

Detecting Mass Consciousness: Effects of Globally Shared Attention and Emotion

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Abstract

A long term research program called the Global Consciousness Project is designed to identify and study effects of mass consciousness engendered by shared attention and emotion. An operationally defined “global consciousness” appears to result from interactions of human beings around the world. We find statistical evidence for small effects from this source in the output of a network of devices which use quantum tunneling to generate random numbers. Detectable changes occur during great events of importance to humans, in which synchronized data collected at independent network nodes separated by thousands of kilometers become correlated. The correlations show that when the attention and emotions of large numbers of people are driven toward coherence by great tragedies or great celebrations, a slight but detectable structure is imposed on our random data. The bottom line formal statistic shows a 6-sigma departure from expectation over the full 12-year database. This is evidence that human consciousness and emotion are part of the physical world, and the design of the experiment suggests a particular interpretation: we interact to produce a mass consciousness even though we are generally unaware that this is possible.

Keywords:

Consciousness, Global Consciousness, Mass Consciousness, Attention, Emotion, Noosphere, Random Number Generator, Network, Random Sequence, Synchronized Random Data

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1. Introduction

The Global Consciousness Project (GCP) is designed to study hypothesized unconscious interactions among human beings over global distances. It extends laboratory research showing effects of human intention on the behavior of physical random systems (Radin & Nelson, 1989; Jahn, et al., 1997), and field research showing effects of group consciousness (Nelson, et al., 1996; 1998). The data we will consider show that we come together in an effective interaction, though we are not conscious of this, in response to great events on the world stage. Driven by tragedies or celebrations, we share emotions deeply and this appears to be coincident with slight changes in the GCP data. The effects are very small correlations where there should be none, in a world-spanning network of physical random sources. Human beings evidently interconnect unconsciously to create a singular mass consciousness that has detectable effects in the world. A full interpretation is speculative at this point, but the data are rich with potential for insight at the margins of what we know about human consciousness. This article is a basic description of the work, and is an invitation to questions and comment.

The GCP extends research on mind-matter interactions conducted over several decades in laboratories around the world. In the Princeton Engineering Anomalies Research (PEAR) lab at Princeton University, the primary experiment used a custom designed Random Event Generator (REG or RNG) incorporating a refined commercial source of electronic white noise. This bench-top experiment provided control over parameters such as the speed and size of the samples drawn from the random sequence of bits. For example, it might be set to collect a 200 bit sample at a rate of 1000 bits per second, and to register a trial each second consisting of the sum of the 200 bits. The equipment displayed the current output trial value and a running mean as feedback to the participant. The experiment used a tri-polar protocol, with instructions to maintain an intention to achieve either a high or a low mean, or to let the machine generate baseline data. Over more than a decade, this rigorously controlled experiment yielded an enormous database, with a bottom line indicating a small but highly significant effect of human intention on random data sequences (Jahn, et al., 1997).

A system to record a continuously running random data stream was developed in the early 1990's, and when truly portable RNG devices became available we were able to take equipment out of the laboratory to ask new kinds of questions. By recording data continuously at concerts, ceremonies, rituals, meetings – group gatherings – we could ask whether group consciousness would affect the RNG. The FieldREG experiment (Nelson, et al., 1996) was not based on intentions, and indeed could be used to gather data in situations where people typically had no knowledge of the experiment. We looked for occasions that might produce a “group consciousness” because everyone would be engaged in a common focus, resulting in a kind of coherence or resonance of thoughts and emotions. For contrast, we identified other, mundane situations (shopping centers, busy street corners) which we predicted would not produce coherence resulting in changes in the data. A long series of FieldREG experiments (Nelson, et al., 1998) produced statistically significant results.

Other investigators, including Dean Radin (Radin, et al., 1996) and Dick Bierman (1996), began doing similar field experiments in a broad array of situations, and we set up collaborations. Radin asked colleagues to collect RNG data during the O. J. Simpson trial, which was expected to garner synchronized attention from huge numbers of people. The combined data from five RNGs showed an impressive departure from expectation at the time the verdict was announced. Other tests looked at data taken during the Oscars, with segregation of the data into periods of strong and weak interest. Again the difference was significant (Radin, 1997).

A chance meeting with people who were organizing a global “Gaiamind Meditation” coincided with the developing idea that we could register some indication of a global consciousness by creating a FieldREG-style group consciousness experiment on a large scale. I arranged a collaboration with colleagues who could record RNG data that might show evidence of a “consciousness field” during the Gaiamind event. The composite of data from 14 independent RNG systems showed a significant effect (Nelson, 1997).

