

Final Report

Bial Project: The Limits of Precognition

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Summary

Two experiments were successfully conducted by the Project Leader. The first experiment was conducted at the Koestler Parapsychology Unit. Eighty participants were recruited who reported having had some form of spontaneous psychic experience in their life. All participants filled in a Participant Information Form which asks questions about participants' belief in psi, their ability to visualize etc. The participant listened to a relaxation tape for 10 minutes and in the subsequent 10 minutes the participant tried to get imagery about a picture they would receive through the post the following week. The participant was then shown four postcard-sized pictures and they had to rate each picture in respect of its similarity to the imagery they had received. The picture with the highest rating (i.e., greatest similarity) was thought to be the one that the participant thought they would receive through the post. Afterwards they had a coffee break to relax and to talk about their experiences during the session. When they were ready, they were asked to have a second go at the experiment. The procedure was exactly as before. Participants were sent the correct picture through the post 2-5 days afterwards, which they were then asked to return to the experimenter.

Each participant therefore did the experiment two times. Unknown to the participant, the target was selected in a different way for their second attempt. In one attempt the target had already been randomly selected and immediately stored by computer at the time the participant was trying to get imagery about the picture they would later receive the post. This was the "clairvoyance" condition. In the other attempt, the target was selected using an algorithm on a prespecified stock market figure on a prespecified future date. This was the "true precognition" condition. Here, participants could presumably not use PK to make the future stock market figures conform to their chosen picture number because there would be too many people with a serious financial interest in the stock market who would have more of an incentive to use their PK to make the stock market figures correspond to their wishes. Also, because the closing price of stock market figures rests on many human decisions, it is unlikely that anyone could clairvoyantly see and/or calculate what so many different people would decide to do. Thus, whereas the "clairvoyance" condition could be successful by participants using either clairvoyance or precognition, the "true precognition" condition is thought to be possible by using precognition alone. The conditions were counterbalanced and the experimenter was blind as to which condition the participant did at any one time.

This experiment is a conceptual replication of a previous experiment funded by the Fundacao Bial, the write-up of which has since been submitted for publication. This previous experiment was conducted entirely through the post and it had found that participants were only able to guess well under the clairvoyance condition ($p = .005$) and not the true precognition condition. There had been a significant difference between the two conditions ($p = .01$). However, this new conceptual replication in the laboratory reported here found the opposite to be the case. Participants scored almost significantly on the true precognition condition ($p = .06$) and only at chance on the clairvoyance condition. There was no significant difference in performance between the two conditions.

Another conceptual replication of this experiment was conducted over the World-Wide-Web [WWW]. Here, one hundred participants were recruited, all of whom reported having had a

precognitive experience. Each participant had to give a written report of their experience before they could take part. Each participant again did two trials and they did their mentation at home and then rated the four pictures on a web-site created specially for each individual. After 2-5 days the participant was directed to a web site where the two correct pictures (one for each trial) were displayed for them to view. The experiment used the same two conditions (clairvoyance and precognition) as above.

This experiment produced different results again from either of the two that had already been conducted. In this experiment over the WWW the true precognition condition almost did significantly badly ($p = .07$), with people apparently almost avoiding selecting the correct picture for what is arguably the more "interesting" condition (i.e., true precognition). The clairvoyance condition performed at chance and the difference between the two conditions was itself almost significant ($p = .06$). This seemed to indicate that people were deliberately avoiding getting the right target in the precognition condition.

The conceptual design of these experiments and some of the outcomes were presented at the Parapsychological Association's 42nd Annual Convention in August 1999.

The results were extremely interesting and they perhaps indicate how context-dependent results in parapsychological research may be. They also teach the important lesson of how difficult true replication can be and how necessary it is to perform replications of studies before coming to any strong conclusions. It is hoped that in the future some more direct replications of these three types of experiment can be conducted (i.e., through the post, in the laboratory and over the WWW) so that we can learn the extent to which the experimental context (through the post, in the laboratory, over the WWW) played a role in obtaining these results and to what extent only chance was at play.

A full report of these experiments is enclosed. It is hoped that the enclosed report will be published at a later date. Naturally, should this be successful, full acknowledgement of Fundacao Bial's generous support will be given.

Does Precognition Foresee the Future? Two Attempts at Conceptual Replication.

The long-standing controversy in parapsychology about whether results from precognition experiments really are due to people looking directly into the future or whether they are due instead to real-time psi and/or calculation (see e.g., Morris, 1982) was addressed in a free-response postal experiment by Steinkamp (1999). Steinkamp's study used two conditions. In the "clairvoyance" condition the computer had already selected the target using a PRNG and had stored the choice directly onto disk by the time that participants made their guess. However, nobody knew until the later time of feedback which target the PRNG had selected. Here, then, participants could either psychically look directly to their future feedback to guess the target correctly or they could use real-time psi (for example, by psychically obtaining the information about the target from the computer). In the "true precognition" condition the target was determined by using a prespecified algorithm on prespecified temperature and stock market figures from a prespecified future date. It was thought that in this condition participants could gain information about the target only by looking directly into the future. Presumably, participants could not psychically get the information about which stock was going to be used to determine their target and then use their PK to affect that stock's performance, because there would be too many other people in the world whose livelihoods depended on stock market performance. These people would have far more of an incentive to use PK on the stock market than either the participant or the experimenter. Also, because the closing price of any given stock depends on so many human decisions, it seems extremely unlikely that anyone could calculate what all those decisions would be and what precise effect they would have on the closing price. Thus, successful results in the precognition condition should provide strong evidence in favour of true precognition. Steinkamp (1999) found that the results in the clairvoyance condition were positive ($p = .005$, $ES = 0.34$), whereas the precognition results were at chance ($p = .5$, $ES = 0.00$). There was a statistically significant difference between the two conditions ($p = .01$) indicating that the clairvoyance condition had performed better than the precognition one. All analyses were one-tailed. Therefore, this experiment seemed to indicate that true precognition may not be possible.

