REMOTE MENTAL INFLUENCE OF ELECTRODERMAL ACTIVITY

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The research question to be addressed here is whether it is possible for mental activity of one person to influence the physiological activity of another person at a distance and under conditions that preclude conventional sensorimotor interactions and conventional physical energies. Such questions are typically asked within the domain known as "parapsychology" or "Psychical research," which deals with processes such as telepathy and clairvoyance. What is not appreciated, however, is that these very questions were actively researched by some of the founders and leading investigators of the disciplines that we now recognize as psychophysiology and conditioning and learning--disciplines that contributed importantly to the development of biofeedback and self-regulation research. I'll mention some relevant projects that were undertaken in the early 1900s in the Soviet Union by researchers who were exploring the newly discovered "conditional reflexes."

Ivan Pavlov himself addressed some of these issues. Pavlov, to whom we are all indebted for his brilliant work in classical conditioning, was intensely interested in the various phenomena of hypnosis and in the unusual physiological and psychological functions manifested in psychiatric patients. In one of his lectures in physiology, after describing the extremely fine differentiations among conditional stimuli that dogs are able to make, he continued: "In us, in human beings, our higher conscious activity runs counter to these lower abilities to differentiate and hence hinders fine differentiation. That this is so is demonstrated by the fact that, in some instances, when

man's normal conscious activity is altered, his ability to differentiate is sharpened. During special states of so-called clairvoyance, the differentiating ability in man reaches infinite sharpness" (Pavlov, 1952, p. 520).

Vladimir Bekhterev, who made important contributions in what we now call "instrumental conditioning," was much more actively involved with these issues. In addition to his better known work in reflexology, Bekhterev himself conducted laboratory investigations of telepathic influence in dogs and in remote hypnotic influence of humans (see Gregory, 1976). Within his Institute for Brain Research at the University of Leningrad, he established, in 1922, a Commission for the Study of Mental Suggestion. The Commission consisted of psychologists, medical hypnotists, physiologists, physicists, and a philosopher. Its charge was to investigate spontaneous cases of psychic phenomena, psychophysiological effects of magnetic fields in hypnotized subjects, and distant mental suggestion of hypnotized subjects.

Much of the distant mental suggestion work was carried out by a young physiologist, Leonid Vasiliev. The research was conducted within a physiological framework and was guided by the electromagnetic hypothesis of telepathy developed by the German neurologist/psychiatrist Hans Berger and the Italian neurologist F. Cazzamalli (Gregory, 1976). It was, indeed, Berger's own motivation to measure this posited electromagnetic carrier of telepathy that guided the investigations that led eventually to his development of the electroencephalograph and to his recording of the first human EEG tracings in 1924 (see Brazier, 1961; Roll, 1960). In this enterprise, Vasiliev was joined by other prominent Russian psychophysiologists, notably K. I. Platonov and Bekhterev's collaborator, A. G. Ivanov-Smolensky (who performed early, important work in developing objective meth-

ods for the study of verbal or semantic conditioning and transfer or, in Pavlovian terminology, the study of "second signalling system" conditioning).

Vasiliev's work was conducted from 1921 until 1938, discontinued from 1939 until 1960, then re-established and continued until his death in 1966. Vasiliev's major work, *Experiments in Mental Suggestion*, was first published in Russian in 1962; an English translation, authorized and revised by Vasiliev, appeared in 1963 and was re-issued in 1976 under the title *Experiments in Distant Influence*. In this highly recommended monograph, Vasiliev details the methods that he and his co-workers used to study distant influence (mental suggestion) in selected subjects. In a series of careful experiments, Vasiliev's team was able to induce motor acts, visual images and sensations, sleeping and awakening, and physiological reactions (breathing changes, changes in electrodermal activity) in persons stationed at remote locations and shielded from all conventional interactions. The methodology of these experiments included : (a) the use of selected, highly hypnotizable subjects, (b) objective recording (by means of kymographs), (c) mechanical randomizers, (d) statistical analyses of results, (e) sensory isolation, (f) electromagnetic shielding, and (g) variation of the distance between the influencer and the influencee (distances from 20 meters to 1,700 kilometers were used). The general findings were: (a) the demonstration of positive results, (b) the finding that the effects survived iron-, lead-, and Faraday- chamber screening, and (c) the identification of important psychological factors that could impede or facilitate the effects.

