Experimental

EFFECTS OF DISTANT HEALING INTENTION THROUGH TIME & SPACE: *Two Exploratory Studies*

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ABSTRACT

Two double-blind experiments explored the effects of healing intention directed towards a distant person. The distant person's respiration, heart rate, fingertip blood volume, and spontaneous electrodermal activity were continuously monitored during 20 randomly counterbalanced one-minute "treatment" and control epochs. The first experiment examined the effects of a group's healing intention directed in real-time at volunteers isolated 200 meters away. The second experiment studied the effects of Umbanda mediums who directed their healing intentions from São Paulo, Brazil towards volunteers who were monitored two months earlier in Las Vegas, Nevada. The first study showed that the groups' healing intention was associated with an increase in breathing rate (p = 0.053, two-tail) and a decrease in electrodermal activity (p = 0.055, two-tail) in the distant volunteers. The second study showed that despite a separation of 6,000 miles in space and two months in time, the mediums' healing intention was associated with an increase in fingertip blood volume (p = 0.013, two-tail) and an increase in electrodermal activity (p = 0.031, two-tail) in the distant volunteers. Possible alternative explanations for the reported effects are considered, and the experimental outcomes and methodological implications are discussed.

KEYWORDS: Distant healing, psychophysiology, time, space

INTRODUCTION

Millions of people believe that the power of prayer can improve their love life, influence politics, and win the lottery. A January 1992 cover story on prayer in *Newsweek* reported that more than 75% of Americans pray at least once a week. Even among the 13% who declared that they were atheists or agnostics, nearly one in five prayed daily, "siding, it seems, with Pascal, and wagering that there is a God who hears them."[1] A March 1994 cover story on prayer in *Life* magazine reported that "Nine out of 10 Americans, ignoring speculation that God is dead, pray frequently and earnestly (and almost all say God has answered their prayers."[2] A poll conducted in June 1996 for a *Time* cover story on faith and healing found that 82% believed that prayers could heal.[3]

Prayer that results in one's own healing may be understood as a variation of the placebo effect. But what about the common belief that prayer can heal a distant person? Skeptics counter such popular beliefs with the pessimistic outlook that "If looks could kill and words could harm, there'd be a lot more dead and a lot fewer sick people around."[4] Or by a more poignant observation: "If prayer worked, Hitler would have been stopped at the border of Poland by angels with swords of fire."[5]

Beyond the beliefs of believers and skeptics, a growing body of laboratory evidence suggests that what we will call "distant healing intention" (DHI) is associated with measurable changes in living systems ranging from bacteria to humans.[6-8] Of particular interest in establishing proof-of-principle for DHI effects are two decades of experiments investigating DHI interactions with human autonomic nervous system activity.[9-11] Meta-analyses of these studies provide strong evidence that DHI is related to predictable changes in a distant person's physiological state.[12]

Distant Healing Intention by Groups

Outside the laboratory, many churches and synagogues maintain prayer circles and spiritual healing groups. One of the reasons for the popularity of these groups is the important social support they provide. In addition, many people

believe that a group's prayers are more potent than those of an individual, perhaps based on the biblical homily, "For where two or three are gathered in my name, there am I in the midst of them."[13] While it is tempting to imagine that intention scales linearly, *i.e.*, that the intentions of ten people would be about ten times "stronger" than one person, this is probably not the case. Human beings are dynamic, interdependent, nonlinear systems, and the group properties of such complex systems are difficult to predict.

Nevertheless, the broad popularity of prayer circles, especially combined with laboratory evidence suggesting that "bonded pairs" produce larger effects than single individuals in studies involving random physical systems as the "targets" of intention, and that there may be a "field consciousness" effect associated with the mental activities of groups, all suggest that distant healing intention by groups is worth exploring.[12,14-16]

Distant Healing Through Space and Time

Because DHI and similar perceptual effects have been repeatedly observed in the laboratory at distances of 30 feet to many miles, then assuming proper physical isolation and shielding of the "healers" from the "patients," we would expect that DHI effects would be detectable over arbitrary distances.[12,17] That is, once the more obvious electromagnetic models of DHI are ruled out, it becomes increasingly likely that these effects may transcend the usual limitations associated with transmitting information or energy across space. In addition, if we suspect that an effect transcends space, then for relativistic reasons, we may expect that it also transcends time. A growing number of DHI studies confirm this expectation,[18] leading Schlitz and Braud to speculate that:

> A particularly intriguing possibility is that the various remote intentionality influences . . . may occur not only nonlocally with respect to space . . . but also nonlocally with respect to time. Such a possibility could allow direct attentional and intentional influences to be directed "backwards in time" to influence probabilistic events involved in seed moments or initial formative conditions harmful or helpful to health and well-being.[11(p.72)]

EXPERIMENT 1: GROUP

This study examined the effects of a group's collective DHI on the autonomic functioning of a distant individual. The group was asked to send non-directed intention towards a member of the group, who was isolated at a distance. "Non-directed" intention meant maintaining beneficial, nurturing thoughts without a specific healing outcome or therapeutic aim in mind. We speculated that DHI effects might manifest as autonomic relaxation because prayer is similar to meditative, relaxed mental states, but the hypothesis was simply that the physiological status during treatment epochs would be different from that during control epochs, thus two-tailed probabilities were employed.[19]

PARTICIPANTS

The experimenter (E, the first author) recruited two groups of volunteers from Las Vegas for this experiment. Group 1 consisted of 21 people taking part in a six-week, spiritually-oriented self-improvement program. Group 2 consisted of 10 people who were part of an Edgar Cayce study group. This latter group had been meeting in Las Vegas for nearly 20 years, and many of the founding members were still in the group.[20] Individuals in both groups exhibited high degrees of enthusiasm and belief in the efficacy of distant mental healing.

EQUIPMENT

Participants playing the role of distant "patient" were continuously monitored throughout experimental sessions with a psychophysiological monitor made by Coulbourn Instruments, model LabLinc V. The raw signals from the LabLinc V were fed through a Data Translation DT-2821 analog-to-digital board housed in a Packard Bell 100 MHz Pentium-based PC, and controlled by Datawave Technologies "Experimenter's Workbench" software.

The Lablinc V consisted of modules for monitoring electrodermal activity (Model V71-23, set at 1000 mV/μSiemens, with AC coupling and DC excitation), a photoplethysmograph for monitoring blood volume pulse in the

fingertip and heart rate (Model V71-40), breathing volume measured by a bellows transduced through a strain gauge coupler (Model V72-25), and skin temperature change from a reference point set to zero at the beginning of the session (Model V71-30, set at 1 V/degree C). Data were recorded at 10 samples per second and streamed directly to the hard disk. In addition, an IBM Thinkpad 700 laptop provided a precise time-of-day signal monitored by a LabLinc bioamplifier module (Model V75-01).

