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BRIEF REPORT

Field REG Measurements in Egypt: Resonant Consciousness at Sacred Sites

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HIGHLIGHTS

A rigorous field study using random number generators at Egyptian 'sacred sites' found striking effects of group consciousness enhanced by meditation and chanting.

ABSTRACT

Over a two-week period, various "sacred sites" in Egypt were visited by a group interested in the spiritual qualities of the ancient temples, pyramids, and tombs. The group engaged in informal ceremonies, including chanting and meditation, to pay respect to the sacred sites of the ancient Egyptians. A portable random event generator and palmtop computer were used to generate and record ongoing random sequences accompanied by a time-stamped computer index and onsite notes of relevant observations and activities. Pre-planned hypotheses predicted anomalous deviations of the sequences during visits to the sacred sites, including the inner sanctum or Holy of Holies in each temple and all the interior chambers of the pyramids. A further prediction was made that resonance- or coherence-building activities of the group, including chanting and meditation in these special locations, would also correlate with anomalous deviations. Both formal hypotheses were confirmed with a combined associated probability of 2.7x10^-6. Other categories of data provided context and helped to distinguish the sources of the anomalous effects.

KEYWORDS

Anomalous deviations, group consciousness, Random Event Generator, Random Number Generator.

INTRODUCTION

The work described here was conducted in 1997 and documented in a technical report of the Princeton Engineering Anomalies Research (PEAR) laboratory (Nelson, 1997b). In the last decade, there has been an increase of interest in bridging scientific, experiential, and spiritual perspectives. Although that was not the motivation for the studies described here, they definitely touch on such interests. Laboratory technical reports are generally only available to colleagues and correspondents of the lab or the authors, but as the academic context changes, they may warrant wider distribution. The recent growth of attention to topics at the edges of consciousness research, including anomalies in random data linked to human intention, suggests that the material in this PEAR Technical Report should be made publicly available. Accordingly, this is the original report with minor revisions and additions for clarity and completeness.

In the intervening quarter-century, there have been a number of applications of what may be called the "FieldREG" technology and approach, which brings a random event or number generator (REG or RNG) into the field to study group consciousness. However, I am not aware of attempts to replicate this research, which looks at group consciousness in sacred sites. There have been related applications, for example, asking whether there may be "field" effects of healing or energy medicine that show up in data from an RNG located near the sessions (Carpenter et al., 2021). Similarly, researchers have asked whether RNG data during group meditations may show correlated departures from expectation (Mason et al., 2007). Another example is a long-term cumulative assessment of FieldREG effects during major solar eclipse events that garner attention from very large numbers of people (Williams, 2017).

METHODS

The experiments documented here follow a protocol developed in the early 1990s to look for effects of coherent group consciousness. The approach was an extension of laboratory findings using quantum-based RNGs developed and tested at PEAR for the express purpose of field research. We had shown that the output of calibrated research-grade physical RNGs could be altered in experiments where participants held intentions to get high or low numbers compared with expectations. The field application brought the same RNG technology out of the lab to study the possible effects of group consciousness. For example, we predicted changes in the data when groups were focused on great music, charismatic presentations, powerful rituals, and other activities conducive to coherence and resonance in the group.

Software was created to record the random data continuously (typically as trials consisting of the sum of 200 bits each second) accompanied by an index that could be annotated by keypresses to identify the time of particular events. The experimental protocol required identification of the beginning and end of conducive moments with a hypothesis that such moments would show departures from expectation. Since there was no directional instruction and nobody holding an intention (most of the group would not even know about the RNG), the standard test was the variance of the data where an increase would occur if anomalous deviations were either positive or negative. In practice, the raw score for each second was expressed as a normalized Z-score, and this was squared to yield a Chi-square distributed value, which is the variance for that data point. Chi-square is additive, so the variance for a specified segment is the sum of the second-by-second Chi-squares with degrees of freedom (df) equal to the number of seconds. The prediction was for an increase in variance in all cases based on the standard protocol for FieldREG experiments, which, from the beginning, predicted a positive deviation (increase) of the variance. This practice allows one-tailed statistical tests and, hence, an increase in sensitivity or statistical power (assuming the experience-based expectation is correct). The FieldREG methodology is documented in Nelson et al. (1996, 1997a).

Consciousness Field Experiment

An experiment addressing the effects of group consciousness on a microelectronic random event generator (REG/RNG) was conducted during a two-week visit to Egypt. Data were collected as an adjunct to a tour arranged for a group of 19 people to visit many of the best-preserved temples and sacred sites of the ancient Egyptians, including the great temples and tombs near Cairo, Luxor, and Aswan, and the Giza and Darshan pyramid complexes. Although the journey was a combination of vacation and personal quest for most of the group, some participants had also made plans to pursue academic or scientific investigations during the trip.

The group consciousness experiment is part of an ongoing series of studies designed to extend the Princeton Engineering Anomalies Research program (Jahn et al., 1987) beyond the laboratory into a variety of real-world environments (Nelson et al., 1996; Nelson et al., 1997a). The data generation and recording equipment and the standardized procedures employed in these investigations are collectively labeled "FieldREG".

The system is based on a miniaturized hardware REG that generates 200-bit trials (with an expected mean of 100 and variance of 50) at a rate of about one per second. The REG is attached via a serial interface to a palmtop computer with software that allows continuous recording of these trials in a sequence that describes a random walk having an equal likelihood of wandering in either the positive or negative direction from its expected zero deviation. Data were gathered throughout the journey in preplanned experiments designed to assess possible variations from normal expectation in those data sequences generated in sacred sites in conjunction with group activities such as meditation or chanting.

The tour provided an extraordinary opportunity to address the hypothesis that coherent group consciousness can affect a sensitive random physical process since it comprised a series of situations in which a group of people shared an intention to become an integrated collective through ritual chanting and meditation. The research plan took advantage of this sequence of replicated group activities by following a well-defined experimental protocol for field applications developed over the past few years (Nelson et al., 1996, 1997a). In addition to observing possible effects of group consciousness, a second formal question concerned the potential influence on the device of sacred sites per se in the absence of any organized group activity. Throughout the trip, a combination of these two factors, along with some other related influences, was available on numerous occasions.