Nevertheless, the experiment was conducted under some very specific circumstances and it was not at all clear how generalizable the findings were. For instance, the study was conducted through the post with participants who had taken part in a survey by Steinkamp (submitted) on precognitive experiences. Therefore, all those who took part in the experiment had already had a number of communications with the experimenter beforehand about precognition. Because the postal experiment followed on from the survey, participants may have felt an ongoing and active involvement in the postal study that may normally be missing from most other studies. Moreover, because all participants claimed to have had a precognitive experience, the participants were probably all believers in precognition. Thus the participants were a relatively select population. It is also arguable that postal experiments may produce different results from experiments conducted in the laboratory or over the web. Indeed, Steinkamp (1998) argued that free-response experiments may not be successful over the Web because the

Web environment is one in which people want to do things that are fast and snappy. Milton & Wiseman's (1999) meta-analysis of mass-media tests of ESP revealed only chance overall results, whereas Milton's (1998) meta-analysis of free-response experiments not using an altered state of consciousness did provide a positive accumulation in favour of psi. That is, the testing environment itself may have implications for what type of experiment is best suited for eliciting psi. Thus the results from Steinkamp's postal experiment testing for true precognition may be peculiar to postal experiments and not generalisable to other experimental environments.

The two experiments reported in this paper are two attempted conceptual replications of Steinkamp's (1999) postal experiment testing for true precognition. The aim was to see the extent to which Steinkamp's findings could be replicated in different test situations. Thus the first conceptual replication was conducted in the laboratory and the second was carried out over the Web.

AN ATTEMPT AT CONCEPTUAL REPLICATION IN THE LABORATORY.

Method

General Overview

Each participant came into the Koestler Parapsychology Unit [KPU] at the University of Edinburgh once for a period of two hours. Participants were placed in an environment similar to the Ganzfeld (details below). They were asked to look forward to the time when they would receive an envelope through the post from the experimenter and to gain some kind of imagery about the picture they would find inside that envelope. After their mentation period participants were given a pool of four static pictures and they had to rate each picture according to how closely it matched their mentation. The picture they rated the highest was the picture they thought they would later receive through the post. After a tea/coffee break, they were asked to have a new attempt at the experiment with a different target pool. Thus each participant did two trials.

Participants

Participants were selected on their willingness to describe themselves as having had at least one spontaneous psychic experience. No attempt was made to get a description of their experience or to verify in any way whether they were telling the truth. Unlike Steinkamp's (1999) postal experiment, participants did not have to claim that they had had a specifically precognitive experience. The participants were drawn from this wider population because the experiment was more limited in its catchment area (only people living in or near Edinburgh could realistically take part in the experiment) than the postal experiment which was able to recruit participants from the whole of the UK. It was thought that this difference in participant population would not be too problematic as even those who had had specifically precognitive experiences had not performed well in the precognition condition in Steinkamp's previous postal experiment.

The participants were recruited by word of mouth, from those who had taken part in previous studies at the KPU, from those who had taken part in the survey by the author

and who had not taken part in the postal experiment, from posters on various noticeboards in and around Edinburgh and from a request published in a local, free newspaper. Participants were of all ages, several nationalities and of both sexes. The vast majority of them had never taken part in a free-response parapsychology experiment before.

Target Set

The target set used was the same as that in Steinkamp's (1999) postal experiment. That is, the target set comprised 280 static postcard-sized pictures divided into 70 pools of 4. The pictures could either be in black and white or in colour and they were varied in theme (e.g., landscapes, abstract art, sculptures, cartoons etc.). All pictures had randomly allocated numbers on the reverse for reference. Further details are given in Steinkamp (1999).

The Conditions

As in Steinkamp (1999), this experiment had two conditions – one “clairvoyance” condition and one “true precognition” one. However, because there was direct participant and experimenter interaction in this experiment, some extra precautions had to be added into the experimental design for this laboratory replication.

Clairvoyance Condition

Before inviting any participants into the Unit, a helper (not the experimenter) got the computer randomly to select a target number (1-4) for each participant and to store that number directly into an appropriate file on the hard disk.¹ As in the postal experiment, this number would refer to the lowest numbered picture in that participant's target pool. For instance, if a participant was given picture numbers 0178, 2139, 0039 and 2009 and the computer had selected target number 3, the target would be the third-lowest number of that set – i.e., the target would be picture number 2009. Neither the helper nor the experimenter knew which target number the computer had selected. The target numbers were stored only on the helper's computer (in the postal experiment the target numbers had been stored on the experimenter's computer). For this condition participants could theoretically use real-time ESP and calculation to guess correctly which picture was the target (e.g., by clairvoyantly seeing which number the computer had selected, knowing through telepathy the method of using that number to determine the target and then making the appropriate deduction). Alternatively, the participant could make a correct guess by foreseeing their future feedback. That is, as in Steinkamp (1999), although this condition is referred to as the “clairvoyance” condition, it does not rule out the use of true precognition.

Precognition Condition

For this condition, before any participants came into the laboratory, the helper got the computer randomly to select two numbers between 1-25 for each participant and the computer stored these numbers immediately in an appropriate file on the hard disk. The first number referred to a temperature figure (°F) in *The Times* on a prespecified future

¹ I would like to thank Marleen Nagtegaal for her hard and thorough work in this experiment as the helper.

date and the second number referred to a stock market figure (closing price) in *The Financial Times* on that same prespecified future date. The prespecified future date was two days after the participant had come to the Unit to take part in the experiment. Because the relevant stock market figures were not available from Saturday-Monday, the prespecified future date for any participants tested on Thursday-Saturday inclusive necessarily had to be Tuesday instead of Saturday-Monday respectively. Similar conditions applied if there was a Bank Holiday (the subsequent day's paper also not having the relevant stock market section).

When the prespecified future date arrived the helper (not the experimenter) would retrieve the target information (i.e., the two numbers referring to a world city and to a specific stock and the target number for the clairvoyance condition) from the computer and the helper would then look up the relevant temperature and stock market figures. Thus if the helper found that the computer had chosen the numbers 4 and 18, the helper would look up the fourth world city temperature listed in *The Times* that day and the closing price of the eighteenth of the top stocks listed in *The Financial Times*. It was prespecified that stock market figures would be rounded up or down as appropriate (thus a closing price of 885.5 would be taken to be 886). If a temperature figure was listed as unavailable in the newspaper, only the stock market figure would be taken. The temperature and stock market figures would then be multiplied together and divided by four until a target between 1-4 could be gained. Thus if the multiplication and division procedure resulted in a number between 1-1.99, the target would be 1; if it resulted in a number between 2-2.99, the target would be 2 and so on up to 4.99. The resulting target number determined which picture the target was (the target number again referring to the lowest-numbered picture in the participant's target pool).

