WELLNESS IMPLICATIONS OF RETROACTIVE INFLUENCE: EXPLORING AN OUTRAGEOUS HYPOTHESIS.

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Virtually all medical and psychological treatments and interventions—conventional as well as complementary and alternative—are assumed to act in present time on present, already well-established conditions. An alternative healing pathway is proposed in which healing intentions—in the form of direct mental interactions with biological systems—may act in a "backward," time-displaced manner to influence probabilities of initial occurrence of earlier "seed moments" in the development of illness or health. Because seed moments are more labile, freely variable, and flexible, as well as unusually sensitive to small influences, time-displaced healing pathways may he especially efficacious. This unusual hypothesis is supported by a review of a substantial database of well-controlled laboratory experiments. Theoretical rationales and potential health applications and implications are presented. (Altern Ther Health Med. 2000;6(1):37-48)

> *Backward, turn backward, O Time, in your flight,*
>
> *Make me a child again, just for tonight.*
>
> —Elizabeth Akers Allen, *Rock Me to Sleep, Mother*

> *What may he done at any time will he done at no time.*
>
> *—Old Scottish proverb*

What if it were indeed possible to turn time backward in its flight and exert real influences on what is "past"? This logically outrageous possibility has been alluded to several times in previous issues of this journal. Dossey[1] and O'Laoire[2] considered the feasibility of time-displaced or backward-acting influences in the context of prayer, and Schlitz and Braud[3] broached this possibility in their review of studies of direct mental influence upon biological systems.

Dossey[4] has explicitly raised the possibility of "time-displaced health" and "time-displaced illness," and has provided clinical examples that may be consistent with the action of consciousness outside of concurrent time. The idea that mental intentions in the present could have direct, observable influences on the past may at first seem like science fiction. Upon closer examination, however, it can be discovered that there exist surprisingly strong theoretical rationales for—and a substantial body of empirical findings consistent with—this unusual idea. In this article I will review the thinking and evidence bearing on this outrageous hypothesis and discuss the implications of the evidence for physical and psychological health and well-being.

EVIDENCE FOR CONCURRENT DIRECT MENTAL INFLUENCE ('REAL-TIME PSYCHOKINESIS')

There exists a substantial experimental database for con-current direct mental influences, or what might be called "real-time psychokinesis (PK)" (mind-over-matter) effects. Careful laboratory research, conducted since the 1930s, has yielded evidence consistent with the conclusion that, under certain conditions, people

are able to influence sensitive, labile physical systems by intending, willing, imagining, visualizing, or "wishing for" desired outcomes. These outcomes occur when the human influencers are at a distance from the target systems and the targets are effectively shielded from all conventional informational and energetic influences.

The inanimate target systems for these studies typically include random mechanical systems (such as bouncing dice or other small objects) or electronic random event generators (REGs) that operate on the basis of radioactive decay or thermal noise in semiconductor components. Exhaustive meta-analyses of inanimate PK studies have yielded impressive results. Radin and Ferrari[5] systematically analyzed 148 studies of direct mental influence of dice, conducted between 1935 and 1987, and concluded that real direct mental influence (PK) effects existed in this database of nearly 2.6 million trials. They also presented and successfully addressed the various criticisms that had been marshaled against such experiments. Radin and Nelson[6] reported a similar extensive meta-analysis of 597 studies of direct mental influence of electronic REGs that had been conducted between 1959 and 1987. Here, too, they found strong and consistent evidence for real PK effects on these inanimate target systems. Subsequent meta-analyses of still more REG data yielded similar, positive findings.[7-11]

In addition to inanimate targets, animate target systems have been used extensively and successfully in direct mental influence experiments. Well-designed studies demonstrating distant mental influence of living systems were carried out as early as the 1920s and 1930s by experimental physiologists working in Russia. In a series of careful experiments, investigators were able to observe direct mental influences on motor acts, visual images and sensations, sleeping and waking, and physiological reactions (changes in breathing and electrodermal activity [EDA]) in people stationed at remote locations and shielded from all conventional interactions. These Russian research teams included many investigators who are now well known for their work in more conventional areas of physiology, conditioning and learning, and higher nervous activity—investigators such as Vladimir Bekhterev, K. I. Platonov, A. G. Ivanov-Smotensky, and Leonid Vasiliev. This early work has been summarized by Vasiliev[12] and by Braud.[13, 14]

During this same period, similar studies were carried out in other countries. There were French experiments on inducing hypnosis at a distance (conducted by such notable investigators as Pierre Joire, Joseph Gibert, Pierre Janet, and Charles Richet) and Dutch experiments on remote influence of motor actions (by H. Brugmans at Groningen, in the northeastern Netherlands).[12-14]

Since then, hundreds of experimental studies of distant mental influences on biological systems have been conducted; many of these have been designed as experimental models or analogs for the study of distant or mental healing. Reviews of these studies have been provided by Braud,[13-15] Braud and Schlitz,[16, 17] Braud and colleagues,[18] Solfvin,[19] Benor,[20] and Targ.[21] Remote mental influence studies designed to explore the efficacy of prayer as well as healing intentions have been reviewed by Braud[22] and Dossey.[4] In the November 1997 issue of *Alternative Therapies,* Schlitz and Braud[23] presented a meta-analysis of studies demonstrating direct mental influences of the intention and attention of one person on the ongoing physiological (electrodermal) activity of another person, monitored-at a distance and shielded from conventional sensorimotor influences.

