Final Report, December 2002

Grant Title: **Psi Reinforcement of Stochastic Mentation (PRiSM)**
Grant Number: **77/00**
Grant Holder: **Paul Stevens**

1. Status of Project

Data collection was completed in early November, with 50 pairs of participants[1] having contributed 100 trials. The project is now complete (see results section below). Feedback/summary sheets are now being sent out to all participants and the study results will be written up for journal submission.

2. Results

2.1 Experimental evaluation of the PRiSM model

The original proposal detailed a 2 condition study comparing true audio-feedback to false audio-feedback. A psi stimulus was hypothesised whereby the receiver in a ganzfeld protocol would show a change in skin conductance at the time the sender decided that they were producing verbal mentation relevant to the target material, this time being indicated by the sender pressing a button. This change in skin conductance would reflect a change in the baseline arousal of the receiver and would act to reinforce the concurrent mentation theme. It was predicted that the skin conductance response would be seen in both true and false feedback conditions, but the reinforcement would only be useful in the true condition. It was thus also predicted that the true condition would show higher "ESP success" than the false condition.

Table 1 shows the ESP success by rank (a target rank of 1 means the correct video clip was the receiver's first choice out of the 4 possible clips. 2 means it was their second choice, and so on). Looking at a measure of direct hits using Rosenthal's Proportion Index (Rosenthal & Rubin, 1989), a standard measure used in ganzfeld ESP studies:

True Feedback Condition, $\Pi_T = 0.49$, std error=0.083, p=0.45
False Feedback Condition, $\Pi_F = 0.49$, std error=0.083, p=0.45
Overall $\Pi_o = 0.49$, std error=0.059, p=0.33

1 It was originally intended to recruit 60 pairs of participants. However, by the beginning of May 2002, only 25 pairs had been completed and refusal rates were high. At this time, before any data analysis had been performed and with the experimenter blind as to the results of the completed sessions, it was decided to reduce the target number to 50 pairs.

Table 1: ESP success by rank

Target Rank	***Feedback Condition***		***Total***
	TRUE	***FALSE***	
1st	12	12	24
2nd	14	13	27
3rd	16	15	31
4th	8	10	18
Mean:	2.4	2.46	2.43

This measure does not support the notion that ESP was present in the study, comparing badly to the mean value for $\Pi = 0.62$ given by Bem and Honorton (1994) in their ganzfeld meta-analysis.

However, the skin conductance response suggested that the receiver was showing a response every time the sender decided their mentation was relevant. Figure 1 shows the skin conductance response profile, constructed from the normalised, averaged responses of all participants over all button presses in the true-feedback condition. The appearance is very much what would be expected if the receiver were responding to a sensory stimulus, even though no such stimulus was present. Note that this response does not merely represent the arousal associated with the receiver talking – depending on the individual sender, button presses often occurred several seconds (up to 30 secs in some instances!) after the receiver had stopped talking. The response profile is also very similar for the null-feedback condition (see figure 2), where the button presses *did not* correspond to the receiver's speech.

One indication as to why the observed increase in arousal at times of relevant mentation did not correspond to increased ESP success can be seen when correlating the number of sender button presses (representing a measure of how well the receiver's mentation matched the target) with the final rank given to the target. Based on the true-feedback condition data, this results in rho=-0.11 i.e. in the right direction but very small (nonsignificant). What this indicates is that even when the receiver is describing things relevant to the target, this has relatively little effect on which target they finally choose. Such a result must cast doubt on the reliability of the ganzfeld protocol for exploring ESP effects.

To explore the notion that receiver physiological lability would relate positively to ESP success, correlations were performed between the variance of the receiver's resting skin conductance and the rank of the target (in the true-feedback condition). This gave a value of r=0.30 (p=0.026). In the null-feedback condition, r=0.04 (p=0.41). Thus, lower variance significantly correlated with higher ESP success for the true feedback condition only, opposite in direction to the predictions made by some theorists but consistent with the PRiSM model, which would benefit from the receiver having a low-variance baseline against which to "detect" the arousal from a psi signal.

