CORRELATIONS BETWEEN ESP AND MEMORY

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I have discussed elsewhere the importance of attempts to integrate ESP into psychology (Blackmore, 1980). One of the first questions to ask may be whether ESP resembles other cognitive processes such as memory and perception. There are several ways in which this may be investigated. They include 1. The study of errors made in ESP, 2. Correlations between ESP and memory or other cognitive skills, 3. Studies of the effects of varying target material, 4. The use of the recall situation as a psi-conducive state and 5. The study of the effects of associative habits on ESP. Some of these approaches have already been discussed. This paper will consider only one of these, that is the correlations between ESP and memory.

Modern research on ESP and memory began after the publication of Roll's 'memory theory of ESP' (Roll, 1966). This was based on the idea that "the ESP response consists of the percipient's own memory traces and that the effect of the external (ESP) stimulus is to activate memory traces rather than supply new ideas or images". Roll drew several predictions from this theory among them that "If memory traces are vehicles for psi impressions, we expect a person with good recall ability to perform well in ESP and, conversely, a good ESP subject to perform well in memory tasks." (Roll 1966, p.510). This prediction is relatively easy to test by correlating performance on ESP and memory tasks and this has been done. But before considering the research that has been carried out I wish to consider what conclusions might be drawn if such a correlation were found.

Firstly Roll predicted a positive correlation between recall and ESP on the basis of his 'memory theory of ESP', but I do not believe this necessarily follows from that theory. If the role of the ESP stimulus is to revive, and in so doing to select, the appropriate memory trace then the major task of recall is carried out paranormally and there is no particular reason to suppose that the same person will be good at normal recall and this other paranormal process. On a two-process theory of memory we may argue that Roll's theory involves paranormal retrieval but normal recognition and one might then predict a positive correlation between ESP and measures of recognition, but not recall. While this is not the only possible interpretation of Roll's theory it does indicate that a positive or negative correlation between ESP and recall scores is not necessarily evidence either for or against it. There are several other models which relate ESP and memory. For example Carington's 'association theory of telepathy' suggests that associations between ideas and images (psychons) tend to persist independently of the person who initiated them and may be utilised by others so leading to the occurrence of telepathy. Although this theory has many drawbacks and can only account for telepathy, not clairvoyance, it treats memory and telepathy as equivalent processes and so would, I believe, predict a positive correlation between them. The same may be said of Price's 'Psychic ether hypothesis' (Price, 1939), Marshall's physical theory of ESP and memory (Marshall, 1960) and what Roll (1966) calls the psi-trace theory of memory, that is that the brain acts as a kind of token object in memory, allowing for retrieval of memories stored as psi-traces. Since in all these theories ESP and memory are seen as the same process I believe they might all predict a positive correlation between ESP and memory.

Rao, Morrison and Davis (1977) argued for a negative correlation on the basis of Bergson's idea that the brain's selective processes act as a protection against recalling and experiencing too much. If ESP is seen as the result of errors escaping cortical surveillance then better ESP would occur with a less efficient memory. But even this is not a simple deduction. Bergson (1911) attributed a selective process to the nervous system, suggesting that in remembering it selects the desired information from all that available. If all information is potentially available then random escapes through the surveillance would not lead to ESP but to confusion. For correct ESP some sort of selection is still needed. Therefore a better selective process may be able to select ESP information better as well as memory. This would lead to the opposite prediction to that made by Rao and his associates.

If a consistent correlation between ESP and memory were found it would not be obvious which theories of ESP would be supported or refuted. Indeed I do not think there is any theory of ESP so clearly formulated that it would allow definite conclusions to be drawn. Nonetheless, such a finding could be useful. It would indicate whether there was a similarity between the processes involved in ESP and memory, or in the factors which affect them, and this could provide a start.

We may now consider the existing evidence for such a correlation. Feather (1965; 1967) was the first to report a correlation between ESP and memory. She gave subjects two runs of clairvoyance, a memory test for a list of 25 ESP symbols and then two more runs of clairvoyance, and found a positive correlation between recall and ESP scores. This study was complicated by the fact that the memory test was very hard, with some subjects scoring below chance on it. Rao et al (1977) suggested that ESP may have operated in the memory test as well so complicating any conclusions drawn, since the correlation could have been due to ESP operating in both tests rather than to any relationship between ESP and memory.

