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ABSTRACT: This series of experiments constitutes the second part of a two-part series of card experiments carried out with the special subject B. D. In the present series the subject shuffled a deck of playing cards to match a target deck shuffled earlier by the experimenter. There were, in all, six series, accounting for a total of 55 runs.

The data, analyzed by an adaptation of Fisher's method, gave significant results in all the series individually, as well as in the pooled data. The main effect was a massive excess of exact hits, about four times mean chance expectation, yielding a *CR* of over 22.0. The presence of such excess exact hits, together with essentially chance performance on number and suit hits, suggests that B. D. produced many more exact hits than could be anticipated through chance association of his hits on the component attributes: for the whole body of data, the chi-square for association between number hits and suit hits corresponds to a *CR* of approximately 11.0. In this body of data, the pattern of visual-like errors associated with the previous single-card clairvoyance experiment was not present.—Ed.

This report concerns a series of experiments carried out with the special subject Bill Delmore (B. D.) following procedures generically describable as "shuffle methods." As will be detailed later, these consisted of various modifications of the early psychic-shuffle technique (Rhine, Smith, & Woodruff, 1938).

B.D. is well known as a special subject from a number of recent reports (Kelly & Kanthamani, 1972; Kanthamani & Kelly, 1974 a; Kanthamani & Kelly, 1974 b; Kelly, Kanthamani, Child, & Young, 1975). In two of these previous papers (1974 a, 1975) we summarized B.D.'s performance in a series of experiments involving a technique called single-card clairvoyance, using playing cards as targets. As the name implies, this technique involved presenting one target at a time for the subject to make a call. In four series, totaling 46 runs, B.D. produced an overall hitting rate on the whole-card targets (i.e., suit and number) which was exactly three times MCE (138 hits in 2,392 trials, corresponding to a $CR > 13.0$, $p < 10^{-30}$). This simply illustrates that the subject was functioning at an extremely high level during this period. The present experiment was carried out during the fall and winter of 1972 concurrently with the single-card clairvoyance. The same methods of evaluation were planned as in the previous experiment.

METHOD

Materials

The testing material was ordinary playing cards. A pool of over two dozen decks of these cards was employed for the entire experiment. All decks were of the same brand, purchased locally from Eckerd's Drug Store, and all cards were blue-backed, except that in one series (Series 6) we also used brown-backed decks.

Procedure

The basic method was similar to the psychic-shuffle or ESP-shuffle technique introduced by Rhine and others (Rhine, Smith, & Woodruff, 1938), in which subjects shuffled decks of ESP cards to match prearranged decks or lists of targets. The early investigators reported very high significance using this technique with a number of subjects. With another special subject, Lalsingh (Sean) Harribance (L.H.), Kanthamani (1974) found this technique a suitable starting point for a series of experiments in which the subject evidenced a high degree of psi. The original psychic-shuffle method was modified in various respects during the present investigations with B.D.; therefore we will merely call our method the "shuffle method."

The basic procedure was as follows. Before each run, the experimenter, H.K., picked two decks of playing cards, in no specific order, from the pool of target decks kept in the bottom drawer of her office desk. (The subject had no access to these materials at any time.) She randomized both decks thoroughly by several dove-tail shuffles and designated one as the call deck and the other as the target deck. The subject then entered the experimental room and sat in front of the experimenter on the opposite side of the desk. Then the experimenter picked up the target deck and shuffled it again thoroughly with at least 10 dove-tail shuffles out of the subject's view and placed it face-down on her side of the desk top. The subject sat in his chair, listening to the sounds of the shuffles and sometimes engaging in light conversation. Generally B.D. was in a good, cheerful mood during these sessions. The subject then shuffled the call deck as long as he wished, with the aim of matching its sequence to that of the target deck. When he finished his shuffling he also placed his deck face-down on the desk. At this point the recording and checking began.

The experimenter first recorded the order of the target deck, and then the call deck. During the recording of the call deck the subject was generally allowed to turn the cards one by one because

he enjoyed doing so, and the presence of additional experimenters and other observers in many sessions rendered it extremely unlikely that he could at this point change the order of the cards. Any correspondences between target cards and call cards were noted during the recording process. At the end of the run, the number of correspondences for whole-card (exact), number, and suit hits were counted and recorded. The data were subsequently key punched, verified, and analyzed by FORTRAN programs written for the IBM 370 computer at TUCC.

