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EXAMINATION OF SIX QUESTIONNAIRES AS PREDICTORS OF PSYCHOKINESIS PERFORMANCE

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ABSTRACT: Data from five studies were examined for a possible connection between scores on a computer PK test and scores on six questionnaires: Vividness of Visual Imagery Questionnaire, Auditory Imagery Scale, Gordon's Test of Visual Imagery Control, Greene Luck Questionnaire, Locus of Control Scale, and PK Attitude and Perceived Experience Questionnaire (PAPEQ). In none of the five studies was significant psi-scoring encountered. The most promising finding was that the more subjects reported having "had a psychokinetic experience" on the PAPEQ the higher their PK scores tended to be in all five studies (weighted composite $z = 3.03$, $p = .001$, one-tailed). One study produced a strong positive correlation between PK scores and the sheep-goat factor of PAPEQ, $z = 2.90$, $p < .005$. This finding, however, was not consistent throughout the other studies.

One way of exploring the PK hypothesis is to see whether scores on PK tests correlate systematically with some measurement of individual differences, such as that obtained with paper-and-pencil tests. If a relationship is found, it can then be used to predict PK test performance, to select subjects, and to construct theories regarding the possible processes involved in PK.

The data reported in this article come from five studies carried out at the University of Edinburgh. In all studies, the subjects completed a set of psychometric tests and then took a PK computer test called "Synthia" (Gissurarson & Morris, 1990). Overall, 170 sessions were conducted in the five studies, and the PK data were compared with the following six scalar instruments: (1) Vividness of Visual Imagery Questionnaire (VVIQ) (Marks, 1973), (2) Auditory Imagery Scale (AIS) (Gissurarson, 1991a), (3) Gordon's Test of Visual Imagery Control (GTVIC) (Gordon, 1949), (4) Greene Luck Questionnaire (Greene, 1960), (5) Locus of Control Scale (I-E Scale) (Nowicki & Duke, 1974), and (6) PK Attitude and Perceived Experience Questionnaire (PAPEQ) (Gissurarson, 1989).

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Imagery and PK

When asked to describe their mental activity (mentations) during attempts to influence PK targets, subjects often mention engaging in specific target-related imagery (Gissurarson & Morris, 1991). A few PK studies have suggested that imagery may be connected with PK performance in controlled tests. Subjects who attempt to visualize the feedback they will receive for PK hits tend to obtain more hits than do subjects attempting other types of imagery or no imagery (Forwald, 1969; Levi, 1979; Morris & Reilly, 1980; Morris, Nanko, & Phillips, 1982; Nanko, 1981; Stanford, 1969, 1981; Steilberg, 1975; see also review in Gissurarson, 1991b). Three studies have attempted to correlate imagery scale scores and PK performance (Stanford, 1969, 1981; Steilberg, 1975). All three used a free-association test to measure the tendency to organize one's ordinary thinking around sensory imagery. Only Stanford (1969) found a significant relationship suggesting that the more subjects tend to use sensory imagery in their thoughts the higher their PK scores will be as long as they use a visual-imagery strategy in attempting to influence their target. In an attempted replication, Stanford (1981) obtained a correlation of only $r = +.03$, although it was in the expected direction. Steilberg reported nonsignificant results but did not provide any further information.

For present purposes, the Vividness of Visual Imagery Questionnaire (VVIQ) was selected to measure visual imagery rather than the more frequently used Betts Questionnaire upon Mental Imagery (QMI) (Betts, 1909). Honorton (1975) wrote:

> While the Betts QMI appears to be satisfactorily reliable, the failure of the test to relate significantly to a variety of verbal and visual recall tasks calls into question its construct validity as a measure of individual differences in vividness of mental imagery. (p. 330)

Honorton concluded that a better measure of imagery for parapsychology studies was needed. George (1981) urged that future researchers in parapsychology should use "strongly validated measures such as the Vividness of Visual Imagery Questionnaire" to evaluate vividness of imagery.

Marks (1973) introduced the VVIQ, which was simply an expansion of the visual section of the abridged QMI (Sheehan, 1967). The VVIQ seems to be fairly reliable (Marks, 1973; McKelvie, 1986; McKelvie & Gingras, 1974; Rossi, 1977) and reasonably valid (Gur & Hilgard, 1975; Marks, 1973; McKelvie, 1979, 1986; McKelvie & Demers, 1979; McKelvie & Rohrberg, 1978; Rossi & Fingeret, 1977). Additionally, control of visual imagery was measured by Gordon's Test of Visual Imagery Control (GTVIC). The GTVIC was designed primarily to differentiate autonomous from controlled visual imagery (Gordon, 1949). It could be argued that the ability to control one's imagery is every bit as important as the ability to produce vivid imagery when attempting to engage in a specific PK-related mentation strategy. The GTVIC seems to have adequate reliability (Juhasz, 1972; McKelvie & Gingras, 1974) and defines a single dimension in factor analytic studies (Di Vesta, Ingerson, & Sunshine, 1971; Forisha, 1975).

We know of no studies in the parapsychology literature that have explored the possible link between auditory imagery and PK scoring in those studies where there is an auditory component to the performance feedback. To assess the vividness of auditory imagery, a short questionnaire was designed, the Auditory Imagery Scale (AIS) (Gissurarson, 1989; 1991a). Modeled after the Betts' QMI format, the AIS has seven questions about the ability to imagine various sounds, each of which requires a rating on a four-point scale (a low rating indicating high clarity and vividness).