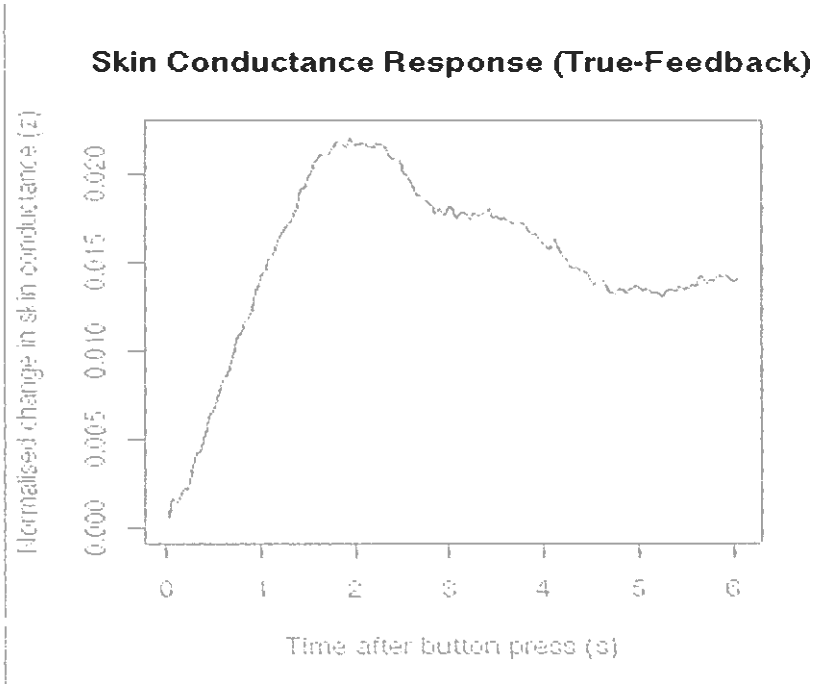

Figure 1: Skin conductance response for the 6 seconds after a sender button-press, normalised averaged over a total of 257 button presses.

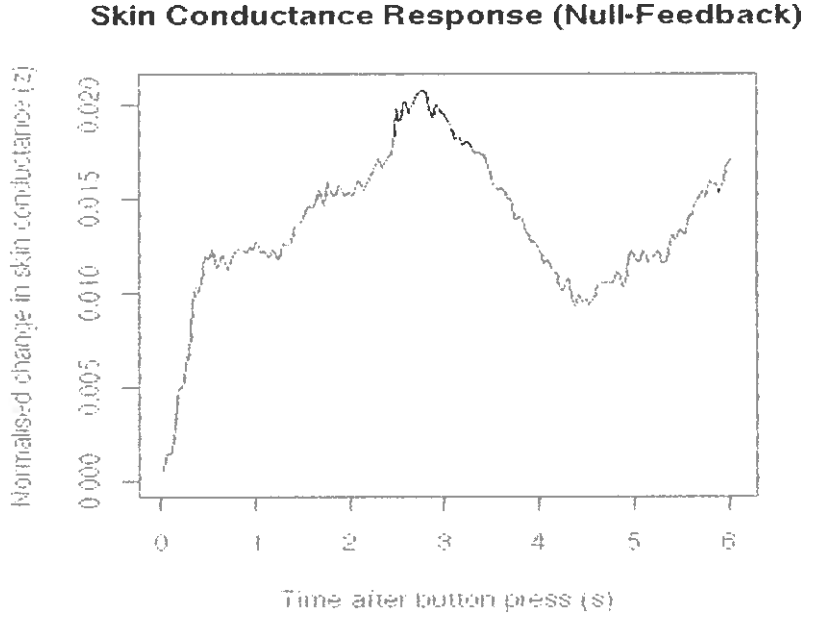

Figure 2: Skin conductance response for the 6 seconds after a sender button-press (null-feedback condition), normalised averaged over a total of 56 button presses.

2.2 Relationship between the psi stimulus and magnetic fields

To investigate this, 2 approaches were taken. The first was to measure fluctuations in the local magnetic field during the mentation period. Table 2 shows the correlations (note: N=92 as 8 sessions did not record valid magnetic field data due to some initial technical problems with the magnetometer).

Table 2: Local magnetic field measurements correlated with rank of ESP target

	Mean Total Flux Density			***Variance of Total Flux Density***		
	r	***Z***	***p (1-t)***	***r***	***z***	***p (1-t)***
Overall (N=92)	-0.255	-2.433	0.008	+0.122	1.164	0.123
TRUE Condition (N=45)	-0.209	-1.386	0.082	-0.239	-1.585	0.056
FALSE Condition (N=47)	-0.300	-2.035	0.020	+0.194	1.316	0.093

N.B. Pearson's r was used as the magnetic field values used were the raw flux-density measurements, which are normally distributed, and not the more traditional geomagnetic indices. To calculate probability levels, an equivalent z-score was calculated using the formula $z=r\sqrt{(N-1)}$ and the probability values then derived from a table of normal distribution values.