This procedure was virtually identical to that used in Steinkamp (1999), except (i) it was a helper and not the experimenter who got the computer to select the world city and stock; (ii) it was the helper who retrieved the target information and who performed the relevant calculations; (iii) all target information was selected right at the beginning of the experiment (in the postal experiment the target information for each participant was not selected until the experimenter posted out their individual test materials) and (iv) there was slightly less uncertainty involved in when the target information would be retrieved because participants were always certainly in the Unit on a specific date. In the postal experiment participants could delay posting their responses for a few days or the postal systems could have been particularly slow; both of these factors would have added to the precognitive time span between the participants' mentation and the time of feedback (i.e., retrieving the target information).

Nevertheless, it was still thought that this condition would provide strong support for true precognition, if successful. As explained in the introduction to this paper and more thoroughly again in Steinkamp (1999), it is hard to see how anyone involved in the experiment could use PK to make their guesses conform to the right picture. It is also difficult to see how such a multitude of human decisions could be correctly calculated even if super real-time ESP were possible. Thus it appears that even in this experiment,

any good results from this condition would have to be by participants looking directly into the future.

Procedure

The number of participants in this experiment was prespecified as 80 and testing took place between February-May 1999.

Before participants were recruited, the experimenter prepared 70 pools of four pictures and placed each pool in a separate brown envelope. Meanwhile the helper got the computer to select and record the target information (i.e., the clairvoyance target number and the precognition numbers indicating which stock and city figures to use) for all 160 trials. Each participant was to complete two trials – one in each condition – and at the time of getting the computer to record the target information the helper counterbalanced the conditions using an ABBA design as in Steinkamp's postal experiment. Thus in this study the experimenter would be blind as to which trial was in which condition for any given participant.

Just before each participant arrived, the experimenter took two of the target pool envelopes and appended to one of them an empty, similar-sized envelope that had a large, pink fluorescent "A" on both sides. The experimenter appended to the other target pool envelope a similar envelope but with the letter "B". The lettered envelopes were the "feedback envelopes". Also appended to each target pool envelope was a "Ratings Form". This form had the participant's code number on it and spaces for participants to fill in the picture numbers in their target pool and the ratings that they were to give to each picture. Because the experimenter had prepared all 70 target pools in advance of the experiment, the experimenter was never consciously aware of what target pool any participant had during their judging session or even of which target pools were paired together.

When participants came into the Unit they were taken up to the reception room. They were told that the experiment had two parts and that they would have a coffee break in the middle. Participants were then informed about the first part of the experiment. They were given envelope A with the fluorescent lettering and they were told that the next time they got that envelope it would be through the post and it would have a picture in it. Their aim in this experiment was to try to get some kind of imagery about what picture they would find inside. It was stressed that they would be opening that very envelope, so they might like to think of the envelope as a direct connection to the future. Participants were informed that the picture could be absolutely anything, including abstract art, cartoons, landscapes, cityscapes, pictures of people or animals, sculptures, line drawings or adverts. They were told that they should not edit their thoughts in any way and that if their mind started to wander, they should say what their mind was wandering about. However, they were advised that if their mind did wander, they should try to return to thinking about what picture they would find in the envelope. They were asked to say their mentation out loud. Participants were told when the target would be selected (usually in two days' time) and that the target would be selected randomly by computer

on that date by another person. Nevertheless, they were advised to focus on when they would get the picture through the post and not on the time of target selection.

The participant was subsequently taken into the sound-attenuated receiver's room used for Ganzfeld experiments at the KPU (see Dalton, Morris, Delanoy, Radin, Taylor & Wiseman, 1996 for details) and the participant was asked to recline in the chair. They attached a small microphone to their clothing and they put on adjustable headphones. Participants were asked to keep the feedback envelope in their hands or on their lap. The main light in the room was then dimmed and switched off, leaving on only a red lamp. The double doors were closed and the experimenter checked that the microphone link between the participant and the experimenter's room was in working order.

A 7-8 minutes' visualization relaxation tape, especially designed for this experiment, was subsequently played to the participant (see Appendix A for the text). Participants were told that the relaxation tape would last 10 minutes. At the beginning of the tape the participant is asked to close their eyes. Towards the end it is suggested to the participant that they are themselves the whole of time and that they can see themselves opening the envelope at home. It is at this point that they are asked to say aloud what they can see inside the envelope. The relaxation tape ends here and it is immediately followed by a 10-minute period of white noise, during which participants gave their mentation. The mentation was recorded in writing by the experimenter. Additional mentation was requested after the mentation period only if the participant had not said anything at all within the ten minutes. This did not happen very often.

Once the mentation period was over, the experimenter turned on the light in the participant's room and gave the participant the envelope with the appropriate target pool (to which the lettered envelope had originally been appended) and the Ratings Form. The participant was told not to open the target pool envelope until the experimenter told them. The experimenter then closed the doors to the participant's room again and returned to the experimenter room. The participant was asked to open the envelope and to check that it had four pictures inside and that each picture had a number on the back of it. Participants then placed the pictures face down while the experimenter reminded them of their mentation. After this, participants looked at each picture in turn, saying firstly whether it had any resemblance to what they had been thinking about and secondly giving it an appropriate rating from 1-99. A rating of 99 meant that the picture was identical to what the participant had been thinking about in the mentation period and a rating of 1 indicated that there was no resemblance whatsoever. Participants were not allowed to give two or more pictures in their target pool envelope the same rating. If they asked whether they should rate the picture according to their gut feeling or to their mentation, they were advised to rate on the basis of their mentation (on the basis that the experimental setting and not the judging procedure was supposed to be the psi-conducive element of the exercise). If they asked whether they should judge in relation to the content of their mentation or to the colours/general shapes of that mentation, they were simply asked to decide how they thought best.