The conclusion reached in these reviews and meta-analyses of concurrent direct mental interactions with biological target systems is that, in certain circumstances, the appropriate deployment of attention and intention is associated with directional shifts in objectively measured activities in distant and shielded biological systems. These anomalous influences occur under conditions that preclude chance coincidence and mediation by conventional physical processes. The biological target systems that have been influenced successfully in these studies have varied widely and have included bacteria, yeast colonies, motile algae, plants, protozoa, larvae, wood lice, ants, chicks, mice, rats, gerbils, cats, and dogs, as well as cellular preparations (e.g., blood cells, neurons, cancer cells) and enzyme activity. In human "target persons," eye movements, gross motor movements, FDA, plethysmographic activity, respiration, and brain rhythms have been influenced successfully.[4,12-23] The "psychokinetic" effects observed in these studies typically are small, yet they are reliable and consistent and may be produced not only by those selected for special talents, but also by unselected research participants who try their hands (or, better yet, their minds) at such feats for the very first time. Taken together, these studies provide a sound empirical foundation for considerations of the "mechanisms," implications, and possible practical applications of what has been called mental or spiritual healing.

THE POSSIBILITY OF TIME-DISPLACED DIRECT MENTAL INFLUENCES

In the studies described in the previous section, objective changes in target system activities were measured while the influence attempts were occurring (i.e., "real time" or concurrent PK influences were being studied). In 1971, a novel twist was introduced into such studies by theoretical physicist Helmut Schmidt. Inspired by the apparently nonlocal and acausal nature of PK effects, and informed by the measurement problem, observer effects, and other paradoxical phenomena within quantum theory, Schmidt conducted preliminary studies to determine whether PK effects could be found using prerecorded targets (i.e., whether direct mental influences might occur in a time-displaced or "backward-acting" manner).

To study possible retro-PK, Schmidt[24(pp268-269)] devised an ingenious experimental design:

> Consider the following experiment: A random number generator [operating on the basis of the truly random, unpredictable, and conventionally uninfluenceable, physical process of radioactive decay] is activated to produce a string of N binary numbers. These numbers are automatically recorded on magnetic tape, paper punch tape, or some other reliable recording medium. Nobody is present during this generation and recording, and nobody looks at the data until at some later time the recorded sequence of "heads" and "tails" is played back [for the very first time] to a subject in a PK test situation. During the slow playback each recorded head or tail makes a red or green lamp light up while the subject tries mentally to enforce an increased lighting rate of the red lamp.
>
> One might think that in this situation the subject could not succeed because the decision as to how many heads and tails will appear has already been made before the test session. But one can also present arguments that PK might still operate, and that, furthermore, such PK tests with time displacement could give some interesting new insights into the physics and psychology of psi [psychic or paranormal phenomenal.

Schmidt actually began carrying out such experiments in 1971 and published a formal report of his findings in 1976. He found that time-displaced PK influences of prerecorded but previously unobserved target events were indeed possible, and that the likelihood or strength of such influences did not differ appreciably from that of real-time or concurrent influences.[24]

In France, Pierre Janin[25] had conducted his own exploratory experiments on "psychokinesis into the past" in 1974, publishing a report of his findings in 1975. Janin found evidence for significant time-displaced PK influences on 2 types of random systems: a radioactivity-based electronic REG and a mechanical system involving randomly occurring right and left movements of steel marbles. He also conducted experiments on concurrent PK on the same 2 target systems and found no significant difference between concurrent and time-displaced PK. In Janin's experiments, the initial random events had been translated into treble and bass sounds on magnetic tape. These sounds were played back, for the first time, to research participants who attempted to influence the events that the sounds represented and that had initially occurred a day or so earlier.

In the Schmidt and Janin studies as well as subsequent retro-PK studies, the interval between the initial occurrence of the influenced events and the time of the later "intentional effort" was 1 or more days. The "instructed aim sequence" of which events were to be influenced in which ways was determined after the events, but before the "effort." This sequence was unknown to the experimenter at the time the initial events were recorded and was based on an intervening quasi-random outcome (such as weather information or the nature of a particular digit in a complex algorithmic calculation). The existence of a PK effect was determined by comparing segments of the prerecorded record that were "wished for" in particular ways (directions) with other segments that were "wished for" in other ways or not at all (control segments), and also by comparing obtained event frequencies with theoretically expected frequencies (based on mean chance expectations). Both empirical and theoretical baselines were therefore used for evaluating the departures that could be attributed to direct mental influence. Appropriate randomness trials and tests were used to ensure that the random processes indeed behaved randomly when they were not being subjected to direct mental influence.

Prior to this published empirical work on retroactive PK, the possibility of time-displaced PK influences had been mentioned or alluded to in theoretical papers published in 1973 by Janin,[26] in 1975 by Evan Harris Walker,[27] and in 1975 in a mathematical theory developed by Schmidt himself.[28]

FORMAL TIME-DISPLACED DIRECT MENTAL INFLUENCE EXPERIMENTS CONDUCTED UNDER INDEPENDENT SUPERVISION

Time-displaced PK tests provide an interesting methodological feature: because an objective record of the to-be-influenced physical events already exists, before the time of the later PK influence efforts, such a record can be given to an independent supervisor for safekeeping and for later checking to ensure that mistakes or deliberate fraud on the part of the experimenter have not taken place. This special feature can allow positive results to be channeled directly to a skeptic or critic of this kind of research. Indeed, if the protocols are properly followed, a retro-PK experiment with a successful outcome is perhaps the most methodologically "safe" and potentially convincing evidence for paranormal or psychic functioning. Schmidt has conducted 5 formal, supervised experiments of this kind. These studies, which are summarized in Table 1, provide strong evidence for the existence of a time-displaced PK effect on prerecorded inanimate events.

TABLE 1 Statistical summary of all experiments on time-displaced direct mental influence of prerecorded inanimate random events conducted under independent supervision

Study report	Obtained *z* score	*P*
Schmidt and colleagues[29] (1986)	2.71	.0034
Schmidt and Schlitz[30] (1988)	1.66	.049
Schmidt and colleagues[31] (1990)	0.62	.27
Schmidt and Braud[32] (1993)	1.98	.024
Schmidt and Stapp[32] (1993)	1.23	.11
Overall results for all 5 experiments	3.69*	.0001

* Stouffer $z = \sum z / \sqrt{N}$, where N=5.

