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PSYCHOKINESIS

To this point our study of parapsychological phenomena has focused on the “receptive” aspects of psi. Thus in ESP the experient acquires some information supposedly by some paranormal means. Chapters 6 and 7 consider the other face of psi, namely its “expressive” character. As well as acquiring information from the environment it may be possible for information to flow from the individual to the environment in a paranormal fashion. One form of such influence already has been referred to, and that is telepathy. In this extrasensory process it is said that information can be conveyed directly from one mind to another. As was noted in Chapter 4 little productive research has been undertaken in regard to the agent’s possible contribution to ESP and consequently the authenticity of this expressive form of psi still is equivocal.

Another general type of expressive psi nevertheless has attracted rather more systematic research and it is known as *psychokinesis* (PK). The term “psychokinesis” literally means movement by the mind or psyche. That is, PK may entail observable movements of objects paranormally produced by an effort of will. More generally PK is regarded as any direct mental influence upon the structure of a physical system, whether or not observable movement occurs. In short, PK is a phenomenon of mind over matter. Psychokinesis and ESP are said to be the two fundamental forms of *psi*.

SPONTANEOUS CASES OF PK EXPERIENCE

Many physical phenomena of spiritualist seances implied the existence of PK. Apports, levitation, spirit raps, materialization, and paranormal movement

of objects in the seance room might be categorized as psychokinetic feats (Braude, 1986; Randall, 1982). More recently we have seen the spoon-bending fad inspired by Uri Geller, with many youngsters claiming to have produced distortions in cutlery, keys, and other metal objects by paranormal means. Other people are said to have a similar power to influence the state of a biological system (psychic healing) or that of photographic film (psychic photography); these two specific expressions of PK will be discussed later in Chapter 7.

For the main part, however, occurrences of the PK experience in everyday life are rather less spectacular, as is evidenced in the following examples.

Maurice Marsh was a colleague of mine for many years and has a long association with parapsychology; indeed he completed his doctoral dissertation on ESP at Rhodes University in South Africa. At one time Maurice was testing a university student for ESP and found she was yielding some promising scores. This trend was appreciated not only by Maurice but by the student herself. One evening the student visited another member of staff (a social anthropologist) and described how well she was performing on the ESP tests. This particular staff member was concerned that his student may be wasting her time participating in such work and after some attempts at gentle discouragement he became sufficiently exasperated to exclaim, "Look, the only thing that could convince me there is anything to this business (i.e., ESP) is if that picture fell down this very instant!" At the moment he pointed to the picture on the wall it fell to the floor. Examination of the picture revealed that the wire on the back of the frame had neither broken nor come adrift, and the hook upon which the picture had been hanging was intact.

A relatively common example of spontaneous PK experience is the stopping of a watch or clock at the time of death of a relative or friend. As Virtanen (1977/1990, p. 71) notes, in folklore the clock symbolizes life; its ticking is evocative of heartbeats, so that when a clock stops it signifies that a life also has ceased. You will recall the old song about the clock that "stopped, short, never to go again when the old man died." Of course, clocks and watches can stop through natural causes, but often in these cases the respondent notes that the timepiece had not wound down, nor was it broken (Rhine, 1981, p. 196). There also are cases in which at the moment an individual experiences a severe crisis a clock starts to tick after years of inaction (Rhine, 1963a, p. 98).

In a case reported to L. E. Rhine (1961, pp. 223–224) a bulb in a floor-lamp exploded. According to the woman who witnessed the event the light bulb "had been cold for hours" and there seemed no reason for its explosion. Intuitively she associated the incident with some sort of family trauma. A few days later she learned that at the time of the PK experience her brother's farmhouse had been destroyed by fire, apparently as the result of an electrical fault.

Another example was reported by the Swiss psychologist Carl Jung (1963, pp. 108–109). His mother heard a loud cracking sound from the sideboard;

upon investigation Jung found that the blade of their breadknife had broken into four pieces.

THE PHENOMENOLOGY OF PK EXPERIENCE

Regrettably there are very few large collections of spontaneous PK case reports and even fewer attempts to subject such collections to content analysis. Nevertheless, following along the lines of her work on spontaneous cases of ESP Louisa E. Rhine has analyzed reports of PK submitted to the parapsychology laboratory at Duke University. The principal trends found in that case collection now will be summarized.

The incidence of spontaneous PK cases is relatively low. At the time Rhine conducted her analysis she had on file over 10,000 reports presumptive of ESP and only 178 cases of PK experience (Rhine, 1963a, p. 88). These data may underestimate the occurrence of PK. For example, in Palmer's (1979) survey of psychic experiences about 7 percent of the sample acknowledged having seen an object move without any natural mechanism being evident. But with the incidence of ESP experiences at over 50 percent in Palmer's study PK does seem to be by far the less common of the two fundamental forms of psi experience.