Each run consisted of 52 trials, and at every session a minimum of one run was completed, sometimes more. The complete experiment consisted of a number of series revolving around the basic procedure described above. The series varied in length, but the length of each was declared before it began. No advance limit was set to the total number of series in the experiment, as our intent was to encourage B.D. to keep working as long as his own generally strong motivation would permit. The experiment ultimately consisted of six series carried out over a period of six months. The first series, as a pilot, was followed by two other, confirmatory series. All these three series were essentially identical with regard to procedure, and each consisted of 13 runs. From the fourth series onward, various changes in the procedure were introduced, partly at B.D.'s suggestion, both to maintain his interest in the experiments and to provide conditions which we hoped would allow fuller expression of his unusual abilities without excessive sacrifice of experimental control. The three final series therefore differ among themselves, as well as from the first three, in procedure as well as length. Sixteen additional runs were completed in these later series, making a total of 55 runs for the whole experiment.

Series 1. In this first series the procedure was almost identical with the original psychic-shuffle method. First the experimenter shuffled the target deck out of the subject's view and laid it on the table face-down. Then the subject picked up the call deck and shuffled it as long as he wished. The recording and checking were done after each run. The experimenter (H.K.) first recorded the target deck, and then the subject turned the cards from the call deck one by one while H.K. recorded them.

At each session the subject completed a different number of runs. A total of 13 runs were completed in five days, stretched over a one-week period.

Series 2. Series 2 was similar to Series 1. B.D. completed another

13 runs in three working days. He started off doing two runs in each of the first two sessions, which were nearly a month apart, but then completed the remaining nine runs on the very next day. It may be noted that this is one of the characteristics of B.D.—that he starts a task or a new series slowly and builds it up rather suddenly. This trend parallels his scoring rate also.

Series 3. The main difference between the third series and the first two is in the recording of the call sequences. As before, the experimenter first recorded the targets and then named aloud each target from the beginning, to which the subject responded by taking the top card from his deck and placing it face-down on the table. In other words, he denied himself immediate trial-by-trial feedback although, once the shuffling was completed, no change was permitted in the call-deck order. It may be recalled that in the first two series, the subject turned the call cards face up one by one during the call-deck recording, so that correspondences between target characteristics and the call card were known immediately after the turning of each card from the call deck. However, in the present series, the experimenter recorded the call sequences after B.D. finished placing the cards one by one, face-down on the table. This change was introduced by B.D. himself to break the monotony of a long series of tests. Also, it is possible that from the first two series, B.D. developed the necessary confidence that he would do well in the test, and therefore was not interested in checking trial-by-trial correspondences between call and target characteristics. The number of hits for exacts, numbers, and suits were then counted as usual at the end of the run.

Another special feature of this series is that B.D. was unusually strongly motivated, having been greatly encouraged by the results of Series 2. Series 3 began on the very next day and B.D. completed all 13 runs that same day in three separate sessions.

Series 4. As mentioned in previous reports, B.D. quickly becomes bored with any fixed procedure and loses interest as it becomes routine. Because of this tendency he engages in constant innovations to keep up his interest. In Series 4 a modification of the procedure was used, at his suggestion. Specifically we now introduced a large cardboard box (see Kanthamani & Kelly, 1974b) with its bottom removed and two small semicircular holes cut into the bottom edge of one side. This box was placed in front of the subject so that he could insert his hands and shuffle the cards inside. The subject always wore short-sleeved shirts, and the two holes barely allowed his hands

and lower arms to go in. This arrangement denied him any view of either the call deck or the target deck during the main shuffling.

H.K. randomized the call deck by thorough shuffling as usual and placed it inside the box. The subject then entered the room and sat in his chair in front of the experimenter. The experimenter then shuffled the target deck and placed it face-down on her side of the desk. The subject next inserted his bare arms and hands through the two holes and shuffled the call deck for as long as he wished and then left the deck inside the box. The experimenter first recorded the target sequence, then the box was removed, and the order of the call-deck cards was recorded. As in the previous series, here also B.D. turned the call cards one by one while recording the call deck. However, in two runs of this series, this method was not followed. Instead, B.D., after his shuffling, released the deck altogether, while the recording was carried out by the main experimenter and a co-experimenter. The results of these two runs were as high as those of the other runs of this series.