ADDITIONAL TIME-DISPLACED PHENOMENA

In addition to the formal time-displaced PK studies just described, there are other phenomena—found both in everyday life and in the laboratory—that suggest a kind of action working backward into the past. In a sense, all actions that are performed in the service of future goals exemplify the idea of a future event or outcome in some way influencing present actions. The influence of the present by the future is, of course, formally identical to the influence of the past by the present. Once—in Aristotelian thinking, for example—there was a place in Philosophy for final causes or teleological action. With natural science's increasing emphasis on efficient causes—and its great success in explicating such causes—ideas of final cause, teleology, intention, and purpose were increasingly banished. Today, when we speak of future events or goals "causing" our present actions, we either use the term figuratively or smuggle the future goal into the present (where it may have legitimate efficacy) via our present anticipations, apprehensions, or expectations about the future events. It is currently politically correct to attribute causality only to such presently acting expectations, rather than to future goal events themselves.

It is more difficult to account for accurate premonitions or precognitive experiences in present-time-only terms. Many apparent premonitions can be explained away as coincidences, subtle rational inferences, or

distortions of perception or memory. There remain, however, convincing anecdotal accounts of extremely detailed and accurate "foretellings" that cannot be dismissed so readily. Moreover, meta-analyses of carefully conducted precognition laboratory experiments have yielded strong evidence for the reality of precognitive effects. For example, Honorton and Ferrari[34] analyzed the results of 309 forced-choice precognition experiments conducted between 1935 and 1987. These experiments involved approximately 2 million trials, during which participants were asked to guess which of several alternative outcomes would be randomly selected to occur at some future time, ranging from milliseconds to a year. Their meta-analysis revealed strong evidence for accurate and reliable pre-cognitive effects in this database.

Successful precognition usually is understood as someone's "mind" somehow reaching out into the future, accessing future information, and bringing this information back into the present. Even on this view, half of the explanatory process already involves something akin to backward action. It is possible, however, to reverse our usual thinking about precognition and conceptualize it as a future event somehow reaching back in time to influence a present mind. If the future-action-influencing-present-mental-activity schema of precognition is reversed to involve a future-mental-activity-influencing-present-action schema, we have a model that exactly duplicates the arrangements and outcomes found in the successful retro-PK studies described above. The entire body of existing evidence for precognition (paranormal knowledge of the future) could therefore easily be recast as evidence for backward-acting influences.

Additional laboratory findings are suggestive of processes involving influences acting backward in time. Klintrnan[35, 36] has reported experiments in which people's reaction times in identifying color patches were faster when a name that matched that color was presented quickly afterward compared to when a name that mismatched that color was quickly presented after-ward. This effect—a kind of "time-reversed interference"—occurs under conditions in which the matching or mismatching color name is randomly determined and the nature of the future name is unknown—in a conventional sense—to the person when the reaction time to the color patch is measured.

Similarly, Radin[37, 39] and Bierman and Radin[38] found that people evidence differential autonomic nervous system reactions (heart rate, EDA, and plethysmographically monitored finger blood volume) to emotional versus non-emotional slides 5 seconds *before* the slides are randomly selected and exposed. The differential autonomic reaction (a kind of anticipatory orientation reaction) occurred during a time when the emotional or non-emotional nature of the upcoming slide was still unknown—in a conventional sense—to the participant. This effect has been termed a "pre-sentiment (pre-feeling)" effect, and it is taken to reflect precognition operating at an unconscious, bodily level. It could just as well be interpreted as an objective event (the presentation of an emotional or non-emotional slide picture itself or the person's *future-reaction* to the slide picture) acting backward in time to influence a person's physiological activity.

TIME-DISPLACED STUDIES OF DIRECT MENTAL INFLUENCE OF LIVING SYSTEMS

With the above considerations and findings as a preface, we come now to the heart of this paper: the direct mental influence of "past" biological activities by intentions active in the "present" is it possible to influence prerecorded but previously unobserved biological activities through a time-displaced, retroactive PK process? Inspired by Schmidt's early PK experiments with inanimate, prerecorded targets, in 1978 colleagues and I conducted a preliminary study of possible time-displaced PK using an animate, prerecorded target.[18] The target activity chosen was prerecorded EDA. Ten participants contributed fluctuating EDA tracings while sitting quietly in a room. These EDA tracings were transduced and stored on magnetic tape, but remained unobserved until they were later presented (decoded and displayed as polygraph pen tracings), for the first time, to a selected research participant who attempted to influence segments of the records in prescribed directions. The intentional "efforts" took place 1 to 7 days after the initial EDA had been emitted and recorded. For each tracing, a quasi-random sequence of 10 influence (i.e., attempt to mentally activate) and 10 non-influence control periods was determined just before each later "intentional effort" session. The influence and control epochs were each 30 seconds in duration.

The overall results for these 10 prerecorded EDA PK sessions did not differ significantly from chance. However, some interesting secondary evidence that influences may have been occurring on a session-by-session basis (based on possible correspondences of session outcomes with observations of the influencer's

changing motivations from session to session) was noted and described in the original report. The results for this study[18] are given as "experiment 1" in Table 2.

Since that initial exploration of a possible time-displaced direct mental (PK) influence on prerecorded activity of an animate target system, 18 similar studies have been conducted. A statistical summary of the results of all 19 of these conceptually similar studies is presented in Table 2.