This was a prelude for an attempt to register effects of the world-wide expression of compassion at Princess Diana's funeral in September of 1997, which, coincidentally, was followed exactly a week later by the memorial ceremonies for Mother Teresa (Nelson, et al., 1998). These were prototypical “global events” for the GCP, in that they were the focus of attention from literally millions of people around the world, and, especially in the case of Princess Diana, occasions for widespread emotional sharing. Shortly thereafter, at a meeting of professional researchers in parapsychology and psychophysiology, the various component ideas for what ultimately became the Global Consciousness Project coalesced into a practical form. The technology was becoming available to create an Internet-based array or network of continuously recording RNG devices placed around the world. After some months of design and implementation, the network began recording data in August, 1998 (Nelson, 2001).

2. Method

This is a new type of experiment, and at the outset no direct precedents were available for certain aspects of the methodology. In particular, while we intended to study the effects of “great events” we had no experience to guide their definition and selection. We knew little or nothing about what factors might be important, precluding the use of “objective” but arbitrary selection criteria. In addition, acquisition of random data from a world-spanning network was new, and required the development of appropriate analytical tools. To address the unique conditions, we adopted a multi-layer research design which would allow exploration of parameters while ensuring robust analysis. During the course of the project, we have gained useful experience allowing refinement, but the basic methodology has remained in place.

2.1. The GCP Instrument

The global network of RNGs may be thought of as an instrument designed to look for an effect of special shared states of human consciousness and emotion. The system uses shielded random number generators developed for professional research in laboratory settings. These devices are based on a quantum level source of random fluctuation called electron tunneling. Diodes or field effect transistors are placed in a circuit arranged to force electrons against the barrier in a solid

state junction. Some electrons penetrate the barrier via quantum tunneling, and this results in a tiny, completely unpredictable fluctuating voltage which can be sampled. High and low samples are converted to become 1 and 0 bits. In the GCP, we take 200 samples each second and record the sum of the bits, yielding trial values which are approximately normally distributed with mean 100 and variance 50, and typically range between 70 and 130.

The network has 65 or 70 operational nodes distributed broadly around the world as shown in Fig. 1, each hosting an RNG connected to a computer running custom software that collects data every second of every day, year after year, synchronized to the second.



Figure1. Google map showing locations of all RNGs that have been in the network and contributed data. The distribution depends on Internet infrastructure.

The software sends the data to a server in Princeton, NJ, where they are added to a continuously growing archive. The result is a database of continuous parallel sequences of numbers – a history of random data – which we can compare with a history of events that are meaningful to humans. At this time, early 2011, the project has been collecting data for more than 12 years, and we have examined more than 345 events meeting the criteria for our formal experiment.

2.2. Hypothesis Testing

Events are selected for analysis from categories including natural disasters and accidents, acts of war and terrorist attacks, and positive events such as celebrations like New Years, religious holidays, and globally organized meditations. We identify engaging events of various kinds about

2 or 3 times per month on average for inclusion in the database. The experiment asks whether the network is affected when powerful events cause large numbers of people to pay attention to the same thing. The question is formally defined in a general hypothesis that frames the experiment:

Periods of collective attention or emotion in widely distributed populations will correlate with deviations from expectation in a global network of physical random number generators.

This hypothesis is very broad, providing the flexibility required at the beginning of an experiment without precedents. It is a composite hypothesis intended to be tested using fully specified simple hypotheses in a series of replications. A registry for the specific hypotheses identifies *a priori* for each event a period of time and an analysis procedure to examine the data for changes in standardized statistical measures. The events and their timing are specified uniquely case by case, and a statistical recipe is set, thus defining a simple hypothesis test for each event in the formal series. This two-level approach – a broad general hypothesis evaluated via specific hypothesis tests – provides flexibility while also ensuring valid, interpretable statistics. The individual event results, when combined, yield a rigorously established confidence level for the composite of all formal trials. This constitutes a general test of the broadly defined formal hypothesis, and characterizes the database for further analysis.

2.3. Data Archive

We collect and archive data from the network continuously, in such a way that it can be used both for the event-based original experiment and for other analyses such as correlation with independent measures (for example, geomagnetic or cosmic or sociological variables) as well as for non-event control comparisons. The archival database at the heart of the research program is the raw trial data stored in a binary format with information to identify the source (RNG device and location) and the precise timing for every trial. In early 2011, the database is about 25 billion trials accumulated over 12 years, representing locations all over the world.

For precise, sophisticated analyses, we normalize the trial values using empirical parameters for each RNG to produce a working database of standardized Z scores. Since these are hardware devices which can break or suffer from electrical instability, we filter out an occasional bad trial using simple, standardized criteria. We use the empirical mean and variance of each device for normalization because each RNG is unique and may exhibit real, albeit barely detectable variations from theoretical performance.

An important aspect of the GCP research design is complete public access to the data archive and software; anyone can download the data for inspection or analysis. This has resulted in valuable independent analyses.

2.4. Analysis

Most analyses are based on a measure we call “network variance.” This is calculated as the squared Stouffer's Z (normalized average Z) for each second across all RNGs in the network. The result is a Chisquare distributed quantity with one degree of freedom. This is summed across all the seconds in the time period specified for the event, and compared with the expected value or degrees of freedom, which is just the number of seconds. For a few events we specify a

measure called “device variance,” which is the inter-RNG variance (the sum of Z^2).