From table 2, it can be seen that, although non-significant, the expected positive correlation with the variance (increased rank/decreased ESP success relates to GMF activity increase) was found for the overall results and for the false-feedback conditions, but that for the true-feedback condition (where the PRiSM model could be operating) the direction or the correlation reverses and is marginally significant. Although speculative, this could imply that different primary processes operate in each condition. If this is the case then the reversed direction could also suggest that the PRiSM process is akin to that seen in micro-PK studies, which also tend to show a negative correlation between success and magnetic field variance.

Based on an earlier paper by Dalton and Stevens (1996), a negative correlation with the intensity of the magnetic field was also predicted (i.e. increased rank/decrease in ESP success related to MF intensity decrease). This was also found, with all conditions showing the same direction of correlation, although this was non-significant in the true-feedback condition.

The second approach towards investigating a psi-magnetic field relationship involved looking explicitly at participants' physiological reactions to a double-blind applied weak magnetic field. Of the 50 receivers, 42 were willing to take part in the additional magnetic field response study.

For the TF condition, the correlation between change in mean SC level and rank of target was 0.02 (p=0.44); between change in variance of SC and rank of target was 0.24 (p=.06). For NF condition, correlations were 0.09 (p=0.28) and -0.008 (p=0.48). Note that, overall, the main response to the application of the magnetic field was a slight increase in the variance of skin conductance, replicating the result found in Stevens' (2001) study.

So, opposite to the prediction, people who did best in ESP task were those who did ***not*** exhibit MF reactivity. This finding suggests that the widely reported inverse relationship between geomagnetic activity and ESP success could indicate an interference effect, the increased magnetic fluctuations acting either as a noise source or a distractor to the ESP recipient.

2.3 Summary

- No evidence for ESP based on first-ranked target measure.
- Results throw further doubt on the reliability of the ganzfeld protocol, as the amount of relevant mentation produced by the receiver does not lead to correct identification of target.
- There is some indication that information transfer is occurring as, on average, the receiver showed a skin conductance response when the sender decided their mentation was relevant.
- Opposite to expectation, there was an inverse relationship between lability and ESP success. This was present in the true feedback condition only.
- The expected (though non-significant) correlation between increasing local magnetic field variance and decreasing ESP success was found both in the overall results and in the the false-feedback conditions. However, this was reversed for the true-feedback condition, suggesting that the PRiSM process is more akin to micro-PK.
- Opposite to prediction, there was an inverse relationship between ESP success and physiological reactivity to magnetic fields.

2.4 Conclusion

Although traditional ranking measures of ESP did not show any difference between conditions, there was a good degree of internal consistency for the more detailed analyses, suggesting that the proposed PRiSM process may indeed be involved in ganzfeld studies with sender-feedback. There is some suggestion that the PRiSM process may be akin to microPK/bioPK i.e. that the sender is influencing the receiver, changing their arousal at times of relevant mentation. Based on the results, it is suggested that the relationship between ESP and magnetic fields may be two-fold: magnetic field fluctuations in the environment in some way aid the physical transfer of information, but those same fluctuations act as interference to reception of the signal by acting on the receiver's physiology. If this is the case, then the ideal conditions for PRiSM-type ESP to occur may be during times of *increased* magnetic activity, using receivers who have tested as being physiologically *unresponsive* to magnetic fields. This is a hypothesis which would be amenable to laboratory testing in future studies.

2.5 References

Bem DJ and Honorton C (1994). Does Psi Exist? Replicable Evidence for an Anomalous Process of Information Transfer. Psychological Bulletin 115: 4-18.

Dalton and Stevens (1996). Geomagnetism and the Edinburgh Autoganzfeld. European Journal of Parapsychology 12: 23-34

Rosenthal R and Rubin DB (1989). Effect size estimation for one-sample multiple-choice-type data: Design, analysis, and meta-analysis. Psychological Bulletin 106: 332-337.

Stevens P (2001). Effects of 5-second exposures to a 50 μT, 20 Hz magnetic field on skin conductance and ratings of affect and arousal. *Bioelectromagnetics* 22:219-223

3. Expenses

For the second year of the project, the allocated amount (being the second installment of €20000 plus the remaining €5000 due on completion of this project) spending was as follows:

Conference costs:	£500 (Receipts enclosed)
Towards salary:	£14652

Total:	£15152 (= € 25000)

All monies have now been spent and the project is now completed.

Signed: Date:

Paul Stevens 13 Dec 2002

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