

Bial**An Evolutionary Approach to Anomalous Cognition**

Grant number: 50/00

Louie Savva & Chris French
Anomalistic Psychology Research Unit,
Department of Psychology,
Goldsmiths College, University of London

Project Summary

The funding provided by the Bial Foundation was used to support the work of PhD student Louie Savva, for the developing and testing of an evolutionary approach to psi phenomena.

There has been very little research conducted pursuing the idea that psi represents an evolved pre-sense. However the idea itself provides a possible explanation for the claimed nature of psi phenomena. The PhD research was an attempt to systematically investigate previously successful research paradigms, from an evolutionary perspective, in the hope of improving results and gaining an insight into the "why" of psi.

Specifically, the Bial award was used to pay tuition fees and provide a maintenance grant over the period of one year, to allow him to finish his PhD, both the final few experiments that were planned and then to complete the writing up of the thesis. Up to the time of the Bial award, Louie had received only minor funding from the Parapsychology Foundation (which was very gratefully received) and was mainly self-funded, but had completed some nine studies and presented a number of papers based on that research at parapsychology conferences.

The Bial award allowed the completing of the final two studies of the PhD: a test of the psi-timing paradigm and a large-scale precognitive animal study.

Psi-Timing

The psi-timing study was an attempt to build upon some work already completed as part of the thesis. Psi-timing research has been conducted by a number of researchers (Lowry, 1981; Schmeidler & Borchardt, 1981; Radin & Bosworth, 1985; May, Radin, Hubbard, Humphrey, & Utts, 1985; Radin & May, 1986 and Braud & Shafer, 1989) and the overall conclusions from the area are positive. Psi-timing experiments generally consist of a behavioural component based on the timing of a key-press, which affects a complex process resulting in a hit or miss.

Study VII in the PhD was an adaptation of the Braud and Shafer (1989) methodology. Braud and Shafer's participants pressed a keyboard button that recorded the current time and used the number to seed a random number generator, which in turn produced a random number between one and six. The participant pressed a keyboard button a second time and produced another random number through the same process. The two

Bial

numbers were then compared and the trial scored as a hit (if the two numbers matched) or a miss (if they were different).

The methodology of Study VII adapted that used by Braud and Shafer, by replacing the second key-press with a simulated key-press (therefore making it a test of precognition). Also different was that when a participant scored a hit it resulted in the presentation of a neutral picture, and a miss resulted in the presentation of a spider picture. It was hypothesised that those rating themselves as spider fearful after the experiment (using a fear of spiders questionnaire) would score more hits than the non-spider-fearful, using precognitive information about the threatening stimulus to illicit a behavioural avoidance response by timing the keyboard press correctly.

Fifty participants contributed 1800 trials, consisting of 36 trials per participant. The overall hit rate was 16.1% and did not differ significantly from the mean chance expectation (MCE) of 16.7% ($t(49) = -.773$; $p > .05$). The difference in scoring between the spider-fearful and the non-spider-fearful was tested through an independent t-test and was not significant, $t(48) = .896$; $p > .05$. The hit rate for the spider fearful group was 15.5% and did not differ significantly from chance ($t(25) = -1.088$; $p > .05$) and for the non-spider-fearful group the hit rate was 16.8% which also did not differ significantly from chance ($t(23) = .123$; $p > .05$).

One thousand control trials were conducted before and after the experimental study (two thousand in total where both key-presses were simulated) and resulted in a combined hit rate of 16.2% that a binomial test found was not significantly different from MCE ($p > .05$). Binomial tests on the control runs, before and after, were also non-significant and showed that, individually, they did not deviate significantly from MCE.

The conclusions drawn from the study are that despite previous significant results, no evidence for a psi-mediated timing response was found in the study.

Study X was an attempt to replicate without significant deviation Braud and Shafer's (1989) original psi-timing findings. The study differed from the Braud and Shafer methodology only in a slight reduction in the hit rate from 1/6 in 36 trials, to 1/5 in 25 trials. This was to shorten the trial length and provide a slightly better hit rate to maintain participant's interest.

Thirty participants contributed 750 trials, consisting of 25 trials per participant. A mean score of 5.8 was found (where MCE was 5) with a hit-rate of 23.2% (MCE 20%). A one-sample Z-test was significant ($Z=2.192$; $p < .05$). Interestingly one participant, who scored 13, had a 2-tailed binomial probability of .00015, which is below even a Bonferroni-corrected 2-tailed p-value.

