

## A REVIEW OF THE PEARCE-PRATT DISTANCE SERIES OF ESP TESTS

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A NUMBER OF considerations have contributed to our decision to present the original and subsequent work identified with what has come to be known as the Pearce-Pratt Distance Series of ESP tests, carried out in 1933-34 at the Parapsychology Laboratory at Duke University. One reason for the review is the need expressed by some students of the subject for a more complete and detailed account of the original experiment than is to be found in any one publication. The first part of the series, what is known as Subseries A, was published in the monograph *Extrasensory Perception* written in 1934 by J. B. R. (6). This section was all that was completed at the time the monograph was written. In 1936 a brief account of the series and its total results was given in an article by J. B. R. in the *Journal of Abnormal and Social Psychology* (8), and in 1937 a condensed version of this article was included in the first number of the *Journal of Parapsychology* (7).

Another reason for the present undertaking is the fact that almost immediately upon publication the Pearce-Pratt Series received special attention. It represented a methodological advance over earlier experimental work in parapsychology; and both for the laboratory group associated with the experiment and for those who were attempting to appraise and criticize the evidence for extrasensory perception, the series had to be considered. Moreover, as new questions were raised about the series, further analyses of the data resulted. Most of these analyses were reported as they were completed, but to the student of today it would be a difficult undertaking to run them all down.

There is the further point that it is now possible to appraise the experiment and its results in the light of the developments of the intervening twenty years, the most productive period of parapsychology. It was considered an advantage to older students as well as new, therefore, for the authors to assemble for re-examination the

factual matter that has accumulated around this single experimental series.

Something should be said regarding the general background of the research. First, there is the all-important aspect of personnel. It should not be forgotten that without Prof. William McDougall's appreciation of the problem and his tolerant and courageous interest in seeing it investigated under good conditions in a psychology laboratory, the experiment would not have been possible. J.B.R. was at the time an assistant professor in the department of which Professor McDougall was head; it was generally understood in those days that research in parapsychology was approved by the Department. J.G.P. was a graduate student in psychology, specially employed as research assistant to J.B.R. From the viewpoint of objectivity, it should be noted that J.G.P. had not at that time shown special interest in the problems of parapsychology, and in fact worked on other problems for his graduate researches. It was not until some years later that he decided to devote his energy to parapsychology.

The subject, Hubert E. Pearce, Jr., was at the time a student in the Divinity School at Duke. He had introduced himself to J.B.R. approximately eighteen months earlier and had stated that he believed he had inherited his mother's clairvoyant powers. In ESP card tests given by J.G.P. and J.B.R. during the intervening period he had exceeded the average score to be expected from chance in practically every experimental session under a wide variety of conditions. During that period he had participated in tests involving nearly 700 runs through the standard deck of ESP cards, averaging approximately 32% successes as compared with the mean chance expectation of 20%. Nothing like this prolonged series of tests had ever been made up to that time, and H.E.P.'s performance was recognized even then as highly exceptional.

The Distance Series was the first step involving different buildings in the separation of H.E.P. from the target card he was attempting to identify. The move was not so much a strictly necessary requirement for the exclusion of visual cues as it was a matter of providing a conspicuously wide margin of safety against the possibility of such cues. The use of different buildings, incidentally, was convenient for the independent recording of the subject's re-

sponses and the card sequences. It became easily possible at the same time to provide for duplicate recording and independent checking.

To those of us who had participated in the long series of earlier tests with H.E.P. under gradually improving conditions of test and observation, this further advance in experimental conditions was hardly required. The essential safeguards had already been approximated. There is, however, a tendency of the mind, when confronted with so incredible a hypothesis as that of ESP, to exaggerate the possibility of alternative factors such as visual cues, recording errors, the loss of records, and the like. The revolutionary character of the ESP hypothesis, then, made necessary a range of precautions that were not normally considered a part of the routine of experimental psychology. This atmosphere of critical apprehension concerning the adequacy of the design needs to be taken into account, for it was a part of the actual situation in which the experiment was conducted.

Some idea of the state of mind prevailing at the time can be gained from the circumstances leading to the planning of Subseries D. Subseries A, B, and C had been designed on the assumption that no error was possible that could favor the ESP hypothesis—not unless the two men, J.G.P. and H.E.P., were deliberately to conspire to produce a fraudulent set of results. Wisely (and accurately) anticipating that there would be those who would find it easier to suspect collusion than to accept ESP as established, Professor McDougall recommended that J.B.R. identify himself with the actual performance of at least a short subseries of the distance tests in order that a theory of collusion would have to involve all three of the participants in the experiment. On the basis of this plan Subseries D was conducted with J.B.R. actively officiating with J.G.P.