The network variance is closely related to and may be expressed as the pairwise inter-RNG correlation. For analyses at the fundamental trial level, we use this version of the network variance measure, which can be symbolized as $Z_i * Z_j$. Because the trial level data have more complete information, including the location and identity of the data source as well as the precise time of each data point, this correlation measure allows deeper analysis leading toward understanding the mechanisms by which the anomalous results may be generated (Bancel and Nelson, 2008).

The trial statistics are combined across the total time of the event to yield the formal result, and for presentation we typically use a “cumulative deviation” graph tracing the history of the second-by-second deviations during the event, leading to a terminal value which is the test statistic. If there is no anomalous effect, positive and negative chance deviations will tend to cancel, resulting in a trace that wanders randomly with little movement away from the flat null expectation. Such a result is shown in Fig. 2, which presents data generated during the US congressional “midterm” elections, November 3 2010. Political events are a category we have regularly sampled, and unless charismatic figures are involved they typically don’t show effects, even though huge numbers of people pay attention.

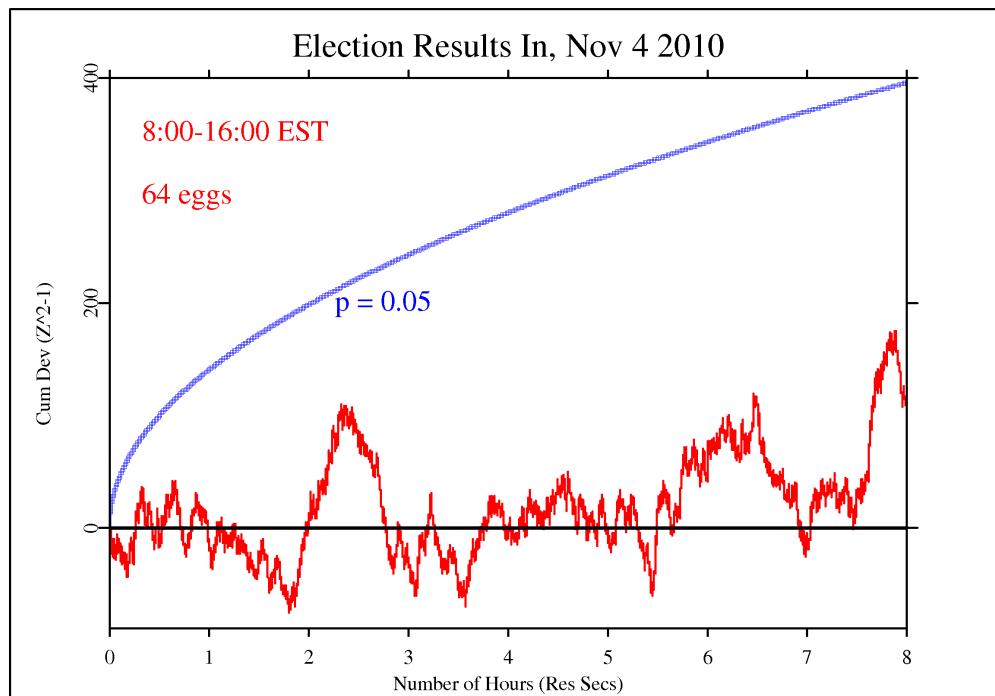


Figure 2. An example of a “null” result. Cumulative deviation during the final hours of the US congressional election in November, 2010.

In contrast, if there is a persistent excess in the network variance (or, equivalently, the inter-node correlation) the cumulative deviation will show a trend which may culminate in a statistically significant departure from expectation. We see such a case in Fig. 3, which shows 6 hours beginning just before the Israeli navy dropped commandos from helicopters to stop the humanitarian flotilla heading for Gaza in May 2010. Several of the volunteers on the ship were killed in the action, leading to an international outcry and probable long-term consequences.