Many subsequent studies have tested the correlation between ESP and memory but mostly only as a secondary or even post hoc analysis. For example Stanford (1970) tested several hypotheses in one experiment. Subjects listened to a story followed by a set of multiple choice questions. The 'correct' answer to these questions was randomly determined. For some the answer was given in the story, for some it was implied and for others it was not mentioned. According to the negative response bias hypothesis one would expect that higher ESP scores would be obtained for those questions which were included in the story (when the 'correct' answer was counter-story) than for those implied or not mentioned, because memory for the story would produce a bias against them. In addition it was expected that subjects with a better memory would show a greater effect. 30 subjects completed the ESP test, a test of incidental learning for the details of a room and various other tasks, not relevant here.

The results confirmed the negative response bias hypothesis. When the answer was specified in the story other answers were more often correct (that is by ESP) than when they were not specified. Also, when the answer had been given, there were few counter-story responses when the 'correct' answer was the same as that given, but more when it was different. High memory subjects obtained significant scores on all counter-story responses, while low memory subjects scored in the

predicted direction but not significantly. Of most importance here though is that on the crucial counter-story responses the high memory subjects scored higher than the low memory subjects, but when no answer was given or implied in the story there was no difference. This led Stanford to conclude that memory, per se, is not related to ESP performance, but the effect is indirect in terms of its relationship to response bias. Thus although Stanford found a positive relationship between ESP and memory he attributed it to an indirect effect of memory.

In a simpler experiment Peterson (1972) gave 28 subjects both memory and clairvoyance tasks using two different kinds of ESP symbol but found no significant relationship between ESP and memory scores. Kanthamani and Rao (1975), developed a method for studying ESP and memory which has been more widely adopted than any other. They argued that previous studies had measured ESP and memory consecutively. They wanted to study their interaction trial by trial, bringing the two as close together as possible. The original method consisted of giving subjects a memory task and incorporating an ESP test into the recall phase. Their hypothesis that ESP would occur differently on recall-correct and recall-wrong trials was tested, but will not be discussed here. I have previously criticised the rationale behind this method (Blackmore, 1980). More relevant here is that an ESP and a recall score was obtained for each subject. Kanthamani and Rao pooled data from 62 subjects and 4 series, correlated these scores and obtained a significant positive correlation of 0.284 (They give an associated t value of 2.876, $p<.01$, 2-tailed. My calculations for their value of r give $t=2.294$, $p=0.025$, 2-tailed. This still shows a significant positive correlation). However, this finding should be treated with caution since the analysis was conducted post hoc, and the data from four dissimilar experiments were pooled.

Parker (1976) tested 40 subjects' digit span in an immediate memory task consisting of progressive learning of lists of 3 to 9 digits. An incorporated ESP task consisted of placing the digit answer on one of two lines. Although overall ESP scores were at chance a significant negative correlation between ESP and memory scores was obtained ($r=-0.347$, $t=2.28$, $p<.05$). In a second similar series a non-significant positive correlation ($r=0.107$) was obtained.

Rao, Morrison and Davis (1977) carried out two sets of experiments in which subjects memorised lists of paired associates, of a trigram and a word. Some ostensibly recall trials were actually ESP trials and the results of each type were correlated. In the first set of seven

experiments ESP scores were close to chance as were the correlations with memory scores and there was no apparent consistency in the direction of the correlations. In the second set, comprising seven further experiments, data for 118 subjects were pooled and (post hoc) a negative correlation between ESP and memory scores obtained ($r=-0.18$, $t=1.99$, $p<.05$, 2-tailed).

Finally in a similar experiment Rao (1978) tested both ESP and memory for 25 pairs of a trigram and a word. 93 subjects were tested in three groups and a small positive correlation between memory and ESP scores obtained ($r=0.18$, $t=1.70$). In addition the data fell into two groups, the first being only computer scored and the second hand scored first. It was the data from the second group which contributed most to the correlation. Rao discussed this difference in terms of a possible checker effect or differences in the subject-experimenter relationship. He also pointed out "Thus, the research has come full circle: no significant correlation in the exploratory study, significant negative correlation in the replication study, and now a suggestive positive correlation for overall results and a strong positive correlation for group 2." (Rao 1978, p.176).

