisticated and aesthetically elegant in their design and implementation. We made a pendulum with a crystal bob on a rod of fused silica enclosed in clear acrylic. Measurements were taken with a razor edge cutting a light beam with timing by a 50-nanosecond clock. We made a delightful small fountain whose transition from laminar to turbulent flow we monitored with photodiode arrays to see whether intention could augment or hinder the descent from order into chaos. And we built a random mechanical cascade of 9000 plastic balls bouncing through an array of pegs into collecting bins, forming a distribution that we tried to shift to the left or right by sheer will or intention. This was a complex mechanical instrument three meters tall, and it earned the ironic name “Murphy” after the famous law, but it served well to ask whether psi could change behavior on a macroscopic scale. And there were more such explorations: a dual thermistor experiment asking for focused temperature changes, an interferometer displaying a shifting pattern of concentric interference fringes, a Crookes tube with a series of evanescent spheres formed by luminescent gas discharge, fluctuating iridescent patterns in a birefringent plastic lever arm. Suffice it to say that we covered a lot of ground in nearly three decades of the PEAR lab.

MMI Findings

A short list of major findings in the PEAR mind-matter interaction program includes many confirmations or replications of others' work. Indeed, the PEAR REG experiments were an extension of the work of Helmut Schmidt in particular (Schmidt, 1973), to provide a completely independent assessment using the best available technology and designs. The research continued for more than two decades, so there is much informative detail. The following summary points

give some notion of the span and depth of the research findings:

1. There is an effect of conscious intention on the output of random systems
2. The anomalous effect is very small, but statistically significant over many replications
3. Depending on conditions, effect size is approximately equivalent to parts per thousand
4. Both high and low intentions yield correlated departures from expectation
5. Baseline trials may show reduced variance, suggesting effects of a "baseline" intention
6. Trials conducted with the operator in local and remote locations have similar effect sizes
7. Trials conducted with the intentional effort prior to the data collection are also successful
8. Experiments with two operators who are a bonded pair have significantly larger effects
9. Serial position analysis shows early trials have large effect which decreases, but recovers
10. Anomalous effects differ in magnitude and style for individual operators
11. About 15% of unselected operators achieve significant overall performance
12. Effect size and style (symmetry of intentions) transfer from REG to other experiments
13. Experiments with a wide variety of random sources show similar effect sizes
14. Effects appear to depend on time invested in intentional effort and may be teleological
15. Anomalous effects depend primarily on psychological factors, not physical parameters

Group Consciousness

In the early 1990's, as miniaturization of electronics allowed construction of small but competent physical random number sources, we developed protocols for collecting data in the field. The question was whether REGs might be affected by mere attention rather than intention, and more generally, whether special states of consciousness might have a kind of "field" effect. A variant of the REG program was created to take data continuously, and allow marking of the beginning and end of time periods of interest. For example, we took the REG, connected to a laptop or palmtop computer, to concerts, rituals, religious ceremonies, sporting events, board meetings, and various other events that might create a state of "group consciousness". The protocol was simple: moments or periods that we judged likely to produce coherent or resonant thoughts and emotions among the people attending the event were marked, and the data were later extracted for analysis. The prediction was for a variance increase (since there was no directional intention, either high or low deviations from expectation would indicate an anomalous effect). We looked at many kinds of events that we expected would produce group coherence, and for a control condition, we collected data in mundane contexts such as shopping centers, busy street corners, academic meetings, etc.

These experiments were termed FieldREG studies, and over several years we accumulated more than 100 datasets from "resonant" situations, and a smaller but substantial number of "mundane" locations (Nelson, et al., 1996; 1998b). A number of special series were undertaken, including data collection at operas, cathedrals, and sacred sites such as temples and tombs in Egypt. In a nutshell, these experiments showed that the REG data tended to depart from expectation in those situations that were conducive to a melding of individuals into a group consciousness. We found a few categories that were especially powerful, or rather, reliable – in the FieldREG experiments,

like the laboratory experiments, effect sizes tend to be small, so that repetitions of essentially similar conditions are necessary to accumulate statistical significance. On the other hand, using a time normalized yield measure (Nelson, 2006), these natural, real world situations have a somewhat larger effect size than that found in laboratory experiments. The largest or most reliable effects seem to involve ritual or some other influence that is designed to bring people to a shared state of mind. On consideration this seems reasonable, though we had to learn by trial and error what the most conducive situations might be. We also found that the combination of collective activity in a special place could be counted on to produce structure in the random data sequence. For example, the Egypt series comprised a traveling group of people interested in ancient Egyptian spiritual practices, who intended to chant or meditate in sacred sites. That is, there was a pre-planned set of resonance-producing activities in the appropriate contexts, intended as a respectful attempt to connect to the spirit of the sacred places we visited. This series is the most consistent, and hence statistically robust subset of the entire FieldREG database (Nelson, 1997, Nelson, et al., 1998b).