Self-Perceived Luckiness

The Greene scale. Four studies have examined a possible relationship between PK performance and self-perception of one's "luckiness" as measured by the Greene Luck Questionnaire (Broughton, 1979; Greene, 1960; Ratte, 1960; Ratte & Greene, 1960). The questions on the Greene scale are, for instance, whether respondents expect to win or lose when it comes to games of chance, or whether they have ever had the feeling that they cannot lose when playing a game of chance. The Greene (1960) study found a negative but nonsignificant relationship between self-perceived luck and PK scores. The Ratte (1960) and Ratte and Greene (1960) studies produced a significant difference in PK scores in favor of self-perceived lucky subjects over self-perceived unlucky ones. Stanford (1977), however, argued that the statistical analyses in these two studies were inappropriate. Broughton (1979) found a significant positive correlation between Greene scale scores and PK scores in his pilot data for subjects tested in a group, a relationship that turned out nonsignificant but in the expected direction in the confirmatory data.

Locus of Control. To further explore the possible connection between PK ability and some sort of self-perceived luck, the present studies use a locus of control scale (Internal-External scale, or just I-E scale). The I-E scale is a forced-choice self-report inventory, which first came into prominence with the publication of a monograph by Rotter (1966) (see also Jackson & Paunonen, 1980, pp. 535–537; Lefcourt, 1976; Phares, 1976). Low scores on the I-E scale are thought to indicate that respondents perceive environmental events in general as if they are contingent on their own behavior (internal control). High scores are thought to indicate that the individual perceives a general environmental event as not being contingent on his own actions but rather being the result of chance, fate, or luck (external control).

Because external control implies self-perceived dependence on chance, fate, or luck, it would seem that this dimension could measure some sort of self-perceived luckiness. The more internally controlled a person was, however, the more he would feel directly responsible for, and the physical cause of, external events. Thus, there would be less and less opportunity for hitherto unrecognized means of interacting with the environment, resulting in no place for PK with high internally controlled people. We have found only one study in the literature that has explored whether high-PK-scoring individuals differed on an I-E scale from low-scoring individuals (Schmeidler, Gambale, & Mitchell, 1976). Using Rotter's I-E scale, Schmeidler et al. did not find any significant difference; however, they did not provide any information about the direction of the relationship, and it may be worth a further investigation.

Nowicki and Duke (1974) attempted to improve the original Rotter scale, which had been criticized for being influenced too much by social desirability, for confounding different types of locus of control, and for difficult reading level. They published the Adult Nowicki-Strickland Internal-External control scale (ANS-IE). We have selected the ANS-IE for the present experimentation and refer to it hereafter as the I-E scale. The expected relationship is that individuals scoring high on the I-E scale (those who perceive themselves as being dependent on luck, fate, and so on) will have more chance of obtaining a high score on a PK task.

General Attitudes Regarding PK

In an attempt to measure various characteristics of one's underlying, general attitude toward PK, we designed a questionnaire, the PK Attitude and Perceived Experience Questionnaire (PAPEQ; see Appendix A). The following factors were selected and incorporated into the questionnaire during its construction.

1. Belief in the existence of PK. The first two questions of the PAPEQ are intended as sheep-goat items. The sheep-goat variable, well known in parapsychology, was first introduced by Schmeidler (Schmeidler, 1943; see also Schmeidler & McConnell, 1958). She and others who followed found that subjects who accepted any possibility of ESP under the conditions of the experiment (these subjects were called *sheep*) tended to score above chance in ESP tests whereas subjects who completely rejected all possibility of ESP (termed as *goats*) tended to score below chance (see review in Palmer, 1978). We have found seven studies that have tested a relationship between "belief" in PK and performance on a PK test (Dale, 1946; Mischo & Weis, 1973; Nash, 1946; Van de Castle, 1958; Weiner, 1979, 1982a, 1982b). Only Weiner (1982a) demonstrated a significant effect related to belief. Interestingly, two studies have reported a positive relation between PK success and subjects' answers to questions about their belief in ESP (Rubin & Honorton, 1972; Watkins, Watkins, & Wells, 1973), but no mention is made of subjects' belief in PK. The sheep-goat classification does not seem to have been adequately and systematically tested for PK. The results so far are ambiguous, the reports are sketchy, and the number of subjects participating in these studies is low with the exception of Dale (1946).

2. Belief in one's own PK ability. The second intended factor of the PAPEQ is the degree of certainty about one's own PK abilities. There are two questions about whether the subject thinks he or she personally can demonstrate PK, in general and in this particular test.

3. Luckiness. Three questions are on self-perceived luckiness (e.g., whether the subject has experienced his hopes or wishes about the future coming true). Here we attempt to get at a more general self-perceived luckiness, as opposed to Greene (1960) who only asked about luckiness in terms of betting and playing casino games.

4. Fear of PK. Four questions ask subjects about their fears of PK (e.g., whether the subject will be afraid of possessing PK abilities). This is an attempt to get at fear factors that may possibly block PK functioning, as suggested by Tart (1986a, 1986b), Batcheldor (1984), and others.

5. Prior experience of PK. One question asks how often, if at all, the subject has had a PK experience.

6. Previous involvement in PK-related activities. Four questions are concerned with activities indicative of a general interest in PK (e.g., if the subject reads books about psychic phenomena). Haraldsson (1981), for instance, used one such question in his ESP sheep-goat scale.