Whether or not one considers the correlation 'suggestive', these results clearly show that there is no simple answer to the question of whether memory and ESP ability are correlated. Indeed the results of Rao and his colleagues confirm the confusing pattern seen in the previous results, that is, a positive correlation found by Feather (1965; 1967), no correlation found by Peterson (1972) and a negative correlation found by Parker (1976).

What is one to make of these results? One could conclude simply that there is no correlation between the two abilities and that the small correlations obtained were spurious. Alternatively the correlations could be valid, but the results obscured by other variables. Perhaps most important of these variables to consider is the type of memory task used. Feather's very difficult task of learning 25 ESP symbols in 15-20 seconds bears little resemblance to learning paired associates or testing digit span. These task differences could be the cause of the varied results, although there must then be some other explanation for the fact that Rao and his colleagues obtained very varied results using the same memory task. But ignoring the latter problem for the moment, what task variables might be important?

One possibility is task difficulty. If ESP can be compared with remembering it is like very difficult remembering. Therefore a harder

memory task may provide a better correlation. In this context it is interesting to note that Feather's task was very difficult and she obtained a positive correlation. This suggestion cannot account for Rao's variable results but nonetheless it could easily be tested.

A second possibility is that a similar ESP and memory task is required. Although this is hard to measure it seems that those studies which used apparently most nearly comparable tasks did not produce the most consistent correlations. These are Feather (1965; 1967), Peterson (1972) and Rao, Morrison and Davis (1977).

One final difference between the tasks may be whether they test primary or secondary memory. Irwin (1979) argued that Roll's theory only predicts a positive correlation between ESP and measures of secondary memory, and that there might be no correlation or a negative correlation with tests of primary memory. The difference lies in the ways in which information is stored. In primary memory it is less deeply processed and represented in such a way that it can only be retrieved in the short term. Information in secondary memory has typically undergone detailed semantic processing and may be available indefinitely. Irwin argued that both Feather and Kanthamani and Rao used secondary memory tasks and obtained positive correlations with ESP, while Parker tested primary memory and obtained a negative correlation. The problem then is the varied results obtained by Rao et al (1977) and Rao (1978). Irwin suggested that their task permitted use of both types of memory, in which case the varied results might depend on subject strategies. This suggests that better correlations would be obtained when subjects were forced to depend on one type of strategy only. This could undoubtedly be tested. Since the available data does not make it possible to conclude whether or not there is a correlation between ESP and memory, more research is clearly required.

The experiments reported here were intended to test further the correlation between ESP and memory scores and to provide more direct tests of the various theories of ESP and memory. It was argued that one interpretation of Roll's theory predicts a positive correlation between scores on ESP and tests of recognition, but not of recall. A first series of experiments therefore included tests of both recall and recognition for a word list and correlated performance with ESP scores. Since the recall-recognition ratio has been used as a measure of the superiority of recognition over retrieval this was also measured. In an attempt to explore other memory tasks another series of experiments included a test of incidental learning. It has been argued that if ESP is like remembering it is most like very difficult

remembering or remembering for which one has had no opportunity to learn. A test of incidental learning is perhaps most closely comparable to this situation and may provide a better correlation with ESP. Also if ESP is like difficult remembering then we may expect better correlations when the memory task is particularly hard. An experiment was designed to compare the correlations on two memory tasks differing in difficulty.

In view of the previous discussion on types of ESP task, we may argue that a positive correlation can only be expected where the ESP task and the memory task are, as far as that is possible, comparable. This has certainly not usually been the case, although the studies of Feather (1965) and Peterson (1972) are possible exceptions and Rao et al (1977) used a comparable ESP and paired-associate learning task. The fact that these studies did not provide strong evidence for a correlation may indicate that this approach is unlikely to be successful although it does remain a possibility. Finally Irwin (1979) suggested that the crucial difference may be whether the memory task measures primary or secondary memory. If this hypothesis had been published prior to these experiments being carried out it would have been tested directly. Nonetheless some analysis is possible to determine whether this hypothesis is compatible with the data obtained here and further experiments are planned.