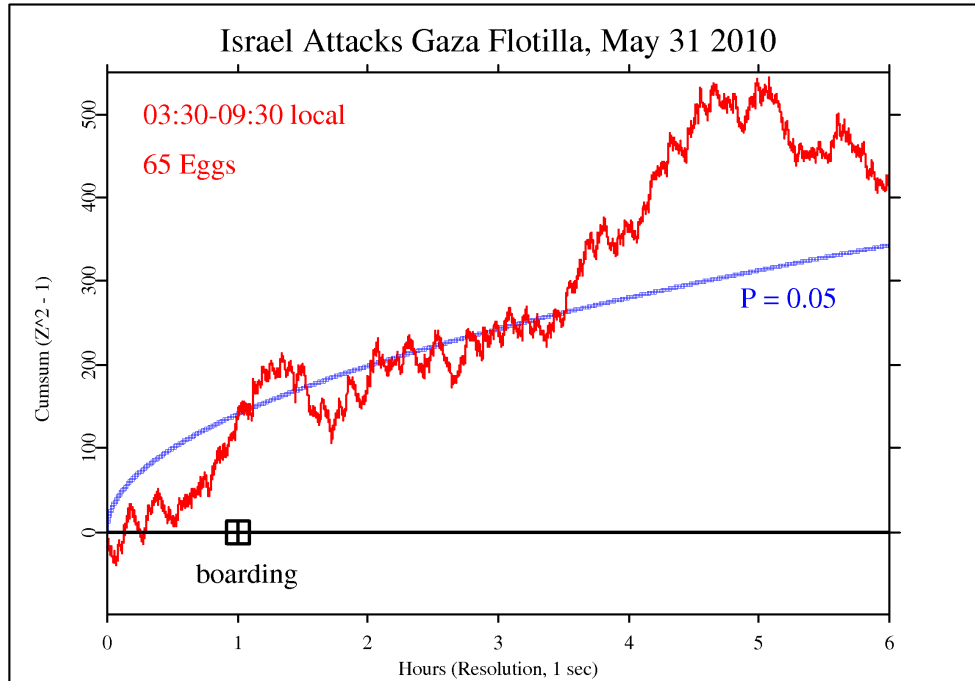


Figure 3. An example of a “positive” result. Cumulative deviation during a 6 hour period representing the Israeli attack on the Gaza flotilla, beginning 1 hour before the ill-fated boarding.

In either case, it is important to recognize that on average the effect size is too small for single events to be interpreted reliably. An effect may be masked by noise, or statistical noise may masquerade as an effect. The signal to noise ratio is very low in these data, resulting in an average effect size of half a standard deviation or less depending on the event type.

2.5. Controls

It is possible to test the data against various kinds of controls, including matched analysis with a time offset in the actual database, or comparisons with an automatically generated pseudorandom clone database. An instructive control background can be created by simulation using random samples from the null hypothesis distribution or, similarly, against the empirical distribution of the test statistic. Since the event data comprise less than 2% of the whole database, the non-event

data can be resampled to produce a distribution of “control” events with the same parameters as the formal events, but random start times. This means we need dozens of replications to achieve robust statistics.

3. Results

Over the 12 years since the inception of the project, hundreds of replications of the basic hypothesis test have been accumulated. The composite result is a statistically highly significant departure from expectation, but it is a small effect, as can be seen in the scatterplot of individual scores shown in Fig. 4. The mean of the distribution is shifted in the direction specified by the hypothesis, but compared with the range of scores, the shift does not look impressive. However, the replication design is powerful: The combined result across 346 formal events as of January 2011 departs from expectation by 6.199 sigma, which translates as odds against chance of about a billion (10^9) to one.

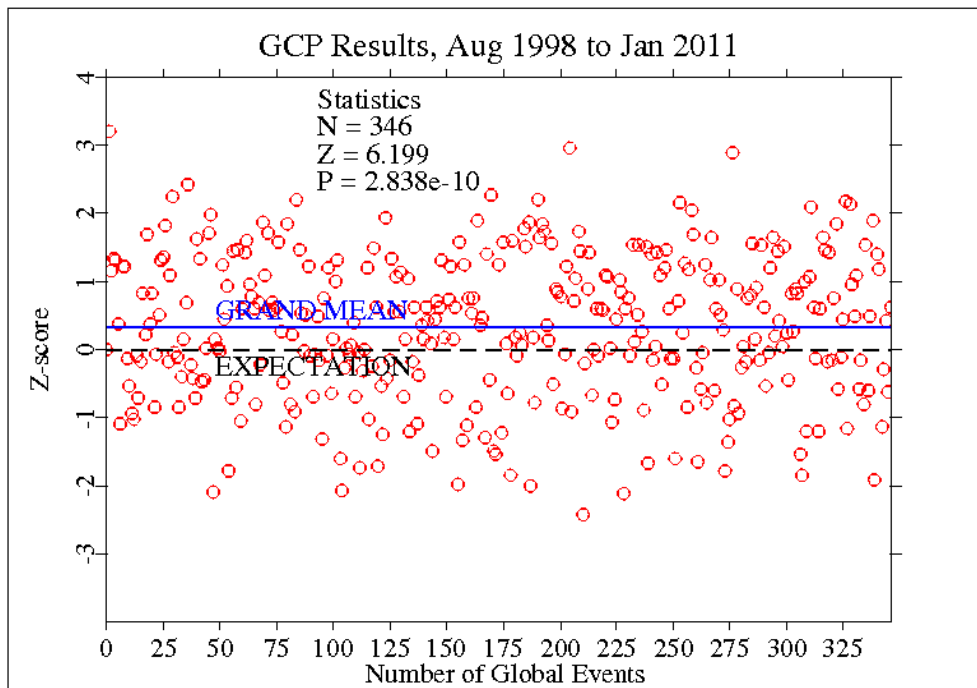


Figure 4: Scatterplot of 346 independent results. The dashed horizontal line shows expectation. Solid line shows mean deviation for all formal trials.