7. Willpower and success. Two questions ask subjects to evaluate their own willpower and success in life. No study seems to have gone on record to state whether it explored a connection between these variables and PK performance.

We hoped that by asking a range of questions related to attitudes toward PK and its involvement in daily life, we could begin to examine more thoroughly how performance in controlled laboratory situations might relate to perceived real-world PK functioning and associated mental life.

Method

The present five studies were conducted as exploratory and screening experiments at the University of Edinburgh and have not been reported elsewhere. As screening studies, their aim was to select subjects for further PK experimentation (see Gissurarson & Morris, 1990). As exploratory studies, they were conducted to look for individual-difference correlates of first-session PK performance and pretest intended experimental conditions, such as the use of different random number generators (RNGs).

Study 1

Subjects. A predetermined number of 10 subjects participated. They were the research staff at the parapsychology laboratory and friends of the experimenter.

PK apparatus. A PK computer test called "Synthia," written in BASIC for an IBM XT 286 16-bit machine, was used to measure PK. In "Synthia," four green rectangles (windows) appear in a row in the upper half of the computer screen (CRT). A pseudorandom number generator (PRNG), designed by Wichmann and Hill (1982, 1984; see also Gissurarson & Morgan, 1988, and Jacobs, 1987) and embedded in the computer program, produced a random designation of one of the four windows. The Wichmann-Hill PRNG has a very large cycle length (6.95×10^{12}) and produces numbers rectangularly distributed between 0 and 1. An arrow appeared beneath the designated window showing that it was the target. The PRNG selected a new target window for every 10 trials of a 30-trial run. On each trial, subjects were asked to "make the computer" select the designated window when they pressed the space bar. If the trial-selected random number matched the target window number, as tallied by the "Synthia" program, the trial was counted as a hit.

A blue star appeared on the computer screen and a beep sounded each time a hit was made during the feedback mode. In the nonfeedback mode, no such feedback was provided. All information regarding each run was stored in an outfile (date, time, whether feedback or nonfeedback mode was being played, the designated target window numbers, and the numbers generated on each trial).[1] Gissurarson (1989) provides a detailed discussion of the security measures that the program and laboratory offered against possible human fraud or electrical bias.

Only one fresh seed was selected for the PRNG for a 30-trial run at the moment when the test was initiated and before the four-window display came on the screen. After the selection of the single fresh seed, which was based on the computer clock, the Wichmann-Hill PRNG algorithm automatically generated the 30 random numbers needed, one by one at each press of the space bar. Hence, the whole run of 30 trials was predetermined once the test was initiated. The experimenter always initiated the program from the keyboard. Theoretical justification of this PRNG setup can be found in Schmidt's quantum collapse (QC) model (1982, 1984, 1987), which is a refined version of his earlier model (1975a, 1975b). Central to the QC model is the assumption that it should be possible for human observers to influence the output of a RNG by affecting the "collapse of the state vector" of binary probabilities. The QC model can be used to argue that the mechanism behind any RNG result in Study 1 was PK triggered at the moment of observation, assuming that the computer clock was an adequate randomizing system.

[1] Two types of control randomness tests were run usually before, during, and after the studies. First, these included tests of the RNG for large series of numbers using the same algorithm ($p = .25$) as the "Synthia" program. For Studies 2–5, a total of 4, 2½, 3, and 9 million trials were made, respectively, the overall difference between duplets being insignificant for all four studies; $\chi^2 = 1.25$ ($p = .74$), $\chi^2 = 6.25$ ($p = .10$), $\chi^2 = 2.75$ ($p = .43$), $\chi^2 = 5.00$ ($p = .17$). The exact results have been misplaced for Study 1. According to the log-book, however, the one million numbers run before and after Study 1 also yielded insignificant differences between duplets. Second, Studies 2–5 were simulated via programs, which included a random time interval between trials. For Studies 2–5, a total of 5, 17, 21, and 34 studies were run, respectively, with two significant studies found at the $p = .05$ level (two-tailed), for Study 4, one above chance and one below chance, which is about what one might expect by chance. No simulated experiments were run for Study 1.

[2] The literature on PK research and PRNGs is growing (Braud, 1980; Gissurarson

Psychometric material. Three scalar instruments were used: the VVIQ, the PAPEQ, and the Greene Luck Questionnaire. The Greene scale was edited for a U.K. sample (e.g., dollars were changed into pounds), but all items were retained.

Experimental rooms. Two rooms in the parapsychology laboratory were used. One room was for filling out questionnaires. An adjacent partially sound-attenuated room was for doing the computer test.

Procedure. The experimenter started by chatting with the subject, then described the experimental session, its purpose, and set-up, followed by a description of the questionnaires and a demonstration of the PK test. Then the subject was left alone in the "questionnaire room" to answer the three questionnaires in the following order: the VVIQ, the PAPEQ, and the Greene scale. After completing the three scales, the subject and the experimenter went to the sound-attenuated room where the experimenter initiated the computer test. The subject completed 60 trials on the computer test: 30 trials in the feedback mode, and 30 trials in the nonfeedback mode. The subject was asked to take a break after the first run of 30 trials and call the experimenter. After the break, the experimenter initiated the other mode of the test, producing a "fresh" seed for the next run of 30 trials. Half the subjects started with the feedback mode first, and the other half started with the nonfeedback mode. A flip of a coin by the experimenter decided for the first subject which mode of the computer test he or she would start with. The second subject got the reverse sequence to that of the first subject. This alternation continued throughout the series.