The following six variables were formed from the raw physiological measures:

- respiration rate per minute, averaged over the preceding five seconds
- respiration volume (chest expansion), averaged over the preceding five seconds
- heart rate in beats per minute, averaged over the preceding three seconds
- fingertip blood volume, averaged over the preceding three seconds
- skin conductance response
- skin temperature on the pad of the left thumb

PROCEDURE

Volunteer "Patients"

E arranged for the group participants to meet in the Consciousness Research Laboratory at the University of Nevada, Las Vegas. When the group had assembled, E escorted them to a comfortable conference room on the other side of the building (*Figure 1*). E explained the purpose of the experiment, described the basic procedure, and then everyone signed an informed consent form. After a short discussion to clarify the procedure, the group selected one person from the group to act as the DHI target or "patient" (P).[21] Each session had a different person act as P.

Before leaving the room with P to return to the laboratory, E gave instructions for the group to wait for a nearby telephone to ring. This ring would provide a signal for the group to begin the session. Then E and P returned to the laboratory via a path of about 200 meters, and through three locked doors, as illustrated in Figure 1.

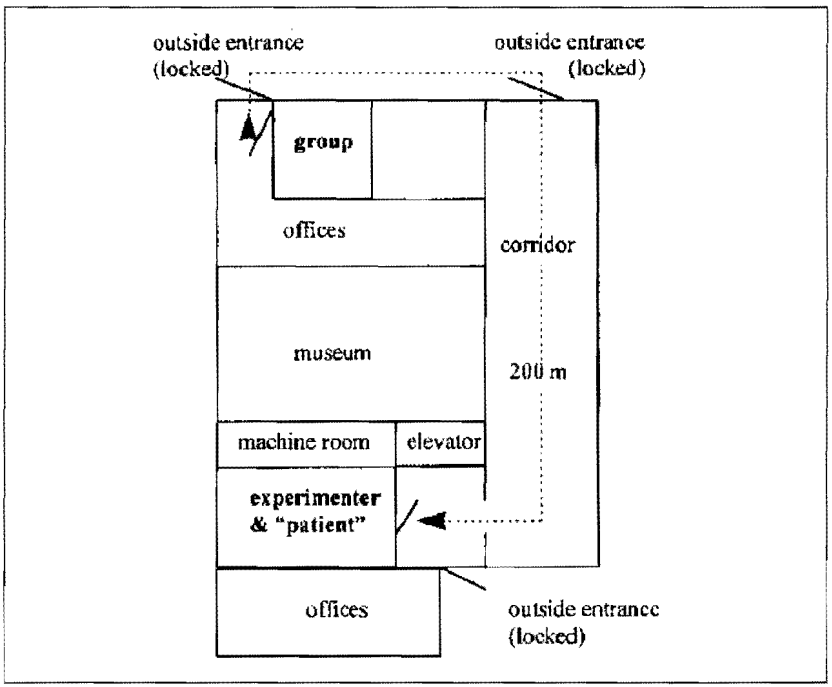

Figure 1. Schematic of the laboratory and group meeting rooms.

In the lab, E asked P to fill out a short questionnaire asking the first four questions shown in Table I. At the end of the session P filled out the last question in Table I. Then E asked P to sit in a reclining chair and remove his or her wristwatch. The watch was removed because it might restrict blood flow in the hand, and it also eliminated any way for P to precisely track the passage of time.

To the left hand, E attached (1) a photoplethysmograph to the pad of the third finger with a sponge clamp, (2) Ag/AgCl electrodermal electrodes moistened with electrolyte conductive cream to the pads of the first and second fingers with velcro fasteners, and (3) a thermister to the pad of the thumb. Then a bellows was comfortably fitted around P's chest with a velcro fastener, and P was asked to rest his or her left hand on a pillow. A colorful, randomly moving screen saver was displayed on a computer monitor about 10 feet in front of P

Table 1

Each participant answered these five questions using a seven-point scale.

Q1) How do you feel before the session begins? (fatigued/depressed, to agitated/anxious)
Q2) What interest or experience do you have with distant mental healing? (none at all, to extensive)
Q3) Do you believe that distant mental healing will be effective in this experiment? (not at all, to absolutely)
Q4) What is your motivation to be healed. (none at all, to extreme)
Q5) How do you feel after the session ended?

to provide him or her with something interesting to look at. Many participants reported that they kept their eyes closed during the session.

After ensuring that the electrode signals were being detected properly, E started the physiological data recording and then dialed a telephone located just outside the conference room where the group was waiting. E let the phone ring twice, then hung up. P knew that the session would begin shortly after E placed the phone call, and that it would last about 20 minutes, but neither E or P had any indication of when the session actually began, or when the individual epochs began, nor did they know anything about the assignment of the treatment or control conditions during those epochs. In addition, the group did not receive any feedback about P's physiological state during the session. At the end of the data recording period, and after removing the electrodes, discussing P's experiences, and having him or her answer the last question on the questionnaire, E accompanied P back to the conference room where the group was waiting. Another person volunteered to be P, and the process was repeated.

Volunteer "Healers"

The phone ringing near the group acted as a signal for one person in the group to press a button on an IBM Thinkpad 365 laptop computer in the room. This button-press began the session, and it also allowed the laptop to record

session timing information and to provide instructions on when and how the group should apply its collective intention. This worked as follows: As soon as a member of the group pressed a button on the laptop, a program running on the laptop set a pseudorandom number generator seed number to the current clock time and generated 10 random bits.[22] If a bit was 1, this would result in the sequence treatment-control (T C), and if the bit was a 0 the order would be control-treatment (C T). These 10 random bits were thus used to create a sequence of 20 randomly counterbalanced epochs. Immediately after generating this sequence, the program began the session.

Each T or C epoch was 44 seconds, followed by a 16 second inter-epoch period, making each session last approximately 20 minutes.[23] At the beginning of each successive epoch, the laptop automatically indicated that the group should either (a) send collective healing intentions towards P upon seeing P's photo displayed on the screen (the T condition), or (b) they should rest and return their intention back towards the group upon seeing a pleasant landscape photo on the screen (the C condition). (This group had previously practiced mental healing on each other, so they were used to directing their attention towards members of the group, regardless of where they were located.) At the end of each 44-second T or C epoch, the laptop indicated that the group should prepare for a possible change of instructions by displaying a painting of the Buddha. Data recorded during the 16-second inter-epoch periods were not analyzed.[24]

Analytical Method

To evaluate the probability of the difference observed between physiological waveforms recorded during the treatment and control conditions, random permutation analysis (RPA) was employed. Recommended by Blair & Karniski for evaluating psychophysiological measures recorded in two different conditions, this method provides the probability of the difference between any two arbitrary time-series waveforms without making assumptions about the shape of the distributions or sequential dependencies among adjacent physiological measures.[25] This method is particularly powerful because it provides an arbitrarily close estimate of the exact probability of the observed difference. The method will be explained in more detail later in the Results section.