FieldREG Findings

What did we learn from several years and over 100 formal assessments of the FieldREG question? In the PEAR database, it is possible to make a strict meta-analytic combination across data subsets, and from that to draw robust conclusions. These are supported also by independent work (Radin, et al., 1996; Bierman 1996). In all such research, it is necessary to use operational definitions, namely, a description of what is done to create or identify the item of interest, the group consciousness. Given that background, a short list of findings includes:

1. Changes in REG behavior correlate with special states of group consciousness
2. Situations conducive to resonant interaction produce increased data variance
3. Practices designed to create group unity and coherence yield larger deviations
4. Some venues may reliably yield decreased variance, but more study is needed
5. Mundane or chaotic situations yield only normal random data sequences
6. We infer that group consciousness can exist and can have anomalous effects
7. The studies tentatively suggest information field or “consciousness field” effects
8. The nature of the questions we ask partially determines the experimental result
9. The potential range of FieldREG applications is broad, and invites further study

Among the several replications of FieldREG work were some that looked at events in distant locations, and some that used multiple REGs. Notable among these were Dean Radin's examination of data from 5 devices in separated locations taken during the reading of the verdict in the O. J. Simpson trial (Radin, 1997), and Roger Nelson's collection of data from 12 REGs in Europe and the US during Princess Diana's funeral (Nelson, et al., 1998a). Both of these events engaged the attention of millions of people, and both showed statistically significant departures from expectation at the most critical or poignant times. These and similar probes suggested it would be valuable to have a continuous record of REG data that could monitor the world stage for indications that special states of “global consciousness” might affect our instruments in a way

similar to the effects of group consciousness.

Global Consciousness Project

We began planning and building a world-spanning network of physical REG/RNG devices in late 1997. The architecture of the network was designed to use the Internet (which was coming to maturity at that time as a world-wide web) to transmit data from remote nodes to a central server for archiving. Here is a brief description of the technology: Custom software on continuously running computers at each node collects one trial (comprising the sum of 200 bits) each second, from an REG on a serial port, stores the trials on the local disk, and transmits the data to a server in Princeton in checksummed 5-minute packets. Custom software on the server stores the data in permanent archives with all data synchronized using network time protocols. The result is a continuously growing swath of parallel data sequences extending from August 1998 to the present time (Nelson, 2001; Bancel & Nelson, 2008). The database is publicly available for download by anyone with an interest in checking our analyses or conducting original research.

A large and comprehensive website at http://noosphere.princeton.edu provides details of the technology and methods, a complete record of the formal hypothesis testing we have done over the years, the primary results, a growing spectrum of deeper explorations of the data, and some interpretive efforts. To date, there are over 250 rigorously vetted, pre-specified events in the formal series, including tragedies and celebrations, natural and human caused disasters, planned and spontaneous gatherings of great numbers. The primary experiment consists of formal events that are specified in a prediction registry prior to any examination of the data. Relatively few events are selected, and the formal series comprises 1.5% of the full 10-year, 15-Gigabyte database. Since we are breaking new ground in psi research, there is little or no history of similar research to guide hypothesis specification. We therefore use a general hypothesis that allows the criteria for selecting events and analysis tools to be kept deliberately free:

> *Periods of collective emotional or attentional behavior in widely distributed populations will correlate with deviations from expectation in a global network of physical random event generators.*

A series of replications (analyses of data corresponding to the individual global events) using this general approach allows us to maintain formal rigor while exploring a variety of occasions that bring people to a common focus. By accumulating subsets of event categories, we gain insight into psychological (or sociological) parameters that help determine the nature and magnitude of anomalous effects in the data. The approach allows considerable latitude in identifying events and constructing test statistics, but with a number of constraints. The events specified in our formal hypotheses all involve large numbers of people, geographical extension, an engaging emotive or attentional character, and they are expected to promote or entail mental coherence.