Another feature of this series, as well as those to follow, is that various observers from the Institute staff, as well as other interested visitors, were present during certain sessions. B.D. always reacted well to the presence of the new persons. In addition to these observers, a second experimenter, H.H., was present in two sessions of this series. He stationed himself at a place from which he could observe both the experimenter and the subject. He also assisted in the recording and checkup processes.

Six runs were completed in this manner, in four sessions, distributed over a period of two weeks.

Series 5. This series also involved the box, and two further changes were introduced. First, B.D. was requested to make "confidence calls" on those trials in which he felt sure of being successful. The details of the confidence-calling procedure have been reported previously (Kanthamani & Kelly, 1974b) and we will not repeat them here.[1]

The second change was in the direction of allowing B.D. more latitude, primarily to help ease his adaptation to the task of confidence-calling, which he found extremely stressful. Specifically, B.D. himself was once again the person responsible for turning the cards of the call deck, and moreover he now did this entirely within

[1] Series 5 and 6 as reported here are the same ones reported in Series 1 and 2 of the 1974b paper except that Series 6 here includes an extra run in which no confidence calls were made.

the box. This modification of course degraded the experimental conditions in that it introduced, in principle, a possibility of sensory leakage that was precluded by the procedures of Series 1 through 4. This problem arises since B.D. remained in tactile contact with the call cards while the target cards were being identified during the recording process. At each step of recording, the experimenter turned up the next target card and named it aloud, and in response the subject set aside the top card of his previously shuffled deck, inside the box. When both decks were completely turned, B.D. removed his hands from the box and thereafter did not touch the cards.

As discussed previously (1974b), we are inclined to think that the runs of this series were in practice identical in type with those of Series 4; B.D. did not appear to alter the order of the cards after the initial shuffling, although we cannot be entirely certain of this since the box remained in place and his hands within it.

Five runs were carried out in this manner during a two-day period, the fifth run being an especially complicated affair involving three experimenters in the recording and checking, but otherwise essentially continuous with the preceding runs. (For details, see Kanthamani & Kelly, 1974b.) The second experimenter, H.H., was present in all the sessions of this series. He kept a close watch on the proceedings and helped in the recording and checkup.

Series 6. This series also had the special feature of confidence-calling as part of the requirement. In addition, this series was different from the previous one in that here B.D. attempted a high-aim–low-aim paradigm; that is, he attempted simultaneously to get high scores on one target deck and low scores on another by shuffling only one call deck. Accordingly, the experimenter now prepared two target decks and designated one for high-aim and the other for low-aim. Also, in this series, the subject was actively encouraged to cut his deck after shuffling it inside the box and to pick any card from within the deck on each trial. The experimenter turned up the top card of both the target decks to the subject's view at each trial, to which B.D. responded by setting aside one card from his deck inside the box, aiming to make a choice that would simultaneously be a hit on the high-aim target and a miss on the low-aim target. The recording and checking of the results were carried out as usual. The box was not removed until both the target decks were recorded.

The five runs completed in this manner counted as five runs

each for high-aim and low-aim targets. B.D. made confidence calls only for the high-aim targets; and furthermore, he restricted them to the last four runs only. The details of these last four runs were given under Series 2 of the previous paper (Kanthamani & Kelly, 1974b).[2] H. H. was present as the second experimenter in the first four runs of the series. In the fifth run, another member of the staff and a visitor were present.

Methods of Analysis

Overall evidence of psi was first assessed by the adaptation of Fisher's method (1924) employed in our earlier reports (1974a, 1974b). Fisher's original scoring system was used rather than his later version (Jephson, 1928–1929), for reasons described in the single-card clairvoyance paper. The following results are reported for each series separately and for all together: the overall Fisher *CR*, the observed and expected values for the nine classes of correspondence between call and target, the overall chi-square for distribution of trials among the classes, and separate tests of significance as appropriate for those classes that appeared to contribute most to the overall effects.[3]

The other main object of analysis was to determine whether the shuffles data contained consistent-missing effects of the kind reported earlier for the single-card clairvoyance experiment (Kelly, Kanthamani, Child, & Young, 1975). Accordingly, the techniques of multidimensional scaling and the auxiliary procedures described in our earlier report were also applied to the entire body of results from the present series.

