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DISTANT INTENTIONALITY AND HEALING: ASSESSING THE EVIDENCE

Marilyn Schlitz, PhD, and William Braud, PhD

Marilyn Schlitz is director of research at the Institute for Noetic Sciences in Sausalito, Calif. William Braud is professor and research director at the Institute of Transpersonal Psychology in Palo Alto, Calif.

Since the 1950s, researchers have attempted to understand reports of distant or "psychic" healing, developing experimental protocols that test the distant healing hypothesis by measuring biological changes in a target system while ruling out suggestion or self-regulation as counterexplanations. This article provides a brief overview of these "healing analog" experiments. It also provides a summary and meta-analysis of 30 formal experiments in which self-reported healers, "psychics," and other self-selected volunteers attempted to influence autonomic nervous system activity in a distant person. Results across the experiments showed a significant and characteristic variation during distant intentionality periods, compared with randomly interspersed control periods. Possible alternative explanations for the reported effects are considered. Finally, the implications of distant intentionality are discussed for an understanding of the possible mechanisms of distant healing, the nature of the mind-body relationship, and the role of consciousness in the physical world. (Alternative Therapies in Health and Medicine. 1997;3(6):62-73)

In Siberia, a middle-aged woman contacts a shaman, whom she trusts to cure her ailing daughter, even though there are hundreds of kilometers between the healer and his patient. Healing, the woman believes, is possible through the power of the shaman's thoughts.

In a jungle in Papua New Guinea, members of the Kaluli tribe gather around a man whom they believe was killed by a distant sorcerer. It is a tragic circumstance, but not surprising for members of a culture in which it is believed that thoughts can create action at a distance.

In an urban setting in Northern California, a woman faces the serious illness of her elderly mother. With the aid of a prayer group from her church, she asks for divine help to restore her mother's health. Although the elderly woman has had no knowledge of her daughter's efforts, she reportedly recovers from her life-threatening illness within hours of the prayer.

These are isolated stories—but they are also connected. Indeed, from *botanicas* in Mexico to street markets in Senegal to the Desert of the Kalahari to healing shrines in Japan to suburban neighborhoods in the United States, we find people who believe that the intentionality[1] of one person can influence another person's health or state of being, even at a distance. Some believe that such influences—though typically associated with healing—may also be used for harm, depending on the intentionality of the practitioner or the actions of the patient.[2,3]

Are such beliefs misguided? It is well established in psychology that popular beliefs and attitudes are poor arbiters of "objective" truth, and anecdotes do not carry the same level of reliability as does the scientific method. Anthropological reports provide rich descriptions of what appear to be cases of intentionality at a distance. However, few attempts have been made to account for the observed effects (from seemingly miraculous healings to hex deaths) beyond psychological or psychosomatic explanations.[3-5] Is it possible that the ostensible efficacy of distant healing may be more than a psychological or self-regulatory effect? If so, how would we know?

To answer these provocative questions, we may turn to the area of psi research, where, for more than a century, small numbers of researchers have been applying strict scientific standards to the study of distant intentionality phenomena. Psi research involves the scientific study of anomalous phenomena including telepathy, clairvoyance, precognition, and psychokinesis.[6-8] Since the 1950s, researchers have attempted to study distant or "psychic" healing by developing experimental protocols that provide "healing analogs." Here, the distant healing hypothesis has been put to the test by measuring biological changes in a range of target systems while ruling out suggestion or self-regulation as counterexplanations.[9,10] It is the goal of this article to briefly overview these healing analog experiments, evaluating the strength of the database within one specific program of distant intentionality research and exploring the implications for our understanding of the possible mechanisms of distant healing, the nature of the mind-body relationship, and the role of consciousness in the physical world.

Reprint requests: InnoVision Communications, 101 Columbia, Aliso Viejo, CA 92656; phone, (800) 899-1712 or (714) 362-2050 (ext 532); fax, (714) 362-2022; e-mail, ivcReprint@aol.com.

EVALUATION ISSUES

Before we can evaluate the evidence for distant intentionality on living systems in the context of healing analog studies, it is helpful to remind ourselves of the criteria that must be satisfied to indicate the existence or nonexistence of the phenomenon under question. Belief versus evidence is not a straightforward issue. For example, we have all heard that "exceptional claims require exceptional proof." Of course, claims are only "exceptional" if they fail to fit within a particular frame of reference. We need not look far into our past, however, to see how scientific beliefs about the nature of reality have shifted from one view to another. The discovery of meteorites comes to mind. For centuries, peasants reported stones falling from the sky.[11] The French Academy of Science dismissed the peasants' stories as incredible at the time, but today scientists have no problem accommodating meteorites. Contemporary evidence that calls into question the dividing line between mind and matter raises provocative empirical challenges—in the same way that meteorites, radioactivity, atomic fission, and radio waves once did.

The field of psi research has been controversial throughout its history. Strong views frequently resist change, even in the face of data. Many people—including scientists—make up their mind about whether distant intentionality is fact or fiction without examining any data at all.[12-14] As one critic and skeptic of the field noted in a recent review: "The level of the debate during the past 130 years has been an embarrassment for anyone who would like to believe that scholars and scientists adhere to standards of rationality and fair play."[15] Although much of the skeptic/proponent debate has been useful, leading to stronger research designs and more sophisticated analyses, it has limited the ability to conduct a clear and unbiased evaluation.

Fortunately, we need not rely on arbitrary criteria to conduct a credible evaluation of the evidence for distant intentionality on living systems. Over the past half century, researchers have developed techniques for measuring possible distant intentionality effects on living systems, and for assessing probabilities so that chance expectation can be determined and criteria can be established for rejecting the null hypothesis.[9,10,16,17] Typically, the goal of these experiments has been to influence some objectively measured process in another living system. The best experiments use careful, controlled designs that rule out conventional sources of apparent effect, including physical manipulations, suggestion, and expectancy.