In all these experiments the simplest prediction is that according to any of the memory theories a positive correlation between ESP and memory scores is expected. Other theories do not predict such a correlation but are not incompatible with it. To distinguish between them other approaches, perhaps along the lines mentioned above, will be needed. But most important is that the results might show whether there is any similarity between the processes of ESP and memory, or the factors which affect them.

The results of 6 experiments are reported here. The preliminary experiments were carried out with the intention of finding the best methods to use in later experiments. Since they suffer from methodological weaknesses they are only reported in outline here (for further details see Blackmore, 1980).

PRELIMINARY EXPERIMENTS

EXPERIMENT 1

20 students in a parapsychology class took part in two sessions each consisting of 100 trials of a standard clairvoyance task with ESP cards and a memory test in three parts. First Ss were shown a list of 25 common nouns, on an overhead projector, for four minutes, and given a further four minutes in which to recall them. This was followed by a second recall test with 25 new words and finally Ss were given a list of 125 words in which the first set of 25 was embedded and were asked to underline any which they thought had occurred in the previous test. The number of words each S correctly recalled and recognised was recorded and the recall recognition ratio for each calculated. These scores were then correlated with ESP scores.

Results

Each S was given a combined ESP score for the two sessions. The mean score was 41.1 which is not significantly different from MCE of 40.0 ($t=1.12$, 19df, $p=0.26$).

The memory tests were effective in that scores varied widely. No S recalled all 50 words correctly and only 2 Ss recognised the 25 correctly. The mean number of words recalled was 37.7 and recognised 21.65. Mean recall-recognition ratio was 0.16. When correlated with ESP scores the following results were obtained:

Recall	$r= 0.09$	$t= 0.38$	$p= 0.71$	19 df
Recognition	$r= 0.002$	$t= 0.01$	$p= 0.99$	19 df
Ratio	$r= 0.21$	$t= 0.90$	$p= 0.38$	19 df

None of these correlations is significant.

Discussion

There were two main faults in the design of this experiment. Firstly one target order was used for all Ss, so allowing for a stacking effect to occur. Individual target orders were used in later

experiments. Secondly, the ESP tests were conducted prior to the memory tests and so Ss already knew their ESP scores. Conceivably this could lead to a spurious correlation between the two. This possibility was eliminated in later experiments. Also the separation of the tests may reduce any genuine correlation if variables such as mood, time of day, or long term changes of some kind affect either ESP or memory scores. Ideally the tests should be carried out at the same time. This was done in experiment 6. A final problem is the small number of subjects. The experiment was repeated with more Ss.

Apart from these faults in design a problem arises in the attempt to correlate one measure, memory test scores, with ESP scores since the latter provide no independent evidence that any ESP was occurring. Two arguments are applicable here.

1. It is often argued in parapsychology that when overall ESP scores are close to chance the effects of ESP may be masked by the opposing tendencies of psi-hitting and psi-missing. If these can be separated then the effects of ESP can be seen. This has been achieved for example by distinguishing groups of Ss according to belief (Schneidler, 1945) or by various personality or attitude measures (Schneidler and McConnel, 1958) or by correlating ESP scores with relevant variables. Traditionally, when correlating ESP scores with other variables there has been no suggestion that overall ESP scores should show a significant deviation from MCE (e.g. Feather, 1967). Sargent(1979) has argued that it is by just such techniques that we can detect the ESP otherwise unobservable in chance scores.

2. An alternative argument is that one might be simply correlating random scores with some other measure and hence producing meaningless correlations. We could adopt the general guideline that the validity of any measure cannot be higher than its reliability. In this case the validity of the relationship between ESP scores and memory test scores cannot be expected to be higher than the reliability of the scores on which it depends. The memory scores are likely, although untested here, to be fairly reliable, but the same cannot be said of the ESP scores without testing. In this experiment we can test the reliability of the ESP measure in two ways.
(a) Since each S completed 2 ESP sessions we can calculate the test-retest reliability of the ESP scores. This gives $r=-0.49$ ($t=2.36$, 19df, $p=0.03$). This correlation is significant but is in the opposite direction to that expected. Ss tended to score in the opposite direction on the two occasions. The intertest reliability of the ESP score is therefore negligible.