TABLE 2 Statistical summary of results of studies of time-displaced ('backward') direct mental influence of living systems

Experimental series	No. of sessions	*P*	*z*	Effect size (*r*)
Braud and colleagues[18] (1979)				
Experiment 1	10	.68	-0.47	-.15
Gruber [40] (1979)				
Experiment 2	10	.01	2.33	.74
Experiment 3	10	.30	0.52	.16
Experiment 4	10	.50	0	0
Experiment 5	10	.10	1.28	.40
Experiment 6	10	.05	1.64	.52
Experiment 7	10	.50	0	0
Gruber[41] (1980)				
Experiment 8	10	.30	0.52	.16
Experiment 9	10	.05	1.64	.52
Experiment 10	10	.30	0.52	.16
Experiment 11	10	.01	2.33	.74
Experiment 12	10	.50	0	0
Experiment 13	10	.05	0.52	.16
Snel and van der Sijde[42] (1990)				
Experiment 14	19	.02	2.05	.47
Experiment 15	19	.02	2.05	.47
Experiment 16	19	.50	0	0
Braud (unpublished data, 1993)				
Experiment 17	15	.074	1.45	.37
Schmidt[43] (1997)				
Experiment 18	10	.00076	3.17	1.00
Radin and colleagues[44] (1998)				

Experiment 19	21	.016	2.16	.47
Overall results for 19 experiments	233	.00000032	4.98	.32

In 1979, Gruber[40] reported 6 experiments. In the 20 sessions of experiments 2 and 3 (10 with the investigator himself serving as influencer and 10 including 10 unselected research participants each contributing 1 session), the prerecorded, animate target activity consisted of locomotor activities of small mammals (gerbils running in activity wheels). The prerecorded living system activity in the 20 sessions of experiments 4 and 5 was a different form of mammalian locomotor activity (gerbils crossing a photobeam in a large cage). The prerecorded activity in the 20 sessions of experiments 6 and 7 was the photobeam-monitored locomotor behaviors of people who had been instructed to walk randomly in a dark room while listening to pink noise (which is white noise, or sounds of random frequencies and intensities, to which "red" sounds of lower frequency or pitch have been added to make the sound more pleasant). In each experiment, the activity of the living target system was converted into recorded click sounds that were stored in an unobserved form until they were played, for the first time, to influencers. The "influence efforts" occurred 1 to 6 days after the target activities initially occurred.

In 1980, Gruber[41] reported 6 additional experiments. In the 30 sessions of experiments 8, 9, and 10 (10 sessions with a special, selected participant and 20 sessions with 20 unselected participants, i.e., those without special talents), the prerecorded activity was the photobeam-monitored behavior of people entering a supermarket in Vienna. In the 30 sessions of experiments 11, 12, and 13, the prerecorded activity was provided by the photobeam-monitored frequency of cars passing through a small and short tunnel in the center of Vienna during rush hour. Again, target activities were converted to click sounds and played, for the first time, to the influencers 1 to 2_ months after the activity initially occurred.

In 1990, Snel and van der Sijde[42] reported results of a study in which a paranormal heater attempted, through distant and retroactive mental influence, to prevent the spread and multiplication of blood parasites (rodent malaria organisms, *Bahesia rodhani)* in red blood cells of athymic rats. The "healer" did not receive feedback regarding the dependent measure (the mean, absolute counts of infected red blood cells, microscopically monitored), but simply worked with photographs of the caged rats. It was not determined which animals were the "target" rats and which were the "uninfluenced controls" until *after* blood cell measures were completed (the condition assignment was randomized by someone not otherwise involved in the study). Measurements were taken 14, 28, and 42 days after the animals were inoculated with the parasites. Measurements on these 3 days are presented, respectively, as experiments 14, 15, and 16 of Table 2.

In 1993, Braud conducted 15 sessions in which participants attempted to mentally influence their own prerecorded spontaneously fluctuating EDA (W.G.B., unpublished data, 1993). Experimental procedures and measurement techniques were similar to techniques described by Schlitz and Braud[3] in 1997, with the important difference that this time the intentional influences were "distant" in time rather than space. The EDA had been converted from analog to digital form, stored as a file on a computer disk and presented (35 to 40 minutes after the EDA had initially been generated and recorded) for the first time as a tracing on a computer monitor screen.

The person who had contributed the EDA tracing approximately one half-hour earlier now watched the tracing and used it as feedback while attempting to mentally influence his or her own prerecorded autonomic activity. Three types of 30-second measurement epochs were randomly interspersed, during which the influencer attempted to either increase (activate), decrease (calm), or not influence (rest) his or her own prerecorded EDA activity. Analyses were performed to determine whether the amounts of EDA during respective periods of the earlier, pre-recorded record corresponded to the influencer's later intentional aims for the various segments of the record. Results of comparisons of time-displaced activation versus calming periods are presented as experiment 17 in Table 2. Although the *P* value slightly exceeded the arbitrary .05 level, the difference was in the expected direction and yielded a substantial effect size.

In 1997, Schmidt[43] published the results of 10 experimental sessions (experiment 18 in Table 2) in which he attempted—successfully—to influence the durations of his own prerecorded breathing intervals, using recording, measurement, and time-displaced influence procedures similar to those described above. Schmidt also interspersed sessions in which he successfully influenced prerecorded electronic random events. Schmidt's influences on prerecorded animate activity (breathing rate) were somewhat stronger than were his influences on prerecorded inanimate activity (REG data), but not significantly so.

In this study and other time-displacement studies reviewed in this article, what is observed is a strong correlation between the occurrence of certain events in a (past) data stream and the occurrence of (future) intentions. Because there is no obvious connection between the prerecorded events and the random process that determines the sequence of later intentional aims (the intervention), and because changes in prerecorded events do not take place in the absence of the later intentional (intervention) aims (as confirmed through direct comparisons with non-influence, control periods), a claim for a form of "causation" or "influence" of the events by the intentions (beyond mere correlation) seems justified.

In 1998, Radin et al[44] reported an experiment in which EDA and other autonomic measures were successfully influenced by influencers who were distant from the target activities in space (6000 miles) and time (2 months). The to-be-influenced autonomic activity records were produced in Las Vegas, Nev, and were stored and remained unobserved until they were influenced 2 months later by healers located in Brazil. The EDA results for 21 sessions are given as experiment 19 in Table 2.