The cumulative deviation display of the results shown in Fig. 5 makes this extreme statistic much easier to recognize and comprehend, especially in contrast with a background of control data.

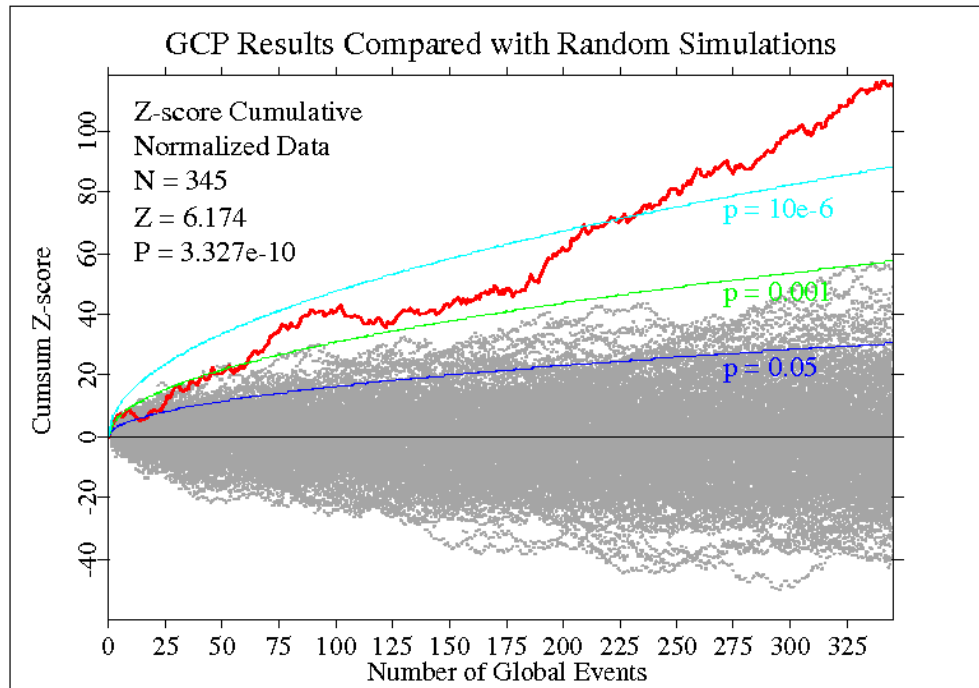


Figure 5: The bold jagged line shows the cumulative sum of deviations from expectation in the formal data. The grey cloud shows 250 simulated datasets drawn from the (0, 1) normal distribution. The horizontal line is null expectation and smooth parabolas show confidence levels.

The bottom line result for the GCP formal experiment is based on a concatenation of all events specified in the hypothesis registry. Of course we include both the hits and the misses – every event that is identified and registered is analyzed and reported. About 70% are positive in the sense they show deviations in the predicted direction, and roughly 15% are statistically significant at the 5% level.

It is important to note that reliable differentiation of an anomalous effect requires many events, perhaps 50 on average (refer again to Fig. 5). Even in categories that consistently show strong effects we need a dozen or more events for signal to rise convincingly out of the noise. This is a consequence of a small effect size. Only the patient accumulation of many tests of our general hypothesis can give us confidence that there is an anomalous effect. Nevertheless, based on our long series of formal replications, the GCP hypothesis is well supported in comparisons of the real data against theoretical expectation or against appropriate control data which have no linkage with events in the world. This result also provides a sound basis for deeper analysis using refined methods to re-examine the original findings and extend them using other methods (Nelson and Bancel, 2006; Nelson, 2008; Bancel and Nelson, 2008).

3.1. Other Structure

Several kinds of exploratory analysis have given useful perspectives on the database (Nelson, et al., 2002; Nelson & Bancel, 2006). Beyond the primary formal hypothesis testing we have a program of secondary analyses, managed by Peter Bancel, intended to characterize the data fully and facilitate the identification of other non-random structure. For this we use trial level data, the finest scale available, which includes not only the fundamental trial outcomes, but complete spatial and temporal information.

For example, the original measure represents a correlation of meanshifts, and a natural question is whether there may be other correlations or structure in the higher moments of the analytical distributions. An independent measure assessing the variance of correlations (symbolized as $Z_i^2 * Z_j^2$) does show effects of a similar magnitude to the $Z_i * Z_j$ correlation described earlier. The general hypothesis also contains implicit questions about spatial and temporal aspects of the anomalous effects. Structure in these dimensions will help us understand the nature of what we are calling global consciousness. A series of as yet unpublished analyses addresses these questions, and the results are promising (Bancel, personal communication).