The GCP is an evolutionary development in psi research which differs qualitatively as well as quantitatively from prior research. The globally distributed network produces synchronized data

in parallel sequences from dozens of physical random sources, allowing a class of investigations that includes inter-device correlations, measurement of momentary variance and covariance, assessment of distance and time as parameters, and quantitative research on the possibility that multiple random sources may augment or otherwise differentiate the response.

GCP Findings

We have found that the anomalous effects typically take a different form from that observed in laboratory REG research. During 10 years of operation we have specified and analyzed 250 global events constituting our operationally defined moments of "global consciousness". The nature and scale of the database provide a number of unique opportunities and findings:

1. Technology exists to gather evidence of global consciousness, suitably defined
2. When global events transpire, we find anomalous structure in the GCP data
3. The average effect size is small, about 0.3 to 0.5 sigma, but conceptually replicable
4. The odds against chance for the composite formal result are about 1 in 10 million
5. The anomalous effects are seen in the collective behavior of the global network
6. Deviation (or structure) is primarily seen as excess pairwise correlation between RNGs
7. Distribution statistics of RNGs are unperturbed, but they correlate during events
8. Two independent, orthogonal correlation statistics respond similarly to the formal events
9. The orthogonal measures of network correlation are also correlated with each other
10. There is differential response of correlation statistics to categorized subsets of events
11. Both correlation statistics exhibit a similar distance dependence with scale ~ 8000 Km
12. Temporal behavior of correlations show the GCP effects have a time scale of 1 to 2 hours

Detailed discussion is beyond the present scope, but some comments are in order. It is essential to understand that we do not look for "spikes" in the data and then try to identify what caused them. Instead, we identify the event first, and then analyze the corresponding data – we make a prediction before examining the data and then test it in the data. This process yields a replication series of proper hypothesis tests which in their aggregate constitute a test of the general hypothesis given earlier.

The significance of each of the enumerated results and of the composite bottom line has been confirmed by extensive simulation using pseudo-random data and direct re-sampling analyses from the network database. We find that while we can measure deviations in data corresponding to the identified events, the database as a whole exhibits parameters consistent with statistical expectation.

The discovery of two demonstrably independent statistics is important to the development of models, and helps to constrain the range of possible explanations. It also helps assure that the anomalous results cannot be ascribed to data selection. The discovery that the anomalies are not simple, direct effects on individual REGs but are driven primarily by inter-device correlations is an instructive surprise. It is yet another indication of the complexity faced by psi researchers, and

an example of the importance of the questions asked. The range of distances over which the inter-node correlations are detectable is approximately 8,000 km, and weighted regressions show a significant decline in effect size over this range. This indicates that while the measured effect is indeed global, it is nevertheless sensitive to the geographical extent of the network and the distribution of the events. We can ask what the implications are for the widespread, albeit still tentative idea that psi effects are fundamentally nonlocal. Finally, temporal structure is also an important feature of the GCP data. Our operationally defined global consciousness would seem to have a "moment" of an hour or two, perhaps corresponding to the much faster time-scale of human consciousness where a sensory or emotional impression can form in a small part of a second, perhaps as little as 100 milliseconds.

Discussion

Over the history of parapsychology, many calls have been made for the "critical" experiment that would at last allay all doubts about the reality of psi phenomena. Skeptics have persistently demanded ironclad research protocols (while unfortunately failing to learn just how good psi research is.) Meta analysis has shown successful replication in several separate protocols with high confidence (Radin & Nelson, 1989, 2003), while "counter" meta analyses using different data subsets and criteria have sought to disabuse us of any impression that the question is resolved (Boesch, et al., 2006). Such academic battles and their accompanying publicity have had some value. Parapsychology research has far better research protocols as a result, indeed, better than several mainstream sciences (Sheldrake, 1998), and those protocols should give anyone who actually knows the literature confidence that, in Gertrude Stein's pithy phrase, "there is some there there."