Recently, researchers have used meta-analysis as a tool for assessing large bodies of data. A meta-analysis is a critical and technical review of a body of published literature.[18] Going beyond the typical narrative literature review, a meta-analysis applies a variety of statistical inference techniques to reported data and attempts to draw general conclusions. The emphasis is on determining the level of replication across experiments of a specific type.[19] A good description of the issues pertinent to evaluating statistical replication can be found in Utts,[20] but they include the following concepts:

• *File Drawer.* Often in social and psychological sciences the measure of success is a P value equal to or less than .05. That is, assuming the truth of the null hypothesis, there is a 5% chance of observing a deviation as large in an independent test. Although the trend is changing, many researchers and technical journals have treated this value as a sharp threshold—studies quoting a P value of .055 are not published; those quoting .045 are. The "file drawer" represents those studies that were conducted but failed to meet the .05 threshold and were not published. Obviously, if researchers were only publishing 1 in 20 studies in the literature, a nonexistent effect would look "real" according to these standards. Any review of evidence must estimate the number of studies in the file drawer.

• *Statistical Power. P* values strongly depend on the number of trials in a study. An experiment may "fail to replicate," not because the phenomenon in question is not real, but because there were not enough trials in the study and therefore not enough statistical power to detect an effect. Rosenthal[18] and others have addressed this question by proposing a trial-independent measure of success called the "effect size." Reviewers must be cognizant of such "threshold" problems.

• *A Replication Issue.* The evidence for the existence of a phenomenon cannot rest on a single investigator or a single laboratory. How other laboratories attempt to conduct a replication of an earlier experiment is a general problem for social sciences.[12] For example, there is such a thing as an exact replication in which independent investigators try to duplicate the original protocol as closely as possible. These studies contribute toward the overall evidence; however, it is possible that some undetected artifact that is subtly embedded in the protocol might cause misinterpretation of the result. A conceptual replication, in which experiments address the broad concept but contain appreciably different methodological details, protects against such misinterpretations, lessens the chances for fraud, and guards against the possibility of inappropriate techniques. In a review of evidence in social sciences, conceptual or heterogeneous replications carry considerably more weight than do exact or homogeneous replications.

Following are (1) an overview of the field of distant intentionality on living systems research and (2) an evaluation of the robustness of the database within one specific research program through the use of a preliminary meta-analysis.

THE SCOPE OF DISTANT INTENTIONALITY RESEARCH

A range of so-called target systems has been used to study the possible effect of distant intentionality on living systems, with a range of possible studies that is nearly as diverse as are the processes within an organism that might be influenced.[21] Research participants have included healers, psychics, and unselected laboratory volunteers. The existing literature shows the typical stages of a research paradigm, moving from less to more systematic research over a period of 40 years. Despite vast differences in the database of more than 150 studies, the experiments generally fall into two major categories.

The first category is a direct analog of actual healing practices. It consists of studies in which a healer seeks to influence and mitigate a deleterious process or condition in a target organism. The aim is to improve the organism's vitality or decrease its morbidity. For example, biologist Bernard Grad, a pioneer in this field of study, watered seeds with saline solution that had been treated by a healer or solution that had not. In a careful, double-blind design, Grad found that the seeds watered with healer-treated saline were more likely to sprout and grow successfully.[22]

Another biologist, Carroll Nash, reported that the growth rate of bacteria could be influenced by conscious intention in controlled, double-blind studies.[23] Likewise, psychological researcher William Braud found a highly significant reduction, attributable to the effect of intention, in hemolysis rates of the participant's own blood cells held in a saline solution in test tubes in a distant room.[24]

Some studies in this category involved an attempt to influence the course of a naturally occurring disease or condition. For example, healers have successfully reduced the growth of cancerous tumors in laboratory animals, compared with growth rates for unhealed control animals.[25] In another example, volunteers successfully minimized complications related to heart disease in hospitalized patients, compared with untreated control patients.[26] It is in this latter case that we find research that bears the closest resemblance to healing per se.

Closely related to these experiments is a subset involving attempts to influence the course of an artificially induced disease or condition. For example, in a series of studies using mice—controlling for possible artifacts such as extra warmth from the hands—Grad and colleagues found that dermal wounds healed more rapidly when treated by healers.[27] Apparently, healers also have been able to increase the recovery rate of experimentally imposed wounds on the skin of human volunteers.[28] Statistical analysis typically shows that the rate of wound healing in the treatment group is significantly faster compared with a control group that is otherwise similar but receives no intentional healing treatment.

A second major category of distant intentionality on living systems involves the measurement of ongoing normal processes or behaviors in target organisms. The typical experiments are designed to have either neutral or beneficial effects. The research includes effects on long-term factors such as growth of plants or cell cultures[29] and short-term changes in motor behavior or physiological activity.[30] For practical reasons, the study of ongoing normal processes has received the most experimental attention.

In particular, numerous studies have addressed the question of whether physiological measures—specifically autonomic nervous system activity in humans—might be susceptible to distant intentionality. In one series of experiments, electrodermal activity (EDA) fluctuations were chosen as the physiological measure. Such measurements are readily made, are sensitive indicators, are known to be useful peripheral measures of the activity of the sympathetic branch of the autonomic nervous system, and have relevance to the area of healing research. Studies using these measures represent a coherent and methodologically consistent subset of the overall database of studies of the influence of distant intentionality on living systems. What follows is an overview and analysis of this subset of experiments; for specific details on each study, please refer to the original study report. We have chosen to focus on these experiments because they represent a well controlled and systematic program of study, because there have been heterogeneous replications in numerous laboratories by independent investigators, and because they are an area in which the authors have extensive experience.

Beginning in the 1970s, a series of experiments was conducted in which skin resistance was measured in the target person while an influencer in a separate room attempted to interact with the distant person by means of calming or activating thoughts, images, and intentions.[31] Based on relatively standard protocols across the 30 studies in this database, simple physiological measures showed a highly significant and characteristic variation during the distant intentionality periods, compared with randomly interspersed control periods.