Again it is possible that this comparative trend is exaggerated by various circumstances. Perhaps people do not countenance the possibility of paranormal factors in physical events as readily as they do in mental events. The concept of ESP is sufficiently familiar that it may be used to "explain" certain mental events, but as PK is a less familiar notion it might not occur to the observer that a particular physical effect could have had a paranormal basis and the unaccountable event may soon be forgotten as "just an accident," something of no great interest. The meaningfulness of the event also may be less obvious in PK experiences. While the content of an ESP experience may have very clear links with an actual event it simply may not strike the individual that for example, the stopping of a clock had some connection with the death of a loved one. Further, in comparison with ESP, it typically is difficult in PK experiences to be sure that an undetected but natural cause was not responsible for the observed event. Finally, for some reason a "mind over matter" effect is much less credible than one of ESP. Perhaps this incredulity is motivated by a strong subconscious fear of the existence of such a potentially unlimited destructive force as PK (Grosso, 1989). In any event, the experient may well be comparatively reluctant to acknowledge having had a PK experience.

Nearly all PK cases in Rhine's (1963a) collection involved two people, one who observed the physical effect and another (usually some distance away) who was undergoing a crisis of some sort. In over a half of Rhine's cases the crisis was death. Typically the two folk in the case were relatives or close friends

so that one individual's crisis normally would have elicited an emotional response from the other person.

This might be taken to imply that the individual undergoing the crisis had used a physical effect as a paranormal means of communicating with the observer. This interpretation is challenged by Rhine. Her reason is that there are a few cases in which only one person was involved. For example, a clock may start ticking when the observer is in a state of crisis. Rhine (1963a, p. 106) cites another case in which a man's watch stopped at the moment he himself died. In such cases there would not seem to be any "message" being sent to an observer. On these grounds Rhine suggests that even when two people feature in a PK case it might be not the distant friend but the observer who is directly responsible for the physical effect. It is hypothesized that the observer extrasensorially perceives the danger faced by the distant friend but rather than admitting this information into consciousness as an intuitive impression or mental image the subconscious mind of the observer uses a physical object as a means of expressing the information.

Certainly the repression of information from consciousness is indicated in many instances. For example, in one case a woman was sitting in her office when suddenly she began to cry. Her employer repeatedly asked her what was the matter but she could not tell him, nor could she stop crying. After some 20 minutes a huge decorative vase fell off its shelf when no one was near it. Subsequently the woman learned that her father had died on the day of the incident (Rhine, 1963a, p. 112). In such cases PK seems to reflect the defense mechanism of *displacement*: extrasensory knowledge for one reason or another cannot be admitted to consciousness and this leads to a state of tension which is released through displacement on to a physical object, a parapsychological version of frustratedly thumping the table with one's fist. (In some cases it is possible that once the tension is released via PK, the extrasensory knowledge may begin to break through into consciousness.)

According to Rhine's analysis it typically is the case that the observer is situated near the object affected and the person in crisis is some distance from it. Some researchers propose that this indicates PK is uninhibited by distance, but their interpretation assumes that the psychokinetic influence stems from the person in crisis rather than from the observer. As noted above such an assumption is questionable. It should be remembered too that there are cases of PK experience in which the presumed referent person was deceased. Forty-six of Rhine's (1963a, p. 91) 178 cases were of this sort; usually they were construed by the experient as a sign of the referent person's post-mortem survival.

There is some variety in the type of physical effect featured in spontaneous PK experiences. Objects may fall, or they may fracture without falling; mechanical objects may stop functioning or restart after a period of inactivity. Commonly the target object is part of the household decor, an object such as a clock, vase, mirror or framed picture. On the other hand this merely may

reflect the frequency with which the respondent is in particular situations or the likelihood of the physical effect being noticed or acknowledged. For example, few reported cases may be set in a shopping center because firstly, observers may spend relatively little time shopping and secondly, if an object falls from a shop shelf its original position is assumed to have been precarious and the involvement of PK simply is not countenanced.

In her main phenomenological analysis of nonrecurrent PK experiences L. E. Rhine (1963a) classified her cases in terms of the physical events reported. The categories she employed and their relative frequencies were as follows: the fall of objects from a wall, mantel, or shelf (36 percent); starting or stopping of clocks (27 percent); breakage or explosion of objects (12 percent); turning on or off of lights (10 percent); opening, shutting, or unlocking of doors (8 percent); and rocking or shaking of objects (7 percent).

This sample of cases nevertheless excludes instances in which the experience was purely auditory (e.g., rapping sounds from a wall). Auditory cases were analyzed separately by Rhine (1963b) on the grounds that they could conceivably have been hallucinatory rather than entailing an objective event. The sample of purely auditory cases included the striking of clocks (12 percent), the ringing of bells (22 percent), and knocks, raps, or less specific noises (66 percent).

On the basis of her analyses Rhine (1963a,b) concluded that the physical phenomena in spontaneous PK experiences are in fact not likely to have been hallucinatory. She cites a number of cases in which the effects were seen or heard by several people. For example, in 57 percent of the purely auditory cases the experient was in the company of at least one other person, and in 92 percent of these instances all persons present were said to have heard the sound.