After rating all the pictures, participants were asked if there were any of the ratings that they wanted to change and they were allowed to make changes if they desired. Once the participant was happy with the way they had rated the four pictures, they were asked to write down the picture numbers and their relevant ratings on the Ratings Form. When the participant indicated that they had done this, the experimenter stored the ratings on the computer, collected the participant's materials from them and asked the participant to sign the Ratings Form.²

The participant and the experimenter then shared a coffee break and chatted and relaxed. Once the participant seemed happy to continue, the experimenter gave them the second "B" envelope and told them that the second part of the experiment was exactly the same as the first, only this time it was a different envelope and a different set of four pictures. They were advised to forget all about the previous session as it had nothing to do with this new one. The procedure, however, was exactly the same and they were informed that they would receive the second picture through the post on the same day as they would receive the first one. Participants were led to believe that both trials were precognitive. The experimenter, of course, did not know which trial was *not* precognitive.

After participants had completed their second trial and they had left the building, both of the signed Ratings Forms were handed over to another colleague for safe keeping.³ These Ratings Forms were to serve as a double-check that the experimenter did not change the participants' ratings on the computer once the targets had been discovered. The experimenter also completed a Target Request Form and handed it over to the helper. The Target Request Form informed the helper which participants' data had to be retrieved on which day. The experimenter also placed the participant's pictures back into the two relevant target pool envelopes and noted on them the participant number and the envelope letter (A or B) to indicate for which trials those particular target pools had been used. The appropriate lettered feedback envelopes were also appended to the target pool envelopes so that the feedback would indeed be returned in the envelope that the participant had held during the trial.

When the prespecified future date arrived (as listed on the Target Request Form), the helper retrieved the target information from the computer, looked up the necessary temperature and stock market figures and performed the requisite calculations. The calculations were subsequently independently double-checked by another person. The helper then entered the information about the target numbers and the stock and temperature figures onto an Excel database. After this, she wrote down only the target numbers for the participant's two trials (A and B) on a Target Information Form and she subsequently handed this form over to the experimenter. This set of procedures enabled the experimenter to remain blind as to which condition had been which. It also meant that the target numbers could be entered onto the database before anyone knew how the participant had fared.

² I would like to thank Paul Stevens for programming the computer to record and store the data.

³ I would like to thank Caroline Watt for storing the data.

On receiving the Target Information Form the experimenter retrieved a printout of the computer file containing the participant's ratings. From this printout the experimenter was able to calculate which picture number was the target and how the participant had ranked the target (the highest rating being a rank of 1, the second highest rating being a rank of 2, etc.). The experimenter subsequently retrieved the participant's two target pool envelopes, took out the appropriate picture and put it in the relevant feedback envelope. As in Steinkamp (1999), the experimenter took care to look only at the target picture when taking it out of the target pool envelope. The two feedback envelopes were then sealed and sent to the participant in a larger envelope along with a feedback letter informing the participant whether they had correctly guessed the pictures for envelopes A and B. It was hoped that making participants open a sealed envelope would enhance a sense of excitement and would make participants pay more attention to the picture inside that envelope. Moreover, posting out the feedback enabled this experiment to replicate more closely the way in which participants received their feedback in Steinkamp's postal study. Also enclosed with the feedback letter was a stamped addressed envelope in which participants could return the target pictures once they had finished with them. Participants were informed that they would be told the overall results once the experiment had finished. The experimenter then gave the printouts of the participant's ratings to the helper who in turn double-checked both the conversion of the target number to the target picture and the participant's ranking of the target picture. After this, the helper entered the information on the database.

At the end of the experiment another person was given a copy of the helper's database, the Ratings Forms and the Target Information Forms so that the forms could be checked against the database.⁴ This ensured that the experimenter had not changed the ratings on the computer once the target was known (because the information on the database was copied from the computer printouts and the Ratings Forms had been stored out of the experimenter's reach by a colleague). It also ensured that the helper could not enter in favorable targets instead of the real ones, because the Target Information Forms were given to the experimenter before the helper knew which ratings the participant had given the various target possibilities.

The pre-planned analyses were then performed. Unlike the postal experiment, all analyses in this study were planned to be two-tailed. This was due to the difference in experimental setting. It was hoped that the power of the experiment would be high enough to show significance at an alpha of .05 if an effect in this study similar to that in the postal experiment were present. As in Steinkamp (1999), the preplanned analyses were as follows: (a) direct hits over all 160 trials; (b) sum of ranks for clairvoyance condition; (c) sum of ranks for precognition condition; and (d) paired t-test to compare the individual conditions.

Results

All effect sizes reported were calculated using z/\sqrt{N} . There were 49 direct hits in 160 trials ($z = 1.55$, $p = .13$, $ES = 0.12$), yielding chance results as in Steinkamp (1999).

⁴ I would like to thank Catherine Derrick for performing this task.

Contrary to Steinkamp (1999) in this study the 80 clairvoyance trials also yielded chance results (SOR = 198, $z = 0.15$, $p = .88$, ES = .02), whereas the 80 precognition trials gave an almost significant result (SOR = 181, $z = 1.85$, $p = .06$, ES = .21). The sum of ranks data are summarized in Table 1 for further information. It can be seen that targets in the precognition condition gained both more ranks of 1 and 2 than in the clairvoyance condition and fewer ranks of 3 and 4 than the clairvoyance condition.

Table 1
Table of Ranks Given to Target Item for Each Condition

Rank to Target	1	2	3	4
Clairvoyance	23	14	25	18
Precognition	26	19	23	12
MCE	20	20	20	20

However, the t-test to compare the conditions was non-significant ($t(df 79) = 1.16$, $p = .25$), which also differs from Steinkamp (1999).

Post-hoc Analyses.