Study X represents a significant replication of the Braud and Shafer experiment and of the psi-timing experiments in general. The unselected participants seemed to be able to successfully identify targets through paranormal means.

The results of studies VII and X were presented at the 26th International Conference of the Society for Psychological Research (Savva & French, 2002c).

Bial

The final Bial supported psi-timing experiment was an attempt to replicate without significant deviation Braud and Shafer's (1989) psi-timing findings and to replicate study X in the PhD series

Fifty participants contributed 1250 trials but the results failed to replicate the success of previous psi-timing experiments, including Study X.

All three studies are to be submitted for publication in the near future, to a parapsychology journal, where the overall conclusion must be that further psi-timing experiments may be worth pursuing in the future, especially when seen as being theoretically related to other similar paradigms, such as the presentiment effect, and the precognitive habituation effect.

Death Avoidance

The final series of experiments in the PhD was an adaptation of an experiment outlined by Cox (1956b) and similar to research conducted by Morris (1967) and Randall (1971). Where the previous research in PhD thesis made use of fear-related stimuli as a means of testing a hypothesised death avoidance behaviour, the death avoidance research is an attempt to simulate real life situations where, as Cox (1956b) stated "in advance of a sudden misfortune, a wholly subliminal precognition can prevent the percipient's involvement" (p.99). In the same paper Cox described, but did not conduct, an experiment whereby insects would be placed into a container where they would be randomly killed through electrocution, depending on their location. Morris (1967) conducted an experiment with rats, where the behaviour of rats randomly killed or spared was compared. However unlike in Cox's proposed experiment, the rats in the Morris experiment could not change their behaviour in such a way as to prevent the future fatal event.

The final study was designed to adapt the methodology of Morris's study and add a behavioural component whereby the organism was able to behave in such a way that a future fatal event would be avoided.

A special insect testing apparatus was designed and built with the assistance of psychology technician Mr. Steve Yesson, figure 1). First the insect chamber of the testing apparatus was opened and an ant placed into the centre of the chamber (or as close to the centre as was possible to). The lid was then closed and the camera section placed over the insect chamber. Once the apparatus was ready the control software was initiated. The software is designed to turn on the bulb and take a picture of the ants location in the chamber after a set period of time (in this case it was 1 minute). It was then to wait a set period of time before randomly choosing a side (a or b). The choice of side was related to a computer generated dissection of the insect chamber into two halves, A or B. Once the computer had made the binary choice, the photograph of the ants location in the apparatus was revealed to the experimenter and in the appropriate dialogue box the side that the ant was on was recorded. A hit was counted if the ant was not on the side chosen by the computer and a miss was when the ant was on the side chosen.

Unlike other psi-tests however this was not the end of the process. A hit resulted in the insect being taken from the insect chamber and placed into a container clearly

Bial

labelled as "survivors". A miss resulted in the insect being placed into another container that contained the acetone. This would lead to the insect dying within a matter of minutes.

After a short period of testing (35 individual ants) it was found that the species itself was not suitable to the conditions of testing. A number of ants had been purchased to allow for the testing of a large number of ants. However this was subsequently abandoned due to the loss of a number of the remaining insects. As such what had been intended to be a more extensive test of the paradigm was reduced to a pilot until the problems could be rectified. Initial testing with the 35 ants resulted in more insects surviving than dying (14 compared to 21, which represents a 60% survival rate). However due to the unforeseen difficulties in maintaining the ant species in captivity, a hardier species was sought for further testing. This has been labeled Study XIIa.

Tribolium castaneum (the red flour beetle) was identified as a hardier species than the ants and one that would allow subsequent generations to be bred from. The procedure involved selecting 100 flour beetles, using the apparatus, where chance would predict roughly half that number would survive. The surviving adults would be permitted to breed (the time from egg to egg was approximately 40 days). The larvae of the previous generation were isolated from the adults and allowed to mature. When the second generation of adults was ready the experiment was run again. As the random number generator is the only selection pressure on the beetles, it was hoped that over each generation the experiment was run, more adults would survive than die, due to increased sensitivity to the psi-signal.

Study XIIb involved the testing of 150 flour beetles. Although there was no significant difference between the numbers of beetles that survived versus the number that was killed, there was a significant difference between the numbers of insects found on side a and the numbers found on side b ($<.01$). This suggested that some environmental factor was influencing the insects position in the testing chamber. It was hypothesised that a number of factors including electromagnetic interference from the computer, to chemical influences across trials, could be affecting the insects behaviour, during testing.