These FieldREG recordings provided formal data sequences that could be compared with the null hypothesis of normal random distribution with an expected mean of zero. The in situ notes made by the experimenter, along with computer index entries concurrent with the data, indicated the beginning and end of the data segments corresponding to the actual visit at each site. For both of the pre-planned categories, data were recorded at "sacred sites," meaning the central focus of temples and major religious structures, specifically the inner sanctum and the Holy of Holies in the temples, the interior chambers in the pyramids, and similar locations. The original sites for many of these structures were chosen with special care according to religious dictates; the ancient Egyptians held that the gods "drove a stake for each corner of the temple."

The two pre-planned categories were distinguished from each other by the degree of potential contribution from the presence and coherent activity of the group. In category A, most of the group was gathered at or in a sacred site for some form of communion, such as chanting or meditation, and they consciously or unconsciously tried to become resonant with each other and with the site. In category B, some of the group were present at the sacred site (in a few cases, only the author with the FieldREG), but the presence was relatively casual, and there was no chanting, meditation, or deliberate attempt to focus as a group.

Three additional categories were defined less formally during the course of the trip to extend and complement the formal data. Category C was characterized by intentional group consciousness activities such as chanting and meditation but without a defined sacred site. Category D comprised visits to special locations such as museums and tombs that were engaging but did not have a clearly defined sacred quality, and where no resonance-promoting group activities took place. A further subset, Category E, addressed a possible "experimenter effect." This was primarily a collection of personal experiences and rituals noted as impressive and meaningful by the operator of the FieldREG system.

Although the last three categories of data were defined during the course of the trip, they were specified without feedback on results so that the data sequences are suitable for the same type of statistical analysis as the pre-planned formal data, albeit without the rigorous hypothesis-testing function of categories A and B. The FieldREG device usually recorded data continuously except for a few hours at night, so the categorized segments in all cases were relatively short subsequences of a few minutes to an hour within much longer data streams.

By separating group coherence from sacred site influences and by assessing the effects of other sites (e.g., those on a tourist's list) that have no acknowledged sacred aspect, data from categories C and D may provide context and possible insights into the source and the nature of anomalous effects. Category E may help to specify possible contributions from the experimenter's conscious and unconscious wishes. The five categories have no common membership or overlap; they are statistically independent estimates of possible deviations from expectation and, hence, may be compared and combined for a comprehensive assessment of the basic question of whether there is any anomalous influence on the FieldREG output.

There were also a few identified and categorized data segments that cannot be included in the fully formal assessment for various reasons. Because of inexperience, the times for the segments at the first four special sites (three in category A and one in E) were not recorded adequately and thus required post facto estimates for the beginning and end of the data sequences. Two data segments were cut short by a "floating point error" that shut down the computer program (one in category A, one in D).

A number of other categories could be defined for exploratory purposes, but most will not be pursued in this report. These include striking first impressions, shopping and bargaining at bazaars, special restaurants, and meals, late-night conversations, and parties and celebrations (for example, a birthday party for one of the group members).

Examples

Graphic presentations of selected data subsets provide a direct visual impression of the type of data that constitute the basis for the quantitative analyses. The raw data are samples from random sequences that show deviations apparently in response to some combination of the sacred sites and the relatively coherent state of consciousness of a group of people in a shared experience. Because the anomalous effects are typically quite small in proportion to the noisy random background, it is

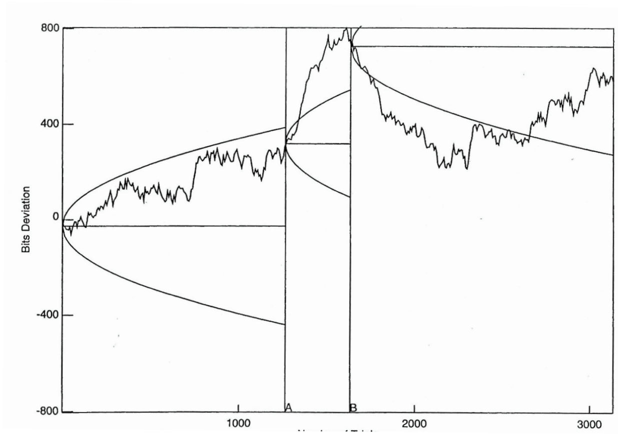

Figure 1. Cumulative deviation of the random event sequence during a 45 minute period immediately prior to landing in Cairo. The central portion corresponds to the first sight of Egypt. Horizontal lines represent chance expectation; parabolas show the 90% confidence interval for the random walk. See text for details.

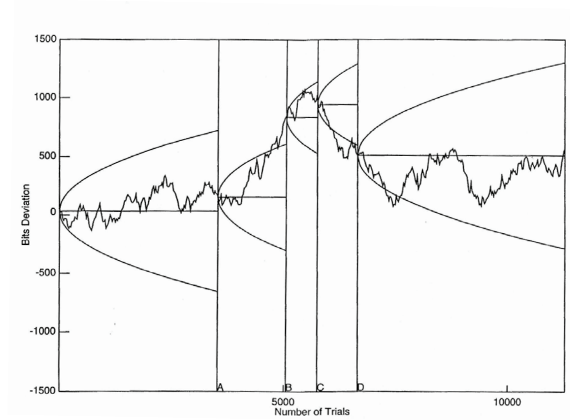

Figure 2. Data taken during two meditations, A to B and C to D, in the Hypostyle Hall of Karnak Temple in Luxor. See text for details.

necessary to display them in a way that emphasizes the signal but cancels out the noise. This is achieved by presenting the data in the form of a "cumulative deviation" graph, which plots the algebraic sum of deviations from expectation over the course of a given data sequence. That is, the difference between each 200-bit trial and its theoretically expected outcome is added to the cumulative sum of the preceding deviations and plotted as a so-called "random walk." If there are only random data in the sequence, the accumulation will wander up and down relative to the expected mean value but will not display a trend. On the other hand, if there is a tendency for more steps or bigger steps to be taken in one direction, the cumulative deviation trace will show a clear trend away from the null expectation.