The condition of the person in crisis (or presumed target person) was found by Rhine (1963a) to interact with the form of the PK experience. The stopping or starting of clocks often was associated with a target person who was dying but rarely with one who was deceased. The fall of objects, on the other hand, was most characteristic of cases with a living target person. Rhine notes, however, that at least a few instances of each form of the PK experience were recorded for each condition of the target person.

Of the above phenomenological trends perhaps the most interesting from the viewpoint of research is that PK might represent a displaced expression of extrasensorially acquired information. Somewhat surprisingly this notion has received little attention in the parapsychological laboratory, although it has been explored to some degree in the context of recurrent spontaneous PK phenomena or poltergeist experiences (as we shall see in Chapter 10).

Although it could be said the consistencies in spontaneous PK case reports do testify to the authenticity of this parapsychological phenomenon, there are many uncertainties associated with spontaneous case reports as far as their evidential value is concerned. Several of these were discussed in Chapter 3 in the

context of ESP. The factor of chance particularly is problematic here. How often do clocks stop and pictures fall at a time when a close friend or relative is *not* in a state of crisis? Unless we have estimates of such occurrences it cannot confidently be asserted that alleged PK incidents of these forms are beyond the realms of pure chance.

Further, it is even more difficult in PK experiences than in those of ESP to rule out the operation of “normal” causes. It is one thing to be reasonably sure that the content of an ESP experience could not have been acquired by normal means, but rarely can the experient or the researcher demonstrate that a supposed PK effect could not have been due to some normal physical process. Investigation of the authenticity of PK would require properly controlled conditions of observation.

In this light we now turn to a review of experimental PK research.

EXPERIMENTAL RESEARCH AND THE AUTHENTICITY OF PK

Experimental PK research began at the Duke University parapsychology laboratory in 1934 when a young professional gambler walked into J. B. Rhine’s office and claimed that he could influence the fall of dice purely by his will power. The two men then got down on the floor and began throwing dice. Although Rhine was not particularly convinced by the gambler’s demonstration it did occur to him that dice throwing was an appropriate task to use in the laboratory investigation of the authenticity of PK (Rhine, 1970, pp. 2–4).

In J. B. Rhine’s initial experiment subjects rolled a pair of dice with the aim of achieving a total in excess of seven on the uppermost faces of the dice. The probability of this event is 5/12. That is, in a run of 12 throws of the two dice it would be expected that purely by chance the sum of the faces would exceed seven on 5 of the throws. A group of 25 participants completed 562 runs (each of 12 rolls) and yielded 5.53 hits per run compared to the MCE of 5, a highly significant result.

The first experimental study therefore was encouraging, but Rhine realized that the dice may have been biased and the data hence were inconclusive. To test whether the results reflected a bias in the dice Rhine repeated the study, first with participants asked to throw a score *less* than seven, and then with the target set at seven itself. Above-chance performance was obtained also under these procedures, suggesting that the initial finding was not an artifact of poorly balanced dice.

Later studies utilized high quality dice as are used in casinos (where slight biases in dice could cause the casino proprietors to lose heavily). Additionally, the face to be thrown in a given run, the so-called *target*, was selected randomly. Methodological improvements also were made in the throwing process. In the