Study XIIc involved testing the progeny of the survivors of Study XIIb. That is to say that the survivors of XIIb were allowed to breed in the survivors container for approximately 30 days. When there were signs of the larval stage, all of the adults who had successfully survived the initial testing stage were removed from the container. These adults were then placed into a jar with acetone to terminate them. The larvae were then allowed to develop to the adult stage, at which point testing began again.

The results of Study XIIc were again not significant, with a total of 200 insects tested and no significant difference between the numbers surviving and those being terminated. There was again a significant difference between the numbers on side a and the numbers on side b ($<.028$) albeit less significant than it had been in Study XIIb. Although it is potentially a sign of some systematic bias affecting the testing, every effort was made to eliminate potential biasing factors.

Bial

Due to the unforeseen circumstances the survivors of Study XIIc were not saved for further testing but terminated some time after the testing.

Study XIIId, XIIe and XIIIf represent the final attempt to replicate what had occurred before, but maintaining the generations for as long as possible. Time constraints meant that only 3 generations of flour beetle were tested. The results at each of the stages were non-significant, and the bias for one side over the other was also seen to disappear, suggesting that it was eliminated or reduced.

This death avoidance research highlights the difficulty in conducting a study such as that suggested by Cox, in a manner to eliminate some of the difficulties encountered during the Morris rat study. It is hoped that this avenue of research will be continued, perhaps as part of a post-doctoral research project or in collaboration with other interested parties, but taking advantage of the experience gained during this large-scale animal study.

It is hoped that most of the studies forming the PhD thesis will be submitted for publication, with appropriate acknowledgement of the Bial Foundation's support.

Future developments

Due to the appointment of Louie Savva to the post of research assistant working with Dr. Mathew Smith on another Bial Funded project (Experimenter Effects and Psi Performance Using a Digital Autoganzfeld System), the writing up of the thesis has been slightly delayed, but it is hoped that a final draft will be submitted to the examiners later this year. During this time Child, Savva and Smith (2004) have already completed a study very similar to the psi-timing experiment, using Bem's precognitive habituation paradigm. This made use of the evolutionary perspective developed in Louie Savva's thesis and a significant precognitive effect was found.

Whilst none of the research has provided the potentially outstanding results hoped for, it is planned that this line of research will be continued, where possible, and at the very least highlights the usefulness of replacing violent and pornographic stimuli with less ethically problematic stimuli, based around evolved fears.

References

- Child, R, Savva, L. & Smith, M. (2004). Unpublished paper on the precognitive habituation effect. To be submitted to the PA 2004 conference.
- Cox, W. E. (1956a). Precognition: An analysis. I. *Journal of the American Society for Psychical Research*, 50, 47-58.
- Cox, W. E. (1956b). Precognition: An analysis. II. *Journal of the American Society for Psychical Research*, 50, 99-109.
- Lowry, R. (1981). Apparent PK effect on computer-generated random digit series. *Journal of the American Society for Psychical Research*, 75, 209-220.
- May, E. C., Radin, D. I., Hubbard, G. S., Humphrey, B. S., & Utts, J. M. (1985). Psi

Bial

experiment with random number generators: An informational model.
Proceedings of Presented Papers: The 28th Annual Convention of the
Parapsychological Association, Vol. 1, 235-266.

- Radin, D. I., & Bosworth, J. L. (1985). Response distributions in a computer-based perceptual task: Test of four models. *Journal of the American Society for Psychical Research*, 79, 453-483.
- Radin, D. I., & May, E. C. (1986). Testing the intuitive data sorting model with pseudorandom number generators: A proposed method. *Proceedings of Presented Papers: The 29th Annual Convention of the Parapsychological Association*, 539-555.
- Randall, J. L. (1971). Experiments to detect a psi effect with small animals. *Journal of the Society for Psychical Research*, 46, 31-39.
- Savva, L., & French, C. C. (2002). Use of a complex psi-mediated timing task. 26th International Conference of the Society for Psychical Research. Manchester Conference Centre, 30th August - 1st September 2002.
- Scheidler, G. R., & Borchardt, R. (1981). Psi scores with random and pseudorandom target [Summary]. In W. G. Roll and J. Beloff (Eds); J. McAllister (Asst. Ed.), *Research in Parapsychology 1980* (pp.45-47). Metuchen, NJ; Scarecrow Press.