The results from this study clearly differ from those in Steinkamp (1999). One difference between the two studies that might be thought to play a major role in the success of precognition is that of the precognitive time span. In the postal experiment the average time between the time of the trial and the time of feedback (i.e., when the experimenter discovered the correct target) was 7 days (median = 6). In this laboratory-based experiment, however, the average precognitive time-span was almost halved at 4 days (median = 3). The variability of the stock market figures was similar in both experiments, the average day's fluctuation in the postal experiment having been 14 points (median = 8) and in the laboratory experiment the average fluctuation of the stock market figures was 17 points (median = 9). If precognition in test conditions is limited to, say, 2 days, this may explain why the results from the laboratory experiment differ so much from the postal ones. Nevertheless, a post-hoc Mann-Whitney U-test examining whether those trials in which feedback occurred in less than 3 days and in which the stock's variability was less than 9 (i.e., less than the medians) differed significantly from those trials in which feedback took longer than the median and in which the stock used was more variable than the median (i.e., greater than the medians) showed no such difference ($N = 24$, $U = 53$, $p = .29$ (2-t)). It therefore seems unlikely that a difference in precognitive time-span can account for the difference between the postal and the laboratory experiments.

Another concern in this experiment was whether participants fared any better or worse by doing two trials in the same day. A post-hoc t-test comparing differences in performance between first and second trials did not show any significant effect ($t(df 79) = .89$, $p = .38$ (2-t)).

Discussion

It was both disappointing and interesting that the results from this laboratory-based experiment did not replicate those found in the postal experiment. Although the precognition condition did not quite produce statistically significant results, the results are close enough to significance to warrant serious consideration. Indeed, it is noticeable that the effect size for the precognition condition in this experiment (.21) is almost identical to that for the clairvoyance condition in the postal experiment when replies with tied ratings were also included (.22). Arguably, the results from this attempted laboratory replication may even be thought to be more closely comparable to the post-hoc analysis in the postal experiment that included tied ratings, because in the laboratory experiment participants simply were not allowed to give two pictures in their target pool the same rating. In retrospect it may have been interesting to have noted which participants initially wanted to tie their ratings and to have considered those results separately to see if omitting participants who have a natural desire to tie ratings (and perhaps thus demonstrating less confidence in ranking the target possibilities) will tend to enhance the overall results.

In sum, whereas the postal experiment seemed to indicate that true precognition was not possible, the attempted laboratory replication suggested the reverse. Although the evidence from the postal experiment against true precognition might appear stronger with a demonstrated significance between the two conditions, one would not expect there to be such a difference if true precognition were possible because people could look into the future for the clairvoyance condition too. Thus the two experiments appear to give quite contradictory findings.

If the findings from the postal experiment and the laboratory experiment are not artificial, their difference must be attributable to some difference in the procedures involved. Both experiments used the same target set, had the same form of feedback, the same experimenter, they were equally well safeguarded and appeared to have a comparable participant population. The method of target selection was also identical in both studies and in neither study was there any evidence that the length of precognitive time span played any major role.

Perhaps the most obvious place to look for differences is in the experimental setting itself. In the laboratory experiment participants were able to ask for clarification if there was anything that they had not understood and it is easier for an experimenter to vocalize emphasis and to stress points with eye contact than to underline important issues in a letter or in other written communications. It is possible, therefore, that in the laboratory experiment participants were more aware that they had to look into the future. Not only were they given an envelope which was described as their "direct connection to the future", but the relaxation tape too emphasised that they were in a timeless zone in which temporal boundaries no longer existed. The experiment was designed to help participants feel that they could indeed go beyond the present. By contrast, in the postal experiment participants already had the target pool of four in a sealed envelope in their possession before they started their mentation. This might well encourage participants to think of

what is in the target pool envelope rather than of what they will later receive through the post (although they were told to think of the picture they would later receive). As a result, participants in the postal experiment may have been conceiving the experiment more as a clairvoyance one whereas participants in the attempted laboratory replication may have thought of the task more clearly as a precognition one.

Nevertheless, if the laboratory experiment is understood as one in which participants more clearly understood their task to be precognitive, the overall results would have to be understood as chance, rather than as approaching significance (which is the case in the true precognition condition alone), because there is no reason why participants should have used precognition on the precognition trials alone.

Another difference between this laboratory study and the postal experiment is that the experimenter was blind in the laboratory study as to which condition was which. Because participants in the postal study did not meet the experimenter and because all participants in the postal experiment received identical letters explaining the procedure, it was not thought to be important for the experimenter to be blind to the conditions at the time of sending out the test materials. It is thus possible that there was some form of "checker effect" at play. In the postal experiment the experimenter did know when sending out the feedback which trial was which, whereas when giving participants feedback in the laboratory experiment the experimenter still did not know which envelope belonged to which condition. At the time of the postal experiment the experimenter was not consciously aware of wishing the results to come out in any particular way, but a checker effect cannot be ruled out.

Alternatively, in the postal experiment the experimenter got the computer randomly to choose the clairvoyance targets just before each individual set of test materials was sent out. These test materials were sent out at various times over the six month period that the experiment run. However, in the laboratory experiment the helper got the computer randomly to select all the clairvoyance targets right at the beginning of the whole experiment and not at the beginning of each individual trial. Hence it could be argued that it might be harder for participants clairvoyantly to see which target number stored in the computer belonged to their specific target set if there were a whole set of numbers through which they had psychically to sift. This argument assumes, however, that participants do not solely look forward to their future feedback alone.

There are doubtless other alternatives that could be considered too. For instance, the greater certainty at the time of the trial in the laboratory experiment as to when the precognitive target would be selected may account for the better performance of precognition in the laboratory setting. As soon as the participant entered the building the experimenter usually knew with some certainty on what date their precognitive target would be selected. In the postal experiment no-one could know at the time of the trial precisely when the target would be selected because the time of target selection was determined according to when the target materials arrived back in Edinburgh (and not by when the participant did the trial). Nevertheless, this scenario would need to explain why participants could foresee the target that would be selected using the stock market figures

but why they could not predict the number of days it would take for their materials to arrive in Edinburgh. On the face of it predicting the stock market figures appears to be the more difficult psi task.

In sum, none of the possible explanations for the difference in performance between the postal and the laboratory studies seem to give a coherent picture, although this lack of coherence is in part due to ambiguities about what precognition and clairvoyance might involve. For instance, does precognition involve foreseeing the selection process or does it involve looking forward to feedback? Does clairvoyance work in the same way as precognition or does it operate differently? What this attempted laboratory replication does show, however, is that if true precognition is possible it may need very specific experimental settings in order to make it work and that replication is not a simple issue. The next attempted replication presented in this paper will highlight this problem yet further.