Table 2 summarizes the results of 233 experimental sessions in which participants attempted to influence a variety of living systems in a time-displaced, retroactive fashion. This table includes all animate, time-displaced studies that have been conducted to date of which the author is aware. To facilitate summary and comparisons, the differing test statistics of the various studies have all been converted to a common metric (*P*, *z*, and *r scores*) for the purposes of this table. The results of 10 of the 19 studies were independently significant (i.e., they yielded *z* scores with associated *P* values <.05); only 1 significant study outcome would be expected on the basis of chance alone. Using a method recommended by Rosenthal[45] for combining results of several studies, a Stouffer *z* score may be calculated by summing the individual *z* scores and dividing this sum by the square root of the number of contributing *z* scores (in this case, 19). The resulting Stouffer *z* score for the combined set of 19 studies of time-displaced direct intentional influence of living systems is 4.98, which has a highly significant associated *P* value of .00000032.

The effect sizes shown in Table 2 are *r* values, calculated according to the formula $r = z / \sqrt{N}$. These effect sizes varied from -0.15 to +1.00, with a mean *r* of .32. All of these statistical results compare favorably with results typically found in behavioral and biomedical research projects. Interestingly, the results are extremely similar to those of Schiltz and Braud's meta-analysis of 11 "real time" (concurrent) intentional influences on EDA.[3] Additional compelling evidence pointing to the robustness of these findings is that—with the single exception of experiment 1—*all* of the coefficients (*r*'s) are in the hypothesized direction.

THE 'SIZE' OF THESE EFFECTS

Throughout this article, statistical significance levels and effect sizes have been used to indicate the presence of direct mental influences. Historically, the arbitrary $P<.05$ criterion has been used as an indication of the reality of an effect. Many of the obtained *P* values in the reviewed studies reach and sometimes greatly exceed this probability criterion. More recently, however, there has been a growing movement within the behavioral and biomedical research communities to deemphasize *P* values (which are rarity indicators) and emphasize effect sizes (which more closely reflect the actual sizes of changes or outcomes and "correct" for differences in sample size). Typically, effect sizes in the ranges of 0.0 to 0.3, 0.3 to 0.6, and 0.6 to 1.0 are taken to represent "small," "medium," and "large" effects, respectively. On average, the effect sizes obtained in the reviewed mental influence studies are at the border between small and medium. However, they compare favorably with what is typically observed in more conventional behavioral and biomedical studies and in some cases the obtained effect sizes are quite large (Table 2). The average effect size observed in these time-displaced mental influence studies (0.32) is 10 times as great as those obtained in some representative medical study outcomes that have been heralded as medical

breakthroughs (effect sizes of 0.04 and 0.03, obtained in 2 well-known studies[46,47] of the effectiveness of propranolol and aspirin, respectively, in reducing heart attacks).

To facilitate the appreciation of effect sizes, Rosenthal (a recognized research methods and meta-analysis expert) has offered a special binomial effect size display that allows us to represent a common effect size measure (*r*) in terms of the corresponding proportion of, for example, people in some sample whose health, well-being, or survival rate might be improved by an intervention or treatment with that particular effect size.[45]

According to this binomial effect size display conversion, an effect size (*r*) of 0.03 would be the equivalent of 3 additional persons surviving in a sample of 100 persons. An effect size (*r*) of 0.30 (observed in the present studies) would be the equivalent of 30 additional participants surviving in a sample of 100. In life-or-death situations, especially, the outcomes associated with these effect sizes are far from trivial.

Another method for estimating the strength of these effects is to calculate the actual percentage of events or activities that change in association with the direct mental interventions. In various reported aggregations of these percent influence scores, the average influence has ranged from a fraction of a percent to a few percent (in cases of random generator influence) to 4% or 8% (in certain electrodermal influence studies) to 80%, 90%, and even 100% changes in individual sessions. In special experiments, remote, direct mental influence effects on EDA did not differ appreciably from the size of deliberate, self-regulation effects on these same activities.[16,48] Again, expressed in these percent change terms these effects are far from negligible.

REPLICATION CONSIDERATIONS

Many of the trials, sessions, and studies in these and other areas of mental influence research do *not* show an effect. Such replication failures are not unexpected in areas that are being freshly explored and in which the effects and measures are relatively subtle. I offer 2 speculations regarding replication failures. The first is that the emergence of these mental influence effects may depend on the simultaneous presence of a complex and interactive set of physical, physiological, psychological, and even social and cultural factors. If all requisite ingredients of such a complex recipe are not present, or present in insufficient degrees, the effect may not occur. The nonlocal or field-like nature of these phenomena suggests that critical variables may reside not only in the immediate influencers, influencers, and target systems, but may also be present in other people or situations that are spatially and temporally removed from the test situation but meaningfully connected with the experiment.

Until we learn more about the limits and boundary conditions of these effects, such "remote" contributors will remain difficult to isolate and control. It is crucial to begin identifying the critical independent, contextual variables that might facilitate or impede these effects. Two of the most crucial variables may be the potential for free variability in the target system and the fullness of the intentions of the influencers (the presence of a strong *need* being one guarantee of strong intentions). Experimenter effects themselves no doubt contribute to the variability in study outcome. The challenge of investigating experimenter effects has been recognized and systematically explored in these areas much more than it has in other research areas.[49] Additional important variables have been identified and discussed elsewhere.[50]

The second reason for replication failures in these areas is that, because of the extraordinary nature of the knowledge claims, many more replications are attempted in these areas than in more conventional areas of research. Even well-accepted findings do not always replicate. It would be interesting to see what would happen if conventional interventions were tested as often as anomalous claims are tested.

A final replication consideration is the "file drawer" issue: could the results of published, positive reports be canceled out by negative findings that are never published and languish in researchers' file drawers? It is highly unlikely that a huge file drawer of unreported, negative findings could cancel out the reported positive findings, for the following reasons:

1. Given the scarcity of funding for this kind of research and the small numbers of researchers who are active in these areas, it is unlikely that a large number of such studies are even conducted.