Results

The basic results by Fisher's method are provided in Table 1 for the six series separately and for all 55 runs together. As will be evident from inspection of the table, each of the six component series is highly significant independently. Moreover, the overall pattern of

[2] Only the high-aim data are included in this report. The low-aim results will be described in a future paper which will include all other unreported data that we have on B.D.

[3] A slight technical complication arising here is that we are applying Fisher's method to matched decks rather than to pairs of randomly selected cards, or pairs each consisting of a subject's call and a randomly selected card. We see no reason to suppose that the results would be more than trivially weaker for the matching case, in accord with the results of Greville (1938) and Stuart and Greenwood (1937) on scoring hits in the usual manner with ESP cards.

Table 1
Summary of Results by Fisher's Method

Scoring Type[a]	OO	OC	OR	CR	SO	SR	ON	CN	SN
Series 1									
Expected score	120.0	60.0	192.0	96.0	60.0	96.0	26.0	13.0	13.0
Observed score	107	58	186	81	60	115	38	10	21
Fisher *CR* = 2.95, $p<.01$; χ^2 = 18.8 (8 *df*), $p<.05$									
Series 2									
Expected score	120.0	60.0	192.0	96.0	60.0	96.0	26.0	13.0	13.0
Observed score	116	57	169	94	65	101	24	15	35
Fisher *CR* = 4.00, $p<.001$; χ^2 = 41.1 (8 *df*), $p<.001$									
Series 3									
Expected score	120.0	60.0	192.0	96.0	60.0	96.0	26.0	13.0	13.0
Observed score	112	55	185	82	63	82	27	11	59
Fisher *CR* = 5.97, $p<.001$; χ^2 = 167.7 (8 *df*), $p<.001$									
Series 4									
Expected score	55.4	27.7	88.6	44.3	27.7	44.3	12.0	6.0	6.0
Observed score	56	21	78	47	31	29	12	5	33
Fisher *CR* = 4.84, $p<.001$; χ^2 = 129.8 (8 *df*), $p<.001$									
Series 5									
Expected score	46.1	23.1	73.8	36.9	23.1	36.9	10.0	5.0	5.0
Observed score	45	22	66	35	19	31	9	3	30
Fisher *CR* = 4.80, $p<.001$; χ^2 = 128.0 (8 *df*), $p<.001$									
Series 6									
Expected score	46.1	23.1	73.8	36.9	23.1	36.9	10.0	5.0	5.0
Observed score	37	13	44	26	30	44	13	10	43
Fisher *CR* = 11.79, $p<.001$; χ^2 = 318.3 (8 *df*), $p<.001$									
Pooled Series									
Expected score	507.6	254.0	812.2	406.1	254.0	406.1	110.1	55.2	55.2
Observed score	473	226	728	365	268	402	123	54	221
Fisher *CR* = 12.88, $p<.001$; χ^2 = 518.7 (8 *df*), $p<.001$									

[a] Scoring types are as follows: OO means no correspondence between call and target; OC means color only (not suit); OR means rank only (both face cards or both plain cards, not matching in number); CR means color and rank; SO means suit only; SR means suit and rank; ON means number only; CN means number plus color; SN means suit and number (i.e., an exact hit).

results from series to series is rather consistent in form, though varying in strength, and in the pooled data this pattern emerges conspicuously. By far the most potent source of statistical significance is the massive excess of exact hits. These contribute to the Fisher *CR*, since the exact-hit category carries the heaviest weighting factor, and to the chi-square, since the squared deviations are weighted inversely by expectation and the exact-hit category contains the largest deviation coupled with the smallest expectation. In the pooled data the number of exacts is four times MCE, yielding a *CR* of approximately 22.0.