Of course skeptical vetting is critically important to good research. It is fair to say that we all have biases, and without help from our skeptical and critical friends, we make mistakes and overlook possible misperceptions and misinterpretations. My own work in the GCP provides useful examples. May and Spottiswoode (2002) attempted to confirm our analyses of the data on September 11 2001, and found that the data were good. However, they criticized our analyses of the data on the basis that no clear interpretation can be made without a well-defined hypothesis. That is correct, of course, and (though in fact we had such a hypothesis in place) we were reminded that exploratory analyses we wished to do, while useful, must be presented as a preliminary to formal work, and clearly differentiated. Scargle (2002) made a strong point that one of the protective measures we take to ensure unbiased data (a logical XOR operation) must necessarily prevent any effect of the sort we report. While there is a certain futility in arguing that reported effects simply cannot be (I think Scargle could not escape his internalized physical models), this argument suggested a focused investigation of the possible ways for a psi effect to penetrate the barrier we erect to prevent bias. As a result, we are much closer to an understanding of mechanisms that might allow the effects we see (and are confident are quite real) to occur.

Finally, this legitimate and important aspect of experimental science, true skepticism, led to the collaborations with Peter Bancel that have deepened and solidified the GCP analyses. Peter

originally undertook to discover whether some problems in definitions, in specification for analysis, in selection of events, etc., might negate the highly significant bottom line for the formal results. He did find some problems, such as partially redundant events and some that were too poorly defined to justify inclusion. He discovered what appeared to be inconsistency in the analytical recipes. But after excluding the errors and rectifying the analytical issues, we found no substantial change in the anomalous effect. In any case, Peter was sufficiently intrigued that he brought his expertise as an experimental physicist and mathematician to bear on the many years of accumulated data, and over the past few years this has allowed a progressive expansion in the range of our assessments. This collaborative work has provided independent perspectives that help assure valid assessments, and it has generated a body of convergent evidence that not only satisfies critical concerns, but greatly deepens and extends our insights into the data.

Ultimately, we must shift attention to modeling – creating the best approximations we can for mechanisms and explanations. These can be tested against the actual data, and to the extent a model fits the empirical findings, it yields insight, refines our understanding of the structure found in the data, and leads to predictions that can be tested in prospective designs. In the end, we want to find a reasonable theory that provides a bridge from the empirical work to an integrated description, an explanation for the remarkable capacities of human consciousness.

Convergent evidence

There is a powerful general point to be made from the psi literature. Given that there are many experiments and observations of high quality showing anomalies in a wide range of disciplines, and independent findings pointing to effects of consciousness that are not accounted for in ordinary psychological or physical theories, we can say that there is excellent "convergent evidence" that consciousness interacts with physical reality. When there is just one opinion, or one experimental observation on a phenomenon, it is difficult to make a case. But with more than 100 years of research by highly qualified scientists looking from different perspectives at the extended capacities and limitations of mind, we can consider whether their findings converge. I think they do, in no uncertain terms, despite and indeed with the help of criticisms that ultimately have strengthened the evidence. We have personal experience and observation of natural occurrences of psi. We have laboratory experiments on extra sensory perception, clairvoyance, psychometry, psychokinesis, and more. We have extensions of these efforts to learn something in the real world, some pragmatic and some purely experimental. Government and business have requested and gotten help from psi practitioners, sometimes with high profile public presence as in the Stargate program of remote viewing. Pertinent to our theme, such work may be regarded as applications of techniques and findings from controlled laboratory research (Targ and Puthoff, 1977; Dunne & Jahn, 2003). Similarly, studies of micro-psychokinesis in the laboratory have lead to field research on group consciousness attempting to confirm that special states of resonance or coherence reportedly stimulated by ritual, music, collaboration, and cooperation may have a detectable presence beyond the experiential (Nelson, et al., 1997; 1998a; 1998b).

The natural extrapolation of field research with REGs into the Global Consciousness Project is a

multi-level example of convergent evidence. Not only does the GCP present an independent and completely different perspective on the question whether mind has real presence in the world, its application of powerful modeling and statistical techniques to search for structure in this large and complex database seek convergent evidence internally. The result is a collection of findings that are on the one hand demonstrably independent, and on the other hand complementary; they are interlocked pieces of a comprehensive picture. Again we find indicators of a real entity that is anomalous in the sense that ordinary physical models do not yet accommodate it. But this evidence converges with and extends the field studies of group consciousness and the laboratory research with individuals. The GCP results say essentially the same thing as do the results of decades of psi research in laboratories around the world, albeit in a different but very rich language. Consciousness is real. It has a role to play as a presence in the physical world. Our work as psi researchers is to go on with efforts to learn more about that presence, and to make clear that the role of consciousness in the world is both real and important. In this first decade of the 21st century, it is becoming apparent that that role is critical.

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