2. Unlike in other research areas, the journals devoted to studies of these types have explicit policies of publishing negative as well as positive research reports.

3. The actual extent of file drawer contributions has been formally and carefully evaluated in the relevant meta-analyses, and the analysts have concluded that the file drawer is not a major threat to the meta-analytic conclusions.

4. The overall significance levels are sufficiently rare as to exclude cancellation even by very large numbers of unreported negative or neutral findings.

IMPLICATIONS FOR PHYSICAL AND PSYCHOLOGICAL HEALTH AND WELL-BEING

The results of the 19 experiments reviewed here suggest that it is possible for people to exert direct mental influences "into the past" to influence the preoccurring and prerecorded activities of biological systems. In these studies, the past events that were influenced in this time-displaced fashion were labile events, characterized by free variability. In addition, the records of the events were stored but never observed during the interval between their initial occurrence and the later influence attempts.

It is crucial to point out that, in the view of Schmidt and others who have conducted these studies, the present intentions, wishes, or PK influences do not *change* the past. Once an event has occurred, it remains so; it does not "un-occur" or change from its initial form. It appears, instead, that the intentions, wishes, or PK "efforts" influence what happens (or happened) in the first place. To clarify this interpretation even further, the time-displaced direct mental intervention could be said to "change" what *would have* happened, but does not change what *did* happen. If, for example, the past events consisted of holes punched in a paper tape record, the intervention does not remove holes that were already there. Instead, the intervention influenced whether certain holes were punched in the first place—if they were punched, they remain punched; if they were not punched, they remain unpunched. In this illustration, what would have happened may be inferred on the basis of a theoretical, statistical expectation (i.e., it would correspond to mean chance expectancy) or may be actually calculated on the basis of empirical contrast conditions (data segments) in which events are counted or measured in the absence of the intervention. Additional evidence that the prerecorded events "Stay put"—once registered—has been provided by examining multiple records, created in various formats. All of the records correspond.

The present or future intentions seem to act on the initial probabilities of occurrence of the events and help determine which events initially come into being (i.e., which of several potential events are actualized). Psychokinesis—whether in the form of distant mental influence or time-displaced mental influence—seems to bias the probabilities of initial occurrence of random or freely variable events such that a desired, intended, or goal-serving outcome increases in likelihood. The process appears to act most efficiently on the seed moments or originations of events. Such stages would seem to be more labile, flexible, sensitive, or susceptible to influences of all kinds, including these direct mental influences.

If the findings uncovered in these laboratory experiments are indicative of general principles, these principles might be applied practically in the service of physical health and psychological well-being. Future intentions may have real influences on present seed moments or origination stages of healthful or harmful bodily events or symptoms in the present, and present intentions may have real influences on past seed moments or origination stages of healthful or harmful bodily events or symptoms in the past. Such effects would be most likely to occur in cases of seed moments that are characterized by randomness or free variability.

Consider a simple system consisting of 2 neurons and their intervening synapse. The processes at the synapse may exist in a delicate state, probabilistically balanced near a sensitive thresh-old that could make the difference between the firing or not firing of an adjacent neuron. Such processes could be ideal "targets" for successful direct mental influences, similar to those described in this article. Indeed, Nobel laureate Sir John Eccles has proposed that synapses may be characterized by probabilistic, random, quantum processes and may be in delicately poised conditions that might make them susceptible to mental influence.[51] Eccles suggested that such influences may be common-place within an individual's central nervous system, providing a mechanism of action that allows ordinary volitional actions. In this view, volitional actions

become instances of endogenous PK in which one's mental intentions may act on the matter of his or her labile synaptic processes to instigate the first of a series of physico-chemical-neuronal activities that eventuate—many "linkages" later—in some observable action or movement. In addition to the probabilistic synaptic activity suggested by Eccles, other substrates that might support quantum randomness effects have been proposed by others. These substrates include the presynaptic vesicular grid,[52] ion channels,[53,54] calcium ions,[55] and cytoskeletal microtubules.[56] In principle, if intention may act directly on a neural (or any anatomical or physiological) substrate in this fashion in "real time," such actions could also take place in a time-displaced fashion.

In addition, if a biological substrate possessing the requisite randomness or free variability can be susceptible to the organism's own intentions, perhaps it is susceptible to the intentions of other organisms as well. Intentional consequences may not be locally confined, but may occur nonlocally (in time and space). All of these suggestions are consistent with the theories and findings of modern PK research—some key features of which have been mentioned in this article. If these nonlocal intentions are aligned with aims or goals of health and wholeness, perhaps active intentions could be directed in the present or even into the past to promote biological and psychological seed moments favorable to physical and psychological health and well-being.

Consider another simple system—a small group of cancerous or precancerous cells at a certain location within the body and a natural killer (NK) cell that is roaming near those cells in a random or freely variable course. It is conceivable that there exists a point at which a random "choice" or "decision" occurs, and the NK cells could move, with 50-50 probability, either toward or away from those cancerous cells (seed moments of disease). In principle, PK or intentional influences could bias the probabilities of action of the NK cell sufficiently to promote movement toward and subsequent destruction of the small group of cancerous or precancerous cells, thereby terminating a seed moment that otherwise might have eventuated in illness or even death (several "linkages" down the line—through probability-pyramiding or snowballing effects).

When a patient appears in our office with a particular malady, we tend to think that the curing or beating of this condition involves using our armamentarium of conventional and unconventional treatments and interventions to slowly and progressively correct that malady in the present. We believe we should use our tools to chop away and gradually destroy an undesired condition that is already well established—working on what now exists, a system with great momentum and inertia. In addition to such real-time therapeutic influences, the findings reviewed in this article suggest an alternative healing pathway. Along with such real-time effects that are often taken for granted, it is possible that our healing intentions may be acting "backward in time" to influence the initial seed moments of the development of the malady that confronts us today. Such an alternative healing pathway or process might be a more effective and efficient one—an "easier" one, because it would be influencing a system at a more labile, flexible, sensitive, and susceptible stage in its development and progression. If such a process could act early and thoroughly enough, it might actually prevent the development of harmful physical or psychological processes. This would constitute an instance of true preventive medicine. Time-displaced healing modalities might actually have important advantages over real-time healing modalities.