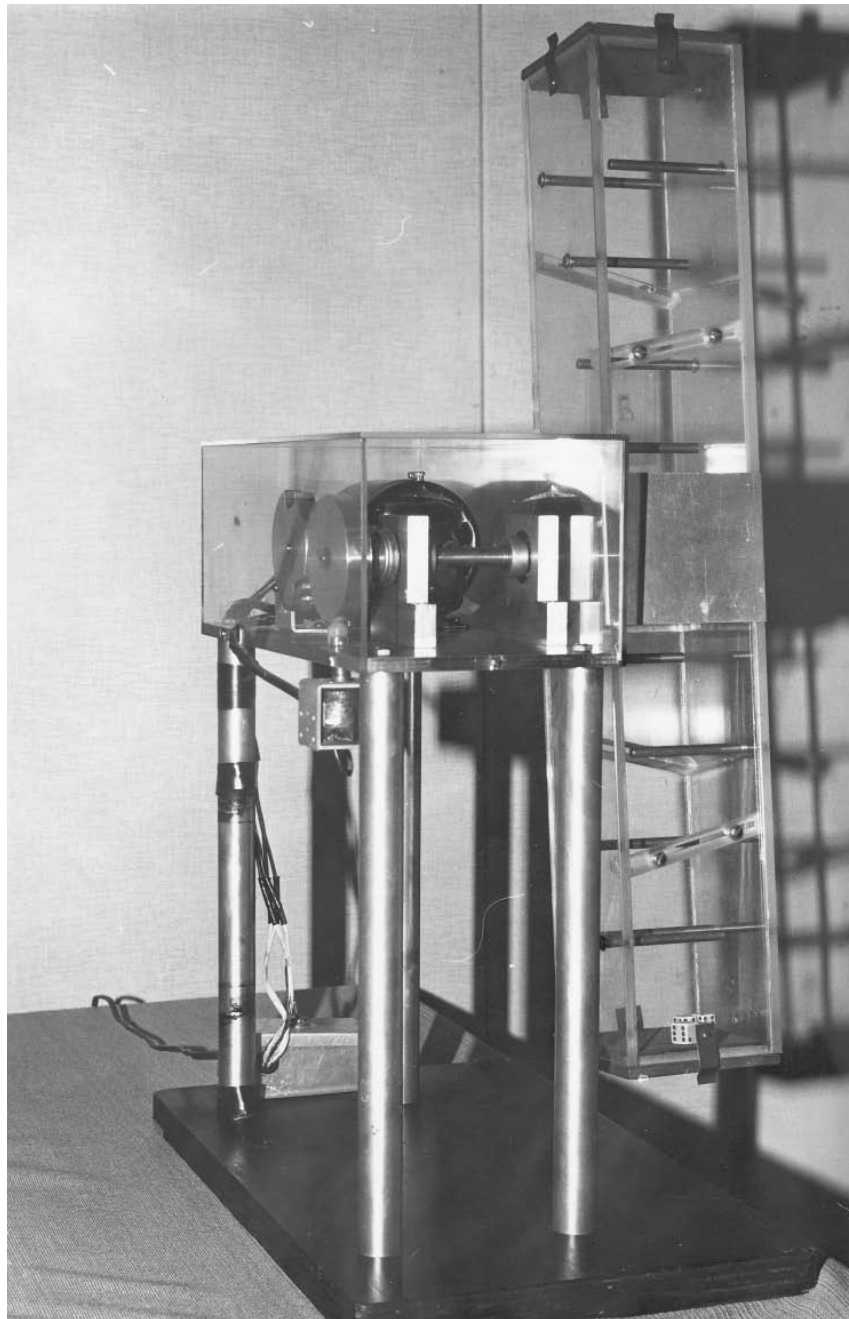


Figure 11. One of Rhine's dice-rolling machines (photo: RRC).

early studies subjects held the dice in their hands and threw them against a wall. With throwing by hand some degree of “fudging” by the subject may be possible. Subsequent experiments relied on other means of releasing the dice: progressively these included tipping the dice off a ruler and down a slide, pulling a cord to release the dice through a shutter and thence down a slide, spinning the dice in a machine-driven fully enclosed wire-mesh tube, and spinning the dice in a similar perspex device which contained baffles to make the fall of the dice even less open to artifactual manipulation.

L. E. and J. B. Rhine (1943) published a cumulative report on their PK investigations in 1943, by which time the controversy over their ESP work had died down somewhat (L. E. Rhine, 1970, pp. 26–27). The PK task became standardized at 24 throws of a single die; with the probability of throwing the target face on any trial being $1/6$, the MCE was 4 hits per run. A number of PK experiments were conducted within this framework, primarily looking at the influence upon performance of various physical factors such as size, weight, and number of dice.

In the 1950s and 1960s interest in laboratory PK research tended to wane, although W. E. Cox in America and Haakon Forwald in Sweden pioneered a novel approach known as the placement method. In placement tests objects were released down a slide and the subject endeavored to influence the objects’ movement towards coming to rest in a specified target location at the bottom of the slide. The placement of objects by chance factors alone could be calculated and thus it was argued that this type of PK test permitted an estimation of the amount of energy attributable to application of the PK “force.”

The 1970s saw a marked resurgence of PK research. Several factors underlying this revival are identified by Stanford (1977, pp. 328–329), but the primary element of the revival was Helmut Schmidt’s (1970a) contribution to the development of random event generators (REGs) based on radioactive decay and his use of these devices in PK research.

The operation of an REG can be described (somewhat simplistically) as follows. In essence an REG comprises electronic circuitry connecting three basic components: a radioactive source (or in some cases a source of electronic noise, rather like intermittent radio static), a counter, and a visual display. The electronic counter has a clock-like face and its indicator can be stopped in any one of a limited number of positions (e.g., four), just as a hand on a clock may point to one of the hours. The indicator on the counter spins around the face at a very high frequency until it is stopped by a signal produced upon the emission of a particle from the radioactive source. The nature of the visual display (the only part of the apparatus open to the observer) is governed by the stopping point of the counter on each trial. Now, the interval between successive emissions of particles from the radioactive source is conceptually random, that is, theoretically it is not possible to predict accurately the position in which the counter next will stop. Hence if an individual can focus on the visual display