Actually the primary research objective in the experiment was to compare the effect of short and long distance on the results. In the planning of the test series, this concern with the role of distance was the essentially novel feature of the experimental design. In most of the tests in which H.E.P. took part during the preceding period, the target cards had been within a yard of him. It was considered a sufficient first step to introduce a distance of at least a hundred times that unit as one that should reveal any effect of dis-

tance on any possible radiant energy that conceivably intermediated in the operation of ESP. Later in the series this distance was increased still farther. While, then, for the general public and the critic especially, the Pearce-Pratt Series came into focus as a conclusive demonstration of the *occurrence* of ESP, to the workers in the Parapsychology Laboratory it became the first definite step in the testing of the hypothesis of the *non-physical nature* of psi, the hypothesis suggested by earlier experimental work as well as by the study of spontaneous psi experiences.

#### PROCEDURE

A single subject, H.E.P., was tested for his ability to identify ESP test cards manipulated by the experimental assistant, J.G.P., in another building, part of the time at a distance of 100 yards and part of the time at a distance of more than 250 yards from the location of the subject. The experiment was designed to test for the clairvoyant type of ESP; and J.G.P., accordingly, did not know the card order in the test.

Aside from planning the experiment, J.B.R. participated only in the independent checking of results, except for Series D in which he participated with J.G.P. as the witness to the operation of the test.

There were, in all, four subseries, A, B, C, and D, totaling 74 runs through the pack of 25 cards; and the series extended from August, 1933, into March, 1934. The testing days were not consecutive, though within a given subseries they were more or less so. They were selected, however, at the mutual convenience of H.E.P. and J.G.P. Subseries C was begun in October, 1933, and four runs were added to it in March, 1934, with Subseries D following thereafter. Specific dates may be found in Table 1. Subseries A was done with the 100 yards distance, Subseries B at 250 yards, and the other two subseries back at 100 yards. The 74 runs represent all the ESP tests made with H.E.P. during this experiment under the condition of working with the subject and target cards in different buildings. It was, in fact, the only distance test involving different buildings done at the Duke Laboratory at the time.

Series A was set up with an advance commitment on termination point. It was agreed that 300 trials were to be given H.E.P. The

following Subseries, B, was intended to be a duplication with only the additional distance involved, but the experimenters were interested in the big shift of scoring level from day to day which was shown at the longer distance. It was decided to allow H.E.P. to continue further so as to see what would happen. Subseries C was intended to be a repetition of Subseries A consisting of 300 trials designed to discover whether the lower scoring rate of Subseries B at the longer distance was a result of the altered situation or whether H.E.P. had declined in scoring ability. Subseries D, as has been stated, was intended as introducing a check on J.G.P., and its length was agreed upon in advance (150 trials, or six runs).

In actual operation the experiment proceeded as follows, regardless of which subseries was involved: At the time agreed upon, H.E.P. visited J.G.P. in his research room on the top floor of what is now the Social Science Building on the main Duke campus. The two men synchronized their watches and set an exact time for starting the test, allowing enough time for H.E.P. to cross the quadrangle to the Duke Library where he occupied a cubicle in the stacks at the back of the building. From his window J.G.P. could see H.E.P. enter the Library.

J.G.P. then selected a pack of ESP cards from several packs always available in the room. He gave this pack of cards a number of dovetail shuffles and a final cut, keeping them face-down throughout. He then placed the pack on the right-hand side of the table at which he was sitting. In the center of the table was a closed book on which it had been agreed with H.E.P. that the card for each trial would be placed. At the minute set for starting the test, J.G.P. lifted the top card from the inverted deck, placed it face-down on the book, and allowed it to remain there for approximately a full minute. At the beginning of the next minute this card was picked up with the left hand and laid, still face-down, on the left-hand side of the table, while with the right hand J.G.P. picked up the next card and put it on the book. At the end of the second minute, this card was placed on top of the one on the left and the next one was put on the book. In this way, at the rate of one card per minute, the entire pack of 25 cards went through the process of being isolated, one card at a time, on the book in the center of the table, where it was the target or stimulus object for that ESP trial.