For practical and theoretical reasons, the question whether distance matters is useful. Most psi researchers consider the phenomena to be non-local, implying connection or entanglement over distance and possibly across time. The GCP database provides a rich opportunity to assess the empirical basis for a general non-local model. This is not a simple task, however. For example, the question requires careful consideration of what “distance” means in this context. It turns out that the events we examine frequently do not have well-defined locations, because our hypothesis actually addresses effects of an attentional and emotional response of people all around the planet. Thus, the most important distance metric may be psychological – the meaning of an event may be the operative source of its effect.

As for time, we want to know how well our guesses about the length of the event match the duration of detectable effects. More generally, we need to learn about the time course of any anomalous effects we find. For some events there is a sharply defined moment – an explosion, an earthquake, a speech – and we can ask how the data correlations relate to that moment. Is there any indication of a precursor response? (Nelson & Bancel, 2006) Are there typical lags or durations of effects? What is the minimum time for an effect to develop, and what factors affect the rise time and the persistence of the anomalous correlations?

3.2. Categories

When we look at psychological and sociological variables, we find other indications of structure. By categorizing the events, we can identify modulating factors that influence the correlations in the data. For example, we find clear evidence that larger, more important events (indicated by number of people engaged) produce larger effects, as shown in Fig. 6. This is consonant with normal psychological expectation. On the other hand, while many people expect a difference for positive and negative events, the data show virtually equal effects.

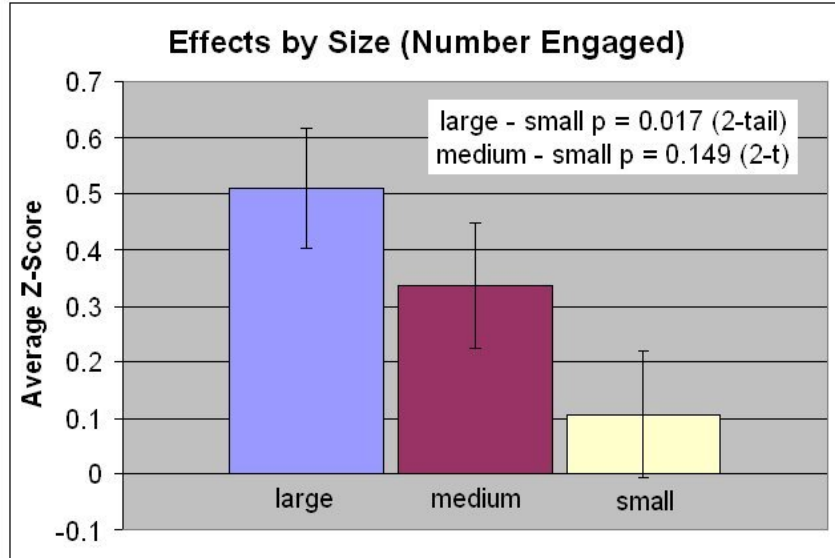


Figure 6. The formal data are categorized by estimating the number of people engaged. Larger, presumably more important events correspond to larger deviations.

The GCP's general hypothesis explicitly proposes an impact of shared emotions, and this can be assessed using subjective ratings. Analysis confirms that deviations during events are modulated by this factor. Figure 7 shows the substantial difference between high and low levels of emotion.

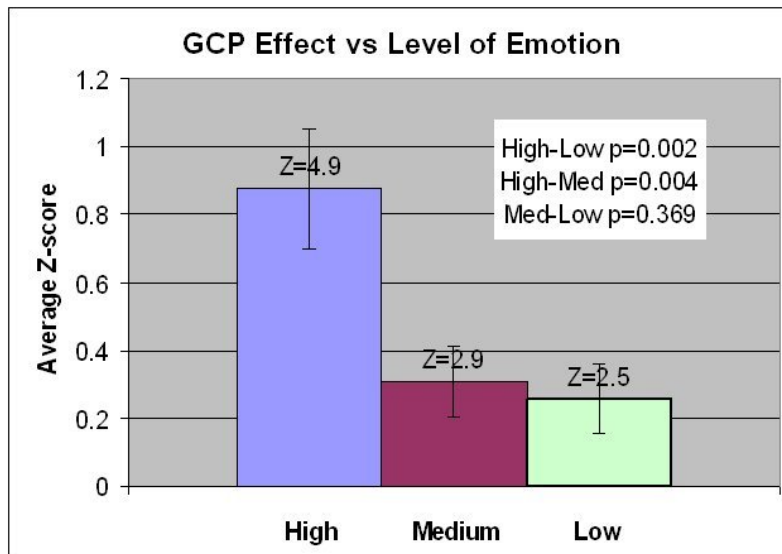


Figure 7. The formal data are categorized according to the level of compassion evoked by the event. Those characterized by greater compassion produce larger deviations.