The presence of a large excess of exact hits, together with essentially chance performance on number hits and suit hits, suggests that B.D. produced many more exact hits than could be anticipated through chance association of his hits on the component attributes. This can easily be tested post hoc by constructing, for each series separately and for all together, a two-by-two table whose marginal totals contain the hits and misses for numbers and suits, and whose cell entries are the totals for the four possible combinations of hitting and missing simultaneously on these attributes. (The reader can readily reconstruct these tables from the data of Table 1.)

For the whole body of data, the chi-square test of association between suit hits and number hits is 126.7, corresponding to a *CR* of approximately 11.0. Although almost entirely absent from the first component series ($\chi^2 < 1.0$), this same tendency is apparent in each of the remaining series, which all give independently significant results, with chi-squares of 11.3, 48.8, 35.2, 36.6, and 13.4, respectively.

This tendency toward exact hits is much more extreme than that reported previously for the single-card clairvoyance series (Kanthamani & Kelly, 1974a) and invites closer comparison between these two bodies of data. As a first step, consider Table 2, in which the overall results by Fisher's method are presented for the pooled data of the two series separately.

In the single-card clairvoyance data there are three principal contributors to the overall significance, namely, exact hits, color–number hits, and number–only hits, in that order. The excess in these categories is compensated for by a fairly uniform depletion of counts in all the remaining categories, the main exception being the suit–only hits, which show a marginally significant negative *CR*.

In the shuffles data the pattern is somewhat different. Exact hits by themselves almost entirely account for the observed significance, and the pattern of depletions is also different, with the lowest four

categories again fairly uniformly low but the next four close to chance expectation.

Table 2

COMPARISON OF SINGLE-CARD CLAIRVOYANCE AND SHUFFLES RESULTS BY FISHER'S METHOD

Single-Card Clairvoyance (46 runs)									
Scoring type	OO	OC	OR	CR	SO	SR	ON	CN	SN
Expected score	424.6	212.4	679.3	339.7	212.4	339.7	92.0	46.0	46.0
Observed score	400	196	623	332	180	304	120	99	138
Fisher CR = 10.73, $p<.001$; χ^2 (8 df) = 268, $p<.001$									
Shuffles (55 runs)									
Expected score	507.6	254.0	812.2	406.1	254.0	406.1	110.1	55.2	55.2
Observed score	473	226	728	365	268	402	123	54	221
Fisher CR = 12.88, $p<.001$; χ^2 (8 df) = 519, $p<.001$									

The single-card clairvoyance results suggest a tendency for B.D.'s guesses to approximate the whole-card target; that is, the excess of number and color–number hits indicates that he was often getting into the "neighborhood" of the complete target without getting it exactly correct. As reported previously (Kelly, Kanthamani, Child, & Young, 1975), this suggestion is confirmed by more intensive investigation of the detailed pattern of trial-by-trial errors. For both numbers and suits (and hence, by a plausible though not strict inference, for the whole-card targets), B.D. did in fact show consistent tendencies to call targets in the immediate neighborhood of the designated target. These tendencies, moreover, were more pronounced in the high-scoring runs of the series. Finally, and most interesting of all, it was possible to show clearly that the overall pattern of these ESP errors, especially in the high-scoring runs, closely approximated the pattern of errors B.D. produced in a concurrent visual task in which he was required to identify color slides of the same target materials at near-liminal stimulus intensities. We tentatively interpreted this result as corroborating a main feature of B.D.'s self-description: specifically, it is consistent with the hypothesis that on a significant fraction of the occasions on which he obtained ESP information during the course of the experiment, he encoded it in the form of visual imagery. Typically this imagery was pale, indistinct, fragmentary, and fleeting, however, so that the visual-like errors appeared at a secondary stage when he attempted to identify it.

The Fisher results for the shuffles experiment seem to indicate something different, so far as they go, since they suggest that in this experiment the tendency to approximate the whole-card target was largely if not entirely absent (except for a possible bare hint associated with Series 6). In order to explore this question more fully it is necessary to look in much greater detail at the relations between calls and targets, using the procedures developed in our previous report referred to above. We have in fact applied these procedures to the present data, and the result is unequivocal—there is no trace of consistent missing for either number or suits, even after division of the data into high-scoring and low-scoring segments. The pattern of visual-like errors associated with the single-card clairvoyance experiment is simply not present as a general feature of the shuffles data.