HYPOTHESIS

The hypothesis was that a group's distant healing intention would be associated with significant changes in distant individuals' average autonomic physiology in treatment versus control conditions. Because no direction was predicted, two-tailed probabilities were employed. Other hypotheses considered in the original formulation of this study will be discussed in future publications.[26]

A total of 15 sessions was planned. This figure was selected based upon the number of trials conducted in similar DHI experiments by Braud and Schiltz, and in a similar successful DHI study conducted by Radin, Taylor and Braud.[10,27] It was also planned that no data would be analyzed until all sessions were completed.

RESULTS

Participants

Group 1 came to the Consciousness Research Laboratory once in the evening and contributed four sessions over the course of four hours. Group 2 came to the lab four times, each for about three hours in the evening, contributing a total of 11 sessions.

Table II lists information about the 15 participants and their answers to the questionnaire. The average age of the 10 women and 5 men was 52.1, ranging from 31 to 70. Their answers to the questions about how they felt before versus after the session showed that nearly all moved from various levels of discomfort (answers above or below the midpoint of 4) to comfort. This is not surprising given that the experiment required them to simply relax in a reclining chair for 20 minutes, knowing that their friends were sending beneficial, nurturing thoughts. Their answers to questions about experience, belief and motivation to be healed were fairly high, reflecting the enthusiasm in these groups for distant healing.

Table II

Participant information overview. The numbers in the Before, After, Experience, Belief and Motivation columns refer to responses on the 7-point scales shown in Table I.

ID	Session Date	Gender	Feeling Before	Feeling After	Experience	Belief	Motivation
701	5/23/97	M	5	4	6	7	5
702	5/23/97	F	4	4	7	7	7
703	5/23/97	M	4	4	7	7	7
704	5/23/97	F	3	4	4	6	4
705	5/27/97	F	2	4	7	7	7
706	5/27/97	F	1	4	7	4	4
707	5/27/97	F	4	4	5	7	7
708	6/3/97	F	2	4	7	7	7
709	6/3/97	M	2	5	7	6	5
710	6/3/97	F	5	4	6	7	6
711	6/10/97	F	3	3	5	7	5
712	6/10/97	F	1	4	7	7	5
713	6/10/97	F	4	4	7	7	7
714	6/17/97	M	4	4	5	6	6
715	6/17/97	M	3	4	5	5	4

Procedural Change

In sessions 1 through 4, contributed by Group 1, the original plan was for the laptop to display a digitized photo of P or a landscape scene as instructions for the T and C epochs, respectively. Unfortunately, there were so many people in Group 1 that not everyone could clearly see the computer screen. Thus, one person was selected to watch the laptop screen and announce aloud when a treatment, control or inter-epoch period had begun. This proved to be a successful means of letting the group know what it should concentrate on, and when.

In sessions 5 through 15, with Group 2, some participants again mentioned that they had trouble seeing the screen, and most indicated that they preferred to keep their eyes closed throughout the session. As a result, the program was altered to have the laptop play a pre-recorded digital audio file in which E spoke the phrase "Please send healing energies now" at the beginning of

treatment epochs, "Please prepare for a change of instructions" at the beginning of an inter-epoch period, and "Please return your attention to the group" at the beginning of control epochs. The laptop's audio output was amplified through an external speaker system to allow everyone in the group to easily hear these instructions. This proved to be satisfactory.

Physiological Analysis

After all 15 sessions were completed, three data files from each session were consolidated into a single file. File 1 consisted of the raw physiological data recorded on the Packard Bell computer, File 2 consisted of time-stamp data recorded by the Thinkpad 700 laptop (used to time-synch the physiological data), and File 3 consisted of the sequence and time of counterbalanced conditions recorded on the Thinkpad 365 laptop (used by the group). To ensure proper time-synchronization among these files, the clocks of the two laptops were both set to Universal Time as maintained by the U. S. Naval Observatory.[28]

Random permutation analysis (RPA) is not as well known as traditional inferential statistics, but as computing power has increased over the last twenty years, this computational approach to statistics has rapidly grown in popularity. Hundreds of publications in many disciplines demonstrate the advantages of this method over traditional inferential statistics.[29-31] RPA is particularly useful for analyzing the highly skewed, autocorrelated time-series datasets generated in psychophysiological experiments.

To illustrate the RPA method, consider the average superposed epoch waveforms in Figure 2. This shows the estimates of electrodermal activity (EDA), averaged per second for the treatment and control conditions, across all 15 sessions in the Group experiment. That is, these curves were formed by averaging the 10 treatment and 10 control curves per session, and then averaging those curves over 15 sessions. This represents a total of 15 x 20 or 300 epochs, of which 150 were treatment epochs and 150 were controls. At 44 seconds per epoch, this means Figure 2 summarizes a grand total of 110 minutes of treatment intention and 110 minutes of control or "non-intention."

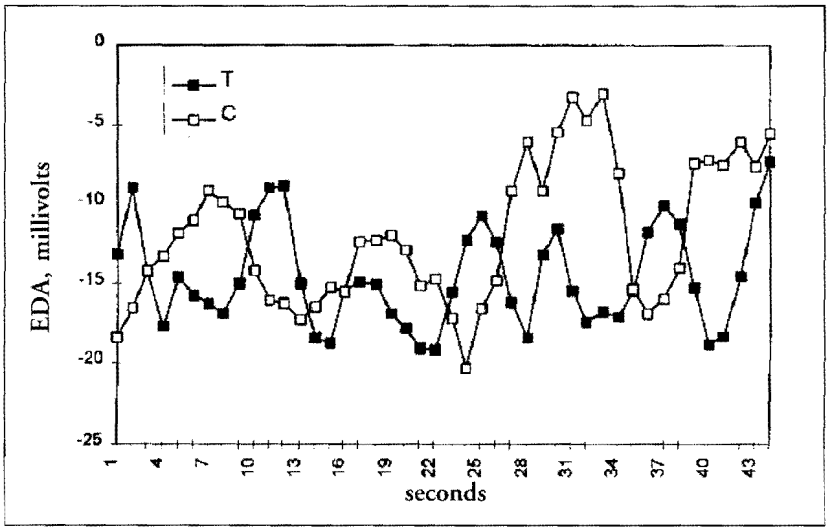

Figure 2. Superposed epoch waveforms for electrodermal activity in the treatment (T) and control (C) conditions, averaged over all epochs in all 15 sessions of the Group experiment. The y-axis is electrodermal activity (spontaneous fluctuations in skin conductance response), measured here in terms of millivolts as recorded by the physiological hardware.

The question is whether the average EDA in the two conditions significantly differed. If the average of the treatment curve in Figure 2 is generally smaller than the average of the control curve, then the cumulative *difference* between the two curves will progressively decrease (*i.e.*, cumulative average T–average C will be negative). This is shown in Figure 3. A value of special interest is the cumulative endpoint, which is around -110 in Figure 3. We now compare this cumulative difference to the same differences resulting from all possible curves that *could have resulted* if other counterbalancing sequences had been used.