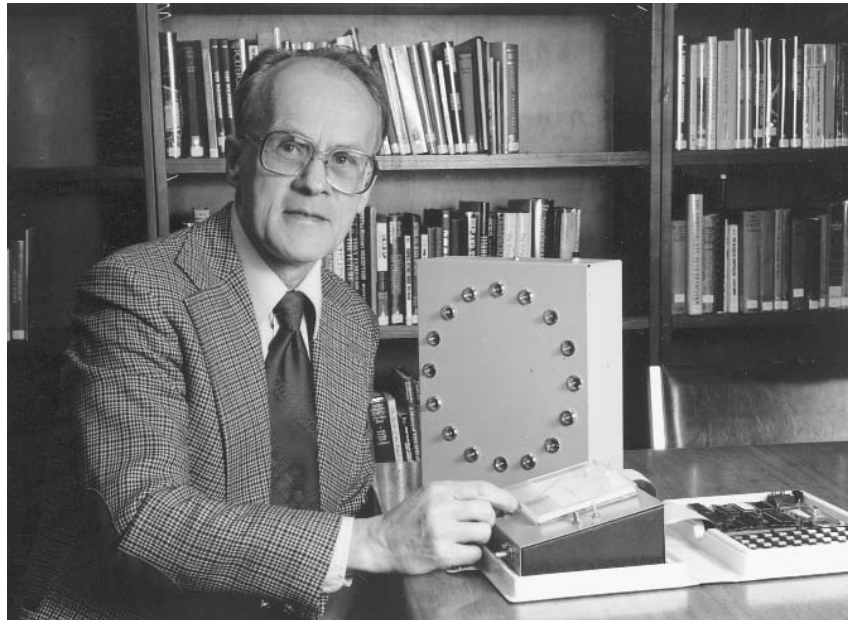


Figure 12: Schmidt demonstrating one of his REGs (photo: Helmut Schmidt).

over a substantial number of trials and in some way “will” it to change in a specified way to a level beyond chance expectation, a psychokinetic effect is said to be evidenced. The statistical randomness of the REG’s output when subjects are *not* attempting to achieve PK effects must regularly be checked.

With REG technology current PK research is methodologically superior to that of the dice-throwing days. The REG can be interfaced with a computer so that the targets and outcomes automatically are recorded and scored without the opportunity for human error. A huge data base also can be obtained in a relatively short period (e.g., Jahn, Nelson & Dunne, 1986).

The methodology of the REG-PK research nevertheless has been criticized, principally by Hansel (1980, 1989), Hyman (1981), and Alcock (1990). Some criticisms, such as the possibility of fraud, are ultimately irrefutable but equally as applicable to any topic of research in the behavioral sciences. The insufficient documentation of methodological detail particularly in the earlier publications on REG-PK received some comment; it is notable that recent papers (e.g., Schmidt, 1991) tend to report the experimental procedure and apparatus very thoroughly. A few other points have been satisfactorily countered by parapsychologists (Rao & Palmer, 1987). One reasonably cogent criticism is that although the experimenters periodically checked their REG apparatus for nonrandomness over extremely long series of trials, this might not have ruled out the presence of nonrandomness in shorter runs of the kind used in the PK

experiments. On the other hand, it is difficult to envisage how such biases could yield significant data in the predicted direction in those studies in which experimental (PK-trial) performance was compared directly to control sequences generated by the same REG (e.g., Schmidt, 1976). The problem of short-run biases also would seem to be negated by the results of meta-analyses of the cumulative record of REG-PK studies (Radin, May & Thomson, 1986; Radin & Nelson, 1989). These analyses suggest there is a small but nonetheless genuine phenomenon here to be explained.

That this phenomenon necessarily entails a “mind over matter” effect as implied by the PK hypothesis is another issue. For example, the REG-PK data might be explained under the *intuitive data sorting* hypothesis: statistically significant performances may stem not from a psychokinetic process but from precognitive identification of an appropriate time to commence the experimental series or to make a response in the experimental task (Radin & May, 1987; May et al., 1995; Vassy, 1990). Recent analyses by Dobyms (1996) suggest that this explanation does not fit the data as effectively as the assumption of a direct (PK) influence, but the simple fact that the intuitive data sorting hypothesis can be proposed is sufficient to indicate that the PK research is not conclusive for the issue of ontological reality. As is the case for ESP, unless parapsychologists can demonstrate the nature of the channel of PK interaction it cannot be said that a “mind over matter” effect has been authenticated.

PROCESS-ORIENTED EXPERIMENTAL RESEARCH ON PK

By means of the techniques described above some experimental research into the nature of PK has been conducted, but the quantity and scope of available data are far more restricted than for ESP. Detailed reviews of the literature are provided by Rush (1977, 1982), Schmeidler (1977, 1982, 1987, 1994b) and Stanford (1977).

If ESP and PK are to be regarded as expressions of some unitary capacity termed “psi” the comparison of PK with ESP becomes crucial and it therefore may be instructive to outline the trends in experimental PK research under the same sequence of headings used in the summary of the ESP literature (see Chapter 4). The following presentation draws in part upon Irwin (1985e).

PK PERFORMANCE: PATTERNS AND IMPROVEMENT

Most of the data on patterns of PK performance are derived from the old research paradigm of dice throwing. In many cases it remains to be shown that

the same patterns can be demonstrated under the methodologically superior REG approach.