Discussion

Experimental Conditions

The procedures of Series 1–4 appear to us to have been sufficiently rigorous to guarantee that the psi effects reported for them are genuine. Had there been sensory leakage from the target deck, it would presumably have been reflected in an excess of hits on the top and/or bottom cards. This is not the case, however; as in previous experiments, B.D.'s scoring is widely distributed through the data, with no apparent preference for particular cards or card positions. Series 5 and 6 are, as we indicated, methodologically weaker. Nevertheless, for reasons which we have detailed previously (Kanthamani & Kelly, 1974b), we believe that the effects in these series are also largely, even if not entirely, genuine psi effects; and in any event their exclusion from the experiment (should the reader feel this necessary) does not materially affect any of the reported results.

Form of Observed Effects

The most interesting question raised by the shuffle results concerns the absence of consistent-missing effects of the type discovered in the single-card clairvoyance work. The two experiments took place over roughly the same span of time, with the individual sessions substantially interspersed. Also, the overall scoring levels are fairly comparable, both being extremely high and, if anything, somewhat higher in the shuffles experiment. What, then, accounts for the difference in outcomes?

Let us consider the character of the psi tasks a little more closely. The interpretation of the single-card clairvoyance procedure seems

at least relatively unambiguous.[4] B.D.'s attention was intensely focused during each trial on discovering the identity of a single concealed target, and he emphatically described himself as carrying out that task by inspecting the contents of his imagery.

What kind of psi task was imposed by the shuffles procedure? There are many possibilities; and the situation is complicated further by the possibility that B.D. did different things at different times, especially in response to changes in the procedures. There is little hope of determining in great detail what took place, but fortunately we can make some progress toward narrowing the range of plausible interpretations.

As a first step, it seems clear that if clairvoyance of the type which occurred in the single-card experiment played any role in the shuffles experiment, it should have manifested itself most strongly in connection with Series 6, in which, it will be recalled, B.D. was actively encouraged to select individual cards from his (previously shuffled) call deck to match an individual and known target card. This is the point at which the present experiment seems most nearly to approximate the conditions of the single-card clairvoyance experiment. Accordingly, we have carried out the confusions analysis procedure on the suit data for Series 6 alone (as well as for Series 5 and 6 together) to determine whether, in fact, consistent-missing effects are present there. As it happens, no such effects are visible. In retrospect, this is not terribly surprising, because we know that B.D. only took advantage of his option to select a call card on a small proportion of trials, preferring generally to accept the results of the previous shuffling and simply to set aside the top card of his deck. Thus, even if consistent-missing effects had been present on the selection trials—but on the selection trials only—these would have been too thinly distributed to show up in the overall data.

In any event, it looks as though something else must have been going on in Series 5 and 6, presumably something which could have occurred throughout the experiment. What might it have been?

One possibility might be called the "pure ESP" interpretation; that is, perhaps B.D. merely randomized his call deck repeatedly, without exerting any kind of influence on its ordering, until clair-

[4] We hedge because it is conceivable, for example, that B.D. could have chosen his calls and exercised PK to force the experimenter to choose the corresponding target; or likewise, that the experimenter herself was the true subject, using her ESP to select targets that would match B.D.'s subsequent calls. We are inclined to suppose, however, that neither these nor related possibilities apply, at least as general characterizations of the processes which occurred.

voyant "inspection" of some sort indicated that he had randomly succeeded in generating a "good" one, one which happened to match the order of the target cards at some criterion level. It makes little difference whether we imagine him inspecting the target deck as it existed during the shuffling or as it would appear subsequently during the recording and checking: the critical point here is the absence of influence on the call deck. As it happens, we can show that interpretations of this class cannot plausibly be accepted as a full account of what took place in the experiment.

First, consider the data of Table 3, which gives, for various values of K, the Poisson approximation to the binomial probability of observing exactly K direct hits in a run. (These are sufficiently precise for our purpose.)