To do this, reconsider the superposed epoch analysis curves shown in Figure 2. These two curves are based on the treatment and control values actually recorded in 15 individual sessions. That is, Figure 2 was formed by taking the averages of 15 *pairs* of curves, where *each* of those curves was itself the average of ten repeated, 44-second sessions. Let us code each of those 15 session-pairs such that each pair is by definition labeled a "1." We can then code a new pair of curves as "0" by flipping the original treatment with the controls. That is, we simply call the actual treatment curve the control curve, and vice versa.

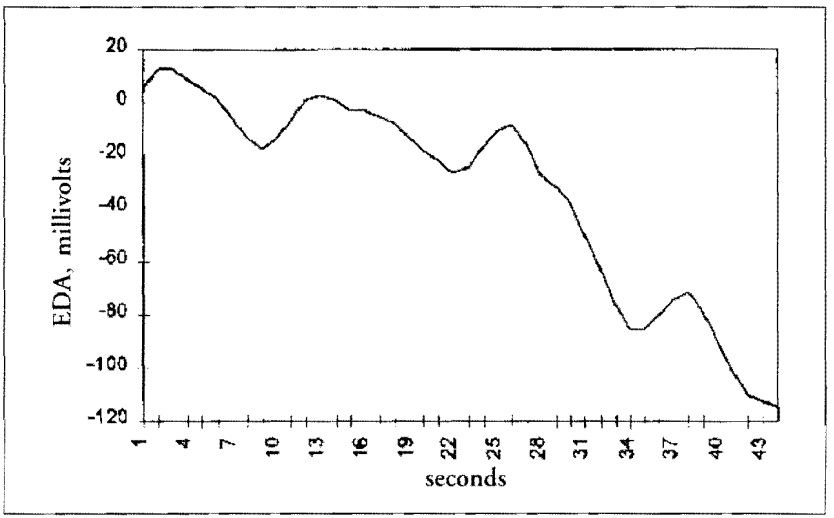

Figure 3. Cumulative difference of the treatment vs. control waveforms shown in Figure 2.

With this coding scheme in mind, the original curves shown in Figure 2 may be represented as a series of 15 1's: [111111111111111]. We can create a new pair of superposed epoch curves by taking a different sequence, say [011111111111111]. This latter example means we reverse the treatment and control curves originally recorded in session 1, and use the original treatment and control mean curves from the remaining sessions. With this new dataset we can create a new pair of superposed epoch means exactly as we did for Figure 2, and then form a new cumulative difference as in Figure 3. The new cumulative end point will be slightly different than the original.

Now create another new sequence, say [10111...], go through the same process, and get a new cumulative end point. Then do it again, and repeat. In this example, there are 2^{15} possible sequences, or 32,768 permutations of these two curves. If we re-calculated the superposed epoch curves and the cumulative end-points for every one of these permutations, we will have created the population of all possible cumulative differences, on a per-session basis, given this dataset. We can then rank the magnitude of our original cumulative end point within this exhaustive set of 32,768 end points.

Let's say that our end point was ranked the 102nd largest out of the entire set. We would immediately see that the probability of getting a mean difference as large as, or larger than, the actual curve we obtained, was exactly 102/32768, or $p = 0.00305$. That is, these two curves were significantly different at $p = .003$ one-tailed, or $p = .006$ two-tailed.

If we had not 15 pairs of curves, but N curves, then the number of permuted results is 2^N. For experiments with say 30 participants (or 30 sessions), this means for an exhaustive comparison we'd have to calculate 2^{30} or over one billion combinations to find the exact probability of our original results. Even for fast computers that could take a while, so instead of calculating the entire set of possible results, we can run a smaller number of random permutations and judge our results in that subset of the population. It turns out that this permutation method converges fairly quickly to a final estimate of the probability, so that a random set of 10,000 permutations is usually more than enough to form an accurate estimate of the exact probability. For example, in an analysis of the data in the second experiment reported here, Figure 4 shows that the probability estimates begin to stabilize after about 300 random permutations. Nevertheless, following the recommendations of Blair and Karniski, the analyses reported here are based on 10,000 random permutations.[25]

Table III shows the results of the random permutation analysis for the Group experiment.[32]

The effect size obtained for EDA, $r = -0.496$ ($p = .055$, two-tail), is larger than the meta-analytic average estimate of $r = .25$ for previous distant intentionality studies involving electrodermal activity.[9,10,12,33] There is no meta-analytic effect size estimate for changes in breathing rate in DHI experiments, but that too was significant in this study with $r = .499$ ($p = .053$, two-tailed). The other physiological measures were not significantly different from chance. It should be noted that after adjustment for multiple analyses, none of these measures may be considered independently significant.

Note that Table III does not list skin temperature, which was one of the physiological signals monitored. After discussing the design and intent of this study with several psychophysiologists, we were convinced that changes in skin temperature were too slow-moving to be reliably detected in the space of the

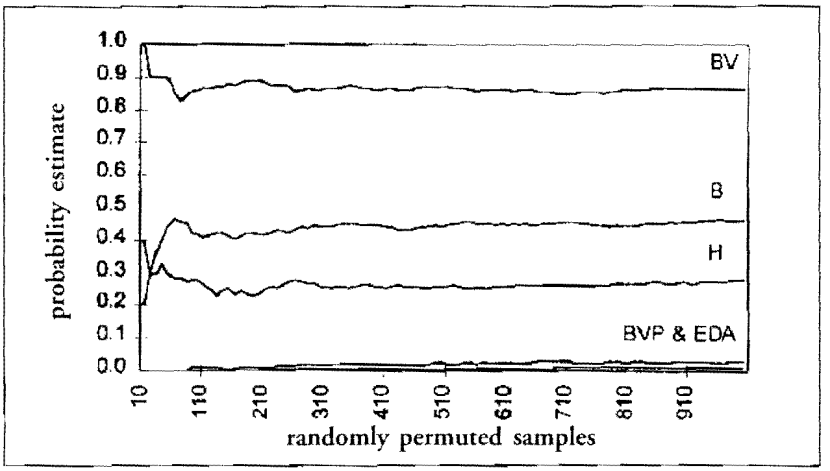

Figure 4. This graph shows how quickly the probability estimates converge towards stable values using the randomized permutation method. This is for data recorded in the Brazil experiment, discussed later. BV was breathing volume, B was breathing rate, H was heart rate, BVP was blood volume pulse, and EDA was electrodermal.

Table III

Results of 10,000 random permutations for the group experiment. The physiological measures are breathing rate (br), breathing volume (bv), blood volume pulse (bvp), electrodermal activity (eda) and heart rate (hr). The value "*p*" is the one-tailed probability of obtaining treatment-control differences as large, or larger than the observed difference; "*z*" is *p* transformed into a standard normal deviate; "*r*" is effect size determined as $z/\sqrt{N}$, where N = 15;[33] and the last column is the 2-tailed *p*.