If the implications just mentioned could be explored in additional, carefully designed studies, it would be possible to learn more about the ranges and limits of time-displaced, direct mental influences. As more is learned about these effects and the factors or conditions that foster or impede them, possible practical applications of these principles in health-related areas could be planned and studied.

POSSIBLE ROLES OF INTERMEDIATE PREOBSERVATION AND DIAGNOSTIC OBSERVATIONS

In the time-displaced studies described above, the to-be-influenced events and record of these events are maintained in an unobserved state until the intentional influence attempts are made. There are provocative

findings suggesting that preobservations of the data or records during the interval between event generation and influence attempt may influence the fate of the initial events (i.e., their susceptibility to later direct mental influence). Schmidt has found that if certain to-be-influenced events are strongly observed (with an intense and meaningful density of attention) during the intervening period, those events may no longer be susceptible to later direct mental influence. It is as though prior observation itself establishes or concretizes the reality of the observed events, "locking them in" and making them no longer susceptible to subsequent mental influence.

Such intermediate preobservation effects have been observed in the case of human, canine, and goldfish "preobservers." It should be pointed out that relatively few experiments of this kind have been performed, and their results are not always consistent.[57,58] However, the outcomes in which time-displaced PK effects may be "blocked" by prior observations are consistent with certain interpretations of the role of human and other observations or measurements in the "collapse of the state vector" in quantum systems, and there have even been empirical tests of such preobservation effects by physicists who have been uninvolved in parapsychological investigations, such as R. Smith (unpublished data, 1968) and Hall and colleagues.[59] If it could indeed be shown that conscious preobservation can block subsequent PK success, this finding could pave the way for an exciting series of studies in which the nature of the preobservation is systematically varied and its influence on PK effects is observed. Preobservations of prerecorded events by humans at various stages of their development and in various states of consciousness could be studied. Indeed, a true comparative psychology of consciousness could be developed in which organisms of various species could serve as preobservers and their outcomes could be noted. The blocking of a time-displaced PK effect could serve as a measurement method for exploring, rather directly, the phylogeny (evolutionary history) and ontogeny (individual development) of consciousness.

The influence of preobservation raises the health-related issue of the possible role of diagnostic observations in these effects. In the time-displaced studies reviewed, care was taken to ensure that the to-be-influenced events had not been consciously observed before the influence attempts were made. The very first observation of these events was in the form of a motivated intention. In fact, one rationale for choosing EDA as a target activity in our studies was that changes in the electrical activity of the sweat glands—which underlie EDA changes—are governed by the autonomic nervous system, the functioning of which we are ordinarily "unaware." A research program could be developed around studies of the nature and degree of "conscious awareness" of the to-be-influenced activities on the part of the organisms originally generating such activities. The issues that could be explored are closely related to the preobservation issues mentioned in the previous paragraphs.

If health-serving time-displaced mental influences can only occur with respect to previously unobserved activities, this might limit their application to physical or psychological conditions that have not yet been observed or noted by patients, clients, or healthcare professionals. A previously diagnosed condition would have been preobserved and therefore be less susceptible to later direct mental influence. The ambiguous empirical findings with respect to preobservation are not yet sufficiently clear to permit useful predictions about the role of diagnostic preobservations. It is likely, however, that the *nature* of the diagnostic observation could be crucial in determining its effects. Strong, clear, unambiguous diagnostic tests or measurements that are viewed by multiple observers might yield outcomes quite different from ambiguous diagnostic measures witnessed under conditions of minimal density, intensity of attention, awareness, or by only a single diagnostician.

Consider the following hypothetical case: A patient receives a pessimistic diagnosis of metastatic cancer with poor prognosis based on a radiologist's interpretation of computerized axial tomography (CAT) scan results for the liver and intestinal areas. The diagnosis consists of observations of vague spots on a CAT scan record. Subsequently, the patient engages in an intense healing program that includes self-healing components as well as the assistance of others. Strong healing intentions (of self and others) are directed toward the patient. Later, a higher-resolution CAT scan reveals a different picture of the "spots" and the initial diagnosis is now questioned. Nearly 7 years later, the patient is alive, well, and happy. Three possible interpretations of this case might be made. First, the initial diagnosis was incorrect and the patient never was ill. Second, there was indeed the beginning of a severe illness that was halted in its tracks and reversed by later psychological and life-change interventions acting conventionally in "real time." Third, there may have been a time-displaced influence of the later healing intentions on the seed moments of an illness, with the illness either not progressing or not occurring in the first place. The ambiguous nature of

the first diagnostic preobservation may have allowed subsequent time-displaced mental influences to be effective. A case virtually identical to this hypothetical example actually occurred and has been reported.[60]

Usually we think of medical diagnoses as beneficial procedures that inform us about the presence of a harmful condition that is really there, allowing us to take appropriate measures to reduce or eliminate the harmful physical condition. The above considerations, however, suggest that a medical diagnosis itself could falsely indicate or *even actually produce* (through focused intentionality) a condition of illness that was not present prior to the diagnosis. Diagnoses may be both therapeutic and iatrogenically harmful. The issues raised by the nature and timing of a "diagnosis" are numerous, complex, and deep, and their adequate consideration would take us beyond the scope of this paper.