Figure 1 shows in this form about 45 minutes of data taken in the airplane just before landing in Cairo. In each of the three marked data segments, the horizontal line (zero deviation) represents chance expectation, and the parabolic curves define a region within which 90% of truly random walks will remain. That is, given only chance excursions, most data sequences will stay within the envelope, but 10% of the traces may exceed the indicated deviation in one direction or the other. The jagged trace represents the cumulative deviation of the actual data over the continuous 45-minute period. The vertical lines indicate times marked in the computer index by the operator using programmed F-keys on the palmtop computer. Beginning at each marked point, a new ± 5% expectation envelope is superimposed on the random walk by the analysis program to facilitate visual assessment of the data within the identified subsequences.

The first portion of this trace displays a fairly typical random walk. In contrast, the middle segment (A to B), representing a five-minute period beginning with the experimenter's first sight of Egypt, displays an exceptionally strong positive trend. This segment has a *Z*-score of 3.07, corresponding to a two-tailed probability against chance of four parts in a thousand. Given the equally unusual negative trend that follows and the fact that these strong deviations of the overall data trace correspond precisely with the group's first experiences and impressions of the Nile Delta region, it is tempting to ascribe some subjective meaning to the image thus produced (indeed, one can readily see the trace as a pyramid shape traversed by the "random" walk). However, such visual impressions clearly do not constitute valid experimental evidence; a formal protocol is required to establish a meaningful correspondence of data deviations with potential influences. This particular example is, in fact, not part of the formal database because the data were not taken in a pre-planned category, but it is presented as an example of the data format and as an introduction to the representation used for the formal datasets recorded at sacred sites as defined in the experimental protocol and described in the following examples. For simplicity and clarity of exposition, only index marks relevant to the description are used to create the figures. Full details are given in the tables.

Figure 2 shows a visit to the Hypostyle hall of the great Temple of Karnak in Luxor by the author alone subsequent to a group visit. This is one of the defined sacred sites and is the forecourt of the Holy of Holies of the temple. The data produce a typical random walk for about 45 minutes (~3500 trials) and then, corresponding with the first of two meditations (A to B), take on a strong positive trend for about 20 minutes. This is followed by a short interlude, watching tourist children (B to C). The data then show a persistent downward trend during a second meditation (C to D). The onsite notes corresponding to the

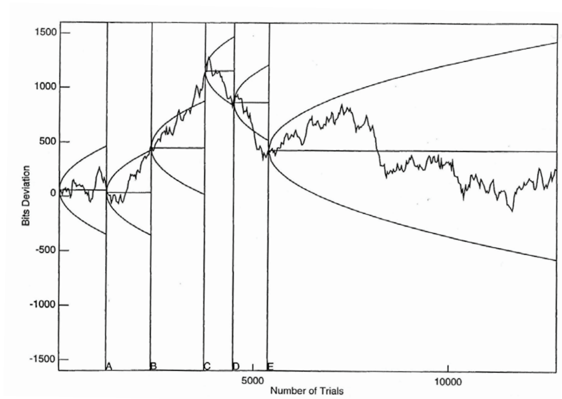

Figure 3: Three-hour visit to the inner chambers of the Great Pyramid of Khufu at Giza. Marked segments show the data taken during chants in the Queen's Chamber, the Grand Gallery, and the King's Chamber. See text for details.

meditations describe a profound experience dominated by an intuitive "recognition" of the purpose of the Hypostyle hall, where some 130 huge stone columns (70 feet high and 15 feet in diameter) transmit the wisdom of the ancient Egyptian priesthood. The graph continues with an hour-long visit to the Temple of Ptah and the Goddess Sekhmet during which the data show modest temporary trends generally consistent with random expectation. These data segments are included in formal analysis category B and are detailed in Table 1B.

Figure 3 presents the entirety of a three-hour visit to the inside chambers of the Great Pyramid of Khufu on the Giza plateau, included in category A and detailed in Table 1A. Beginning about 20 minutes after entering, the group chanted in the Queen's Chamber (A to B), then chanted during a spontaneous transition ritual in the Grand Gallery (B to C) leading to the King's Chamber. These two sequences (A to C) show a strong continuous positive trend

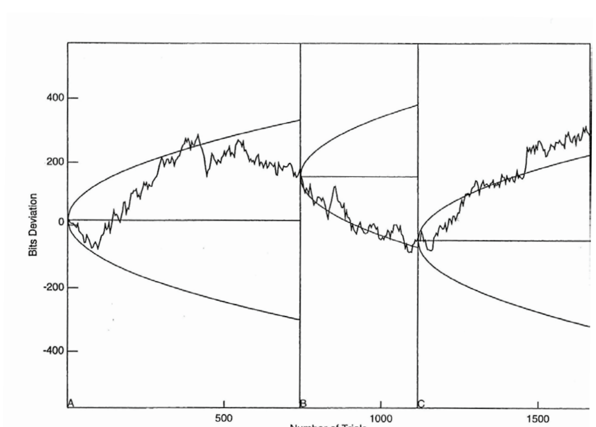

Figure 4: Twenty-minute visit to the inner chambers of the Khafre Pyramid at Giza. Marked segments show data taken in the Queen's Chamber, the Gallery, and the King's Chamber. See text for details.

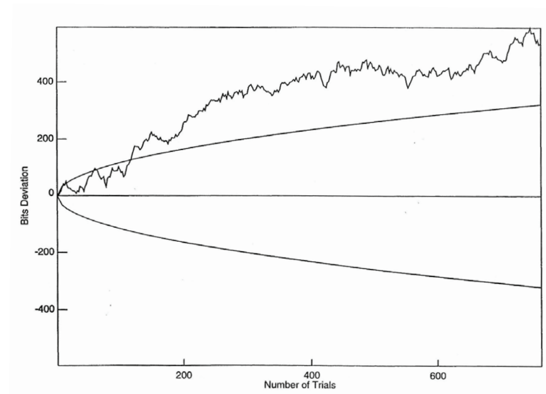

Figure 5: Data taken in the Holy of Holies of the Temple of Edfu. The group engaged in chanting and meditations. See text for details.