The experiments involving autonomic nervous system activity as the dependent measure will be divided into two major sets of studies. In the direct intentionality set, 19 experiments involved an attempt by one person to influence the physiological activity of a distantly situated other person, without any direct perception of—but with some type of physiological feedback about—the latter. A total of 434 different people participated in these experiments: 317 as influencees, 105 as influencers, and 12 as experimenters.

In the remote observation set, 11 experiments were conducted that allowed the influencer to observe the distant person during random periods via closed-circuit television. A total of 230 individual sessions were conducted in these 11 experiments.

DIRECT INTENTIONALITY EXPERIMENTS

Whereas the specific details of the experiments differed slightly, the general method across studies involved the instructed generation of specific intentions by one person, and the concurrent measurement of autonomic nervous system activity in another person. Throughout the experiment the two persons occupied separate, isolated rooms, and all conventional sensorimotor communication between them was eliminated to ensure that any obtained effects were truly attributable to distant intentionality.

In a typical experiment, person A was instructed to try to induce a specific physiological change in person B. The expected psychophysiological effect was assessed by measuring the spontaneous EDA (skin resistance responses, or SRR) of person B during randomly selected recording epochs. During half of these epochs, interspersed randomly throughout the session, person A generated imagery designed to produce a specific somatic effect (decreased sympathetic nervous system activity in some cases, increased sympathetic activation in other cases). The remaining half of the epochs served as control periods during which person A did not generate the relevant intention. Person B, of course, was unaware of the sequence of the two types of epochs and was also "blind" to the exact starting time of the experiment, the number and timing of the various periods, and so on. In the majority of experiments, the influencee was instructed to make no deliberate effort to relax or to become more active, but rather to remain in as ordinary a condition as possible and to be open to and accepting of a possible influence from the distant influencer whom he or she had already met. The influencee was asked to allow his or her thought processes to be as variable or random as possible and to simply observe the various thoughts, images, sensations, and feelings that came to mind without attempting to control, force, or cling to any of them.

The influencer sat in a comfortable chair in front of a polygraph in another closed room. During control periods, the influencer attempted not to think about the influencee or about the experiment, but to think of other matters. During influence periods the influencer used the following strategies (either alone or in combination) in an attempt to influence the somatic activity of the distant influencee:

1. The influencer used imagery and self-regulation techniques to induce the intended condition (either relaxation or activation, as demanded by the experimental protocol) in himself or herself, and imagined (and intended for) a corresponding change in the distant subject.

2. The influencer imagined the other person in appropriate relaxing or activating settings.

3. The influencer imagined the desired outcomes of the polygraph pen tracings (ie, imagined few and small pen deflections for calming periods and many and large pen deflections for activation periods).

Rest periods in the various experiments ranged in duration from 15 seconds to 2 minutes between recording epochs. During those periods, the influencer was able to rest and prepare for the upcoming epoch.

To eliminate the possible influence of common internal rhythms and to remove the possibility that the influencer and the influencee just happened to respond at whim in the same manner and at the same time, it was necessary to formally assign to the influencer specific times for engaging in imagery. Such assignments had to be truly random, counterbalanced, and, of course, could not be known to the influencee (lest the influencee self-regulate his or her own physiology on the basis of such knowledge to confirm the expectations of the experimenter). The influencee's blindness with respect to the imagery/nonimagery sequence was maintained by keeping all participants (including the experimenter) blind regarding the sequence until preparatory interactions with the influencee had been completed and the session was about to begin. Only then, when the influencee and the influencer/experimenter team were stationed in their separate rooms, did the experimenter become aware of the proper epoch sequence for that session.

To evaluate the outcome of the protocol just described, the amount of EDA during the intentionality epochs is compared with that of the control epochs using conventional parametric statistical techniques. If the experimental protocol just described is not violated, and yet it is found that significantly greater somatic activity of an appropriate type occurs during the intentionality periods than during the control periods, we can conclude with confidence that a distant intentionality effect has occurred, and that the results cannot be attributed to (1) conventional communication channels or cues (because the two parties are isolated from contact with each other through the use of distant, isolated rooms); (2) common external signals, common internal rhythms, or rational inference of the imagery/nonimagery schedule and resultant appropriate self-regulation (because the imagery/nonimagery schedule is truly randomly determined and is unknown to person B); or (3) "chance coincidence" (because the level of responding to be expected on the basis of chance alone may actually be determined and compared statistically with the obtained response levels). What follows is an overview of the 17 experiments in the direct intentionality set.

Experiments 1 through 4—Mind Science Foundation

These experiments, designed by William Braud and colleagues at the Mind Science Foundation, were considered demonstration-of-effect or proof-of-principle studies.[30,32,33] The experiments involved male and female volunteers as "receivers" of the distant intentionality effects. These participants were not selected on the basis of any special physical, physiological, or psychological characteristics; they could best be described as "self-selected" on the basis of their interest in the topics being researched. In experiment 1, the distant intentionality influencer was the experimenter; in experiment 2, it was a well known psychic healer; in experiments 3 and 4, this role was played by unselected volunteers. Overall significance in the distant intentionality effected was reported in three of the four experiments. There appeared to be no important differences in the effect due to the type of influencer involved.

Experiments 5a and 5b—Mind Science Foundation

In this experiment investigators[31] were interested in whether those with a greater "need" for a possible calming influence would evidence stronger results than those without such need. Therefore, for that experiment, individuals who self-reported symptoms of greater than usual sympathetic autonomic activation (eg, stress-related complaints, excessive emotionality, excessive anxiety, tension headaches, high blood pressure, ulcers, or mental or physical hyperactivity) were selected as influencees. The latter were also screened in an initial EDA recording session to guarantee that they did, in fact, exhibit greater than average sympathetic autonomic activity. For this study, the influencers were the experimenters. A significant calming effect was observed for the group who had greater sympathetic autonomic activation (ie, greater need to be helped remotely).