During this same time frame, similar investigations were being carried out in other countries. There were French experiment on inducing hypnosis at a distance (by Joire, Gibert, Janet, & Richet), Dutch

experiments on the remote influence of motor acts (by Brugmans at Groningen), hypnotic experiments on "community of sensation" (in which a sensory experience of the hypnotist appeared to be experienced by the hypnotized subject), and international studies of telepathy and clairvoyance (see Vasiliev, 1976, for a discussion of some of these studies).

Ever since I read Vasiliev's (1963) monograph, I have been intrigued by his experiments and curious about whether it would be possible to replicate them. I was particularly interested in his experiments of remote mental influence of physiological activity. Through the interest and support of the Mind Science Foundation, my coworkers and I have indeed been able to replicate some of Vasiliev's work, and it is these experiments that I shall now summarize for you. Although we have studied remote influence effects upon several behavioral and physiological response systems(see Braud, Schlitz, & Schmidt, 1989), I shall restrict my comments to a series of experiments on remote mental influence of phasic electrodermal activity. We have completed fifteen experiments using the same general experimental design and methodology. Since my purpose today is to describe the method itself and the overall results, I shall not present the rationales, details or specific outcomes of the individual experiments; such detailed information may be found in our published reports (see Braud & Schlitz, 1989).

In these experiments, a subject sits in a comfortable room while his or her spontaneous skin resistance responses (SRRs) are monitored continuously by means of electronic equipment interfaced with a microcomputer. These SRRs reflect the degree of activation of the subject's sympathetic nervous system and, hence, the suoject's degree of emotional, cognitive, or physical activation or arousal. Higher

SRR activity is, of course, associated with physiological activation, whereas lower SRR activity reflects relaxation and calmness. In a separate, distant room (typically 20 meters away), the experimenter is stationed with another person, the "influencer." Floor plans of the research areas are given in Figures 1 and 2. The ongoing SRR activity of the distant subject is displayed to the influencer by means of a polygraph (chart recorder) and also is objectively and automatically assessed by the computer system. The influencer watches the polygraph as she or he attempts to exert a remote mental influence upon the distant subject. Influence attempts are made during ten 30-second periods; these are randomly interspersed among ten 30-second control or baseline periods during which no influence is attempted. The subject, of course, is unaware of the nature, timing, and scheduling of these periods, and is physically isolated from any conventional energetic or informational signals from the influencer. Thus, the protocol completely eliminated suggestion and expectancy effects.

The aim of the influence is to either calm, activate, or not influence the distant subject according to a prearranged random schedule. During calming attempts, the influencer relaxes and calms himself or herself, intends and gently wishes for the subject to become calm, and visualizes or imagines the subject in a relaxing, calming setting. During activation attempts, the influencer tenses his or her own body, intends and wishes for the subject to become more active, and images the subject in activating, energizing or arousing settings and situations. During the noninfluence control periods, the influencer attempts to keep his or her mind off of the subject and to think about matters unrelated to the experiment. The influencers may use the polygraph tracings as feedback to indicate how well their influence attempts are

succeeding. They may try out different mental strategies, abandon unsuccessful ones, and add variations to those that appear to be successful. Alternatively, they may proceed without such feedback and simply close their eyes and intend and visualize the desired outcomes. We have found that both feedback and nonfeedback strategies are effective.

For each experimental session, the subject's total, SRR activity during each 30-second recording epoch is determined by means of an analog-to-digital converter interfaced with the microcomputer. The equipment samples the subject's SRR activity 10 times each second (which is quite adequate for a slowly changing reaction such as skin resistance) for the 30 seconds of a recording epoch and averages these measures, providing what is virtually a measure of the area under the curve described by the fluctuation of electrodermal activity over time (i.e., the mathematically integrated activity). Each session, therefore, yields ten quantities of electrodermal activity during the remote mental influence periods and ten quantities of electrodermal activity during the noninfluence, control periods. It would be possible to statistically compare the ten influence scores with the ten control scores for a given subject. However, because the scores may not be independent (i.e., may be autocorrelated), we use the more conservative strategy of reducing an entire session's activity to a single score (a type of "majority vote" score) that reflects the manner in which the subject's total electrodermal activity is distributed during the session, that is, the percentage of the subject's total activity in the predicted direction that occurs during the entire set of influence epochs; this can be contrasted with the acitivity occurring during the entire set of control epochs. In the absence of a remote mental influence effect, these two scores should approximate each other, that is, their expected

Values should be 50 percent. For a given experiment, the percent influence scores (a single score for each subject contributing to that experiment) are compared statistically with mean chance-expectation of 50 percent using single mean t tests. A schematic representation of the events of an experimental session is given in Figure 3.