The bidirectionality of PK: psi missing. In some experimental investigations of PK (e.g., Steilberg, 1975) subjects have scored below MCE to a significant extent, that is, incorrect outcomes were obtained more often than expected by chance. Psi missing therefore occurs in PK. Sometimes this arises in the context of a differential effect (e.g., Gibson & Rhine, 1943). The occurrence of PK missing in association with negative elements in mood or personality is not well documented (Stanford, 1977, p. 330 & pp. 345–348).

There seem to be no reports of consistent missing, that is, a trend towards producing one particular outcome when another is intended.

The focusing effect? In some of the early dice-throwing research at Duke University many subjects performed best on trials in which the target was a six. This may have been due to a preference for sixes acquired in playing children's dice games and thereby it would constitute a focusing effect. Again, a bias in the dice may have contributed to the excess of sixes: with pitted dice the higher numbered faces are lighter and hence these may tend to turn up more frequently than the lower numbered faces.

Position effects. One of the factors prompting the Rhines' publication of their accumulated data in 1943 was the observation of a decline in scoring within each session (Rhine, 1970, p. 29). This suggested to the Rhines that PK has an affinity with ESP. Like ESP tests the majority of dice-throwing studies evidence better performance in the first quarter of the session than in the last quarter; within-run declines also were reported (McConnell, Snowdon & Powell, 1955; Rush, 1977, pp. 34–36). Critics (e.g., Girden, 1962) nevertheless continued to maintain that position effects in these studies were due to chance, bias in the dice, or nonrandom effects in the operation of the dice-rolling apparatus.

Subsequent research with REG methodology has not given much attention to position effects, although some experiments have confirmed the within-session decline (Honorton & May, 1976; Schmeidler, 1987, p. 19) and position effects across series (Dunne et al., 1994).

The differential effect. As with ESP, PK experiments featuring two contrasting conditions may yield contrasting levels of performance, often with hitting in one condition and missing in the other (e.g., Cox, 1971; McMahan, 1947).

Displacement? It is not clear that spatial or temporal displacement of PK can occur within a run of trials. In the dice research the identity of the target usually was changed for each run rather than for each trial; hence it would not have been meaningful to look for a displacement of PK on to the target for the trial after (or before) the intended one, since both trials had the same target. Nevertheless some researchers (Pratt & Woodruff, 1946; Palmer & Kramer, 1984) have noted positive scoring on the target that was just abandoned, an

effect which is suggestive of temporal displacement. Braud (1987, p. 215) also asserts the possibility of spatial displacement, with significant scores being found for dice face outcomes other than the intended one.

Among the more recent REG studies Schmidt (Schmidt, 1976; Schmidt, Morris & Rudolph, 1986; Schmidt & Stapp, 1993) has performed several experiments consistent with the concept of *retro-PK*, that is, the operation of a psychokinetic influence on a past event (or perhaps a future event's influence upon the present). The methodology used by Schmidt can be queried on the grounds that its data also are interpretable in terms of a precognitive parapsychological experimenter effect. That is, the experimenter may unwittingly have used his own psi to select targets that would yield significant results in relation to subjects' subsequent efforts.

Clustering? There are no indications that PK "hits" tend to cluster together rather than being spaced randomly through the run (Stanford, 1977, p. 354). This is in contrast with Kelly's (1982) and Don, McDonough, and Warren's (1991) suggestions of ESP clustering. You will recall that the latter data, however, are based on post hoc analyses and a direct investigation of ESP clustering has yet to be undertaken. Additionally, a trend toward clustering might be affected by the frequency with which the targets are changed, whether from trial to trial (as in ESP work) or from run to run (as in most of the PK research).

Improvement and the role of feedback. Providing the subject with trial-by-trial feedback does not seem to lead to an improvement in PK performance: scoring continues to decline within the session (Stanford, 1977, pp. 359–360). In the context of PK Tart's argument for the importance of feedback therefore is not supported. Tart (1983) argues however, that a prerequisite level of PK ability is necessary for his predicted learning effects to take place. Gissurarson (1997) also suggests that a strong sense of commitment and persistent practice may be important in "learning" PK skills.

TARGET VARIABLES

Among the target systems that have been used in experimental PK research are rolling dice, tossed coins, falling spheres, falling drops of water, spinning roulette wheels, and various sorts of video displays governed by an REG.

Physical aspects of the target objects have been given some experimental scrutiny.

In the older dice-throwing work the size of the dice had no significant or consistent effect upon PK scores (e.g., Humphrey & Rhine, 1945). Forwald's (1961) methodologically superior study did reveal die size as a factor in level of performance but the nature of the data suggests that size as such was not as fundamental as the extent to which the dice bounded and spun before coming to rest.

The die's density (weight with size held constant) or its component material has not proved to have any linear effect upon scoring. In one study using celluloid dice and lead dice of the same size, the former yielded significant above-chance scoring and the latter scoring below chance to an equal degree (Cox, 1971). This differential effect occurred without the participants knowing that dice of different densities were being used.