Other results using subjective categorization similarly show differentiations that parallel what is found in individual psychology (Nelson, 2008). For example, if we ask raters to decide how strongly fear is evoked, the data follow the ratings. Similarly, if we ask how much compassion is embodied in the events, we find a clear differentiation, with events characterized by deep and widespread compassion yielding relatively strong effects. This makes sense if we understand that compassion is a model for interconnection: compassion means that we feel and share the emotional states of others. It is by definition a condition that brings us together and makes us psychologically coherent. Differentiations like these provide some insight into the conditions underlying the anomalous correlations, and may contribute to sensible models for the effects.

4. Discussion

The GCP is a long-term experiment that asks fundamental questions about the presence of human consciousness in the world. It provides evidence for effects of synchronized collective attention – operationally defined mass consciousness – on a world-spanning network of physical devices. Indicators of anomalous data structure are correlated specifically with moments of importance to humans. The convergence of independent analytical findings provides strong evidence for the anomalies, and integrating these into scientific models will enrich our understanding of consciousness. The findings suggest that some aspect of consciousness may directly create effects in the material world. This is a provocative notion, but it is the most viable of several alternative explanations.

This is the only research program of its kind, but there is good reason to study the questions it raises. Replication is desirable but difficult because of the size and complexity of the project. However, the data are available for independent replications re-testing the hypothesis we propose with a new, independent selection of events. Perhaps more important, the data are available to pose many good questions we have not been able to address.

The GCP findings are not explained by conventional sources or spurious influences, and we provisionally conclude that the effects are correlated with qualities or states of collective consciousness. Social and psychological variables are important to the extent they reflect mental and emotional coherence among the people engaged by the events. The evidence suggests an interdependence of consciousness and the environment, though we cannot yet describe the mechanisms in a formal way. The GCP findings do not fit into our current scientific models of the world, but facts at the edges of our understanding can be expected to direct us toward fundamental questions. As Richard Feynman remarked (1981), “The thing that doesn’t fit is the thing that is most interesting.”

4.1. Models

We have demonstrated the existence of unexpected correlations and structure in the event data, and these results can serve as input for theoretical models of the deviations. Successful models will not only describe the empirical findings, but also refine our understanding of the structure, and they should lead to testable predictions and better models. Ultimately we seek a theory that

provides a bridge from the empirical findings to a deeper understanding of the role mind or consciousness plays in the material world.

Three classes of models to consider are: 1) conventional physical and electromagnetic fields, or conventional methodological errors or biases, 2) unconventional fortuitous selection of events via experimenter intuition, or determination by retroactive information flow from future results, and 3) consciousness or information fields sourced in individual human minds, or a non-linear field representing a dynamical interaction among minds.

We can show that the first class is excluded by the experimental design and by empirical tests (Bancel and Nelson, 2008). Intuitive selection and retroactive information approaches are variants of a parapsychological theory which has been advanced to explain psi functioning (May, et al., 1995; Shoup, 2002). The idea is that expectations about the experiment play a role, and that deviations may result from a fortuitous choice of timing rather than an actual change in the data. Anomalies are attributed in some models of this type to the selection of unlikely data excursions in a naturally varying sequence, mediated by the experimenter's intuition, or, more forcefully put, by precognition of the eventual results, which informs the choice of events, their timing, and the test procedures. An explicit version of this model (Schmidt, 2009) has been tested against the GCP data and nominally rejected, with the rejection further supported by the model's failure to accommodate the second-order correlations and the spatial and temporal structure found in the data (Nelson & Bancel, 2009).

The picture is more promising when we look at field-type models associated with human consciousness. A simple version is similar to ordinary physical models of fields generated by a distribution of sources. In this case the field sources are associated with individual conscious humans, while the field dynamics that might explain the RNG correlations derive from the coherence of human activity during events. This proposal can accommodate all the inter-node correlations and structure seen in the data, but it remains phenomenological since it does not explain how the field arises in terms of underlying principles. A more complex non-linear dynamic field model would propose that individual minds are mutually interactive, and that the interactions are responsible for an emergent field which depends on individual consciousness but is not reducible to it. The model implies that the dynamic and interactive qualities of consciousness also involve subtle interactions with the physical world and that these are responsible for certain anomalous phenomena such as are found in the GCP experiment.

4.2. Implications

What should we take away from this scientific evidence of interconnection? If we are persuaded that the subtle structuring of random data does indicate an effect of human attention and emotion in the physical world, it broadens our view of what consciousness means. One implication is that our attention matters in a way we have not imagined possible, and that cooperative intent can have real consequences. On a philosophical/scientific level, the evidence is consonant with V. I. Vernadsky's and Teilhard de Chardin's vision of the noosphere – a sheath of intelligence they believed would envelop the earth when humans advanced to the next stage of evolution (Teilhard, 1961; Vernadsky, 1926).