Study 2

A predetermined number of 40 volunteers participated in this study: (a) those responding to advertisements put up around the University of Edinburgh; (b) those who had indicated an interest in parapsychology research to someone at the parapsychology lab; and (c) those who came via participants already tested (each participant was given a copy of the advertisement to give to an interested friend). The procedure and the experimental environment were the same as those in Study 1. The AIS was brought in at this stage in addition to the VVIQ and PAPEQ, and the Greene scale was replaced by the I-E scale (see Discussion). The four questionnaires were administered in the following order: VVIQ, AIS, PAPEQ, and I-E scale. Again the computer test "Synthia" was used, with the same set-up of the PRNG as in Study 1. The trials, however, were increased in this and all remaining studies from 30 to 40 per run to provide more data and to make the statistical analysis more attractive. The experimenter initiated the PRNG as before.

Study 3

A predetermined number of 10 subjects participated, who were staff and visitors at the parapsychology laboratory and friends of the experimenter. Eight of the 10 subjects had taken part in Study 1 five months earlier. The procedure and experimental environment was the same as before. Three questionnaires were administered in the following order: VVIQ, AIS, and PAPEQ. The selection of the initial "fresh" seeds was changed such that for every trial a new fresh seed was automatically generated by the "Synthia" program based on the computer clock. These seeds were then processed by the Wichmann-Hill PRNG algorithm to produce the trial decisions one per trial. New initial fresh seeds via the computer clock were also selected (before each 10-trial block) to determine which window was to be the target for each of the four 10-trial sequences. This meant that the subject's exact timing when pressing the space-bar for the next trial was the key event in what random number was generated. To distinguish between the two different set-ups of the PRNG, we called the former version (used in Studies 1 and 2) PRNG1 and the one used in Study 3 PRNG2.

Study 4

Twenty volunteers participated, mainly people responding to advertisements about the study around the University of Edinburgh campus. The procedure and the environment were the same as those in previous studies. Four scalar instruments were adminis

& Morris, 1990; Jacobs, 1985; Jahn & Dunne, 1987; Katz, 1983; Lowry, 1981; Radin, 1982a, 1982b; Schmidt, 1981; Shafer, 1983; see also Radin, 1985, on the practical use of pseudo-RNGs in parapsychology). Researchers in parapsychology have repeatedly failed to find a significant difference between scores with random and pseudorandom targets (Schmeidler, 1987), suggesting that there may be a similar mechanism responsible for the observed effects. Observed bias in PRNGs has been hypothesized to be the result of one of two functions: (*a*) PK affecting the system (computer clock or live RNG) that is used to generate fresh seed numbers that initiate the PRNG (e.g., Jacobs, 1985; Schmidt, 1981; see also theoretical arguments on this point in Vassy, 1985; and Walker, 1984), or (*b*) precognition of favorable moments for selecting these seed numbers (Radin, 1982a; see also May et al., 1985). At our current level of understanding, however, the actual cause of those biases we observe remains unknown.

TABLE 2
PK SCORES FOR STUDY 5 BROKEN DOWN INTO THEIR VARIOUS RNG COMPONENTS

	Live	PRNG	PRNG1	PRNG2	PRNG1-E	PRNG1-S
Feedback						
Hits	430	443	241	202	118	123
Trials	1840	1760	880	880	440	440
MCE	460	440	220	220	110	110
n	46	44	44	44	22	22
z	− 1.62	0.17	1.63	− 1.40	0.88	1.43
Nonfeedback						
Hits	455	470	242	228	115	127
Trials	1760	1840	920	920	440	480
MCE	440	460	230	230	110	120
n	44	46	46	46	22	24
z	0.83	0.54	0.91	− 0.15	0.55	0.74
Combined						
Hits	885	913	483	430	233	250
Trials	3600	3600	1800	1800	880	920
MCE	900	900	450	450	220	230
n	90	90	90	90	44	46
z	− 0.58	0.50	1.80	− 1.09	1.01	1.52

Note: PRNG1-E denotes PRNG1 when the experimenter initiated it; PRNG1-S denotes PRNG1 when the subject initiated it.

the studies yielded overall feedback $z = -0.27$, overall nonfeedback $z = 1.34$, and combined total score $z = 0.76$.[4] No significant PK scoring was found on any of the various RNGs used in Study 5 (see Table 2). Among the RNGs for all studies combined, scoring on PRNG1 when the experimenter initiated was the highest. Combining *z* scores from PRNG1 (when the experimenter initiated it) for all four studies where it was used yielded an overall feedback $z = 1.68$, an overall nonfeedback $z = 1.02$, and a combined total score $z = 1.88$. No other RNG condition approached overall significance.

[4] The method is that of combining *z* scores weighted by some reasonable criterion related to the studies in question. Following the method of Mosteller and Bush as described in Rosenthal (1984), we weighted $z = (W_1z_1 + W_2z_2) / \sqrt{W_1^2 + W_2^2}$, using the *z* scores associated with a given result. Each *z* was weighted by sample size.