(combined $Z = 3.3$) over a period of about 40 minutes and are followed by a similarly steep negative trend over the next 30 minutes in the King's Chamber (C to E) during which two long group meditations took place. The rest of the trace corresponds to a variety of more individualized and personal rituals primarily associated with the large granite "sarcophagus" in the King's Chamber.

In Figure 4, we see a visually similar albeit less well-defined pattern. This was generated during a visit to the inner chambers of Khafre's Pyramid, the "second" pyramid of Giza. The visit was much shorter (only about 20 minutes) than that to Khufu, and since only two members of the group were present, it belongs in category B and is detailed in Table 1B. Because of the small signal-to-noise ratio, detailed interpretations are unjustified, but it may be interesting to note that again, the slope in the Queen's Chamber (A to B) is largely upward, followed by a downward slope beginning in the Gallery (B) that reverses during chants and rituals in the King's Chamber and sarcophagus during the last few minutes of the visit (C to end).

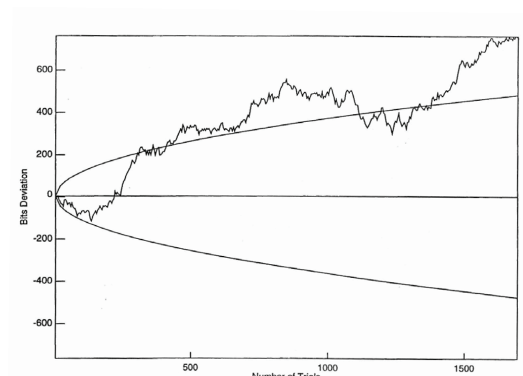

Figure 6: Data taken in the Holy of Holies of the Temple of Kom Ombo, dedicated to healing. The group participated in chants and meditations, and most also engaged in a healing ritual. See text for details.

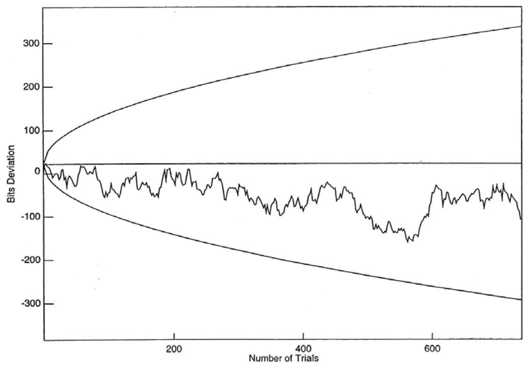

Figure 7: Data taken in the Holy of Holies of the Temple of Philae. This temple was moved from its original location, where it would have been submerged in Lake Nasser. The group engaged in chanting and meditations. See text for details.

Figures 5, 6, and 7 show data sequences taken during group rituals in the "Holy of Holies" that are the central foci in three of the major ancient temples: Edfu, Kom Ombo, and Philae, respectively. In Edfu and Kom Ombo, the upward-going trends are quite strong and are typical of FieldREG traces produced in many of the sacred sites, especially in category A. The Philae data, however, show no indication of any anomalous trend. It may be noteworthy that Philae, alone of the temples visited during this tour, is not in its original site, having been relocated to preserve it from flooding by the construction of the high dam at Aswan. Thus, although the reconstruction is remarkable, the temple is no longer in the sacred location determined according to the ancient Egyptians by the gods.

Analysis Procedures

The assessment of FieldREG data depends upon precise specification of the beginning and end of each data subsequence defined according to the experimental hypothesis. Each specified segment is extracted from the background data, and its statistical parameters are calculated. The Z-score (deviation of the mean normalized by its standard error) for each segment is squared, and these values are summed. The resulting quantity ΣZ^2 is χ^2 distributed with degrees of freedom equal to the number of segments or Z-scores, allowing the calculation of an overall probability for the accumulated deviations. Although the REG is extensively calibrated in independent tests, justifying a comparison of deviations in the active data against theoretical expectation, the pre-planned analysis also includes a comparison against a distribution of results generated by random resampling. In this procedure, subsequences with the same lengths as the active segments are repeatedly drawn from the original data sequence with randomly specified beginning points. This process is repeated 1000 times within each database to yield a large sample of Z-scores calculated for segments of exactly the same lengths as the active data but with randomly determined timing rather than direct correspondence with the presence and activities of the group. Although the resampling procedure can be designed to draw only from the background data, the present analysis utilizes the complete database and hence includes some parts of the active data by chance, making it a more conservative procedure.

In operation, the FieldREG program displays only the date and time and a count of trials since the most recent index mark, but in breaks between periods of data acquisition, the experimenter had some graphic feedback during periodic checks to ensure that the system was performing correctly. Since the onsite notes and the index marks were made prior to such observations and are specific, they provide an unambiguous identification of beginning and ending times for all the events corresponding to the formal experimental hypotheses, uninfluenced by this feedback. A few remaining practical issues and caveats concerning segment identification are embodied in the following categorization rules, which were designed to eliminate potential uncertainties or ex post facto decisions about inclusion or exclusion of segments:

1. Identification of the sacred sites was made in the onsite notes at the time of the visit. These comprise the scheduled sites specified in the trip itinerary, plus a few additions such as a second visit to Karnak Temple, a late-night trek to the Sphinx, and visits to the inside chambers of the Sneferu, Mycerinus, and Khafre Pyramids.
2. Delimitation of the portion of an extended visit to be included in the analysis was noted at the time of the visit. The general procedure for determining the actual site and specifying the timing for purposes of the FieldREG analysis was developed during the first site visits and was based upon the group's informal process for selecting appropriate places for chanting or meditation. In the special case of the pyramid visits, the entire period spent inside the pyramid was used in all cases with segmentation according to the notes and index marks identifying the individual chambers and passages. In very long visits, subsets identified as distinct rituals or chants were regarded as separate events for analytic purposes.
3. Beginnings and ends of segments were recorded in the onsite notes timed to the minute (with a probable error of fewer than two minutes) from a synchronized wristwatch, and these times were used for the analysis if no

Table 1A. Sacred Sites Group Chanting or Meditation.