Experiment 6—Mind Science Foundation

This experiment explored the role of feedback to the influencer.[34] Three experimenters tested the abilities of 24 unselected volunteer influencers to decrease the spontaneous EDA of 24 distant volunteer influencees. For half of each session, trial-by-trial polygraph feedback of the EDA of the influencees was provided to the influencer and experimenter. For the other half of each session, feedback was not provided, and the influencer simply closed his or her eyes and imagined the desired outcome. Significant differences were found in the nonfeedback condition, but not in the feedback condition.

Experiment 7—Mind Science Foundation

This experiment[34] investigated the target person's ability to block an unwanted distant intentionality influence upon his or her own physiological activity. Two experimenter/influencers attempted to increase the EDA of the distant persons. Sixteen influencees were instructed to "shield" themselves—using psychological attention, imagery, and intentional strategies—from the distant intentionality influence. Sixteen persons were instructed to cooperate with the distant intentionality effect, without knowing, of course, when such efforts were being attempted. The influencers were unaware of whether a particular influencee was "blocking" or not.

Experiment 8—Mind Science Foundation

This experiment[34] explored the specificity or generality of the effect by means of simultaneous measurements of several physiological systems (EDA, pulse rate, peripheral skin temperature, frontalis muscle tension, and breathing rate). There were two conditions in the experiment. In the standard condition, three experimenter/influencers attempted to calm the distant person's physiology. In the instructed specificity condition, the influencers were asked to attempt to make their distant intentionality influence as specific as possible. Feedback was provided for only the EDA measure.

Experiment 9—Mind Science Foundation

Experimenters served as influencers for 30 sessions in which the aim of the study was to determine whether increments or decrements in EDA might be more readily produced via distant intentionality influence.[30]

Experiment 10—Mind Science Foundation

Experimenters served as influencers for 30 sessions in which a within-subjects design was used to learn whether the magnitude of the remote intentional influence could be voluntarily self-modulated by the influencers[30]; there were attempts to produce large or small changes on different occasions.

Experiment 11—Mind Science Foundation

This experiment involved unselected volunteers and three trained Reiki healing practitioners.[35]

Experiments 12, 13a, and 13b—Mind Science Foundation

This involved a pilot study and two formal experiments designed to test a particular theoretical interpretation of remote intentionality effects, an "intuitive data sorting" or "decision augmentation" model (a description of which goes beyond the scope of this article).[36] The test of the model involved two methods of randomly selecting the sequences of remote calming and remote activation intentions. The pilot involved a total of 40 sessions in which selected influencers worked with unselected influencees. No overall significance was found. In the formal studies, 32 sessions were conducted in which there were fewer opportunities for a decision augmentation to occur. In these sessions, a significant remote intentionality effect was reported (experiment 13a). In the 32 sessions in which there were greater opportunities for decision augmentation, however, there was not a significant remote intentionality effect. Although consistent with the existence of a remote intentionality effect, these outcomes were not supportive of the decision augmentation model that was being tested. Additional details may be found in Braud and Schlitz.[37]

Experiment 14—University of Edinburgh

This was a first attempt at closely replicating the Mind Science Foundation remote intentionality work by researchers at another laboratory. The study was conducted at the University of Edinburgh, Scotland, by three experimenters.[38] This replication study consisted of 16 sessions involving a total of two new experimenters, six new influencers, and nine new influencees. The obtained *t* score, though not independently significant, yielded an effect size virtually identical to the average effect size obtained in prior studies of this type (r=.27).

Experiment 15—University of Edinburgh

This was a conceptual replication of the EDA remote intentionality work in which positive versus neutral emotions were experienced by the influencers and intended to affect the remote influencees.[39] An identical response measure of the effect yielded a P of .08 and an effect size identical to the mean effect size observed in prior studies (r=.25). Other response measures, not reported here, also yielded significant outcomes.

Experiment 16—University of Nevada, Las Vegas

This conceptual or systematic replication by Wezelman et al[40] involved 11 sessions with three new experimenters, three new influencers, and three new influencees. It did not yield a significant outcome, and results went in a direction not predicted.

Experiment 17—University of Nevada, Las Vegas

An additional systematic or conceptual replication[41] involved 16 sessions, two new experimenters, two new influencers, and two new influencees. The experiment yielded a highly significant remote intentionality outcome and large effect size.

REMOTE OBSERVATION EXPERIMENTS

Many people have had the experience of being stared at from a distance, only to turn around and discover a pair of gazing eyes focused on them. Indeed, survey data support the widespread distribution of these experiences. As early as 1913, JE Coover reported that 68% to 86% of respondents in California had had this type of experience on at least one occasion. A survey of the Australian population reported that 74% of the respondents had had such an experience,[42] 85% within a student population at Washington University in St Louis,[43] 94% of those surveyed in San Antonio, Tex,[44] and 80% of those informally surveyed in Europe and America.[45] Several attempts have been made to explore these claims within a laboratory setting. A review of this literature was reported by Braud et al,[44] who identified four studies prior to the ones reported here that made use of conscious guessing as the dependent measure.

Based on these four studies, Braud et al[44] concluded that there is suggestive evidence to support the hypothesis that people can consciously discriminate periods of covert observation from nonobservation under conditions that controlled for subtle sensory cues. The effect size in these studies was not particularly strong, however. According to Braud and colleagues,[44(p376)] this could have been due to the fact that "the testing method used in these studies was not the most appropriate one." In particular, the authors argued that the use of conscious guessing might be less relevant to everyday life experiences, in which detection of an unseen gaze takes the form of bodily sensations and spontaneous behavioral changes. For example, people frequently report the prickling of neck hairs or the tingling of the skin. What follows is a summary of the 11 experiments in this set.