Table 3
APPROXIMATE BINOMIAL PROBABILITY OF K HITS IN A RUN (POISSON)

Values of K	0	1	2	3	4	5	6	7	8	9
$p(K)$	.3679	.3679	.1839	.0613	.0153	.0031	.0005	.00007	.000008	.0000009

Regrettably, we did not make records of the exact numbers of shuffles B.D. performed on each run; however, we are confident that in all but a few special runs the number was very small, certainly not more than four or five and sometimes just one or two. Now consider Table 4 which gives the numbers and identities of runs containing K hits for all observed values of K.

Even if we eliminate from consideration the methodologically weaker and procedurally different Series 5 and 6 (runs 46-55), it is clear that Tables 3 and 4 jointly allow us to rule out the "pure ESP" interpretation. For if B.D. were not exerting some kind of influence on the order of the cards, he should have had to carry out very many more shuffles than he did in order to generate the observed hit distribution. For example, consider the five runs with five hits, which are all drawn from the first four series. The average number of tries to first success,[5] given a probability p of success, is $\frac{1}{p}$. On

[5] For the following short proof, we are indebted to Dr. Joseph Greenwood. The expected number of tries $\bar{x} = \sum_{x=1}^{\infty} x \cdot p(x) = (1p + 2qp + 3q^2p + \dots) = p(1 + 2q + 3q^2 + \dots) = p\frac{d}{dq}(q + q^2 + q^3 + \cdots + 1 - 1) = p\frac{d}{dq}\left(\frac{1}{1-q} - 1\right) = \frac{p}{p^2} = \frac{1}{p}$.

the average, therefore, B.D. should have had to shuffle his deck about 325 times before randomly turning up a five-hit run, in the absence of any influence on his deck.

Table 4
DISTRIBUTION OF EXACT HITS BY RUNS

K Hits	Run Number
0	2, 4, 11
1	6, 12, 15, 16, 17
2	1, 3, 5, 7, 10, 14, 22
3	8, 9, 13, 18, 19, 20, 24, 25, 28, 31, 33, 48
4	23, 26, 27, 29, 34, 38, 42, 44, 46
5	21, 30, 35, 36, 41
6	32, 39, 40, 47, 51, 52
7	37, 43, 45, 49, 53
8	54
9	...
10	50
Over 10	55 (16 hits)

Thus, for many individual runs—and at least grossly for the entire experiment—we must assume that some process was at work which exerted a very strong influence on the orderings produced by shuffling. The most likely possibility seems to us to be a straight PK effect, in which B.D. forced the decks to so arrange themselves as to lead to high scores. It might be argued that this would necessarily have involved some form of clairvoyant "inspection" of both decks after each shuffle, but this does not appear to us to be at all certain in light, for example, of Schmidt's (1974) observations concerning the apparent "goal-directedness" of PK. Another possibility suggested by Schmidt (personal communication) is some combination of clairvoyance with extreme manual dexterity. Although this does not appear particularly plausible to us, we have not found any way to rule it out in the present experiment. (Note, incidentally, that these hypotheses might be discriminated in further experiments by using mechanical or electronic "shuffling" procedures.) It is, however, worth mentioning at this point that B.D. himself emphatically interpreted his task as a PK task and, moreover, one in which his objective was to produce only exact hits.

In any event, our net situation appears to be this: we are inclined to suppose that at least some, perhaps most, of the observed effects in the shuffles data are PK effects, consistent with B.D.'s own view. If clairvoyance effects were generally present, they do not appear to

have been of the same form as the effects in the single-card clairvoyance series, owing to the utter absence of consistent-missing patterns of the previously observed form, even in places where they seemed most likely to appear.

Whether the results reflect a single "new" process, such as PK, or some unresolvable mixture of new and old ones, they lead us to conjecture that what we may have here is the beginning of a distinction, for this one subject, between internal psychological mechanisms underlying, or at some level associated with, psi performance in two (or more) different modes. We stress that this evidence is only suggestive; a more convincing demonstration along these lines would require comparison between psi tasks which were relatively unambiguously distinct, and preferably would turn on the existence of two (or more) clearly different consistent-missing patterns rather than absence vs. presence of a single such pattern.

Nevertheless, we hope that the results reported here may help open the way to further study of this important question. The methods of confusions analysis provide one line of attack, as indicated here; but in closing we would suggest that another and possibly more efficient and direct approach could develop from within-subject investigations of the psychophysiological conditions associated with success in different psi tasks.

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