Date	Begin	End	Description	No. Trials	Z
Oct 6	0820	0830	Tomb of Titi's Minister *	744	1.504
Oct 6	1025	1035	Saquara Temple Hall of Columns *	744	2.224
Oct 6	1128	1135	Saquara Outside Holy of Holies *	522	2.067
Oct 6	1412	1422	Sneferu Pyramid Main Chambers	754	2.930
Oct 7	1603	1625	Sphinx Group Meditation	1557	1.573
Oct 7	1635	1640	Sphinx Great Invocation	270	-1.334
Oct 8	1645	1657	Medinet Abou Holy of Holies +	884	0.680
Oct 9	0745	0808	Karnak Holy of Holies	1712	0.263
Oct 10	0936	0948	Dendara Holy of Holies	823	0.251
Oct 10	1825	1830	Luxor Holy of Holies	266	-0.121
Oct 13	0854	0905	Edfu Holy of Holies and Nut	763	2.729
Oct 13	0922	0931	Edfu Holy of Holies, 2nd stop	670	-0.765
Oct 13	0945	0950	Edfu External Chapel	655	-1.275
Oct 13	1710	1718	Kom Ombo Holy of Holies	651	1.824
Oct 13	1718	1732	Kom Ombo Healing Rooms	1046	1.858
Oct 15	0759	0808	Philae Holy of Holies	740	-0.530
Oct 17	1120	1135	Mycerinus Main Chamber	1140	0.377
Oct 17	1135	1145	Mycerinus Multi-resonant Chamber	786	1.967
Oct 17	1720	1725	Khufu Entrance Passage	507	0.038
Oct 17	1728	1745	Khufu Queen's Chamber	1485	1.941
Oct 17	1745	1800	Khufu Grand Gallery	1015	2.659
Oct 17	1800	1812	Khufu King's Chamber, 1st chant	747	-1.345
Oct 17	1812	1823	Khufu King's Chamber, 2nd chant	882	-2.133
Oct 17	1830	1900	Khufu King's, Lights Off	2234	-0.428
Oct 17	1900	1954	Khufu Sarcophagus Chants	3885	-0.610
Oct 18	2325	0100	Khufu, Second visit, King's	7072	0.002

* Non-formal: post facto time specification (see text)
+ Non-formal: Segment short, possible damage, computer floating point error

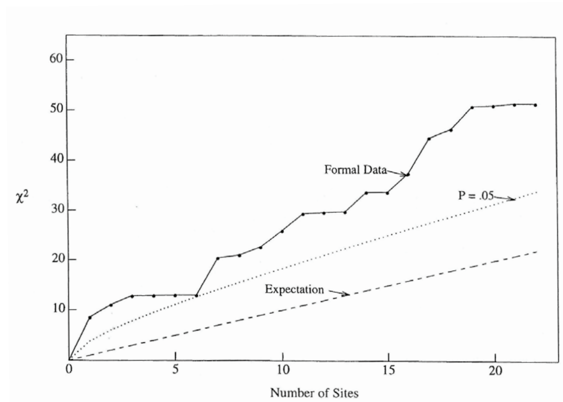

Figure 8: Graphic display of the data presented in Table 1A shown as the accumulating Chi-square from independent data sets representing Category A. These are visits to sacred sites accompanied by active group chanting or meditation. See text for details.

corresponding mark was made in the computer index.

4. In all cases where an index mark was made within two minutes of the noted time, the index mark was used to specify the beginning or ending time; otherwise, the noted time was entered into the analysis program.
5. Where no notes of times were available (e.g., if there was no light) but index marks were made, these were used according to contextual notes made before and after the event.
6. In cases where an event was noted as having just ended with no beginning point marked, the preceding five-minute period was regarded as the segment. Similarly, if only the beginning was noted with no other indication of duration, the subsequent five minutes were taken. For a "point" event, the preceding three and subsequent two minutes were taken. These specifications were designed for exploratory purposes, and no segments thus defined are included in the formal analysis.

Although the notes defining the segments and the categories are quite extensive, they are sufficiently cryptic as to make an independent categorization and specification of the data subsequences by someone other than the experimenter (and note-taker) quite difficult. In the absence of independent encoding, the process of identifying and categorizing the segments was undertaken twice to check the reliability of the process. Three changes were made in the categorization (e.g., the Nefertari Tomb visit was originally included in category A, but it was changed to category D because, although impressive, it did not fall within the pre-planned circumscription of sacred sites). No changes were required for the segment timing, and the overall results of the analyses were very similar for the original and corrected specifications. The results reported here are based on the second specification.

RESULTS

Table 1A shows the segments corresponding to sacred site visits where the group gathered to chant or meditate. Included are the date and the beginning and ending times for the segment, a short description of the site, the number of trials, and the Z-score for that segment.

The composite deviation for this category is significant with a probability against chance of p = 3.7x10^-4. Details and comparisons with the other data sets are presented in Tables 2 and 3. The data are shown in Figure 8 in the form of a cumulative sum of the Z^2 (χ^2 distributed) values associated with each site. The figures include a dashed line showing the expectation for the cumulative

Table 1B. Sacred Sites Without Coherent Group Attention.

Date	Begin	End	Description	No. Trials	Z
Oct 6	1422	1440	Sneferu Sarcophagus Chamber	1317	-0.355
Oct 8	1720	1725	Medinet Abou Duet	358	-0.538
Oct 9	0645	0715	Karnak West to East Side	2233	-1.565
Oct 9	0740	0745	Karnak, Holy of Holies Gathering	230	-1.371
Oct 9	0825	0840	Ptah Temple and Sekhmet	1065	2.041
Oct 9	0840	0904	At Sekhmet to End Visit	1851	0.454
Oct 10	0930	0936	Dendara Inner Temple, Nut	488	0.000
Oct 10	0950	0955	Dendara Sacred Lake	330	-1.822
Oct 10	1931	1936	Luxor 2nd Stop, Holy of Holies	452	-0.193
Oct 11	0628	0632	Karnak Sacred Lake, Scarab	253	-1.102
Oct 11	0715	0738	Karnak Hypostyle, 1st Meditation	1518	2.402
Oct 11	0747	0757	Karnak Hypostyle, 2nd Meditation	897	-2.097
Oct 11	0810	0825	Ptah, Sekhmet Meditation, Love	1045	1.330
Oct 11	0825	0907	Ptah, Sekhmet, Just Sitting	3366	-0.224
Oct 15	1035	1045	Philae, Upstairs Mystery Room	745	-0.741
Oct 17	0950	1005	Valley Temple Holy of Holies +	1181	-1.556
Oct 17	2339	2347	Sphinx Trek Inside Enclosure +	645	2.155
Oct 17	2347	2352	Sphinx, Between Paws +	340	0.169
Oct 17	2352	0012	Sphinx, Behind Stela in Pit +	1505	-1.054
Oct 18	2205	2215	Khufu Second Visit, Enter to Pit	671	2.555
Oct 18	2215	2247	Khufu Pit Rituals	2308	-1.460
Oct 18	2247	2300	Khufu Pit Exploration	1015	-0.821
Oct 18	2300	2308	Khufu Pit Nile and World Map	638	1.943
Oct 18	2308	2325	Khufu Return to Original Entrance	1251	-1.180
Oct 19	1625	1635	Khafre Queen's +	741	0.899
Oct 19	1635	1640	Khafre Gallery +	376	-1.539
Oct 19	1640	1647	Khafre King's and Sarcophagus +	548	2.054