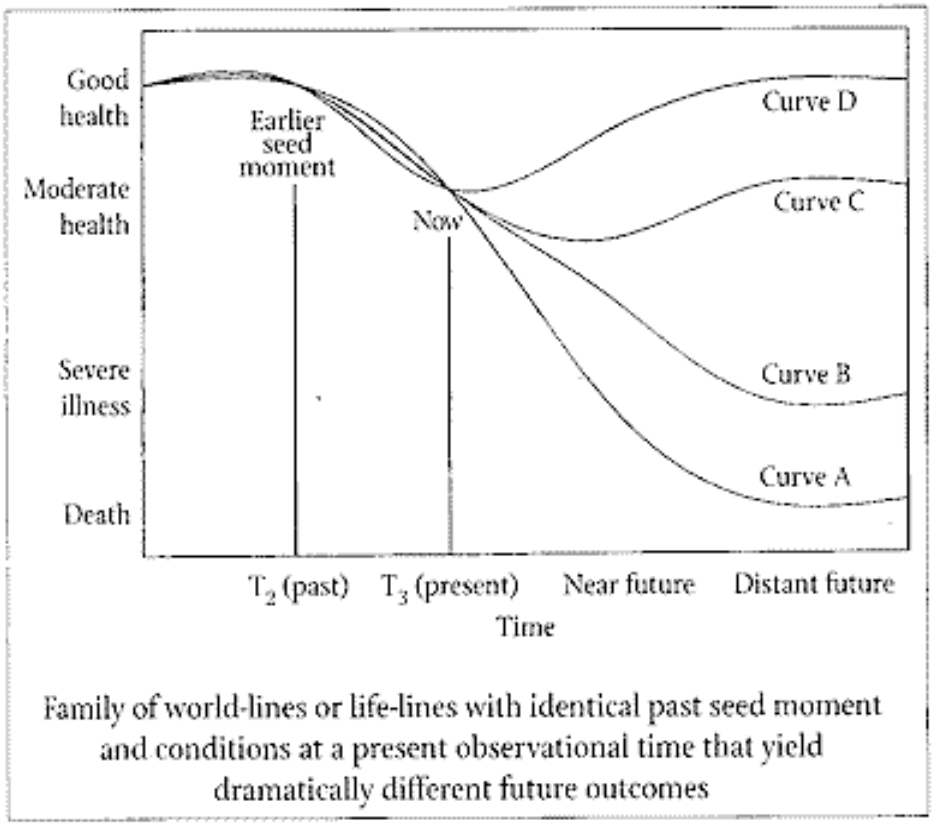
AN APPARENT PARADOX AND ITS POSSIBLE RESOLUTION

> *Paradox is simply the way nonduality looks to the mental level.*
>
> —Harman and DeQuincey[61(p45)]

We cannot end our discussion of possible health-serving, time-displaced intentional influences without mentioning what may be (to some) a troubling logical difficulty. If retroactive intentional effects do not *change* the past, but influence what came to be in the first place, how would one handle a case in which a patient presented with a malady that already had developed and was too obviously strongly present in this moment? If a future, intentional mental intervention were to be effective in such a case, would it not have to "undo" something that already had happened, and would this not lead to logical. contradictions and paradoxical considerations?

There are several ways of dealing with such difficulties. One is to posit that it is indeed possible to change the past and not merely influence initial probabilities of occurrence. Another suggestion is that the presenting condition is complex, and that some of its synergetic, harmful components may not yet have occurred in sufficiently full form or may still be susceptible to concurrent or time-displaced mental influences. A third possibility is indicated in the Figure. The nature of a symptom complex that presents itself to a physician at time T_3 may in fact be common to a family of curves (world-lines or life-lines) that describe various potential time courses of the progression of an illness.

In the Figure, curve A represents a poor prognosis in which health declines progressively, eventually resulting in the death of the patient. Curve B indicates a less severe illness time course. Curve C indicates a gradual, incomplete recovery. Curve D depicts a relatively rapid and complete recovery.



Family of world-lines or life-lines with identical past seed moment and conditions at a present observational time that yield dramatically different future outcomes

Note that the presenting condition at time T_3 could be on any of the 4 curves and, based only on information available at time T_3, one cannot know which curve actually may be in effect. It is possible that healing intentions generated at time T_3 might retroactively influence which of a family of possible curves is actualized at time T_2—the common seed moment for several possible progression/outcome curves.

Therefore, without violating the principle that time-displaced intentions might act only to influence but never to change the past, it is still possible to account for illness recovery curves C and D, *because one of these entire curves may have been selected, through the biasing agency of time-displaced intentionality,* from the equiprobable curves with potential origins at time T_2. Note, also, that curve D may represent an outcome that typically is termed "spontaneous remission" by the medical community. A thorough report of several hundred instances of "spontaneous remission" from metastatic cancer is available.[62] Is it possible that at least some of these spontaneous remissions are the result of time-displaced healing intentions on the part of patients, their loved ones, or health professionals?

It should be pointed out that the time-displaced possibilities presented in this section and elsewhere in the article do not preclude more conventional, "real-time" influences that could be active at time T_3 or any other time. In fact, every moment in the development of healthful or harmful conditions can be conceived as a "seed moment" for future progressions of those conditions. As such, every moment of the development or progression of a health condition may be susceptible to *both* concurrent conventional and complementary and alternative influences as well as possible time-displaced influences of the types proposed in this article. The latter are suggested as adjunctive and not necessarily exclusive influence pathways or possibilities.

ADDITIONAL CONSIDERATIONS

The following areas remain to be discussed: (1) issues and research findings involving the most effective mental influence strategies; (2) whether "trial by trial" feedback to the influencers is necessary for these effects to occur (it is not); (3) possible alternative paranormal interpretations of these obtained findings (there are several, but all involve "violations" of our usual understanding of what is possible in time); (4) theoretical understandings of what might underlie these obtained effects; (5) the relevance of these findings to an intriguing suggestion made by Schopenhauer about the complex and seemingly deliberately orchestrated interrelation-ships of our world-lines and lives in space and time[63] and the anthropic cosmological principle[64]; and, perhaps most interestingly, (6) the import of these findings for our apprehension of the nature of time itself. These issues must await a later presentation.

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