(b) It could be argued that reliability could not be expected between ESP tests carried out so far apart in time. We can therefore test the reliability within one experiment by halving the data for each S and correlating the two halves. In the second session there were four runs of 25 trials each. For each S run scores on the first and third runs were compared with those on the second and fourth. This gives a correlation of r=-0.17 (t=0.64, 19df, p= 0.53) which is not significant. The correlation is small and negative and implies there is no internal consistency to the ESP scores in this case.

Of course in other experiments the reliability may be higher and certainly more Ss should be tested before reaching any conclusions but with no test-retest reliability or internal consistency I believe it must be unwarranted to place any reliance on a correlation between this measure and any other.

If we follow this second argument we may conclude that we should only look for correlations between ESP and other measures if we have either (a) evidence from overall scores that ESP occurred or (b) some indication of reliability in the data. This was not the case in this experiment. The following, similar, experiment used an improved method and more Ss.

EXPERIMENT 2

36 students in a parapsychology class completed 2 ESP tests and a memory test. The ESP tests each consisted of 4 runs of clairvoyance with individual target lists sealed in opaque envelopes. The memory test was similar to that used in the previous experiment except that only 3 minutes were allowed for learning and recall of the two sets of 25 words. Words in the first set were all of 6 letters or less and in the second set of more than 6 letters. In the final recognition test Ss were given 3 minutes in which to underline those words embedded in 100 words, which had appeared in the first set. The number of words from the first set recalled and recognised was recorded and the recall-recognition ratio calculated. Correlations between these memory scores and ESP scores were calculated as before.

Results

The mean ESP score was 41.6 which is not significantly different from MCE of 40.0 (t=1.98, 35df, p=0.06). For the memory tests means were 17.9 for recall, 20.6 for recognition, and 0.87 for recall-recognition ratio. When these are correlated with the ESP scores the following results are obtained:

Recall	r = 0.43	t = 2.78	35 df	p = 0.009
Recognition	r = 0.31	t = 1.90	35 df	p = 0.07
Ratio	r = 0.29	t = 1.77	35 df	p = 0.09

These results are different from those of the previous experiment. Memory scores are lower, presumably because less time was allowed for learning, and there is a significant positive correlation between ESP and recall scores, though not with the other measures.

Discussion

These results indicate a positive correlation between ESP and word recall ability, though not recognition. This outcome was not expected on the basis of any of the models. It implies that there may be some process involved in recall, but not in recognition, which is relevant to ESP. This is likely to be a process concerned with retrieval rather than storage. At first sight this might indicate support for a memory theory of ESP such as Carington's or Price's rather than Roll's memory theory of ESP. In this respect it is interesting that the positive correlation was obtained with the harder memory task, which conforms to the suggestion that the more difficult memory task more closely resembles ESP. This possibility was tested directly in experiment 6.

Before trying to interpret these findings further, though, some words of caution are needed. First, as previously, the ESP tests were conducted before the memory tests and Ss knew their ESP scores, if they could remember them. This problem was eliminated in later tests. Secondly we can check the reliability of the ESP measure used here by determining the correlation between the two sets of ESP scores. For these r=-0.09, 35df, t=0.55, p=0.59. This correlation is very small

and it must be concluded that the ESP scores used do not constitute a reliable measure. In further experiments different memory tasks were used.

EXPERIMENT 3

23 students in a parapsychology class completed 2 ESP tests each consisting of 200 trials of clairvoyance with ESP cards, and a test of incidental learning. Before a parapsychology lecture various objects were placed on two tables in the lecture theatre, words and numbers were written on the blackboard and pictures in different colours were drawn on the overhead projector. During a break these were removed and on returning Ss were given an answer sheet and asked to recall as many of the 20 items as they could. For each S the number recalled correctly was correlated with his ESP score.