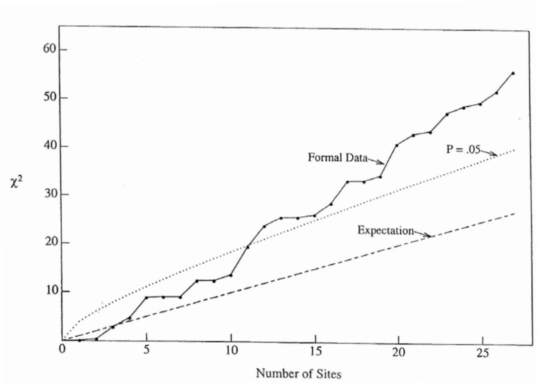

Figure 9: Graphic display of the data presented in Table 1B shown as the accumulating Chi-square from independent data sets representing Category B. These are visits to sacred sites but not accompanied by group activity.

sum (a function of the degrees of freedom) and a dotted line indicating the limit of "significant" deviations (p = 0.05) as the number of data points increases.

Table 1B presents the data from sacred sites where the group did not engage in chanting or communion. Again, the composite deviation is significant, associated with p = 7.8x10^-4. (See Tables 2 and 3.) The data are shown in Figure 9 in the same format as Figure 8. In both cases, there is a steady accumulation of anomalous excess deviation, which becomes highly significant for both datasets. (See Tables 2 and 3.)

Table 1C contains results for data taken during group activities where resonance or communion among most of the members was either organized or arose spontaneously but where the group was located in relatively mundane sites. Here, the composite deviation is not significant. (See Tables 2 and 3.)

Table 1D shows the results for a number of sites that are typically included on a tourist itinerary. They are interesting and subjectively powerful, but they did not qualify as "sacred" by the experimental definition, nor did the group engage in chanting or meditation. The composite deviation is moderately significant (p = 0.032). Details

Table 1C. Group Resonance or Coherent Attention, Not in Sacred Site.

Date	Begin	End	Description	No. Trials	Z
Oct 6	1540	1550	Rameses II head meditation	864	0.293
Oct 8	0550	0605	Airport, Ra at Sunrise	1111	0.543
Oct 9	1720	1725	Ship, Sunset Charles' Birthday	437	-1.008
Oct 12	1548	1648	Ship, Group Meditations	4432	-1.111
Oct 12	1648	1654	Gillian's Flowers into Nile	1075	-1.689
Oct 12	1710	1721	Solar Eclipse, from Ship	682	0.119
Oct 13	1510	1609	Learn Overtone Chanting	4271	-1.342
Oct 14	0943	1020	Felucca around Elephantine	2753	0.752
Oct 14	1113	1117	Felucca Sail Repair, Etc.	298	-0.614
Oct 14	1721	1841	Astrology Session, Larry	5978	-0.452
Oct 14	1845	1858	Astrology Detail, Ida	944	-2.030
Oct 16	1201	1230	Faiyum Lake Circle Meditation	2160	0.578
Oct 17	1017	1020	Circle Blessing for Morad	187	-0.486
Oct 17	2245	2305	Sphinx Trek Cemetery	1743	-2.005

Table 1D: Tombs and Other Non-Sacred but Notable Sites.

Date	Begin	End	Description	No. Trials	Z
Oct 7	1014	1032	Tutankamen Treasure Room	1340	-1.592
Oct 8	1340	1400	Tomb Rameses IV	1452	-1.051
Oct 8	1450	1505	Tomb Rameses III *	650	0.255
Oct 10	0945	0950	Dendara Crypt	566	0.690
Oct 11	1340	1352	Nefertari Tomb No. 3501-3509	1019	-2.574
Oct 11	1409	1502	Three Tombs, West Bank	3621	-1.201
Oct 11	1600	1635	Ramesseum	2723	1.089
Oct 16	2032	2050	Cairo Cultural Center, Dervishes	1485	1.740
Oct 16	2110	2230	Dervish Music and Whirling	6029	0.679

are shown in Tables 2 and 3.

Table 1E shows results for data sequences taken while the experimenter was alone or with only a few others of the group and was involved in relatively private or personal experiences that he identified as having ritual or sacred intent. The composite deviation is not significant. (See Tables 2 and 3.)

Table 2 summarizes all the data, including the preplanned formal categories as well as the three extensions, indicating the χ^2 for each category, its degrees of freedom, and the corresponding probability that the accumulated deviations of the FieldREG segments might be attributable to chance fluctuations. This is the figure of merit for the hypothesis tests. To provide some background detail, though it isn't pertinent to the experimental hypothesis testing, the table also gives a mean Z-score and standard deviation showing the directional tendency and variability of the segment Z-scores. (Negative Z-scores indicate downward trends; positive Z-scores upward trends). These statistics can be compared with their theoretical expectations: mean 0 and standard deviation 1. The mean deviation is significant (Z = -3.742) for category C and marginal (Z = 1.406) for category A (the latter is statistically significant if the ex post facto encoded segments are included). As might be expected, several of the standard deviation values are quite large, commensurate with the large corresponding χ^2 accumulations.