Experiments 1 through 4—Mind Science Foundation

Braud and colleagues[44] designed an experimental procedure based on the hypothesis that remote observation may be detected at the level of sympathetic autonomic nervous system activity. In a series of four experiments,[46] a person stared at a distant participant through the use of a closed-circuit television system while the autonomic nervous system (electrodermal) activity of the latter person was being monitored via chart recorder and computer. The experimental design, as in previous studies involving remote mental influences on human physiology,[30,37] allowed a within-subjects evaluation of covert observation compared with nonobservation (control) periods. The researchers reported that the EDAs of "starees" correlated significantly with the intense attention of the isolated and remote observers in each of the four experiments; effect sizes ranged from .25 to .72. Results were bidirectional, depending on the attitude of the observer and the psychological conditions in effect at the time of the session.

Experiments 5 and 6—Cognitive Sciences Laboratory, Science Applications International Corporation

Designed by Marilyn Schlitz and Stephen LaBerge, these experiments examined intentionality influences of a remote observer, using within-subjects evaluations of experimental sessions that compared mean level of skin conductance response during the covert-observation and control conditions.[47] The goal was to replicate the effect in an independent laboratory, and to focus the effect in the direction of increased EDA. As predicted, skin conductance activity during the covert observation periods was significantly elevated compared with control periods in each of two studies. The effect sizes were .36 and .44.

Experiments 7 through 9—University of Hertfordshire

Three attempted replications of the Braud and Schlitz work on autonomic nervous system detection of remote staring were carried out by researchers at the University of Hertfordshire.[48,49] None of these three studies was independently significant; effect sizes ranged from .26 to .14.

Experiment 10 and 11—University of Hertfordshire

Because differences in results have been correlated with experimenters, this study was designed to test for a distant intentionality experimenter effect. Using the same laboratory, procedure, equipment, and participant population, two researchers (Richard Wiseman and Marilyn Schlitz) replicated his or her initial results—Schlitz's data producing significant deviations from chance and Wiseman's data producing a chance result.[50] This experiment suggests that the intentionality of the experimenter may be an important variable in the outcome of distant intentionality studies.

RESULTS ACROSS EXPERIMENTS

Thirty experiments using the methods described above have been published as of this writing. In most experiments, the primary method of analysis involved a comparison of the proportion of EDA, which occurred during the distant intentionality epochs of a session, with the proportion expected on the basis of chance alone (ie, .50). Chi-square goodness-of-fit tests indicated that the distribution of obtained session scores did not differ significantly from a normal distribution; therefore, parametric statistical tests were used for their evaluation. Single-mean t tests were used to compare the obtained session scores with an expected mean of 0.50.

Summary statistics for the 19 direct intentionality experiments are presented in Table 1. For experiments (such as direct intentionality experiments 5 and 13) in which significant differences obtained between different subconditions and/or in cases in which a priori decisions had been made to evaluate certain groups separately, scores are presented for each subcondition; otherwise, scores of subconditions are combined and presented for the experiment as a whole. The number of sessions contributing to each experiment varied from 10 to 40. The single-mean t tests produced independently significant evidence for the distant intentionality effect (ie, an associated P of .05 or less) in 7 of the possible 19 cases, yielding an experiment-wise success rate of 37%. The experiment-wise success rate expected on the basis of chance alone is 5%.

Results for the 19 direct intentionality experiments are presented in other forms in Table 1 and Figure 1. For these presentations, we calculated z scores and effect size scores for the overall results of each experiment. The z scores were calculated according to the Stouffer method,[19] which involves converting the studies' obtained P values into z scores, summing these z scores, and

TABLE 1 Studies of direct intentionality influences on electrodermal activity: statistical summary of 19 successive experimental series

Experimental series	**Single mean *t***	***df***	***P***	***z*†**	**Effect size *r***
Braud and Schlitz[29]					
Experiment 1	3.07	9	.0065	2.73	.72
Experiment 2	2.04	9	.035	1.81	.56
Experiment 3	2.96	9	.0077	2.42	.70
Experiment 4	-0.76	9	.736	-0.63	-.25
Experiment 5a	2.40	15	.014	2.20	.53
Experiment 5b	-0.09	15	.537	-0.09	-.02
Experiment 6	1.77	23	.043	1.72	.35
Experiment 7	1.15	31	.13	1.13	.20
Experiment 8	0.45	29	.33	0.44	.08
Experiment 9	0.44	29	.33	0.43	.08
Experiment 10	1.31	15	.10	1.28	.32
Experiment 11	0.62	14	.28	0.58	.16
Experiment 12	0.21	39	.41	0.23	.03
Experiment 13a	2.41	31	.02	2.08	.40
Experiment 13b	-0.53	31	.70	-0.52	-.09
Radin et al[38]					
Experiment 14	1.07	15	.15	1.04	.27
Delanoy and Sah[39]					
Experiment 15	1.41	31	.08	1.41	.25
Wezelman et al[40]					
Experiment 16	-0.58	10	.71	-0.56	-.18
Rebman et al[41]					
Experiment 17	4.07	15	.0005	3.30	.72
Overall results for 19 experiments		**398**	**.0000007**	**4.82**	**.25**

* All *P* values are one-tailed
† *z* values are presented for Stouffer *z* purposes

dividing by the square root of the number of studies being combined; the result is itself a *z* score that can be evaluated by means of an associated *P* value. These 19 experiments yield an overall Stouffer *z* of 4.82, which has an associated *P* value of .0000007. The effect sizes shown in Table 1 and in Figure 1 are *r* values, which are particular forms of the effect size measures recommended for meta-analyses of scientific experiments.[19,51,52] The *r*'s were calculated according to the formula $r=\sqrt{[t^2/(t^2 + df)]}$. These effect sizes varied from -0.25 to +0.72, with a mean *r*=+.25, and compare favorably with effect sizes typically found in behavioral research projects.