The number of dice thrown on each trial does not seem a pertinent variable at least in the physical sense (Rhine & Humphrey, 1944). At the same time, if only one die is thrown per trial a greater number of trials is required to yield a given quantity of data and as the test progresses the subject working with a single die could become increasingly bored, a situation which might well depress performance. There also are some complex methodological issues in the multiple-dice studies (see Kennedy, 1978, pp. 92–94 for an analysis).

In PK studies with electronically generated targets a very high rate of target generation may impair performance (Schmidt, 1973), but there is evidence to suggest that this effect springs from the participant's perception of the tasks rather than from any intrinsic limitations of PK (Stanford, 1977, pp. 353–354).

In a study with pictorial stimuli Stanford (1983) obtained higher PK performance when the target slide had low similarity to other pictures that could be selected by the REG. Although "similarity" here was judged partly in terms of contours and thereby might be deemed a physical dimension, it also entailed some semantic interpretation of the pictures. Whether Stanford's data reflect purely physical or psychological target characteristics therefore is unclear. Certainly the variable of physical similarity or discriminability of REG outcomes warrants further investigation.

In REG research there also is some indication that PK scoring is not influenced by the complexity of the device which generates the target (Schmidt, 1974).

One physical characteristic which may influence PK is the *lability* of the target system, that is, the ease with which the system can change from one state to another, or the amount of "free variability" in the system. In a series of experiments conducted by the American parapsychologist William Braud (1980) labile target systems appeared more open to psychokinetic influence than were systems characterized by high inertia. This is not to say that static targets are impervious to PK (see the section on macro-PK in Chapter 7). Again, it is feasible that Braud's results are due more to psychological than to physical factors: a highly stable system may strike unselected experimental subjects (consciously or subconsciously) as so immutable as to discourage attempts to influence its state.

Looking globally at the research on physical aspects of PK target systems it would appear that such factors have little effect on PK performance except perhaps by way of their psychological impact on the participant. This accords with similar research into ESP. Further, these data suggest that it might not be

appropriate to think of PK as a paranormally produced physical force. It must be acknowledged, however, that the scope of the PK studies in this regard has been limited. Faith may move mountains, but that PK can do so as readily as it appears to influence dice is a matter yet to be resolved conclusively. Braud's research also serves as a caution that there may be important physical dimensions yet to be explored in this context.

While on the subject of the pertinent characteristics of the target it should be mentioned that PK can occur even when the participant is unaware of the nature or even the existence of the target system. For example, in most REG experiments the subjects are asked to try to influence a video display and as far as they are concerned this display is the "target." On the other hand, it might be presumed that the point at which the REG system is open to PK influence is in the emission of particles from the radioactive source, a part of the system that is unknown to the subjects. Indeed the subjects may even be unaware that they are taking part in a PK experiment. In one study the uninformed participants were given either a boring task or a pleasant task according to the outcome of an REG situated in an adjacent room; the number of people gaining access to the pleasant task exceeded chance (Stanford, Zenhausern, Taylor & Dwyer, 1975). It seems then that PK is directed toward a *goal* rather than necessarily to the underlying physical mechanisms of the target event. This aspect of PK is particularly important in the context of constructing a theoretical account of the phenomenon, and it also offers a viable alternative to the view that PK operates like a physical force. The *teleological* (goal-directed) character of PK is discussed by Stanford (1978); see also Chapter 8.

OTHER SITUATIONAL VARIABLES

Performance in a PK task may vary with the physical setting of the experiment presumably by way of an effect on the motivation of participants. With psychological factors controlled most physical variables appear irrelevant. For example, PK does not decline with increased distance between the subject and the target system, provided the subject remains unaware of the actual distance (Dickstein & Davis, 1979). There is one study in which PK scoring was significantly higher in light than in darkness (Gibson & Rhine, 1943), but in another study the reverse was observed (McMahan, 1947). Perhaps some subjects find darkness unnerving, while for others it is conducive to relaxation.

As with ESP the experimenter's motivation, attitudes and handling of subjects can have some bearing on the outcome of a PK study. Some evidence of this is cited in White's (1977) review.

A little work has been conducted on the states of consciousness most conducive to good PK scores (Gissurason, 1997). There are indications that a relaxed frame of mind is more advantageous than intense striving for an effect

(Debes & Morris, 1982; Steilberg, 1975). Thus superior performance may be obtained when the PK task is presented as a kind of game. Similarly, various yoga/meditation techniques seem to be PK conducive (Gissurarson, 1997). Passive visualization of the target also seems more efficacious than thoughts about imagined processes leading to the goal (Levi, 1979; Morris, Nanko & Phillips, 1982). These findings are consistent with the idea that PK performance is facilitated by an unforced state of absorption in the goal of the task (Isaacs, 1986), although the occurrence of spontaneous PK experiences does not seem to be related to a need for absorption (Irwin, 1985b).