AN ATTEMPTED CONCEPTUAL REPLICATION ON THE WORLD-WIDE-WEB.

General Overview

Participants were told over email to get some imagery in their own time at home about what picture a computer would select for them to see over the Web. When they had some idea about what they thought the picture would be like, they were told to go to a web site that had been selected especially for them. On this site they would see four pictures and they were to give a description as to how well each picture fitted the imagery they had had. They would then be asked to rank each picture accordingly as to its likelihood of being the one selected for me to show them over the Web. They then had one more go at this experiment with a different set of pictures. Once they had completed their second trial, they were shown which two pictures the computer had chosen.

Participants

Participants were selected on the basis of their having had a precognitive experience. All participants had to email the experimenter in the first instance with an account of their premonition. There was no attempt to assess the experiences submitted as to their likelihood as being specifically precognitive (or even as necessarily psychic).

There were two main reasons for requiring participants to submit an experiential account beforehand. Firstly, the aim was to get a participant population as close as possible to that used in Steinkamp's (1999) postal experiment. In the postal experiment all participants had participated in a survey of precognitive experiences, so all participants had told the experimenter of an experience they had had. Although the participants for the Web experiment had not filled out a questionnaire about their experiences it was hoped that divulging a personal experience beforehand might at least replicate something of the flavour of the population in the postal experiment. Secondly, the experimenter suspected that many people may volunteer for the Web experiment with no real intention of serious participation. It was hoped that requesting an account of a personal experience would deter those responding purely out of curiosity. Those who merely wrote that they had had an experience without describing it were not allowed to participate.

Participants were recruited from various sources. Some participants had taken part in the experimenter's survey. These were mostly those who lived abroad and could not be included in the postal or laboratory experiments. Email messages were repeatedly posted to two mailing lists devoted to parapsychology (prf and paranormal) in order to recruit people. Postings were also repeatedly made to a variety of newsgroups (alt.dreams, alt.paranormal, uk.rec.psychic, uk.misc) and a call for participants was listed on the KPU Website.

Target Set

The target set was the same as that used in Steinkamp (1999) and in the laboratory experiment described in this paper. The materials were scanned in so that they could be shown over the Web.⁵

The Conditions

As in both of the other experiments there were two conditions – one testing for clairvoyance and the other for true precognition. The methods of target selection and of counterbalancing the conditions were identical to the other two experiments except in the following respects:

- The computer was asked randomly to select the appropriate figures for the clairvoyance and precognition trials just before the experimenter sent out the first email describing the experimental procedure to each individual participant. Thus this part of the procedure was identical to Steinkamp (1999), but slightly different from the laboratory replication in which all numbers were randomly selected before the experiment began.
- As in Steinkamp (1999) the experimenter was not blind as to which condition was which. It was thought that it was not necessary for the experimenter to be blind because the information emailed to participants was standardized (and thus no sensory cues could be given. Also there were in-built checks in the experimental design to guard against experimenter error). Again, the laboratory experiment differed insofar as the experimenter was blind to the conditions in that study.
- The prespecified date for looking up the precognitive stock market and temperature figures was two days after receiving the participant's second trial at the experiment (subject to the provisos of stock market figure availability involved in the other two experiments).
- The experimenter – and not a colleague as was the case in the laboratory experiment – was responsible for looking up the stock market and temperature figures and for performing the calculations. This is identical to Steinkamp (1999).

Procedure

The number of participants for this study was prespecified as the first 100 who completed two valid trials. Testing took place between December 1998 – June 1999.

⁵ I would like to thank Paul Stevens for his help in scanning the target materials.

Before the experiment began the test materials that had been returned from the postal experiment were scanned in and prepared for display on the Web.

Once a participant had emailed the experimenter with an account of a precognitive experience that they had had, the experimenter assigned them a participant number and selected two Web sites for them.⁶ Each web site had four pictures, each below the other, and each with an input box beside it for the participant to type in any similarities that they perceived between their mentation and that particular picture. The experimenter then entered the participant's code number onto the database with a note of which web sites had been allocated to them. After this, the experimenter got the computer to select randomly the target information for that participant (i.e., the target number for the clairvoyance condition and the world city and stock for the precognition condition). As before, this information was stored immediately onto the hard disk by the computer and the experimenter did not know which numbers the computer had chosen.

The experimenter subsequently sent a standard email explaining the experiment to the participant. Participants were asked to take some time at home and to try to get some kind of imagery about what picture the computer would later select for them to see over the Web. It was suggested that they could get imagery by using dreams, by drawing or by just sitting quietly and thinking about it. Participants were informed that the picture had not been selected yet, but that the picture would be one of the four pictures they would later see when they went to the allocated web site (the address of which was enclosed in the email). They were instructed not to go to this web site until they had some idea in their mind about what the picture that the computer would later select would be like. Participants were advised that they would have to rank each picture as to its likelihood of being the picture they thought the computer would later select. They were told that they would have to have one more go at the experiment after their first attempt. The web site itself repeated much of this information to make sure that participants would not forget what they were supposed to do.

When participants arrived at the relevant web site they had to fill in the input boxes beside each picture with a description of any similarities between their mentation and that particular picture. After they had done this for all four pictures, they had to rank each picture accordingly. To help participants rank the pictures, the four picture alternatives were reproduced in miniature in a row underneath the table of four large pictures and input boxes so that participants did not have to scroll up to remind themselves of the pictures. Underneath each miniature picture there was a selection box for participants to select which picture they wanted to give which rank (1-4). When participants submitted the information the program automatically checked that the participant had given each picture a different rank and that the participant had written something beside each picture. If all the required information was present, the participant was informed that they had successfully completed their first trial and that they would get an email from the experimenter in the next few days with information about their second go. They were reminded that they would not discover which picture the computer had selected until they had completed both goes. The computer then sent the participant's submission directly to

⁶ I would like to thank Paul Stevens for his assistance with the web programming.

another person [Catherine Derrick – CatD] (not to the experimenter) and left a message in a file on the experimenter's home directory to indicate that this particular participant had successfully completed their first trial.⁷ The computer also noted the time and date of the trial.