Group	*p*	*z*	*r*	2-tail *p*
br	0.027	1.932	0.499	0.053
bv	0.425	0.189	0.049	0.850
bvp	0.546	-0.115	-0.030	0.908
eda	0.973	-1.922	-0.496	0.055
hr	0.636	-0.348	-0.090	0.728

44 second epochs employed in this study, thus this factor was dropped from further analysis.[34]

EXPERIMENT 2: BRAZIL

This study examined the effects of DHI through space and time. Professional healers in São Paulo, Brazil, some 6,000 miles from Las Vegas, were asked to apply their healing intention to volunteers whose physiology was monitored two months before in the Consciousness Research Laboratory in Las Vegas.

The second and third authors invited spiritual healers from the Umbanda tradition in Brazil to act as the healers in this study. Umbanda is a religion that evolved from an amalgam of religious cultures and practices, primarily Catholicism, Candomblé and Kardecist Spiritism.[35] Umbanda is a spiritistic religion, in that it stresses the relationship between humans and nature, especially nature spirits, through rituals called "giras." Giras are generally practiced in spiritual settings like temples, called "terreiros." Each terreiro is led by an individual who is also the spiritual advisor to the Umbanda mediums. The mediums act as intermediaries between a panoply of spirits evoked by the giras and individuals who ask for their intercession. Umbanda spirits include Oxalá (associated with Jesus), Iemanjá (associated with Mary), Exus (amoral spirits), and Pombas-giras (prostitutes). Giras rituals are commonly used for healing, giving advice, and providing magical spells.

PARTICIPANTS AND EQUIPMENT

The same equipment, physiological measurements, and questionnaire used in the first study were also used in this study.[36] Volunteer "patients" were recruited by the first author in Las Vegas in May 1997, and the healers were recruited by the second and third authors in São Paulo in July and August 1997.

PROCEDURE

Volunteer "Patients"

When a volunteer arrived at the Consciousness Research Laboratory in Las Vegas, E explained the purpose of the experiment, described the procedure, and

then the participant signed an informed consent form. As in the Group study, E invited P to fill out a questionnaire asking the questions shown in Table I. Then E took four color digital photos of P, attached the electrodes and checked the physiological signals as before. When P indicated that he or she was ready to begin, E started the physiological software and for the next 24 minutes physiology was continuously recorded as P simply relaxed in the reclining chair.[37]

Volunteer Healers

Software similar to that used in the first experiment was also employed in this study. The program, along with copies of all digital photos of the participants, their original signed consent forms, and a compressed version of all of the digitized physiological data were sent to the two experimenters in São Paulo, Brazil (E_{SP}) for the healing part of the experiment. The compressed data were sent to Brazil to provide a backup copy that could be independently re-analyzed, if necessary, and to place a representation of the data in the vicinity of the healers. Most sessions were conducted in a terreiro in São Paulo that had agreed to participate in this study. When a medium was ready to begin the healing session, E_{SP} pressed a button on a computer. This caused the software to generate a sequence of 20 randomly counterbalanced recording epochs, as in the Group study.

The only change in this program was that rather than displaying a picture of Buddha to indicate the inter-epoch periods, a picture of the Umbandan spirit "Omolu" was used. The second author had selected the picture of Omolu because she liked it, learning only later that Omolu is a divinity associated with healing and diseases, smallpox in particular.[38] In this study, each recording epoch was planned to be 50 seconds, followed by a 10 second inter-epoch period.[39]

Analytical Method

The design and analysis of DHI experiments assumes synchronized timing between the healers' intention and the recording of the participants' physiological data. This time-matching makes it possible to assign a *meaning* to the various counterbalanced segments of the data. However, in this study, given

that healers were asked to focus their intention "backwards in time," we must clarify our temporal assumptions. What we ordinarily mean by time-synchronization actually combines two factors: There is synchronization *between* healer and participant sessions, and also synchronization *within* the sessions. Another way to state this is that we assume that our clocks start at the same moment in time, *and* we assume that our clocks are running at the same speed.

In the present experiment, we also make these two assumptions, except that the way the clocks started, and the way they maintained the same standard clock speed, *was by agreement* among the healers, participants, and experimenters. There are other ways of interpreting what may be happening in this type of study (as discussed later), but for now we will take a relativistic perspective and simply define that the moment E began a physiological recording session in Las Vegas was the *same* as the moment that E_{SP} began a healing session in São Paulo. We further assume that both clocks from that point ran at the same speed (at least until the end of the session).

After all healing sessions were completed, E_{SP} mailed the computer files containing the healers' counterbalanced instructions, one file per session, to the first author. These files also contained date and timestamps for each session. This data was evaluated using the same randomized permutation method used to evaluate the Group study data.

Hypothesis

The hypothesis was that the mediums' healing intention in São Paulo in July and August 1997 would be associated with significant changes in the individuals' autonomic physiology recorded in Las Vegas in May 1997. Directional effects were not predicted, thus two-tailed probabilities was used.

Results

Subjective Reports

Twenty sessions were planned, but a total of 21 volunteers wished to participate, so 21 sessions were conducted. Table IV summarizes information about

Table IV
Participant information overview for the Brazil study.

ID	Patients Time	Patients Date	Healers Time	Healers Date	Gender	Before	After	Experience	Belief	Motivation
601	13:36	5/19/97	21:19	7/25/97	F	4	4	1	3	3
602	11:22	5/21/97	21:44	7/25/97	F	5	5	6	7	7
603	12:00	5/21/97	22:11	7/25/97	M	1	4	4	4	7
604	14:34	5/21/97	21:06	7/30/97	M	4	4	6	4	5
605	12:28	5/22/97	21:31	7/30/97	M	1	4	7	7	7
606	16:12	5/22/97	21:56	7/30/97	F	6	4	7	6	7
607	11:32	5/23/97	22:20	7/30/97	F	5	4	6	6	6
608	11:01	5/25/97	21:13	8/12/97	M	3	4	1	1	4
609	12:02	5/25/97	21:31	8/12/97	F	4	4	4	5	5
610	11:02	5/26/97	21:55	8/12/97	M	3	6	5	5	7
611	11:56	5/26/97	22:19	8/12/97	M	4	3	4	3	7
612	12:40	5/26/97	22:43	8/12/97	F	4	4	4	4	4
613	13:39	5/29/97	23:07	8/12/97	F	1	4	7	7	7
614	14:34	5/29/97	21:04	8/14/97	F	6	4	6	7	7
615	15:41	5/29/97	21:27	8/14/97	F	5	4	6	7	6
616	17:50	5/29/97	21:51	8/14/97	F	3	4	6	7	6
617	14:50	5/30/97	22:14	8/14/97	M	4	4	5	6	7
618	16:22	5/30/97	22:38	8/14/97	F	4	4	4	7	7
619	17:06	5/30/97	23:02	8/14/97	F	4	4	7	7	4
620	18:46	5/30/97	21:54	8/19/97	M	4	4	7	7	4
621	19:53	5/30/97	22:21	8/19/97	F	4	4	5	7	7

the 21 volunteers and their answers to the questionnaire. The average age of the 13 women and 8 men was 50.3, ranging from 28 to 71. Participants' answers to questions about experience, belief and motivation showed that they were relatively enthusiastic about distant healing intention, and again they moved from various stages of discomfort before the session to fairly uniform levels of comfort afterwards.