In addition to the main analyses presented above, a number of additional assessments can be made as global checks on the analytical procedures and to provide a broader perspective on the results. The formal analysis is based on the resampling process described earlier, where randomly placed subsequences with the same lengths as

Table 1E. Personal Rituals and Experiences: Experimenter Effect.

Date	Begin	End	Description	No. Trials	Z
Oct 6	0933	0937	Titi, "Reading" Hieroglyphs *	298	-0.147
Oct 7	1152	1211	Cairo Museum Individual Tour	1450	-1.786
Oct 11	0757	0805	Ritual Walk to Sekhmet	506	-1.314
Oct 15	0945	1007	Philae, Ritual for Original Site	1707	0.288
Oct 16	0530	0540	Ritual Packet for Khufu	787	-1.079
Oct 16	0540	0610	Ritual Wrapping for Khufu	2108	1.435
Oct 18	1048	1107	Citadel Mosque Prayer, Youths	1349	0.015
Oct 18	1130	1134	2nd Mosque, Outside Prayer	298	0.893
Oct 18	1150	1210	Coptic Church Worship, Kids	1490	-0.289
Oct 18	1310	1320	2nd Mosque, Inside Prayer	745	0.389

Table 2. Overall Results, Pre-planned Formal and Extension Categories.

Category	Mean Z	Std Dev	Chi-square	DF	Probability
A Formal, Site and Group	0.4487	1.4967	51.468	22	3.7x10^-4
B Formal, Site Only	-0.0599	1.4706	56.324	27	7.8x10^-4
C Extension, Group Only	-0.6037	0.9629	17.157	14	0.248
D Extension, Other Sites	-0.2775	1.5232	16.858	8	0.032
E Extension, Experimenter	-0.1609	1.0620	9.255	9	0.414
A with post facto	0.6287	1.4579	63.411	26	5.7x10^-5
D with short segment	-0.2183	1.4359	16.923	9	0.050
E with post facto	-0.1595	1.0013	9.277	10	0.506
Combined Formal	0.0714	1.4656	107.792	49	2.7x10^-6
All Extensions (C, D, E)	-0.3910	1.1333	43.270	31	0.071
All Formal and Extensions	0.0599	1.3649	151.062	80	2.7x10^-6
Include post facto and short	0.0208	1.3697	163.093	86	1.0x10^-6

Table 3. Summary Statistics from Resampling Procedure Adjusted Chi-square, Z-score, Trial-based Effect Size.

Category	N trials	Chi-square	DF	Probability	Z-score	Effect	SD(eff)
A	29660	52.318	22	.00028	3.450	.0200	.0058
B	27367	54.658	27	.0013	3.021	.0183	.0061
C	26935	15.780	14	.327	0.448	.0027	.0060
D	18235	17.176	8	.028	1.911	.0141	.0074
E	10440	9.741	9	.372	0.327	.0032	.0098

the active segments are repeatedly drawn from the original data sequence. This yields a distribution of *Z*-scores from which we may calculate an "adjusted" χ^2 value corrected for the empirical variance of the *Z* distribution. Other estimates for the likelihood of the outcome are also calculated, including a Bonferroni-adjusted probability for the most extreme deviation in each analysis subset and the percentage of the 1000 resampled χ^2 results that exceed the value determined for the indexed experimental segments.

Overall, these estimates agree well with the formal statistics. The adjusted χ^2 statistics are shown in Table 3, and these may be compared with the unadjusted values presented in Table 2. The differences are well within the range of chance fluctuation. In addition to the adjusted χ^2 and probabilities, Table 3 includes a corresponding *Z*-score. From this, an effect size $E = Z/\sqrt{N}$ is calculated and presented in the table along with its standard deviation.

DISCUSSION

These analyses detail an array of anomalous effects on the data stream generated while the FieldREG was present in various sacred sites visited by a group of people interested in spiritual matters. There was a notable but non-significant increment in the yield when the group engaged in an activity such as chanting or meditation at these sites to promote group resonance and a connection with the genius loci or spirit of the place (category A). Seven of the sites that are included in Category B because only a small part of the group was present arguably could belong to Category A, and it is worthwhile to consider what differences accrue if they are reassigned. The χ^2 for A increases to 67.068 with 29 degrees of freedom and a probability of 7.6x10^-5. For B, the new values are $\chi^2 = 40.724$, 20 *df*, and $p = 0.0040$. However, because the number of trials in each category changes, the effect size calculations are altered very little: in category A, the effect size increases from 0.0200 to 0.0202, and in B, it decreases from 0.0183 to 0.0180. The effect size difference between the two categories A - B remains non-significant at 0.0022 with a corresponding $Z = 0.262$ and $p = 0.397$.

The calculation of the χ^2 and corresponding probability for the accumulated deviation in the various categories requires inclusion of all the relevant sequences. It is thus important to consider the possible effect of inadvertently excluding some data segments that properly belong to a given category. We can estimate the number of missing sequences necessary to reduce the accumulated χ^2 to a non-significant level using a technique developed to address the possible "file drawer" effect in meta-analysis (Rosenthal, 1991). For the formal categories A and B, the estimate for the number of sequences with a null contribution to the χ^2 needed to reduce the significance level to $p = 0.05$ is 126 and 120, respectively, i.e., some five times the number of data sequences actually identified, meeting Rosenthal's criterion for a robust meta-analytic effect. Further, if the formal categories are combined, the number of unidentified "file drawer" sequences required to nullify the statistical indication of an anomalous effect rises to nearly 600. Given these estimates and the well-formulated criteria for inclusion in the formal categories, it is clear that the results shown in Table 2 cannot be attributed to inadvertent or motivated selection of best cases or to a "file drawer" exclusion of weak cases.

It is instructive to compare these FieldREG results with those in intentional laboratory experiments where individual operators try to influence the random event sequence to higher or lower values. In these, the overall average effect size is approximately 0.003. This is a smaller yield by a factor of six relative to categories A and B, and the difference is statistically significant. On the other hand, a subset of laboratory experiments with co-operator pairs who are "bonded" couples (Dunne, 1991) has an effect size (0.017) that is quite similar to that in the two formal categories in the present database. We may speculate that the comparable results derive from some form of resonance that is present in both cases. Interestingly, the effect sizes in categories C and E, although these subsets do not approach statistical significance, are of the same order as that found in standard single-operator REG experiments in the laboratory. The similarity of the yield suggests that these may be functionally similar situations where larger databases may be required to discern small but consistent effects.