TABLE 3
SPEARMAN RHO (*rs*) CORRELATIONS BETWEEN PK HITS AND SCORES ON SCALAR INSTRUMENTS

Study	VVIQ-PK$_f$	AIS-PK$_f$	Greene-PK	I/E-PK	GTVIC-PK$_f$
1 (n = 10)					
rs	− .003		− .18		
z	0.009		0.50		
2 (n = 40)					
rs	− .15	− .06		.20	
z	0.96	0.36		1.23	
3 (n = 10)					
rs	− .41	− .41			
z	1.24	1.22			
4 (n = 20)					
rs	− .21	− .03		.35	
z	0.93	0.14		1.53	
5 (n = 90)					
rs	− .02	− .07		− .06	.15
z	0.18	0.63		0.60	1.37

Note: For VVIQ, AIS, and GTVIC, Spearman *r* is correlated with feedback (f) PK scores only. *Greene* refers to the Greene Luck Questionnaire. *I/E* refers to the I-E scale.

Imagery, Luck, and PK

The Greene Luck Questionnaire was used only in Study 1 (see Table 3). Greene scale scores produced a nonsignificant negative correlation, $rs(8) = -.18$ ($z = 0.50$), with the total PK score (more self-perceived luck relating to lower PK scoring instead of the other way around as was the case with Ratte, 1960, and Ratte and Greene, 1960). Some subjects voiced reservations about it, for example, that people did not tend to patronize casinos in Edinburgh and therefore the questions were irrelevant. Thus, it was decided to eliminate this questionnaire from later studies. External locus of control was suggestively but not significantly correlated with PK scores in Studies 2 and 4, $rs(39) = .20$ and $rs(19) = .35$, respectively, which was the expected direction. In Study 5, one question (Question 22) was eliminated from the I-E scale. It was the only question that showed a negative correlation with PK scores in Studies 2 and 4. Unfortunately, the correlation for Study 5 was slightly in the negative direc-

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tered in the following order: VVIQ, AIS, PAPEQ, and I-E scale. The computer test "Synthia" was used with the same arrangement of the PRNG as that used in Studies 1 and 2 (i.e., only PRNG1), initiated by the experimenter.

Study 5

Ninety subjects participated, selected from the same three sources used in Study 2. One question was deleted from the I-E scale (Question 22; see Discussion) prior to its administration. The Gordon's Test of Visual Imagery Control (GTVIC) was brought in at this stage. The following scales were administered in the following order: the VVIQ, the AIS, the GTVIC, the PAPEQ, and the I-E scale. The following revision of the procedure was made: The description of "Synthia" and the demonstration game were provided not at the beginning of the session as were done in Studies 1–4 but after the subject had answered the questionnaires. Thus, any effect on questionnaire responses related to the subject's attitude toward the computer test was minimized.

While preparing Study 5, we obtained a live-source RNG called RBG O4CA-S, which is based on an analog noise generator and produces wide-band noise (reversed biased PN-junction noise, recombination noise, often called Zener noise). The RBG O4CA-S is made by the Synchronicity Research Unit in the Netherlands (for details, see Gissurarson & Morris, 1990, and *User's Guide Random Bit Generator RBG O4CA-S,* 1988).[3] Two versions were made of the "Synthia" program, a live RNG version and a PRNG version. Each version had 40 trials, and the trials could be run in either the feedback mode or the nonfeedback mode. The PRNG version included both PRNG1 and PRNG2. In the PRNG version, if the subject started doing the 40 trials with PRNG1, the program automatically changed over to PRNG2 after 20 trials, and if the subject started doing the 40 trials with PRNG2 the program automatically changed over to PRNG1 after 20 trials. Before the test was run, the program prompted for whether the experimenter or the subject would initiate the test. When the return key was pressed after this prompt, the test was run and initial "fresh" seeds were selected for PRNG1. For half of the runs, the experimenter initiated the test; for the other half, the subject initiated the test. The initial seed numbers for PRNG1 were stored in an outfile. After the study, these were checked for the highest scoring subjects to make sure that the seeds recorded were consistent with the random numbers generated.

The necessary counterbalancing of the four conditions (feedback vs. nonfeedback; PRNG vs. live RNG; PRNG1 vs. PRNG2; experimenter-initiated vs. subject-initiated) was obtained by four coinflips using procedures analogous to the one described earlier.

[3] Because the random bit output is slightly biased, $p(1) = p(0) = .5 \pm .02$, the *User's Guide* recommends performing a debiasing in software. After adding the recommended debiasing procedure to the RBG, we tested it for over a million trials and no significant deviations from chance were found.

TABLE 1
OVERALL PK SCORES OF THE FIVE STUDIES

Study	Feedback mode	Nonfeedback mode	Both modes
1 (n = 10)			
Hits	77	77	154
z	0.27	0.27	0.38
Trials	300	300	600
2 (n = 40)			
Hits	426	409	835
z	1.50	0.52	1.43
Trials	1,600	1,600	3,200
3 (n = 10)			
Hits	100	108	208
z	0	0.92	0.65
Trials	400	400	800
4 (n = 20)			
Hits	202	210	412
z	0.16	0.82	0.69
Trials	800	800	1,600
5 (n = 90)			
Hits	873	925	1,798
z	1.04	0.96	0.05
Trials	3,600	3,600	7,200

RESULTS AND DISCUSSION

Overall, 170 sessions were conducted in the five studies. In none of the five studies was significant psi-hitting encountered (see Table 1). In general, scoring tended to be slightly higher in the nonfeedback mode than in the feedback mode. Combining the z scores from

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tion, $rs(89) = -.06$ (see Table 3). Weighted composite z score for the I-E/PK correlations yielded $z = 0.26$.