In his cubicle in the Library, H.E.P. attempted to identify the target cards, minute by minute, and recorded his responses in pencil. At the end of the run, there was on most test days a rest period of five minutes before a second run followed in exactly the same way. H.E.P. made a duplicate of his call record, signed one copy, and sealed it in an envelope for J.B.R. Over in his room J.G.P. recorded the card order for the two decks used in the test as soon as the second run was finished. This record, too, was in duplicate, one copy of which was signed and sealed in an envelope for J.B.R. The two sealed records were delivered personally to J.B.R., most of the time before J.G.P. and H.E.P. compared their records and scored the number of successes. On the few occasions when J.G.P. and H.E.P. met and compared their unsealed duplicates before both of them had delivered their sealed records to J.B.R., the data could not have been changed without collusion, as J.G.P. kept the results from the unsealed records and any discrepancy between them and J.B.R.'s results would have been noticed. In Subseries D, J.B.R. was on hand to receive the duplicates as the two other men met immediately after each session for the checkup.

Thus, from day to day as the experiment proceeded, H.E.P. was kept informed, as he had been in all his earlier experiments, as to the rate of success achieved. The practice of expressing enthusiastic congratulations should be mentioned as a part of the procedure. If, as rarely happened, the scoring rate was low, favorable emphasis was placed on the overall performance, the general average maintained, and the high standing of the subject in the comparative scale of ESP subjects. Throughout the series the paramount objective of high-order performance was held before the subject with all the vigor and expectation that could be communicated.

## RESULTS

### *General Evaluation*

Since they were one series of tests carried out under essentially the same conditions, the four subseries (totaling 74 runs, or 1850 trials) may be pooled. Mean chance expectation is 20%, or 370 hits. The total number of successes actually scored for the series is 558, which is better than 30%. The theoretical standard deviation derived on a conservative basis is 17.57. This total of 558 hits

is 188 above the theoretical expectation and it gives a critical ratio of 10.70. The probability that a critical ratio so large as this would occur on the basis of random sampling is less than  $10^{-22}$ . In the determination of the critical ratio given above, allowance is made for the slight correction applicable when, as in this experiment, the balanced ESP deck is used; that is, when there are five of each symbol in each pack. The variance of scores obtained with the 5 x 5 ESP deck depends upon the frequency with which the subject calls the different symbols. The largest variance results when the subject always calls exactly five of each symbol, and the SD of 17.57 was obtained on this assumption (2). However, the subject rarely called five of each symbol in a run, and the exact SD would therefore be smaller than the one used here, which makes the estimate of statistical significance a conservative one.

Table 1  
PEARCE-PRATT DISTANCE SERIES: GENERAL RESULTS

Subseries	DATES		Runs	Dev.	SD	CR	P
	Start	End					
A.....	8/25/33	9/ 1/33	12	+59	7.07	8.35	$<10^{-14}$
B.....	9/ 2/33	9/30/33	44	+75	13.54	5.54	$<10^{-6}$
C.....	10/18/33	3/10/34	12	+28	7.07	3.96	.000075
D.....	3/12/34	3/13/34	6	+26	5.00	5.20	$<10^{-6}$
Total...	8/25/33	3/13/34	74	+188	17.57	10.70	$<10^{-22}$

Each of the four subseries is independently significant, as may be seen by reference to Table 1. The table shows for each subseries the date, number of runs, deviation, standard deviation, critical ratio, and the associated probability.<sup>1</sup> A complete record of the card order and calls for the series has been furnished from time to time to qualified workers who wish to make some special study of the material. This practice will continue.

<sup>1</sup> In the two reports, mentioned above, in which the run scores of the series were published, the scores of Subseries B and C were not given consecutively, and there were two other minor errors. It seems worth while, therefore, to list the complete run scores in chronological order here. The division between days or sessions is indicated by the use of semicolons.

Subseries A: 3; 8, 5; 9, 10; 12, 11; 11, 12; 13, 13, 12.

Subseries B: 1, 4; 4, 4; 7, 6; 5, 0; 6, 3; 11, 9; 0, 6; 8, 6; 9, 4; 10, 6; 11, 9; 5, 12; 7, 7; 12, 10; 6, 3; 10, 10; 6, 12; 2, 6; 12, 12; 4, 4; 3, 0; 13, 10.

Subseries C: 9, 8; 4, 9; 11, 9; 5, 4; 9, 11; 2, 7.

Subseries D: 12, 3; 10, 11; 10, 10.

*Results of Further Studies and Analyses*

Since this series was first reported, the data have been used by a number of research workers at the Parapsychology Laboratory for additional analyses. Some of the analyses bear upon the general question of whether the target order was sufficiently random to justify the assumptions underlying the statistical methods used in the evaluation of the results. Other analyses were aimed at trying to discover further psychological information relevant to questions of how ESP operates. The following review includes most of these analyses, though it does not cover all of the critical reviews and discussions.