Session Details

The "patient" recording sessions in the laboratory at the University of Nevada were uniformly unremarkable; most participants enjoyed relaxing in the chair for 20 minutes. The sessions with healers were more varied and will be described in more detail.

Three of the 21 healing sessions involved people who were not Umbanda healers but had a strong belief in distant mental intention effects. These included sessions 620 and 621, which were not conducted in the terreiro but in E_{SP}'s office in São Paulo. Session 620 also involved two people acting as healers, because they preferred to work together. Session 608 was originally run with a medium in the terreiro, but E_{SP} accidentally mistyped the epoch time-length, which caused the session to last 12 minutes instead of the planned 20. As a result, the same session was run again later in E_{SP}'s office with a non-Umbandan healer. Session 608 therefore had two different, partially overlapping counter-balanced sequences, but to avoid data selection this session was included in the overall analysis using the treatment/control sequence generated when it was run the second time.

The first three sessions and session 605 were conducted in silence in the terreiro. During the other sessions in the terreiro and in E_{SP}'s office, New-Age music was played. Drums commonly used during the mediums' rituals were not used for the healing sessions because Mãe Rute, the founder and leader of the terreiro, thought that the strong beating sounds would disturb the mediums' focus. Before the beginning of the sessions, Mãe Rute helped prepare the mediums by individually blessing them in the *quarto de santo* (the "saint's bedroom," a special sanctuary in the terreiro) to help them focus their attention on the upcoming session.

Mãe Rute also prepared the terreiro itself with incense and by lighting candles. During the healing rituals, the mediums wore their "guias," a necklace of different colors associated with the medium's patron saint, and all-white clothes. To help conform to this practice, the researchers also wore white clothes and shoes. No one was allowed to cross their legs or arms during the sessions, as this was thought to perturb the "energy stream." The non-Umbandan healers did not follow any special rules about the color of their clothes, but they too avoided crossing their arms and legs during the experimental sessions. This is because of the common belief in Brazil that mental interactions (*e.g.*, telepathy, distant healing) are mediated by energetic exchanges, and if you cross legs, fingers or arms the "energetic current" is interrupted.

To assist the healers' focus in a given session, they gazed at a photo of the "target" person displayed on the computer screen, and they also held the original

Table V
Results of 10,000 random permutations for the Brazil experiment.

Brazil	*p*	*z*	*r*	2-tail *p*
br	0.402	0.247	0.054	0.805
bv	0.854	-1.055	-0.230	0.291
bvp	0.007	2.473	0.540	0.013
eda	0.016	2.155	0.470	0.031
hr	0.229	0.743	0.162	0.457

consent form signed by that individual. It was explained to the healers that the distant "patients" were to be affected according to when the session had actually taken place, *i.e, in the past*, when their photos were taken and when they had signed the consent forms. The healers indicated that they understood this instruction.

Physiological Analysis

The effect size obtained for EDA, $r = 0.470$, was again larger than the previous meta-analytic average $r = 0.25$. In addition, the effect size for changes in blood volume was $r = 0.540$, again larger than previous meta-analytic estimates.[12] The other physiological measures did not significantly differ from chance. With adjustment for multiple tests, the blood volume pulse measure remained significant.

Figure 5 shows the effect sizes (with ±1 standard error bars) for both studies. Based on the observed changes in EDA, these results suggest that on average individuals in the Group study responded to distant healing intention by becoming more relaxed, whereas on average individuals in the Brazil study became more aroused. However, the overall picture is actually more complicated because breathing rate increased for the Group participants, which seems contrary to systemic relaxation, and fingertip blood volume increased for the Brazil participants, which seems contrary to systemic arousal.

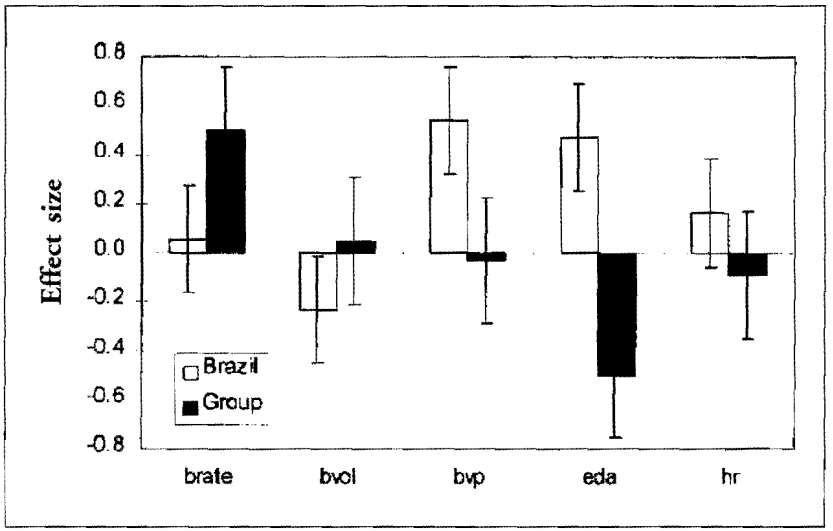

Figure 5. *Effect sizes for physiological measures in the Group and Brazil studies, with one standard errors bars. The values correspond to breathing rate, breathing volume, blood volume pulse in the fingertip, electrodermal activity, and heart rate.*

DISCUSSION

ALTERNATIVE EXPLANATIONS

Can these results be explained as design flaws, or artifacts? Schlitz and Braud suggest six alternative explanations for successful results in these types of experiments.[11]

1. *The results are due to sensory or subliminal cues passing between the healers and "patient" participants.* The participants and experimenter in the Group study were isolated from the healers by 200 meters, numerous concrete walls and three locked doors. In the Brazil study, they were separated by two months and 6,000 miles. Given that there were no other forms of communication between the healers and participants in these studies, this hypothesis can be rejected.