The VVIQ score (lower score indicating better vividness) was negatively but nonsignificantly correlated with PK performance in the feedback mode in all five studies (see Table 3) as expected. An analysis combining z scores yielded $z = 0.84$. The GTVIC was only used in Study 5 where it also correlated in the expected direction with feedback PK scores, albeit nonsignificantly (higher score on the GTVIC indicating better imagery control). Finally, the AIS score (lower score indicating better vividness) was negatively but nonsignificantly correlated, as expected, with feedback PK scores for all four studies where it was used. Combining the z scores yielded $z = 0.85$. Of the 14 analyses in Table 3, none were close to significance, but 12 were in the expected direction, including the 10 related to imagery.

PK Attitude and Perceived Experience Questionnaire

Prima facie, the PAPEQ was intended to measure seven components that might be involved in an overall attitude germane to PK. An exploratory factor analysis was conducted, based on the pooled data, to verify that logic. (For those who filled PAPEQ out twice, which was done in Studies 1 and 3, only the second occasion was included in the analysis because on the first occasion the PAPEQ was still in its pilot form.)

A principal components factor analysis of the PAPEQ showed that all the questions loaded positively on a single dimension (see factor loadings, means, and standard deviations in Appendix B). The variance in response to individual PAPEQ items overall was low, the standard deviation for only two questions exceeding 1.00. If we look at individual studies, the total PAPEQ score correlated nonsignificantly and inconsistently with the total PK score throughout Studies 1–5 (see Table 4). The total PAPEQ score without Questions 5, 7, 16, and 17, which had the poorest loadings on the single component, yielded no improvement in correlations with the total PK score. It may be noted, however, that a homogeneous sample, such as the present one and as indicated by the low response variance, produces a restriction of range for correlation coefficients, thereby reducing their power. Future researchers may want to use an unselected pool of subjects to ensure more variability in responses.

TABLE 4
SPEARMAN RHO (*rs*) CORRELATIONS BETWEEN PK HITS AND THE SEVEN FACTORS AND QUESTION 15 ON PAPEQ

	Study 1 (n = 10)	Study 2 (n = 40)	Study 3 (n = 10)	Study 4 (n = 20)	Study 5 (n = 20)
F1-PK (Belief in PK)[a]					
rs	.16	.46	.47	− .04	− .03
z	0.46	2.90**	1.42	0.18	0.32
F2-PK (Fear of PK)					
rs	.65	− .23	.09	− .15	− .01
z	1.84	1.44	0.27	0.67	0.08
F3-PK (PK interest activities)					
rs	.34	− .24	− .03	− .17	.11
z	1.03	1.48	0.09	0.73	0.99
F4-PK (Luckiness)					
rs	.14	− .02	.49	− .09	− .08
z	0.43	0.11	1.46	0.37	0.77
F5-PK (Mindpower training)					
rs	.57	− .17	− .09	.14	− .01
z	1.50	1.05	0.26	0.60	0.08
F6-PK (Success on tasks)					
rs	.12	.24	.34	.03	− .01
z	0.33	1.50	1.01	0.12	0.13
F7-PK (Wishing/willing)					
rs	.15	− .09	.25	.08	.09
z	0.46	0.55	0.74	0.34	0.84
Q15-PK (PK experience)[b]					
rs	.37	.36	.41	.32	.20
z	0.83	2.24*	1.24	1.40	1.88
PAPEQ total[c]					
rs	.25	− .04	.12	− .19	− .07
z	0.74	0.27	0.35	0.77	0.67
PAPEQ without Questions 5, 7, 16, 17					
rs	.33	− .07	− .09	− .04	− .05
z	0.92	0.42	0.27	0.17	0.48

[a]For F1, Questions 1, 2, and 3 make up the sheep-goat scale.
[b]Question 15 had five possible answers (the range being 0–4).
[c]*PAPEQ total* refers to the connection between total scores on PAPEQ and PK.
* $p < .05$, two-tailed.
** $p < .005$, two-tailed.

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The 18 PAPEQ items (see Appendix A) were rotated, using a simple structure orthogonal rotation, with factor loadings greater than or equal to .60, and the Kaiser criterion. Seven factors were extracted: Belief in PK (F1 = Questions 1–3), fear of PK (F2 = Questions 8, 12–14), PK interest-related activities (F3 = Questions 9, 10), luckiness (F4 = Questions 5, 7), experience of "mind power" training (F5 = Questions 6, 11), success on tasks (F6 = Questions 16, 18), and wishing-willing (F7 = Questions 4, 17). By and large, these factors are similar to those we had in mind when making the PAPEQ. One question, Question 15 (Have you had a psychokinetic experience?), did not relate to any of the separate factors, although it did load reasonably well (.58) on the single dimension. Looking at individual studies (see Table 4), F2, F3, F4, F5, and F7 correlated somewhat inconsistently with PK scores. However, F1, F6, and Question 15 would appear to merit further discussion.