*Tests of Assumptions Underlying Statistical Methods.* Greenwood and Stuart (3) did a cross-check in which the subject's calls were arbitrarily matched against the cards of the third run following, the calls for the first run being checked against the card sequence of the third run, the calls of the second against the cards of the fourth, etc. To make the cross-check series the same length as the experimental series, the calls of the last two runs were checked against the cards of the first and second runs respectively. The 74 cross-check runs give a total of 387 hits, a deviation of 17 above mean chance expectation, which is less than one standard deviation.<sup>2</sup> The empirical variance of the cross-check run score distribution is 4.772, which is a close approximation to the expected value when the size of the sample is taken into account. Greenwood (2) also obtained the variance of the series by an exact method which takes into account the actual frequency with which the subject called the different symbols in each run. The average variance per run by this method was found to be 4.116, which is slightly greater than the theoretical variance of 4 for the binomial hypothesis which applies to the open deck or random order of cards and the value of 4.167 for the matching case based upon comparing two adequately shuffled closed decks. All four variances agree so closely in value that it makes no difference in the conclusions drawn from the data which of the four is used to compute the critical ratio. Stuart (10) calcu-

<sup>2</sup> The cross-check score as originally reported was 385 hits. In the present paper the practice followed has been to report the corrected figure when any analysis previously published has been found to have an error. All of these corrections are trivial and none affects any interpretation of the findings. The student who notices any such discrepancies should give this review precedence over the earlier publications.



lated the empirical variance from the run scores and found a value of 12.83. The extreme range of the scores, from 0 to 13, with the tendency for scoring to be below chance on many runs in Subseries B, contributed to the large empirical variance; but even so, the Pearce-Pratt Series is highly significant when evaluated by the empirical SD ( $CR=6.10$ ,  $P < 10^{-8}$ ).

*Analyses for Secondary ESP Effects.* The data of this experiment were checked for displacement by Russell (9), who compared each call with the targets in the run for as many places away as the position of the call permitted. In the usual terminology this means that for backward displacement the data were checked for  $-1$  through  $-24$  displacement; and for forward displacement, for  $+1$  through  $+24$ . No evidence of displacement was found.

The Pearce-Pratt Series was included by Pratt (5) among a number of high-scoring experiments, the results of which were studied to see whether the hits were clustered or whether, conversely, they were distributed as if they were in a random series. There was no evidence of grouping of hits in the Pearce-Pratt Series nor in any of the other ESP and PK data analyzed.

This experiment was also included among those surveyed by Pratt (4) in his analysis of ESP data to determine if there was any evidence that the subject interrupted or changed his habitual sequence of calling after making a hit. The Pearce-Pratt Series did not yield any evidence of change-of-call; that is, there was no difference between the frequency with which the subject followed a response that made a hit by the different ones of the five symbols in his next call and the frequency with which one of his calls that made a miss was followed by the various symbols.

Also, without giving the detailed figures, we can report here that there was no evidence that could be detected by a chi-square analysis to indicate that the subject interrupted his habitual sequences of symbol association at the point of making a hit. This is a question that needs to be examined in longer series of high-scoring subjects where a weak effect would more likely be revealed by the statistical measures applied. If it is true that a subject scores well above the level attributable to chance without deviating from whatever habitual sequence preferences he may have, this fact might pro-

vide an important clue regarding the manner in which ESP impressions are brought to conscious expression.

In still another analysis of this series, Cadoret and Pratt (1) examined the misses in the subject's trials to see if there was any evidence of consistent wrong associations between responses and target symbols. No evidence of consistent missing in the Pearce-Pratt Series was found, though evidence in the results of other experiments led to the tentative conclusion that consistent missing was a genuine secondary effect.

All in all, the results of the analyses for secondary effects that have been made with the Pearce-Pratt data add up to a strong indication that H.E.P. was successful in achieving what he was attempting to do; namely, to direct his ESP calling upon the target for that trial, the card that was on the book at the moment the call was made. The single exception to this rule is one that was apparent while the series was still being done. That was the tendency in Subseries B for the subject to score below chance in some runs. That subseries produced a remarkable number of low scores, too many to be attributed to random fluctuation, though the above-chance scores still predominated to such an extent that the total score of the 44 runs of Subseries B is significantly above chance expectation.