Summary statistics for the 11 remote observation experiments are presented in Table 2 and Figure 2. The number of sessions contributing to each experiment varied from 16 to 30. The single-mean *t* tests produced independently significant evidence for the remote observation effect (ie, an associated *P* of .05 or less) in 7 of the possible 11 cases, yielding an experiment-wise success rate of 64%, compared with a success rate, expected on the basis of chance alone, of 5%. These 11 experiments yielded an overall Stouffer *z* of 3.87, which has an associated *P* value of .000054. The effect sizes ranged from -.57 to +.50, with a mean of + .25, which is identical to the mean effect size obtained in the 19 direct intentionality experiments. Shown also in Table 2 and Figure 2 are results of a "sham control" test conducted in connection with experiments 3 and 4. In this sham control, data were treated as they were in a true remote observation study, but remote observation did not, in fact, occur. Chance results were found, as expected, in this special control condition.

If the results of all 30 EDA experiments are combined for the purpose of a global evaluation, the overall summary statistics

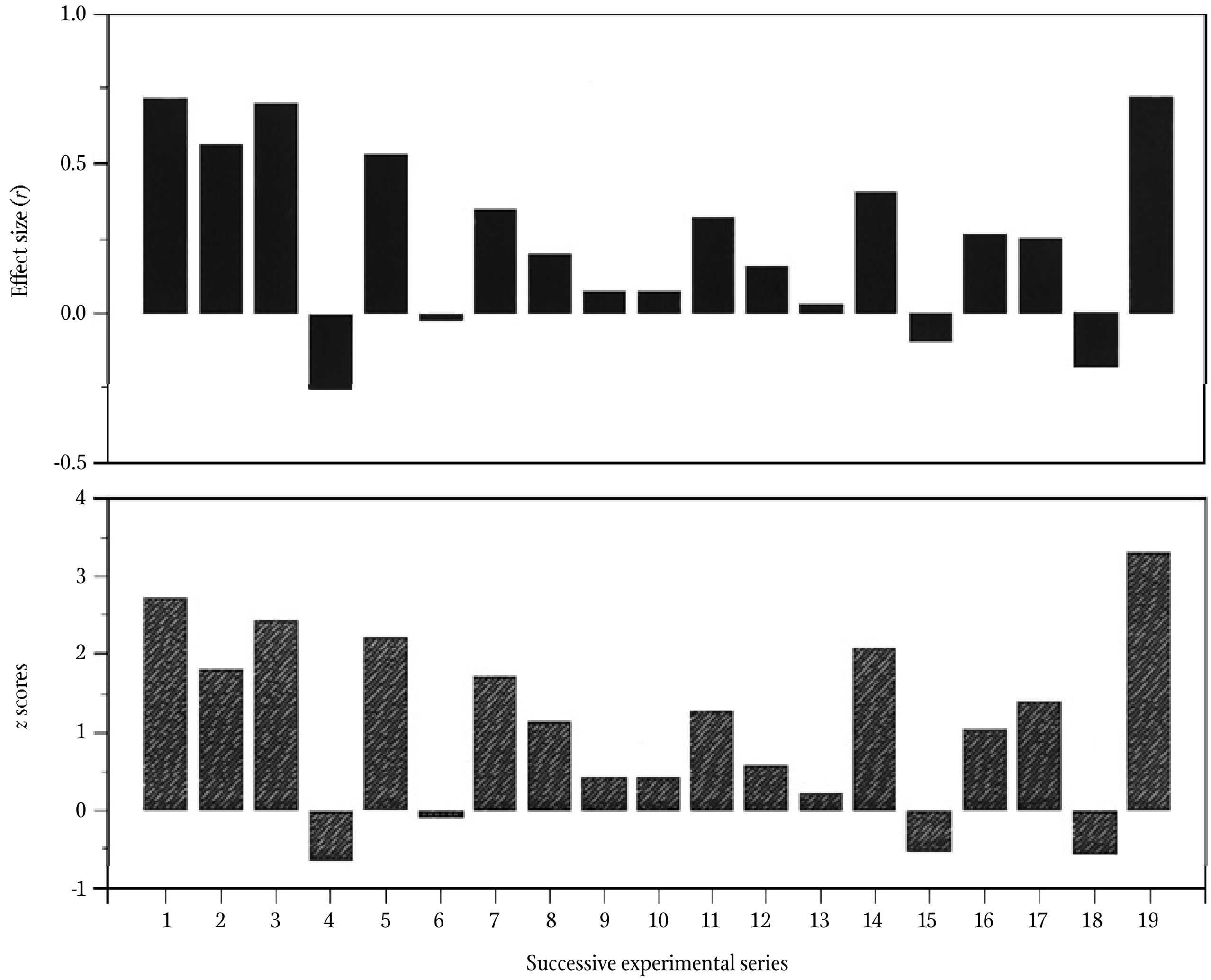

FIGURE 1 Effect sizes (*r*) and *z* scores for 19 successive experiments in which one person attempted to influence another person's electrodermal activity through remote intentionality. Negative signs are used to indicate results inconsistent with the direction of the overall findings.

are as follows: the single-mean *t* tests produced independently significant evidence for the remote intentionality or remote observation effect (ie, an associated *P* of .05 or less) in 14 of the possible 30 cases, yielding an experiment-wise success rate of 47%, compared with a success rate, expected on the basis of chance alone, of 5%. These 30 experiments yielded an overall Stouffer *z* of 6.17, which has an associated *P* value of 4.58×10^{-10}. The average effect size (*r*) is +.25.