F1: Belief in PK. Three questions (1, 2, and 3) loaded greater than or equal to .60 on F1. Question 3 had a factor loading of .606, which is marginally above the criterion level that was chosen, whereas Questions 1 and 2 loaded .87 and .86, respectively. Typical sheep-goat questions have been about overall belief in the existence of ESP/PK. Too specific questions (such as ones about personal ability to demonstrate psi, as in Question 3) may perhaps be demanding different responses than do questions about overall belief in psi. Although it is debatable whether to include Question 3 in the sheep-goat scale, we decided to do so. (For comparison, F1 with only the first two questions included yielded: for Study 1, $r_S = .14$, $z = 0.40$; for Study 2, $r_S = .57$, $z = 3.58$; for Study 3, $r_S = .37$, $z = 1.11$; for Study 4, $r_S = .01$, $z = 0.06$; for Study 5, $r_S = -.01$, $z = 0.07$.).

Only in Study 2 was there a significant relationship between the sheep-goat scale and total PK scores, $r_S(39) = .46$, $z = 2.90$, $p = .0037$, two-tailed (see Table 4), although Study 3 is also encouraging. Combining z scores for the F1-PK correlations across studies yielded $z = 1.01$. The 90 subjects in Study 5 did the computer test with a complicated combination of RNGs. One may wonder whether there was any special RNG condition that correlated higher with the sheep-goat scale for the subjects in Study 5. As can be seen in Table 5, such was not the case. For instance, the PRNG1 condition (when the experimenter initiated the computer test), which is the same RNG condition as that used in Studies 1, 2, and 4, correlated nonsignificantly and in a negative direction with the sheep-goat scale, $r_S(43) = -.18$, $z = 1.18$, $p = .24$, two-tailed.

There seem to be three elements that were different between Study 5 and the previous four studies: (*1*) The subjects in Study 5 were shown the PK computer test and had it described for them after they completed the scales, whereas subjects in the other four studies had a demonstration of the test before they went through the questionnaires. (*2*) The subjects in Study 5 had to complete more questionnaires than subjects in the other studies did. (*3*) The experimenter spent less time on subjects in Study 5 in comparison to the time he spent on subjects in the other studies. Study 5 was conducted under time pressure, and the experimenter tended to run subjects quickly through the procedure. Future research will have to decide the significance, if any, these changes had on subjects' responses and scoring on the PK test.

TABLE 5
SPEARMAN RHO (r_S) CORRELATIONS FOR STUDY 5 BETWEEN SELECTED PAPEQ FACTORS AND PK SCORES, BROKEN DOWN INTO THEIR VARIOUS RNG COMPONENTS

	Live-RNG (n = 90)	PRNG2 (n = 90)	PRNG1-E (n = 44)	PRNG1-S (n = 46)
Sheep-goat scale (F1)				
r_S	− .08	− .002	− .18	.26
z	0.74	0.02	1.18	1.76
p	.47	.93	.24	.07
Success on tasks (F6)				
r_S	− .04	.04	− .11	.28
z	0.41	0.39	0.71	1.45
p	.68	.70	.49	.14
PK experience (Q15)				
r_S	.12	.24	.31	.28
z	1.11	2.23	1.98	1.44
p	.27	.02	.04	.15

Note: All p values are reported as two-tailed.

F6: Success on tasks. The more subjects perceived themselves as successful and able to influence the PK test on PAPEQ (F6; Questions 16 and 18), the higher PK scoring they tended to get in Studies 1–3. As with F1, the reason why this relationship disappeared in the remaining two studies is not clear and may simply reflect statistical regression. Combining z scores for the F6-PK correlations across studies yielded $z = 0.63$. The PRNG1 (when the experimenter initiated the computer test) condition in Study 5, which is the same RNG condition as that used in Studies 1, 2, and 4, correlated nonsignificantly and in the opposite direction with the F6 dimension, $r_S(41) = -.11$, $z = 0.71$, $p = .49$, two-tailed (see Table 5).

Question 15: Prior PK experience. The positive relationship between Question 15 (whether people report having had a psychokinetic experience in everyday life) and total PK scores was the only relationship that was consistent in all the studies. The weighted, combined composite z scores for this trend yielded $z = 3.03$, $p = .001$, one-tailed; and the weighted, combined estimate of the size of the effect yielded an overall r of .27, which is a decent correlation coefficient although not very high. As can be seen in Table 5, this relationship is also consistent across RNGs for Study 5, with the lowest correlation observed on the live-RNG. The PRNG1 (when the experimenter initiated the computer test) condition, which is the same RNG condition as that used in Studies 1, 2, and 4, correlated significantly and in the positive direction with Question 15, $rs(41) = .31$, $z = 1.98$, $p < .05$, two-tailed. This is perhaps the most promising finding from all the studies, especially since it seems sufficiently robust to survive the diversity of conditions presented throughout the studies, including Study 5.

Concluding Remarks

Perhaps the most interesting and promising finding from the five studies reported here was that the more subjects reported having "had a psychokinetic experience" the higher their PK scores tended to be on "Synthia." It would be interesting if other researchers attempted to replicate this finding. In the future, researchers could also follow this question through by developing other questionnaire items in order to inquire more about these PK experiences, and perhaps gradually build up an effective self-report inventory in predicting PK performance. The apparent consistency of the relationship between prior PK experience and experimental PK success across a variety of RNG conditions suggests that there may not be radical differences in the psi process from condition to condition. It should be noted, however, that although this finding is encouraging, no correction has been made for selection, and the fact remains that it could be a statistical fluke. In the absence of any clear-cut findings, the implications of this for the different theoretical approaches to RNG-PK will remain unclear for the present.