The number of subjects tested at one time may be regarded as a situational factor. In one early study employing the dice methodology two subjects trying to achieve the same target face were more effective than when each tried for a different target (Humphrey, 1947). In another experiment the run variance was greater when the pair of subjects aimed for the same target (Feather & Rhine, 1969). Few of these so-called "help or hinder" studies have been undertaken with the more sophisticated REG methodology. An interesting variation of this approach was used by Schmidt (1985), with two subjects making *successive* attempts to influence pre-recorded events by means of retro-PK; only the individual who made the first such attempt was associated with a significant effect. There still are too few data upon which to base a decision about additive PK effects across different people.

SUBJECT VARIABLES

Some studies have examined PK performance in relation to the beliefs of the experimental participants. A few sheep-goat experiments have been conducted but unlike ESP a belief in the possibility of PK evidently has little if any effect upon dice-throwing performance (Dale, 1946; Gissurarson, 1991; Gissurarson & Morris, 1991; Stanford, 1977, pp. 330–331). As PK is even more sensitive than ESP to the subject's level of mental relaxation it is possible that the advantage of a stronger positive attitude to PK is offset to some degree by a concomitant increase in level of arousal. Nevertheless in one study with an REG-PK task Weiner (1982) found a strong positive correlation between performance and belief in the existence of PK; this result was not obtained in her attempted replication of the experiment.

Possibly associated with PK belief is the acknowledgment of personal spontaneous PK experiences. The frequency of prior PK experiences has been found to correlate positively with PK test scores (Gissurarson, 1991; Gissurarson & Morris, 1991).

There is scant evidence that the subject's mood during the test affects scoring level although few studies have addressed this issue directly. Van de Castle (1958) reports that the Expansive/Compressive index of mood may be

related to PK performance, although the data are weak and lack independent confirmation. Research on personality correlates of PK has not fared much better. Van de Castle's study indicated also that spontaneous people exhibit higher scores than inhibited subjects. Other studies suggest a negative correlation with anxiety (Broughton & Perlstrom, 1985) and possibly with defensiveness (Watt & Gissurarson, 1995). Few experiments, however, have sought to relate PK performance to major personality variables.

Physiological correlates likewise have been given little attention. Schmidt (1991) failed to establish any relationship between experimental PK performance and heart rate.

Some research on cognitive variables has been undertaken. The capacity for generating mental imagery does not seem to be a correlate of PK scores (Gissurarson & Morris, 1991). Similarly, different imagery strategies in themselves were not observed by Gissurarson and Morris (1990) to affect PK performance differentially, but Stanford (1969) found that people tend to do better in a PK task when they use their preferred mode of cognitive processing; thus habitual visualizers achieve higher PK scores when they visualize the target than when forming free associations to the target. Another investigation by Krieger (1977) revealed a significant relationship between PK and a test of depth of semantic processing; the latter is a factor in establishing information as a secondary (long-term) memory trace, so perhaps PK is linked with long-term memory skills. Although there is some coherence in reported associations between cognitive style and PK performance it must be said that there are attempted replications and other studies that have yielded nonsignificant results.

The experimental literature therefore evidences similarity between PK and ESP in some respects. But in other respects the parallelism is less clear. To be sure there are reports of people who are adept in both ESP and PK (Stanford, 1977, pp. 346–347), but this might be due to an attitudinal factor or the like rather than to any fundamental commonality between “two forms of psi.” The principal difficulty here is that little research has been directed to the psychological dimensions of PK performance. Much of the current work, despite the welcome improvements in precision and control, still is concerned with the existence of PK and the forms it may take. More of this material is reviewed in the following chapter but at the present point it must be regretted that we are left with comparatively little process-oriented data from which to deduce the modus operandi of PK.

Key Terms and Concepts

psychokinesis (PK)	target face
PK as a displaced reaction	PK placement test
dice methodology	random event generator (REG)

intuitive data sorting	labiality
PK missing	teleological approach
position effects	situational variables
retro-PK	subject variables
target variables	cognitive variables

Study Questions

1. Define psychokinesis and describe the principal techniques employed in its experimental investigation.
2. Have you had a spontaneous PK experience? If so, did it exhibit any of the phenomenological characteristics reported by Louisa Rhine?
3. What trends have been deduced from collections of spontaneous PK case reports? What is the evidential value of such material?
4. To what extent do the patterns in PK test performance parallel those of ESP ?
5. Is retro-PK a testable hypothesis?
6. Some people are inclined to think of PK as a mentally produced physical force. What experimental findings cast doubt on this simple notion?
7. Suppose you throw a die 100 times and on each throw you attempt to call the outcome. The correspondence between the throws and the calls is statistically significant. How could you determine whether this result was due to ESP or due instead to PK?
8. What is an REG and how do these devices work? What precautions must be observed in using an REG in parapsychological research?
9. The results of an REG-PK experiment might be construed as being due to precognition. Explain the rationale of this view. Might spontaneous cases of PK similarly be attributable to precognition? Conversely, might spontaneous cases of precognition be attributable to PK?