2. *The results are due to internal physiological rhythms that may have influenced the participant's autonomic nervous system activity.* This was ruled out through the use of a randomly counterbalanced schedule of treatment and control periods. With

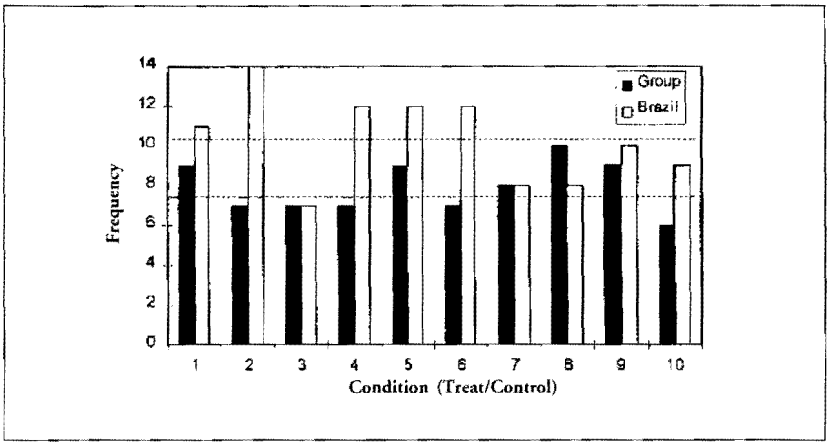

Figure 6. Count of the number of times the sequence "TC" was used in the Group and Brazil experiments, over all epochs (i.e., there were 20 epochs per session, based on 10 counterbalanced sequence-pairs). With proper random counterbalancing, we would expect approximately equal counts of the sequence TC as CT. Given a total of 15 sessions for the Group study, and 21 for the Brazil study, the expected frequencies for TC are 7.5 and 10.5, respectively. The expected counts are shown as dashed lines. Chi-squared tests show that the observed frequencies were selected uniformly at random.

proper random sequencing, there should be no systematic biasing effects due to physiological drifts or rhythms. Examination of the actual counterbalanced sequences (TC vs. CT) used in the two experiments, shown in Figure 6, confirm that the counterbalancing was adequately random.

3. *The results are due to chance correspondences between the healers' intentions and the participants' physiological responses.* The random permutation analysis used to estimate the probability of these differences showed that in both experiments, without making any assumptions about sample distributions or inter-sample autocorrelations, differences in two of the five physiological measures were significant at $p \leq .05$ (two-tailed).[40]

4. *The results are due to recording errors or misreadings of the data.* All data recording was fully automated. In addition, in the Brazil study, copies of all experimental materials and the raw physiological data were sent to the experimenters in São Paulo before the healers' counterbalanced sequence data were generated. Both parties independently maintained separate copies of all raw data. It is unlikely that this hypothesis can explain the results.

5. *Participants self-regulated their physiology to conform to the experimenter's expectations.* The double-blind protocol prevented the experimenter and participant from knowing anything about the healers' randomly counterbalanced sequence of treatment and control epochs, thus the experimenter had no expectations that could be conveyed to P.

6. *The results are due to arbitrary selection of data.* The number of sessions in each study was planned in advance, and all data were analyzed at the end of the study.

In sum, common methodological flaws that may generate artifactual results in these studies were taken into account by the experimental design. The obtained results are not adequately explained by known design flaws.

Experimental Differences

Why did the Group and Brazil experiments result in significant changes in EDA, but in opposite directions? The difference between the EDA results in the two studies is itself significant (see Table VI), and withstands adjustment for multiple testing.

We speculate that the difference was due to how the participants felt about being the object of remote intention in the context of the two experiments. Members of the Group experiment knew each other well, and they periodically came together as a group expressly to focus their intention on each other. Thus, Group participants would probably associate remote group intention with their feelings about local group intention—healing intention results in a pleasant, meditative, relaxed state. By contrast, the healers and patients in the Brazil study never met face-to-face, and the participants were probably more anxious about being remotely "affected" from the future, by spiritual mediums 6,000 miles away.

The empirical evidence supports this speculation. Experiments investigating "the feeling of being stared at" show that when the starers and starees are relative strangers, EDA significantly rises when remote staring takes place.[11] It is as though the body reflexively responds to remote staring as a threat, and this in turn causes autonomic arousal. However, individuals who are specifically trained in a dyadic meditative practice whereby they gaze into their partner's eyes while meditating, show a significant drop in EDA.[41,42]

Table VI

Difference between physiological results in the Group and Brazil experiments.

Condition	*p* (two-tail)
br	0.233
bv	0.379
bvp	0.067
eda	0.004
hr	0.440

INTERPRETATIONS

If these results are not due to obvious artifacts or to chance, then what is happening? Does DHI really *influence* a distant person's autonomic physiology? At first blush, this is the obvious implication (let's call it Interpretation 1), but influence is just one of at least four other interpretations.

Interpretation 2

Observed effects may be due to psi perception, in which the distant person unconsciously perceives the "nonlocal intention" of the healer and uses this suggestion to self-regulate their physiology.[43] The distinction between influence and perception is important, because DHI as a causal influencing force might be able to catalyze or even force dramatic healing effects to take place, such as those produced by the use of biochemical interventions like antibiotics. By contrast, DHI as a remote perceptual effect might be limited to producing still-effective, but quite a different sort of effect, similar to what can be achieved through mind-body techniques like hypnosis, placebo and biofeedback.

Interpretation 3

Another possibility is that the outcome of the experiment is determined by the individual who hits the button on the laptop computer to begin the healer's

session (let's call him or her the "starter"). This would require some type of precognition, or perhaps psychokinesis, or melding of the two since they are so difficult to separate experimentally.[44,45] Recall that when this button is hit, a program generates the random counterbalanced assignments for the treatment and control epochs. The random sequence depends on *when* the button is hit, thus if the starter had precognition and could perceive the future results of the experiment, then he or she could wait to start the session at a time that would provide a favorable match between the counterbalanced treatment/ control sequence and the future, spontaneous fluctuations of the distant participant's physiology. Or, if the starter were able to somehow influence the computer, this might also result in a favorable counterbalanced sequence.

Whether the precognitive possibility is viable depends on how long the starter has to wait. If the results of a given experiment require the starter to wait around for years, a precognitive explanation becomes less plausible. In the present studies, the counterbalanced sequence is generated by a pseudorandom number generator, which in turn is set by a seed number linked to the computer system clock. When the button is pressed, the program reads the clock time to the nearest second, and that is used as the seed number. Thus, if we assume that the participant's future physiology was not externally influenced at all, then we would obtain a new experimental outcome once per second, as the computer would generate a new counterbalanced sequence once per second.