Appendix A
PK Attitude and Perceived Experience Questionnaire (PAPEQ)

The proportion of subjects responding to each item is given in rounded percentages after rating categories.

1. Do you think that the existence of psychokinesis is:
   a. Impossible, Rating 0: 2%
   b. Unlikely, 1: 21%
   c. Likely, 2: 58%
   d. Certain. 3: 19%

2. Do you think that some people may be able to affect physical conditions (or move objects or influence other people) with their "mind"?
   a. Definitely yes. Rating 3: 18%
   b. Yes, I think so. 2: 49%
   c. Probably not. 1: 28%
   d. No. 0: 5%

3. Do you believe that you can demonstrate the psychokinesis effect (i.e., affect physical conditions or move objects or influence others with your "mind")?
   a. No, definitely. Rating 0: 10%
   b. No, I don't think so. 1: 42%
   c. Yes, perhaps. 2: 43%
   d. Yes, definitely. 3: 4%

4. Do you experience your hopes or wishes about the future coming true?
   a. Never, Rating 0: 2%
   b. Seldom, 1: 8%
   c. Now and then, 2: 46%
   d. Often. 3: 45%

5. Do you consider yourself lucky?
   a. Not at all, Rating 0: 8%
   b. Slightly, 1: 16%
   c. Fairly, 2: 49%
   d. Very. 3: 28%

6. Have you previously had experience of some sort of mind power training?
   a. Never, Rating 0: 77%
   b. Once, 1: 9%
   c. Twice, 2: 0%

d. Three times or more. 3: 13%

7. Which of the following alternatives do you consider to be the best description of your luckiness/unluckiness?
   a. I am lucky in terms of getting what I want. Rating 3: 66%
   b. I am lucky in terms of receiving unexpected gifts. 2: 19%
   c. I am very rarely lucky. 1: 12%
   d. I am not lucky at all. 0: 3%

8. Would you be satisfied with yourself (or feel comfortable) if you were personally responsible for a PK event (for instance, if you were to break glass with your "mind")?
   a. Not at all, Rating 0: 11%
   b. Unlikely, 1: 24%
   c. Likely, 2: 38%
   d. Certain. 3: 28%

9. If you get the opportunity, do you then watch films like *Poltergeist* or read articles or books about people that have extraordinarily powerful influence/effect upon others with their "minds"?
   a. Never, Rating 0: 17%
   b. Seldom, 1: 24%
   c. Now and then, 2: 41%
   d. Often. 3: 18%

10. Do you read books about psychic phenomena?
   a. Often, Rating 2: 33%
   b. Seldom, 1: 43%
   c. Never. 0: 25%

11. Do you read books or articles on mind power training?
   a. Never, Rating 0: 51%
   b. Seldom, 1: 20%
   c. Now and then, 2: 25%
   d. Often. 3: 4%

12. Would you be afraid of possessing psychokinetic abilities?
   a. Yes, Rating 0: 3%
   b. Probably yes, 1: 24%
   c. Probably not, 2: 32%
   d. No. 3: 41%

13. Would it bother you to directly witness a PK event (for instance, a table levitation)?

   a. No, Rating 2: 57%
   b. Perhaps, 1: 31%
   c. Yes. 0: 12%

14. Do you think you could easily get over it (and not be concerned about it in the future)?
   a. No, Rating 0: 8%
   b. Unlikely, 1: 3%
   c. Likely, 2: 41%
   d. Certain. 3: 48%

15. Have you had a psychokinetic experience?
   a. Never, Rating 0: 71%
   b. Rarely, 1: 8%
   c. Likely, 2: 8%
   d. Now and then, 3: 10%
   e. Often. 4: 3%

16. How successful in general do you consider yourself to be?
   a. I am definitely not a very successful person. Rating 0: 2%
   b. I am not as successful as the others. 1: 16%
   c. I think I am a rather successful person. 2: 73%
   d. I am definitely a very successful person. 3: 10%

17. Which of the following statements best describes you?
   a. I am definitely strong-willed. Rating 3: 24%
   b. I am moderately strong-willed. 2: 66%
   c. I am fairly weak-willed. 1: 10%
   d. I am very weak-willed. 0: 0%

18. Which of the following statements best describes how you feel about the task that you are about to participate in?
   a. I will definitely not be able to influence the test. Rating 0: 3%
   b. I will probably not be able to influence the test. 1: 67%
   c. I will probably be able to influence the test. 2: 28%
   d. I will definitely be able to influence the test. 3: 2%

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Appendix B
Factor Loadings, Means, and Standard Deviations for the 18 PAPEQ Items

Items 10 and 13 contain three options, and Item 15 has five. All others have four.

Items	Factor loadings	Means	SD
1	.56	1.95	0.69
2	.59	1.99	0.65
3	.71	1.42	0.74
4	.32	2.15	0.60
5	.23	1.97	0.86
6	.47	0.49	1.02
7	.22	2.49	0.81
8	.58	1.82	0.96
9	.36	1.60	0.97
10	.50	1.08	0.76
11	.46	0.83	0.96
12	.62	2.11	0.88
13	.61	1.45	0.70
14	.47	2.08	0.92
15	.58	0.64	1.14
16	.24	1.90	0.57
17	.13	2.14	0.57
18	.64	1.29	0.55

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