On receiving notification that the first trial had been completed, the experimenter would note the date that the trial had been completed on the database. After this, the experimenter would send a standardized email thanking the participant and giving them information about how to do their second go. Participants were told that the second go was exactly the same as the first but that the web site would have different pictures from the first go.

When the computer notified the experimenter that a participant had completed their second trial, this second trial date was also noted on the database. It was from this date that the prespecified date of calculating the precognitive target was assessed (regardless of whether it was the first or second trial that had been precognitive). On the prespecified date, then, the experimenter would retrieve the target information for that participant from the computer, look up the necessary temperature and stock market figures and perform the necessary calculations on those figures. In this respect, the web experiment was treated exactly as if it had been like the postal experiment in which the experimenter could not know how long ago the participant had completed their precognition trial. In the postal experiment participants could theoretically have waited hours or weeks before proceeding to the next trial, although all participants in the postal experiment had been told to leave a gap of at least 24 hours between trials. Thus, because the experimenter could not look at the test materials to see when participants had completed their precognition trial in the postal experiment (because the experimenter should not know before calculating the target number what the participant had guessed), the precognitive interval in that experiment had to be decided in respect of when the experimenter received the envelope concealing the participant's two sets of guesses rather than when the participant did the precognitive trial. The web experiment was treated in exactly the same way, but instead of waiting for a participant's envelope, the experimenter waited for the computer to inform the experimenter that the participant had submitted their second trial.

Once the experimenter had obtained the two target numbers for that participant, the calculations to obtain the precognitive target number were independently double-checked by CatD. Once the calculations had been confirmed, the experimenter handed over the target details to CatD for storage. This acted as a security measure against the experimenter being able to change the target numbers at a later date once the participants' guesses were known.

Once the experimenter lodged the target details with CatD, CatD emailed the participant's responses to the experimenter so that the correct target could be determined

⁷ For various reasons, the person to whom the participants' submissions were sent varied throughout the duration of the experiment. I would like to thank Alison Roe, Mary Hutchison and Catherine Derrick for agreeing to have this data sent to them in the course of the experiment.

and the experimenter could insert the target pictures into the standard feedback web site. The experimenter then emailed the participant with a standard letter to tell them which web site to go to for their feedback. The feedback web site informed the participant whether the computer had selected their 1st, 2nd, 3rd or 4th choice of picture for each trial and then showed them which pictures the computer had chosen. Participants were assured that they would be informed of the overall results at the end of the study.

Once the first 200 pairs of trials had been completed, a colleague checked the original target numbers in CatD's possession with those on the experimenter's database, the participant's guesses on CatD's home directory with those entered on the official database (thus effectively double-checking that the experimenter did not later change the participant's guesses on the database) and corrected any experimenter error in determining which picture should be the target.⁸

The pre-planned analyses were the same as for the laboratory experiment. That is, all analyses were planned to be two-tailed. The main pre-planned analyses were (i) the use of direct hits for all 200 trials; (ii) sum of ranks for each of the individual conditions; and (iii) a paired t-test for the condition comparison.

Results

There were 49 direct hits in 200 trials, yielding results at chance ($z = -0.08$, $p = .9$, $ES = -0.01$). The sum of ranks analysis on the clairvoyance trials was also at chance ($SOR = 240$, $z = .85$, $p = .40$, $ES = .09$), whereas the sum of ranks analysis on the precognition trials approached significance in the psi-missing direction ($SOR = 267$, $z = -1.74$, $p = .08$, $ES = -0.17$). Thus, the clairvoyance trials were clearly at chance but in the psi-hitting direction, whereas the precognition trials had a definite trend towards psi-missing. This becomes clearer if one looks at Table 2 below showing the distributions of ranks to the target items; the precognition condition clearly has an excess of targets ranked at 3 and 4 and a corresponding minority of ranks of 1 and 2.

Table 2
Ranks assigned to the Target in the Web Experiment

Rank to Target	1	2	3	4
Clairvoyance	28	23	30	19
Precognition	21	19	29	31
MCE	25	25	25	25

The paired t-test comparing the two conditions was almost significant and illustrated a tendency for precognition trials to do worse than clairvoyance trials ($t(df99) = 1.83$, $p = .07$).

Discussion

⁸ I would like to thank Marleen Nagtegaal for all the double-checking.

The findings from the web experiment are inconclusive. The results from the precognition condition appear to indicate that participants may in some sense have deliberately avoided guessing the precognition targets correctly. It is difficult to understand why this might be the case. I have already argued elsewhere (Steinkamp, 1998) that web-based experiments may need to be designed differently from laboratory-based ones in order to be successful. The WWW is an environment in which people like to get quick results and the contemplative nature of free-response experiments may simply not be suitable or may even be psi-inhibitory for the WWW. Moreover, if people have to pay for their internet connections, they may not like to spend too long over one trial.

Nevertheless, this experiment was designed as far as possible to enhance the likelihood of success. Participants had to submit a personal experience before they took part and hence they could not rush straight into the experiment. Participants were also selected on the basis of their claim to have had a precognitive experience beforehand and thus they should have been fairly sheepish in character (thereby increasing the likelihood of success, if previous analyses are reliable [see e.g., Lawrence, 1993]). Moreover, participants were included only if they had the patience to complete two trials at the experiment. It would therefore appear that these people would not be those who necessarily require instant gratification.

All the same, a number of participants emailed me personally to comment on how long it took for the pictures to load up on their screens. One participant also noted that the different pictures took different lengths of time to load up on their screen; hence they were able to look at some pictures longer than others. This delay in loading up the pictures and the inequality of loading times alone could be a factor inhibiting success with free-response experiments on the WWW. Other participants remarked on the difficulty of the spatial distance between them and the experimenter or computer (many participants were based in the USA and the experimenter and the computer were based in the UK). This latter observation is somewhat surprising, because if participants are looking forward to the time of feedback – which is what the experimenter had intended – the pictures would be shown on the participant's screen and hence there would be no great distance at all. Indeed, this was one advantage of using the WWW.