How many seconds would the starter have to wait for a favorable time in the present studies? Let's take the results of the Brazil experiment as an example. In this case, two of the five physiological measures were significant at the $p < .032$ level, two-tailed. Assuming that these measures were independent (they aren't, but say they are), the cumulative binomial probability of up to two measures significant at this level out of five is $p = 0.0003$, which corresponds to a standard normal deviate (z score) of 3.42. If we further assume this $z = 3.42$ is akin to a combined z score over 21 sessions, then we would require an average score of $z = 0.75$ over each of 21 sessions to achieve this overall level of significance for the Brazil study. An average z of 0.75 is equivalent to a probability of $p = 0.28$. Events with this probability can occur by chance once in 1/.28 times, or about 1 in 4.4 times assuming each event is independent. In the present experiment, this means

that in principle the starter need wait only 4 to 5 seconds to get a favorable start time that would result in a per-session probability (for one physiological variable) of $p = 0.28$, or $z = 0.75$. This is plausible, thus in spite of the fact that none of the starters for the Group or Brazil studies reported any conscious effort to wait for the favorable time to begin each session, nor did they get session-by-session feedback (ever, by design), we cannot completely exclude the possibility of unconscious precognitive timing as an explanation of these results. The precognitive timing hypothesis has been developed in detail in the "Decision Augmentation Theory" of May, Utts and Spottiswoode.[46]

Interpretation 4

A fourth interpretation of these results is that nothing unusual happened until the data were analyzed. This is associated with so-called "observational theories" of psi effects, which are based on interpretations of quantum mechanics.[47,48] The essential idea is that unobserved data may remain in a undetermined, virtual state until it is collapsed into a more solid reality by the act of observation. This collapse is envisioned to involve consciousness in some way, leading to the speculation that study outcomes in psi experiments may conform to the wishes of the analysts, rather than the healers, the participants or even the experimenters.

While this idea challenges the assumptions of both realism and objectivism, both cornerstones of scientific method, numerous empirical studies have examined variations of this idea, labeled "observational effects," "retroactive PK," "expectation effects," and "checker effects." Cumulatively the evidence suggests that the first (and worse, maybe later) observers of experimental data somehow influence the data.[47,49]

In the present case, the first observer and first analyst of the data was the first author, who throughout these studies maintained an expectation—based on previous experimental outcomes—that these studies would be successful. Thus, we cannot dismiss the possibility that observer expectations played a role in the outcome.

Interpretation 5

A fifth idea is that the "us" vs. "them" dichotomy is misconceived from the start. That is, it may be that we are not dealing with healers, patients, and experimenters, but one "higher-order organism," or One Mind. From this perspective, which is inspired by the mystical world-view, what we see as anomalous coincidences between healers and patients, or for that matter between individuals and random number generators in psychokinesis experiments, or senders and receivers in telepathy experiments, all *look* like coincidences that transcend time and space, but they are actually due to our perspective. We do not ordinarily see that what appears to be two—healers and patients, individuals and random number generators, senders and receivers—are in fact one and the same.

As a metaphor, imagine that we have an aquarium with some fish in it. We setup a camera to observe the fish. We spot a goldfish, who will represent the patient in our experiment. We collect detailed data on its movements and infer models about its behavior. Now we setup a second camera at an angle which is orthogonal to our first camera. We spot a different fish, and call it the healer. We record its behavior. After a while we notice that there are peculiar coincidences between the behaviors of the two fish. When the healer moves a certain way, so does the patient. We have discovered a distant healing intention effect, or telepathy, or psychokinesis!

Except we've made a mistake. We thought we were looking at two fish, but it turns out we were looking at one fish the whole time. The one fish appeared to be two because it was seen from two different angles, and it looked different. But of course from a perspective outside the tank, we understand that our so-called anomalous correlation is not so anomalous after all. Instead, the anomaly was due to a mistake in assuming that the fish were different. And even if the fish *were* different, there could be another common, yet unseen influence, that controls the behavior of all of the fish.

Given this One Mind interpretation, perhaps the reason we do not ordinarily see perfect correlations in our experiments is because our cameras are not properly focused (imperfect measurements), the angles of the cameras shift during the experiment (stochastic variations), there are many fish involved (it

is not always clear what we're measuring), the aquarium moves (environmental effects), and the experimenter labors under the illusion that he/she is separate from the objects of study. However, the experimenter is, of course, inside the aquarium with the fish, and worse, is *identical to the objects of study.*

From this perspective, interpretations 1 through 4 are akin to discussing the behavior of shadows on the wall, blissfully unaware that the shadows are simply projections of a more comprehensive reality residing beyond our usual world-view. This is not to suggest that we live in an illusionary land, but rather that reality may be multiplexed or hierarchical, and while psi may be detected in our reality, it does not "originate" here.[50] That is, results in psi experiments are perfectly valid, not because we created something new, but because the correlations were already there and we happened upon a formalized way of detecting it.

CONCLUSION

This experiment adds to the empirical database supporting previous laboratory studies indicating that distant healing intention (DHI) is associated with statistically significant changes in human spontaneous autonomic physiology. The study on group healing intention resulted in a larger effect size for changes in electrodermal activity than observed in previous meta-analytic estimates involving individual intention. This suggests that groups may enhance DHI effects. Although it should be added that the present effect size was not statistically significantly larger than the earlier meta-analytic estimate.

The second study examined time and space-displaced DHI by spiritual healers located over 6,000 miles from the participants, and time-displaced two months in the future. Again, the effect size for changes in electrodermal activity was nearly twice as large as previous meta-analytic estimates. This suggests that use of professional healers may enhance DHI effects, and that DHI is independent of both space and time. But again, the effect size observed here was not significantly different from previous estimate due to the small sample size.

Finally, detection of effects that apparently transcend space and time highlights a methodological paradox. These studies rely upon conventional techniques

such as double-blinds, randomly counterbalanced conditions, and time-synchronized measurements, to study unconventional hypotheses. Overall, the studies provide evidence in favor of the hypotheses. But the hypotheses posit phenomena that challenge the very assumptions underlying the methods! That is, for informational, perceptual or energetic effects (however we wish to interpret these) that transcend time and space, the very concept of "double-blind" no longer makes sense. Nor does random counterbalancing, or sensory shielding, or precise time-synchronization. In other words, by strict use of standard methodologies, we have transcended the limits of those methodologies.

This puzzle resembles the ultimate outcome of systematically applying reductionistic methods in physics. That is, by probing ever-smaller bits of matter with better and better instruments, we finally discovered a quantum world which was so dramatically different from the world of common sense that fundamental assumptions about reality were (and still are) shaken.

In the present context, transcending our methodology implies that distant healing intention is genuinely beyond the conventional worldview. It is as though we are truly flatlanders, attempting to study higher- or other-dimensional phenomena, but we are limited to the tools that were developed in flatland. Perhaps, from this flat perspective, developing new methodologies more suited to those other dimensions should be our highest priorities for future research.

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21. In particular, it was explained that this study was specifically intended to examine short-term physiological changes in rhe "patient," and that no claims for medically relevant healing outcomes were being investigated or implied by the experimental procedure.
22. Written by the first author in Microsoft QuickBasic.
23. Physiology was generally recorded continuously for 24 minutes to provide a few minutes to calibrate and test the equipment before rhe session, and ro start the session with the phone call.
24. In actual practice, it turned out that the inter-epoch period lasted 19 seconds instead of 16 seconds because the original program was developed on a faster computer than the laptop used by the healers to generate their condition and timing information. The extra three seconds were probably caused by the laptop's slower disk access speed and screen display times. This time delay did not affect the final data analysis because the

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