Results

The mean ESP score was 41.1 which does not differ significantly from MCE of 40.0 ($t=1.09$, 22df, $P=0.29$). The memory test was effective in that most Ss recalled some items although none recalled all 20 items correctly. The mean number recalled was 7.8. When memory scores are correlated with ESP scores $r = -0.40$. This is not significant ($t=2.0$, 22df, $p=0.06$).

Discussion

No significant correlation was obtained between ESP scores and scores on an incidental learning test. However, the correlation obtained was in the opposite direction to those obtained for recall and recognition and this difference was pursued in later experiments.

There were again two major faults. In the ESP test all Ss were given one target order, and Ss knew their ESP scores before taking the memory test. These faults were eliminated in the next, similar, experiment.

EXPERIMENT 4

50 students in a parapsychology class completed 200 trials of clairvoyance, 100 trials prior to the memory test and 100 trials afterwards, with individual target lists sealed in opaque envelopes. The memory test was the incidental learning task used in the previous experiment.

Results

The mean ESP score was 41.64 which is significantly above the MCE o 40.0 ($t=2.35$, 49df, $p=0.023$). Memory scores varied from 2 to 17 items recalled with a mean of 8.26. The correlation between these scores an the ESP score for each S gives $r=-0.19$ ($t=1.34$, 49df, $p=0.18$). This correlation is not significant but it is negative, like that found in the previous experiment, which may indicate some weak effect.

It has previously been suggested that the reliability of the ESP measure should be tested. In this experiment the combined ESP scores are significantly above MCE. However, the intertest reliability is again low with $r=0.10$ ($t=0.70$, 49df, $p=0.49$). This means that althoug the overall ESP scores are significant the measure is not reliable an any correlation based on it may not be reliable either.

In previous experiments it was mentioned that Ss' prior knowledge of their scores might produce spurious correlations with memory scores. In this experiment half the test was conducted before the memory test and half afterwards. This makes it possible to use the ESP scores separately in correlations to see whether there is any difference. The results are as follows:

Memory - ESP(1)	$r = -0.16$	$t = 1.09$	49 df	$p = 0.28$
Memory - ESP(2)	$r = -0.11$	$t = 0.77$	49 df	$p = 0.45$

There is little difference between these two and it can be concluded that the Ss' knowledge of their ESP scores did not significantly affect their memory scores. This problem therefore does not seem important although it would be preferable to avoid it altogether if possible. In the next experiment one ESP test was carried out before

the memory test and one in the same session. The two could be compared to see whether there is any difference if the two tests are taken at the same time.

EXPERIMENT 5

20 students in a parapsychology class completed in one session 100 trials of clairvoyance with individual target orders sealed in opaque envelopes, and in a second session a memory test followed by a further 100 trials of clairvoyance. The procedure for the memory task was identical to that used in the last experiment, that is, an incidental learning task.

Results

The mean ESP score for the first test was 19.70, which is not significantly different from MCE of 20.0 (t=0.36, 19df, p=0.73). For the second ESP test the mean was also 19.70 (t=0.34, 19df, p=0.74). For the combined results the mean is 39.4 where MCE is 40.0 (t= 0.53 19df p= 0.60). The mean number of items correctly recalled in the incidental learning test was 12.4. Various correlations of interest are listed below.

Memory - ESP (combined)	r=-0.22	t=0.96	19df	p=0.35
Memory - ESP (1)	r=-0.18	t=0.77	19df	p=0.45
Memory - ESP (2)	r=-0.18	t=0.50	19df	p=0.62
ESP (1) - ESP (2)	r=-0.19	t=0.50	19df	p=0.62

The correlation between total ESP scores and memory scores is again negative but is very small. Two other points are of interest.

1. The intertest reliability of the ESP scores is low and the correlation between the two negative. To this extent the ESP measure is unreliable.
2. It was suggested that a test of ESP made at the same time as the memory test might produce a higher correlation. However, the results of the test given immediately after the memory test, and before the results of this were known, shows no difference from the earlier test.

The means for the two tests are the same and the correlations with memory scores similar and both insignificant. Clearly, carrying out the test in the same session makes no difference to the results.

Discussion

The results of three similar studies can now be summarised. The correlations between ESP and incidental learning scores are shown below.