#### DISCUSSION

Viewed twenty years later, the results of the Pearce-Pratt Series still appear to allow no interpretation except that they were due to extrasensory perception. So far as the extrachance character of the series has been re-examined, it has led only to confirmation of the fact that the statistical significance of the results cannot be challenged. Moreover, no tenable sensory interpretation has even been proposed to explain the data. The recording-error hypothesis has presented no reasonable claim for support, and the additional studies of the card distribution in the series have shown no peculiarities of patterning that could in any way alter the conclusions. Even the collusion hypothesis would have to involve all three of the participants in a deliberate conspiracy. And finally, the scores were high enough and consistent enough over the series that common sense without benefit of involved mathematics would assure us that the series was not mere chance.

If, then, as the Warner survey revealed (11), these results, along with all the other researches on extrasensory perception, failed to establish a convincing case for ESP for the majority of the members of the American Psychological Association responding to Warner's questionnaire, it can safely be said that the issue is not a matter of scientific evidence. The series contributed all that an experiment can do toward establishing the ESP hypothesis. The rest is a question of receptivity on the part of the professional group.

It is true, the conclusions are circumscribed. Only one subject was involved and from this no generalization can be made regarding other subjects. Only a short span of time in a lifetime of the individual subject, H.E.P., was involved, and from this one study it would not be possible to make a general statement beyond those limits. This particular study could not claim to have brought out what enabled Pearce at this time to score at this percentage rate or to enable a prediction that he could, under definable circumstances, repeat this performance. None of these things, however, has been claimed for the Pearce-Pratt Series. It was enough to say that under the circumstances, within the limits, and at the time, an extrachance performance did take place that could not be ascribed to anything but the operation of extrasensory perception, whatever that is and however it is to be explained. But to have reached this point with the degree of reliability and unequivocality represented was sufficient to constitute a turning-point in the thought and experimental plans of the laboratory concerned. From that point on, another problem, another stage in the investigation of ESP was in order.

While incidentally intended to provide improved test conditions, the Pearce-Pratt Series introduced a comparison of distances. In the 30 runs of tests made at the distance of 100 yards in Subseries A, C, and D, the average per run was 8.8 hits. The average for all of H.E.P.'s 690 runs made up to the time the series began was 7.9 per 25. The comparison of the results indicated, then, that this order of distance could not be considered a limiting condition. In this experiment, at least, the subject's scoring could not be said to have been lowered by the introduction of distance at the 100-yard stage.

With the longer distance, 250 yards, introduced in Subseries B, the 44 runs averaged 6.7 hits per 25. This might, on the basis of averages, raise the question of a possible effect of the longer distance.

A closer look, however, at the chronological score distribution on page 171 discourages that type of interpretation. The score distribution suggests, rather, some other factor, something that apparently raised or lowered the scoring for a given day's work. Whatever the factor was, it was not one of mere distance between the subject and the pack of cards. At least, so the reasoning went at the time, and the experimental results were taken to suggest, though not conclusively to prove, that distance of this order was not a factor related in any essential way to the operation of ESP. Since the distances were comparatively short, the results suggested the importance of tests with longer distances. And the suggested absence of a relationship between ESP and distance logically raised the question of the relationship of ESP to time. This experiment thus had much to do with precipitating the experimental investigation of precognition, which was begun with the same subject, H.E.P.

Nothing stands out now in retrospect more strongly than the shift of importance of different features of such an experimental research as this one. During the intervening decades the Pearce-Pratt Series came to have its greatest value because of the character of the experimental conditions under which it was done. Its principal contribution to the understanding of the nature of ESP—its bearing on the question of distance—was hardly noticed, and it may still be some time before it is. However, it did accomplish its purpose in turning the attention of the workers immediately concerned to problems that logically followed acceptance of the results as showing no effect of the distance involved.

Today, however, for the experimenters who are confronted with the more urgent problems of the field and who look back at this series, the paramount feature is the exceptionally high scoring produced and held for so long a time by this individual subject, H.E.P. There had been in his earlier work ample evidence that H.E.P. worked up to a crescendo of enthusiasm and ambition in his tests and that in general his scoring rate followed the rise and fall of his motivation.

As already indicated, he actually rose above his earlier scoring when introduced, in the first subseries, to the distance test conditions. It was as if this was a special challenge to him, something of a climax, as indeed it was. In the general intellectual atmosphere

which he breathed, the conquest of distance was a climactic undertaking. The eye falls, too, on the striking shiftiness of scoring introduced when the distance was increased to 250 yards. It was shortly after this series was over, a matter of months, that H.E.P. suddenly lost his capacity to score significantly in the card tests under any of the conditions or in any of the types of tests in which he had performed so steadily and brilliantly for about two years. This special series may have a point of relevance to the primary problem of parapsychology today, the problem of acquiring control over psi performance.

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