The GCP results inspire deeper questions about our relationship to the world and each other. The

questions reach beyond the supply lines of our scientific position, but the experimental results are consistent with the idea that subtle linkages exist between widely separated people, and that consciousness is an essential and creative element in the physical world. If we conceive a noosphere, even one that is too subtle to perceive, we will be motivated to be more conscious of the interconnection it implies. It means we are part of a great being, as Eddington observed, (1928) and this confers responsibility but also confidence in the potentials we share.

Acknowledgments

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References

- Bancel, P. A., Nelson, R. D. (2008) The GCP Event Experiment: Design, Analytical Methods, Results. *Journal of Scientific Exploration*, 22, 309-333.
- Bierman, D. J. (1996) Exploring correlations between local emotional and global emotional events and the behavior of a random number generator. *Journal of Scientific Exploration*, 10, 363-374.
- Eddington, A. S. (1928) *The Nature of the Physical World*. MacMillan (1926–27 Gifford lectures.)
- Feynman R. (1981) *The Pleasure of Finding Things Out*. Interview: BBC television program Horizon, accessed Jan 28 2010 <http://www.scribd.com/doc/23587979/>.
- Jahn, R. G., Dunne, B. J., Nelson, R. D., Dobyns, Y. H., Bradish, G. J. (1997) Correlations of random binary sequences with pre-stated operator intention: A review of a 12-year program. *Journal of Scientific Exploration*, 11, 345-368.
- May, E. C., Utts, J. M., Spottiswoode, S. J. P. (1995) Decision Augmentation Theory: Toward a Model of Anomalous Mental Phenomena. *Journal of Parapsychology*, 59, 195-220.
- Nelson, R. D., Bradish, G. J., Dobyns, Y. H., Dunne, B. J., Jahn, R. G. (1996) FieldREG Anomalies in Group Situations. *Journal of Scientific Exploration*, 10, 111-141.
- Nelson, R. D. (1997) Multiple Field REG/RNG Recordings during a Global Event. *Electronic Journal Anomalous Phenomena* (eJAP), accessed July 31 2010 <http://noosphere.princeton.edu/ejap/gaiamind/abstract.html>.
- Nelson, R. D., Boesch, H., Boller, E., et al. (1998) Global Resonance of Consciousness: Princess Diana and Mother Teresa. *Electronic Journal Anomalous Phenomena* (eJAP), accessed July 31 2010 http://noosphere.princeton.edu/ejap/diana/1998_1.html.

- Nelson, R. D., Jahn, R. G., Dunne, B. J., Dobyns, Y. H., Bradish, G. J. (1998) FieldREG II: Consciousness Field Effects: Replications and Explorations, *Journal of Scientific Exploration*, 12, 425-454.
- Nelson, R. D. (2001) Correlation of Global Events with REG Data: An Internet-Based, Nonlocal Anomalies Experiment. *Journal of Parapsychology*, 65, 247-271.
- Nelson, R. D., Radin, D.I., Shoup, R., Bancel, P.A. (2002) Correlations of Continuous Random Data with Major World Events. *Foundations of Physics Letters*, 15, 537-550.
- Nelson, R. D. and Bancel, P. A. (2006) Anomalous Anticipatory Responses in Networked Random Data. *Frontiers of Time: Retrocausation -- Experiment and Theory*, Ed. Daniel P. Sheehan, AIP Conference Proceedings, 2006, Vol. 863.
- Nelson, R. D. & Bancel, P. A. (2009) Response to Schmidt's commentary on the Global Consciousness Project, Letter to the Editor. *Journal of Scientific Exploration*, 23, 510-516.
- Nelson, R. D. (2008) The Emotional Nature of Global Consciousness. *Behind and Beyond the Brain. 7th Symposium of the Bial Foundation 2008. Emotions, Proceedings*. Porto: Fundação Bial.
- Radin, D. I., and Nelson, R. D. (1989). Evidence for consciousness-related anomalies in random physical systems. *Foundations of Physics*, 19, 1499-1514.
- Radin, D. I., Rebman, J.M., Cross, M. P. (1996) Anomalous organization of random events by group consciousness: Two exploratory experiments. *Journal of Scientific Exploration*, 10, 143-168.
- Radin, D. I. (1997) *The Conscious Universe: The Scientific Truth of Psychic Phenomena*. New York: Harper Collins.
- Schmidt, H. (2009) A Puzzling Aspect of the "Global Consciousness Project", Letter to the Editor. *Journal of Scientific Exploration*, 23, 507-509.
- Shoup, R. (2002) Anomalies and Constraints - Can clairvoyance, precognition and psychokinesis be accommodated within known physics? *Journal of Scientific Exploration*, 16, 3-18.
- Teilhard de Chardin, P. (1961) *The Phenomenon of Man*, written 1938-40, French publication 1955, New York: Harper & Row.
- Vernadsky, V. I. (1926) *Biosphera (The Biosphere)*, Nauchnoe khimiko-technicheskoye izdatel'stvo (Scientific Chemico-Technical Publishing): Leningrad.