Thus far, we have completed 15 electrodermal remote influence experiments, with the number of subjects in each experiment ranging from 10 to 40. In all, there have been 323 sessions conducted with 271 different subjects, 62 influencers, and 4 experimenters. The experiments have yielded evidence consistent with the hypothesis that one person may exert a remote mental influence upon another person's physiological activity. Thirteen of the 15 studies yielded overall results in the expected direction. Six of the 15 experiments (40 percent) were independently significant statistically (i.e., had p values less than .05); this is to be compared with the 5 percent experiment success rate expected on the basis of chance alone. Fifty-seven percent of the individual sessions were successful (i.e., yielded results in the expected direction); this is to be compared with the 50 percent session success rate to be expected on the basis of chance. When the series as a whole is analyzed using a recommended method for combining z scores of similar experiments (Rosenthal, 1984), an overall Stouffer $z = 4.08$, with an associated $p = .000023$, was obtained. Effect sizes were calculated using the "Cohen d" measure (in which the value of the significance test is divided by the square root of the number of scores contributing to that test)--a method recommended by those interested in the meta-analysis of scientific experiments. The mean effect size is 0.29, which compares favorably with effect sizes typically found in biomedical and behavioral research. Results are summarized and depicted graphically in Figure 4.

The overall results indicate that significantly more phasic electrodermal activity of the prescribed type (i.e., more activity during activation-aim periods, less activity during calm-aim periods) occurred during remote mental influence periods than during comparable control periods. The experimental design guaranteed that the obtained effects could not be attributed to conventional sensorimotor cues, common external stimuli, common internal rhythms, or chance coincidence. Neither can the results be explained in terms of various other potential artifacts or confounds; these are considered in detail and dismissed in Braud and Schlitz (1989). Thus, the results reflect an anomalous psychophysical interaction between two individuals separated from one another in space.

It is important to note that the experiments I've just reported were not carried out with special subjects. Unlike Vasiliev, we did not work only with carefully selected, highly hypnotizable subjects. Rather, we worked with anyone in the community who was interested enough to volunteer to participate in the studies. Similarly, the influencers represented a cross section of the community and were not selected on the basis of special skills or experiences. The fact that we were able to observe significant results in these unselected subjects, and often in persons attempting the task for the very first time, suggests that we are dealing with a common, widespread ability--one that is, perhaps, normally distributed within the general population. It would be of great interest, however, to conduct special experiments with influencers and subjects selected for high hypnotizability in order to approximate more closely the remarkable results reported by Russian and French investigators during the early decades of this century.

These electrodermal experiments may be viewed as successful conceptual replications of the distant mental suggestion studies re-

ported by Vasiliev (1976). In turn, there have been several recent conceptual replications of our work (Gruber, 1979, 1980; Kelly, Varvoglis & Keane, 1979; Khokhlov, 1983). To our knowledge, however, there have been no exact replications by other laboratories of the electrodermal studies just described. One of my motives for summarizing this research here today is to encourage such replications by independent investigators. I am pleased to note that several members of this Association already have expressed interest in attempting to replicate these experiments. This would provide an expanded data base that would increase our understanding of the various physical, physiological, and psychological factors that may facilitate or impede this remote mental influence effect, provide important information about its generality, range and possible limits, help us develop the models and theories necessary to an improved understanding of these findings, and help delineate the implications and possible applications of this curious phenomenon.

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FOOTNOTES

1. Thirteen experiments were conducted. In those experiments, there were 15 opportunities for the remote mental influence effect to be tested. For simplicity, in this presentation, the term "experiment" is used to describe these 15 test opportunities. For Figure 4, mean z scores and mean effect sizes are shown for the 13 experiments themselves; Experiment 5 contained two test opportunities, as did Experiment 13.

2. The analog-to-digital converter was used in Experiments 5 through l5; In Experiments 1 through 4, the chart recordings were manually scored in a comparable manner by an assistant under blind conditions.

3. Using a single mean t test in this fashion is identical to using a matched (pairwise) t test to directly compare the influence versus control scores. Distribution tests indicated that the score distributions were appropriate

for the use of parametric tests. When the scores were analyzed using comparable nonparametric tests, results were virtually identical to those described here.

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