Indeed, these comments and some others suggest that participants were not necessarily looking forward to the time of feedback, but that they were trying to predict what would happen at the time of selection. A couple of people even wrote in their mentation or in private emails to the experimenter that they found it hard to get into the "computer's brain". Another person described themselves as imagining what kind of picture they would pick if they were a computer and deciding that if they were a computer they would probably pick something abstract. These remarks indicate that the experimental task should not have been described as one in which participants should try to guess which picture "the computer will choose for them to see", because this description had obviously confused at least some of the participants. This is itself a valuable lesson.

In addition 39% (58/200) of all trials required the experimenter to send one or more reminders before the participant finally did that part of the experiment. This might indicate that a substantial number of participants had lost enthusiasm in the study either at the outset or halfway through. If all the factors mentioned so far do play a role in the success or otherwise of an experiment, then these demotivating aspects in the web environment may provide an incentive to participants to perform badly in the arguably more “interesting” condition (i.e., “true precognition”) as a kind of psychic protest. This is nevertheless a post-hoc speculation and it would need further supporting data before it could be offered with any confidence.

Apart from the obvious differences between this Web experiment and the original postal experiment, there were also other, more subtle differences. One difference was that in the postal (and laboratory) experiment, the picture numbers were made explicit to participants because this is how participants had to identify the pictures they were rating. In the Web experiment the picture numbers were hidden because all participants effectively saw the picture itself (the picture was labelled by its picture number by the computer program, but this was not evident at the participant’s web site). Thus in the web experiment the clairvoyance condition may have been harder for participants if performance in the postal experiment had been enhanced by participants being able to see which picture had which number (although, obviously, participants had not been able to see the target number stored by the computer and participants would not normally have known how that target number referred to which picture). However, this is not a particularly plausible scenario as it would not explain why there should be an almost significant difference between the precognition and clairvoyance scores.

Another difference between this experiment and the other two lies in the way in which participants got feedback. In both the postal and the laboratory experiments participants had to open two separate envelopes to see which pictures had been selected for the experimenter to send them. However, in the web experiment participants had to go to only one web site to see both feedback pictures and thus there was not the same clear separation between the two pictures. Thus, if participants were to look forward to their future feedback, it is conceivable that it would be difficult to know psychically which of the two pictures they were supposed to be foreseeing.

Additionally, in the previous two experiments participants had rated the pictures from 1-99 and these ratings were then later converted to ranks. In the web experiment participants ranked the pictures from the outset. It is possible that ranking pictures makes participants think differently about what they are doing. When participants give ratings (and both of the other experiments were more successful than the web-based one) they may be more likely seriously to consider likenesses between their mentation and the pictures they have before them. When they are asked to assign ranks, participants may be more likely to switch their focus from any likenesses between their mentation and the pictures to the idea of which picture they think the computer is most likely to select. That is, participants may rank according to their hunches at the time of assigning the rank rather than relying primarily on their mentation.

Because participants in the web experiment had ranked rather than rated the pictures, the mode of feedback in the web experiment also differed from the other two experiments. In the two previous experiments participants were told whether they had got each picture right or wrong. In the web experiment participants were informed whether the computer had selected their 1st, 2nd, 3rd or 4th choice for each picture. It is unlikely that this makes any difference to participants' performance in the study, although a casual impression from correspondence indicates that participants may be happier with ranked feedback than with right/wrong binary feedback (especially if they do not do well). A small minority in the laboratory experiment expressed annoyance that their guesses had been classified as either right or wrong, whereas a small minority in the web experiment e-mailed back to say that they found it amusing that the computer had selected, for example, their two 4th choices. Thus, to the experimenter's surprise, being reminded of just how badly they had done did not worry participants as much as being told that they had failed to get the pictures right.

CONCLUDING REMARKS

The initial postal experiment appeared to provide some strong evidence that true precognition was not possible. The subsequent conceptual replication in the laboratory suggested the reverse and the final web-based conceptual replication showed, if anything, that participants tended successfully to psi-miss in the true precognition condition and, moreover, to an almost significantly greater extent than in the clairvoyance condition.

The three procedures did differ quite substantially from each other and it is possible that these differences in procedure are largely responsible for the difference in results. There is some support for this in the literature to date. For instance, although Rogo's (1977) precognition ganzfeld experiment produced psi-missing results (and was not designed to rule out the possibility of real-time psi), it did not place much emphasis in putting participants into the frame of mind that precognition was possible. Freeman's (1962) forced-choice experiment explicitly set out to make participants think that precognition was easier than clairvoyance and it subsequently achieved significantly better results in the precognition condition. Likewise, Sargent and Harley's (1982) precognitive ganzfeld experiment achieved more hits than would be expected by chance and in this study the experimenters were also participants. Thus, as experimenters, they would not have needed to be persuaded so strongly about the possibility of precognition, because their motivation to succeed would already have been high. A meta-analysis by Steinkamp, Milton and Morris (1998) similarly indicated that precognition trials fare better when interspersed in clairvoyance trials; thus suggesting that a psychological resistance to precognition may hinder results in precognition experiments. Although this same meta-analysis did not reveal any difference in performance when participants were encouraged or when they were not, it is still possible that participants need not merely to be encouraged, but rather to have the feasibility of precognition somewhat forcibly suggested. It is therefore possible that the laboratory experiment produced successful results in the precognition condition because a lot more effort was taken in helping participants to accept the notion of precognition. This same emphasis would be hard to get across in more impersonal experiments such as those on the web or through the post.

The emphasis on precognition may even have made the clairvoyance trials psychically less attractive in the laboratory setting.

Nevertheless, the thoughts offered in these concluding remarks are necessarily selective and post-hoc. What these two attempted replications have shown is the need for caution in the face of any experimental finding. The next step in discovering whether true precognition is possible is to perform a direct replication of the laboratory experiment. If the experiment could be directly replicated with the same results, this would go some way to show that true precognition is possible, at least under certain conditions. The essential and non-essential conditions (e.g., strong encouragement; period of relaxed mentation in the laboratory, red light) could then be teased out at a later stage. Direct replications of the postal and the web experiments may also serve to show further whether it is indeed plausible that experimental results are strongly dependent on the experimental procedures used. These thoughts are not new, but systematic research is still relatively rarely implemented. The two failures to replicate presented here serve well to illustrate how important such research is.

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