Inspection of Tables 1 and 2 and Figures 1 and 2 suggests that a distant intentionality effect did not occur in all experiments, but that across experiments the data show a relatively consistent effect size that appears replicable and robust. In terms of its magnitude, the effect is not a negligible one. Under certain conditions, the distant intentionality effect can compare favorably with an imagery effect upon one's own physiological activity. Although it is not reviewed in this article, an autonomic self-control experiment was conducted immediately following direct intentionality experiment 5.[31] In this psychophysiological self-regulation study, volunteers attempted to calm themselves using relaxing imagery during ten 30-second periods, and their EDA during those periods was compared with activity levels during 10 interspersed nonimagery control periods. The strength of the self-control imagery effect in that study (an 18.67% deviation) did not differ significantly from the strongest distant intentionality effect of experiment 5 (a 10% deviation).

ALTERNATIVE HYPOTHESES

It is important to address various alternative hypotheses that might be proposed to account for the results presented in this review. These alternatives are described below, along with

TABLE 2 Studies of electrodermal detection of remote observation: statistical summary of 11 successive experimental series

Experimental series	Single mean *t*	*df*	*P*	*z*	Effect size *r*
Braud et al[44,46]					
Experiment 1: Untrained participants	-2.66	15	.02*	-2.37	-.57
Experiment 2: Trained participants	2.15	15	.025	1.98	.48
Experiment 3: Replication 1	1.92	29	.03	1.85	.34
Experiment 4: Replication 2	2.08	15	.025	1.91	.47
Schlitz and LaBerge[47]					
Experiment 5: First experiment	1.88	23	.036	1.80	.36
Experiment 6: Second experiment	2.36	23	.014	2.20	.44
Wiseman and Smith[48]					
Experiment 7: Electrodermal activity experiment	1.45	29	.08	1.41	.26
Wiseman et al[49]					
Experiment 8: First experiment	0.66	21	.26	0.64	.14
Experiment 9: Second experiment	0.91	19	.19	0.88	.20
Wiseman and Schlitz[50]					
Experiment 10: Wiseman experiment	0.48	15	.32	0.46	.12
Experiment 11: Schlitz experiment	2.25	15	.02	2.07	.50
Braud et al[46]					
Sham control	0.30	15	.38	0.31	.08
Overall results for 11 experiments		**230**	**.000054**	**3.87**	**.25**

* This *P* value is two-tailed; all others are one-tailed

rationales for discounting each of them. In the following paragraphs, the term "observer" is used to include both the influencers of the direct intentionality studies and the starers of the remote observation studies; the term "observee" is used to include both influencees in the direct intentionality studies and the starees in the remote observation studies.

1. The results are due to sensory cues or other uncontrolled external stimuli. Based on the experimental design, this alternative hypothesis can be rejected. There were no known or obvious factors that could have influenced the observee based on the random schedule of experimental and control periods.

2. The results are due to internal rhythms that may have influenced the observee's autonomic nervous system activity. This potential artifact has been ruled out with the use of a random and counterbalanced schedule of experimental and control periods.

3. The results are due to chance correspondences between the observer's observations and the observee's physiological responses. The use of conventional statistical techniques, as well as the existence of nontrivial effect sizes in the predicted direction, minimize the likelihood of coincidence.

4. The results are due to recording errors or motivated misreadings of the data. The data were recorded through the use of an automated procedure that eliminated human error in data recording.

5. Observees knew the target sequence and so manipulated their physiology to conform to the experimenter's expectations. The use of a random sequence that was accessed after all preexperimental interactions with the observee ruled out this potential artifact.

6. The results are due to arbitrary selection of data. The number of trials and subjects was specified in advance and the reported analyses include all recorded data that fell within the experimental protocol.

DISCUSSION

This article began by asking whether beliefs in distant intentionality and healing may simply be misguided. Although reported instances of healing in everyday life may turn out to be effects of ordinary treatments, physical influences from the healer (such