No single source of the anomalous effect is unambiguously evident. Rather, the results suggest that several factors may contribute. The largest effect size is in subset (A), where all the potential sources of anomalous influence are present, including a coherent or resonant group of people engaged in shared ritual activity that may be enhanced or potentiated by the environment of a sacred site. However, even with no organized group engagement, such sites produce nearly the same level of effect in category B. Smaller but still significant effects in category D similarly indicate that unique and engaging sites may contribute to the anomalous results even without the "sacred" aspect, while the non-significant effect in the mundane locations of category C further supports the suggestion that the site may be important. The experimenter's expectations are also a potential influence that must be taken into consideration (White, 1977), and although the separate subset (E) comprising personal experiences of the experimenter shows only a very modest accumulated deviation, this factor cannot be totally excluded. The experimenter, more than anyone else in the group, was directly involved in these experiments and had expectations and motivations for achieving a useful and interesting result. It is plausible that reactions to the group dynamics within the powerful environment of the temples and pyramid chambers could have resulted in unusually large experimenter contributions, specifically in those settings. Nevertheless, while the experimenter was necessarily a part of the group, it appears from the hierarchy of effect sizes that the primary sources of anomalous deviations are the special locations and the group interactions.

The subjective impressions of several members of the group describing a "special quality" in the pyramid chambers and the primary spaces of the temples are instructive. It may be difficult to establish whether the subjective qualities are engendered directly by the place or, by the internal imagery and feelings of the people, or by some combination of both. A similar question is whether the stones and structures of a sacred site have a primordial character that makes them different and inspiring to people, or whether their use by people for sacred purposes might imbue them with some special character. This is not necessarily an issue that can be addressed experimentally, but it appears to be touched upon by the FieldREG effects produced in categories A and B.

CONCLUSION

The circumstances of this project, the personal experiences, and the opportunity to gather these particular datasets are all unusual and would be difficult to replicate. However, the results are sufficiently powerful statistically that they can support some tentative interpretations, buttressed by an increasing database of related applications (Nelson et al., 1997a). Although the precedents for the FieldREG paradigm remain limited, we can offer the following summary assessment of the results:

1. A well-calibrated random event generator produced anomalous effects when operated in certain Egyptian sacred sites linked with the presence of a group of people interested in achieving a shared experience of the spiritual and sacred aspects of these places. A formal test of the appropriate experimental hypothesis yields a probability of a few parts per million that the accumulated deviation is merely a chance fluctuation.
2. The average effect size was on the order of six times that found in laboratory REG experiments using similar devices and more than twice as large as the average of similar FieldREG applications in more mundane environments. However, among the latter applications, data generated in other ritual and ceremonial environments have exhibited effects that approach those of the Egyptian database in scale (Nelson et al., 1996, 1997a).
3. The largest effects occurred when the group attempted to develop a resonant bond through meditation and chanting within the sacred sites and were smaller when there was no group activity or when the group interacted in more mundane locations and circumstances. This implies that both the place and the group activity may play contributing roles.
4. In sacred sites where chanting or meditation did not take place, an effect was produced that is nearly as large as that in the optimal case, suggesting that simple group presence given an appropriate location may also be sufficient to generate anomalous results.
5. While statistically significant, the effect was considerably smaller in other historical or cultural sites that were interesting but did not qualify as "sacred" by the criteria established in this protocol. These places did not generally evoke a resonant group interaction, but they were certainly engaging, suggesting that even a mundane place or situation that focuses group attention may promote anomalous effects.
6. Individual experiences of the experimenter, even though deeply moving or engaging, did not appear to be adequate to produce consistent large effects comparable to those of group activity in a sacred site. Instead, the effect size was similar to that produced in single-operator laboratory experiments.

IMPLICATIONS AND APPLICATIONS

A clear implication of this study is that there is an interaction of environment and the state of consciousness and that both may be instrumental and important in the generation of anomalous REG behavior. The nonrandom behavior seems to be strongest when the REG is immersed in a milieu created by a "group consciousness" based on interpersonal emotional resonance enhanced by a conducive environment. Such resonance appears to be facilitated by shared experiences, such as rituals in certain locations that were evidently designed for this purpose. The resulting anomalous effects apparently have little to do with ordinary physical parameters but are clearly linked with the subjective information that is present (Jahn & Dunne, 1997; Nelson et al., 1997a). In the FieldREG paradigm, this subjective information is established or registered in objective terms when the nominally random data sequence becomes slightly more predictable and takes on a secular trend instead of continuing its theoretically expected random walk.

Extending the interpretation to a broader perspective, this experiment can be taken as tentative evidence for special places that have an intrinsic sacred quality. That is, we recognize selected spaces or locations distinguished from the ordinary by their ability to stimulate actions and experiences that we term spiritual or sacred. On the other hand, our evidence doesn't rigorously establish the prior existence of a sacred quality in the space, though it leans that way (consider the Philae example). Most likely, there is a combination of factors linked with anomalous effects – a special place, interesting and meaningful intentions, practices, or rituals that promote coherence and resonance. Group consciousness can be achieved by intention, for example, by meditation, but also may be imposed by circumstances, as when we share feelings of awe toward a sacred presence and forget our separateness.

As the ancient understanding has it, two heads are better than one. We are more effective and powerful when we come together and create a new entity, a group consciousness, which is a little smarter than any of us. It is essential to ensure that our group effort is positive, so we should seek sacred spaces and follow practices that are conducive to right action in service of well-being.

There is scientific support for the notion that what we wish for becomes slightly more likely to come into being. The future is not fully determined; it has a fundamental unpredictability, a randomness in its manifestation that can be changed from what it might have been. Our experiments show that when we become coherent internally or in a group, we become a source of structuring information that may influence what happens next in our environment. This capacity is generally unconscious, but it can be brought up into conscious awareness when we wish, and it can be applied to turn up the brightness of our future.

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