1.	Experiment 3	r=-0.40	t=2.00	22df	p=0.06
2.	Experiment 4	r=-0.19	t=1.34	49df	p=0.18
3.	Experiment 5	r=-0.22	t=0.96	19df	p=0.35

All the correlations are negative but none is significant. In addition it should be noted that experiment 3 used a faulty ESP test procedure. The timing of the ESP tests was varied but the intertest reliability of the ESP tests was uniformly low and it appeared to make no difference when the tests were carried out. However, since all the correlations with incidental learning were negative it was thought this might indicate some weak effect and so the final experiment also used an incidental learning procedure but of a different kind.

MAIN STUDY EXPERIMENT 6

In previous experiments a positive correlation between recall scores and ESP and a small negative correlation between incidental learning and ESP scores were obtained. Although all the correlations were small, if we assume, for the moment, a real effect, then several possible differences might be responsible. These include
1. Attentional differences.
2. The different extent to which the information was processed.
3. The difficulty of the memory task.
Undoubtedly there are other possibilities which could be tested but it was thought premature to try to test any one hypothesis in detail. Instead the following experiment was designed as a general test for all the above hypotheses. Ss were given an ESP test with words as targets and afterwards were unexpectedly asked to recall both those

words which they had chosen as targets in the ESP test and those they had not chosen. The two scores were then correlated separately with ESP scores. The chosen words might be expected to be better attended to, better processed, and easier to recall than the non-chosen words. We should therefore expect a difference in the correlation between the two types of memory test and the ESP scores. That is, if any of the above hypotheses is correct, the correlation between the number of non-chosen words recalled and ESP should be higher than that between the chosen words recalled and ESP. If such a difference is not found these hypotheses can be rejected, but if it is found then further experiments should be designed to explore them further. Since this task is again one of incidental learning the minimum prediction is that both correlations should be negative.

Method

Ss were 32 students in a parapsychology class. Targets were 50 common four-letter words arranged in 10 groups of five. On each trial Ss were asked to choose one of five words. The target lists of 10 words each were prepared by computer and sealed in opaque, numbered envelopes by an assistant who took no further part in the experiment. Ss were given a list of 10 groups of five words each and an envelope containing their target list. When they had all finished they gave in their sheets and were given a blank piece of paper and asked to remember as many of the words as they could, including those they had chosen as targets and as many others as possible. When they had finished, the test sheets were returned to other students to be marked. All were rechecked later. For each S the ESP hits, and the number of words, both chosen and not chosen, was recorded.

Results

The mean ESP score was 1.94 which is slightly, but not significantly, below MCE of 2.0 ($t=0.32$, $p=0.25$). Memory scores for the chosen words averaged 7.5 (75%, sd=2.89) and for the non-chosen words 6.2 (15.6%, sd=4.56). This large difference indicates that, as expected, the chosen words were more readily recalled and had presumably been better attended to. The two tasks therefore differed in difficulty as intended. The mean for overall memory scores was 13.72 (sd=5.60). For each S the two memory scores were correlated with

the ESP test score and the following correlations were obtained:

ESP - chosen words recalled	$r=0$
ESP - non-chosen words recalled	$r=0.32$ ($z=1.80$, 31df, $p=0.07$)
ESP - total words recalled	$r=0.26$ ($z=1.46$, 31df, $p=0.14$)

None of these correlations is significant.

Discussion

Small correlations were again obtained and the difference between the two correlations was in the direction opposite to that expected. That is, negative correlations were predicted with the higher correlation between ESP and non-chosen words. Instead there was no correlation between the number of chosen words recalled and ESP and a positive, though small, correlation between ESP and the number of non-chosen words recalled. The main hypothesis of this experiment was therefore not confirmed.

Additionally, from previous results, we can make the simple prediction that since this task was one of incidental learning the correlations would be expected to be negative. None of them was and the overall memory score gives a weak positive correlation with ESP scores. This makes it seem more likely that previous weak negative correlations were spurious, or at least, if there was an effect operating it is either specific to the previous task used and not generalisable to other incidental learning tasks or it is sporadic an not repeatable.