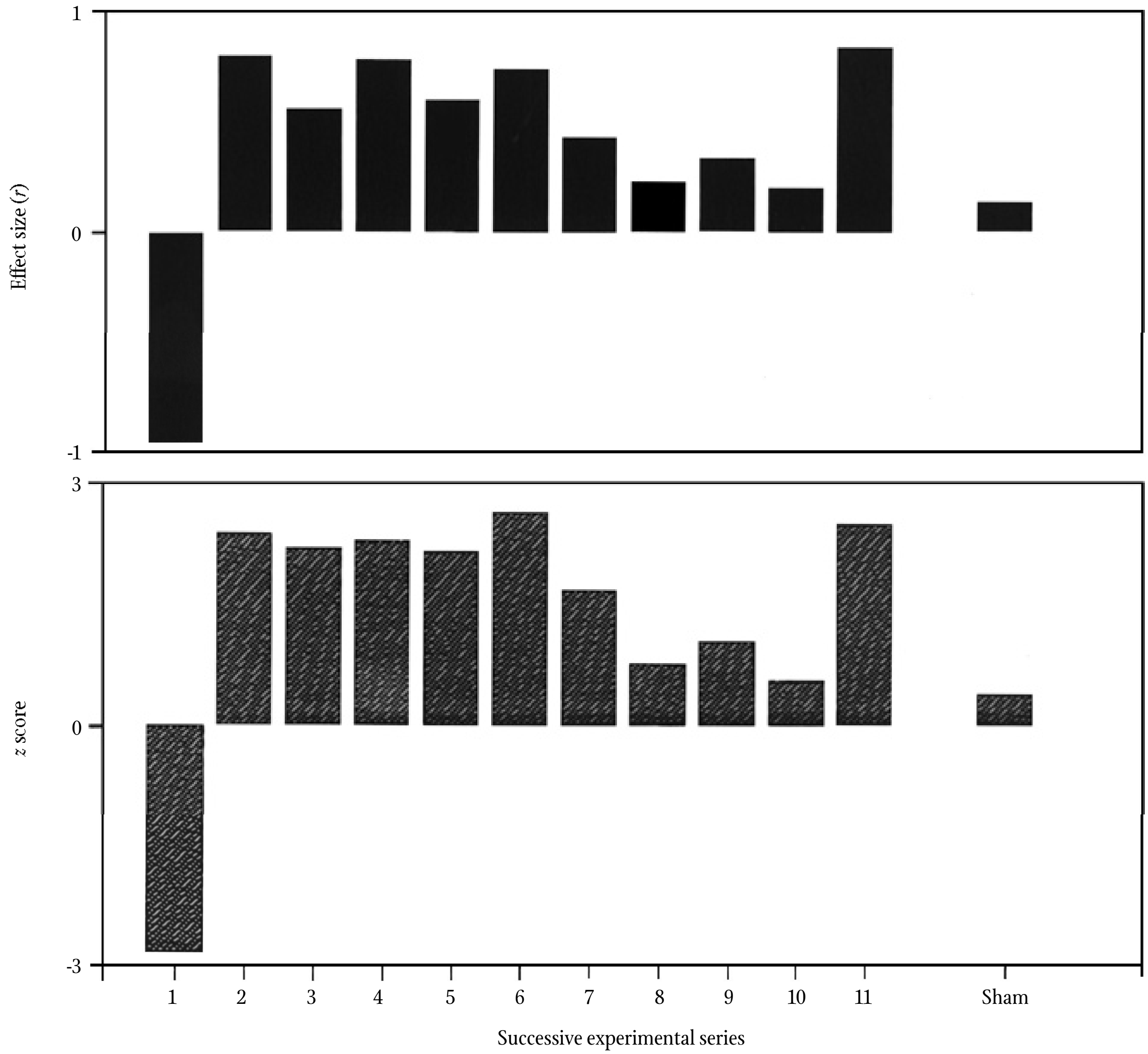

FIGURE 2 Effect sizes (*r*) and *z* scores for 11 successive experiments in which electrodermal activity was used as an indicator of autonomic detection of remote staring. The "sham" indications are for control sessions in which remote staring did not occur. Negative signs are used to indicate results inconsistent with the direction of the overall findings.

as heat or electromagnetic or static electrical fields), or other conventional sources including the simple passage of time (spontaneous recovery),[53] they may also include conscious or unconscious distant intentionality effects.[54] A primary research goal has been the development of methods through which distant intentionality effects might be isolated and distinguished from other influences.

Based on a review of this experimental literature, the statistical results are beyond what is expected by mean chance expectation. With relatively consistent findings from different laboratories, it is unlikely that the results are due to some systematic methodological flaws. It is with confidence, therefore, that researchers reject the null hypothesis. Whereas the distant intentionality effect sizes are small, they are comparable to—or, in some cases, eight times larger than—those reported in some recent medical studies that have been heralded as medical breakthroughs.[20,55] In short, based on the standards applied to other areas of science, distant intentionality effects on biological systems, like other areas of psi research,[56,57] appear promising for future inquiry.

Distant intentionality is a challenging, important, and potentially useful area for scientific research. There is increasing interest in and use of alternatives to conventional medicine. In service of this interest, there is a need for carefully controlled experimental research to assess the viability and the proper application of intentional healing and related practices.

A particularly intriguing possibility is that the various remote intentionality influences reviewed in the report may occur not only nonlocally with respect to space (as these studies already have indicated) but also nonlocally with respect to time. Such a possibility could allow direct attentional and intentional influences to be directed "backward in time" to influence probabilistic events involved in seed moments or initial formative conditions harmful or helpful to health and well-being. These processes could provide adjunct modalities for preventive healthcare. We explored such retroactive intentionality effects empirically as early as 1979,[33] and discuss such possibilities more thoroughly in a separate article.[29] The authors are engaged in ongoing research projects addressing this issue.

As with any progressive research program, the results of this work present new problems for future research. The scientific community seems to believe that explanations for the claimed results of the distant intentionality work will be forthcoming through modifications in our current scientific models.[58,59] Although this may be the case, it is equally possible that the data will help us to reflect on and potentially revise the epistemological and ontological assumptions that are used to guide modern science itself. In this way, distant intentionality research may lead us to a new way of knowing about the world and our place within it.

Following the relativistic views of science recently advanced by works in the history, sociology, and philosophy of science, we may recall that science deals with models and metaphors representing certain aspects of experienced reality.[60] Any model or metaphor may be permissible if it is useful in helping to order knowledge, even though it may seem to conflict with another model that is also useful. (The classic example is the history of wave and particle models in physics.) It is a peculiarity of modern science that it allows some kinds of metaphors and disallows others. It is perfectly acceptable, for example, to use metaphors that derive directly from our experience of the physical world (such as "fundamental particles" or "acoustic waves"), as well as metaphors representing what can be measured only in terms of effects (such as gravitational, electromagnetic, or quantum fields). It has also become acceptable in science to use more holistic and nonquantifiable metaphors such as organism, personality, ecological community, or universe. It is taboo, however, to use nonsensory "metaphors of mind"—metaphors that tap into images and experiences familiar from our own inner awareness.[61] We are not allowed to say, scientifically, that some aspects of our experience of reality are reminiscent of our experience of our own minds—to observe, for example, that distant intentionality phenomena might indicate some supra-individual, nonphysical mind.

Social philosopher Willis Harman[62] speaks of the need for a new epistemology that employs broader metaphors and recognizes the partial nature of all scientific concepts of causality. (For example, the "upward causation" of physiomotor action resulting from a brain state does not necessarily invalidate the "downward causation" implied in the subjective feeling of volition.) A new epistemology would implicitly question the assumption that a nomothetic science—one characterized by inviolable "scientific laws"—can in the end adequately deal with causality. In our search for a better understanding of the mechanisms underlying distant healing, the most fundamental issue is whether consciousness is *real* in some nontrivial sense. Can it be "causal"? Results reported here and elsewhere[63,64] suggest that consciousness may be causal, or that, in some ultimate sense, there may be no causality—only a whole system evolving.[65] In the latter case, distant intentionality might not be an anomaly ... but part of another order of reality.

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