CONCLUSION

The results of 6 experiments have been reported here. On the basis of the preliminary experiments several hypotheses were made and teste in a final experiment but were not confirmed. The most reasonable conclusion seems to be that the weak correlations obtained were due t chance.

SUMMARY AND DISCUSSION OF RESULTS

The results of 6 experiments investigating correlations between ESP and memory scores have been reported. Table 1 is an attempt to summarise these results. Several conclusions are possible.

1. The most conservative argument is that correlations can only be meaningful if the measures correlated are reliable and consistent. It has been shown that the ESP measures used here are neither consistent nor reliable. The corresponding correlations might therefore be meaningless.

2. One may accept the unreliability of the ESP measure but allow only those correlation coefficients with an associated probability of less than 0.05 to be taken as indicative of a real effect. Here we have one, in experiment 2, which shows a positive correlation between recall and ESP scores. This could lend support to a memory model of ESP and lead to speculation on the relationship between this particular task and ESP.

TABLE 1
Results of 6 experiments correlating ESP and memory

Experiment	Overall signif	Correlation of ESP with Recall	Recognition	Ratio	Memory task Inc le	1 or 2
1	no	0.09	0.002	0.21	-	secondary
2	no	0.43	0.31	0.29	-	secondary
3	no	-	-	-	-0.40	secondary
4	$p<0.05$	-	-	-	-0.19	secondary
5	no	-	-	-	-0.22	secondary
6	no	-	-	-	0.26	both

However, caution is needed here, firstly because the effect is obviously not stable, since there was no sign of it in experiment 1, which used the same task, and secondly because this is only one significant finding among so many. In 6 experiments overall ESP scor were significant in only one, experiment 4, and of 10 independent correlation coefficients reported as primary analyses only one is significant, in experiment 2. Furthermore, if all analyses are considered (though not all are independent) in a total of 34 significance tests 2 were significant at <.05. This does not seem go grounds for rejecting the null hypothesis that chance alone accounte for all the results.

3. It can finally be argued that the effects of ESP are extremely weak and often obscured by counteracting effects but nonetheless the directions of the correlations can give us valid information. Following this argument the data here indicate two lines of approach The first six experiments all conformed to the pattern that deliberat learning correlated positively with ESP while incidental learning correlated negatively. Simple hypotheses were developed from this finding and experiment 6 was designed to test them by comparing two different memory tasks and an ESP test. The results were not as predicted and a weak positive correlation between ESP and incidental learning was found.

Another possible way of interpreting these results was suggested recently, and after these experiments were completed, by Irwin (1979) He suggested that measures of secondary memory may correlate positively with ESP, and measures of primary memory negatively. In Table 1, the type of memory task is indicated, and it appears that Irwin's suggested framework does not fit these data.

Even if one ignores unreliability and levels of significance and looks only at direction of correlations there does not seem to be any meaningful pattern in these data. But this is perhaps not surprising. The attempt to correlate ESP with other measures may, after all, be futile. If no ESP occurs it is clearly impossible to test hypotheses about its nature and even if it does occur the predictions must be clearly formulated if any conclusions are to be possible.

In conclusion it seems that the results of 6 experiments on the correlation between ESP and memory provide no evidence for any such correlation and lead to no hypotheses for future research. I would go so far as to say that the data presented here appear to describe the purely random results of pairing chance scores with memory test scores. In the absence of any ESP it is clearly impossible to test hypotheses about the nature of the process. To do this it will be

necessary to find a source of ESP first.

ABSTRACT

It has been claimed that several theories of ESP predict a positive correlation between ESP and memory. The basis of these predictions is discussed and the existing evidence for such a correlation assessed. Ways of making sense of the conflicting findings are considered and some further predictions drawn. 6 experiments are reported. In two preliminary experiments, recall and recognition scores were correlated with ESP scores and one positive correlation with recall obtained. In three further studies negative, but non-significant, correlations between ESP and incidental learning were found. From these findings it was predicted that a negative correlation would be found between ESP and incidental learning scores with the higher correlation with the harder task. These predictions were tested in the main expeiment but were not confirmed. The ESP measures used were found to be inconsistent and unreliable and it was concluded that hypotheses about the nature of ESP could not be tested in the absence of any ESP.

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