APPENDIX 2:

A FURTHER CONSIDERATION OF THE SENDER AS A PK AGENT IN GANZFELD ESP STUDIES[10]

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ABSTRACT

In this study we were concerned to evaluate whether the sender plays any active role in successful ganzfeld GESP experiments by comparing sender and no sender conditions. In a replication of Roe Holt & Simmonds' (2003) novel method, during the sending period receivers generated a mentation based on their experiences in ganzfeld, and simultaneously a random number generator (RNG) acted as a proxy receiver by 'selecting' statements from among a pool of 768 to give a 20-item 'RNG mentation'. Forty ganzfeld trials were conducted with novice sender-receiver pairs, of which 23 involved senders and 17 did not. Receivers registered a 25% overall hit rate, equal to mean chance expectation, with slightly better performance in sender trials than no sender trials (26.1% versus 23.5%). Two independent judges used the RNG mentation to rank order the clips in each target set, and produced hit rates of 30.6% and 16.7%. Both independent judges gave higher hit rates for the sender trials than for the no sender trials (42.1% versus 17.6%; 26.3% versus 5.9%), though these differences were not significant. None of a number of individual differences measures significantly predicted receiver performance, and indeed none were suggestive ($p < .1$).

INTRODUCTION

Despite the relative success of clairvoyance designs in eliciting evidence for ESP when used with other protocols (see, e.g., reviews by Rhine, Pratt, Stuart, Smith & Greenwood, 1966, and Utts, 1996), it has been commonly assumed that a sender can make some positive contribution to the outcome of Ganzfeld studies. Relatively few Ganzfeld experiments have adopted a clairvoyance design except where the objective of the study was to compare sender and no sender conditions. Honorton (1995) found that of 73 Ganzfeld studies only 12 did not employ senders. His meta-analysis comparing sender and no sender experiments showed that those including senders generated better performance than those that did not, although the effect seemed to be confined to those experimenters who had used both conditions at some time. If it could be shown that the sender were unnecessary this would have practical advantages in that sessions would be easier to co-ordinate for only one participant at a time, and security would be more straightforward, since no person need know the identity of the target until after the participant's judgements had been recorded.

[10] We would like to gratefully acknowledge the financial support of the Institut für Grenzgebiete der Psychologie und Psychohygiene e.V., which has enabled us to conduct this study and to the Bial Foundation for support during analysis and writing up. An earlier version of this paper was presented at the 45th Annual Convention of theParapsychological Association, Vienna, August 2004.

Eight previous Ganzfeld studies have directly compared sender and no sender conditions within the same study (see Roe, Sherwood & Holt, 2003, for a more detailed review), which together give a reasonably consistent picture. Two studies have reported scoring when a sender is aware of the target to be significantly better than when a sender is absent (Raburn & Manning, 1977; Sargent, Milton, Payne & Bennet, unpub, cited in Milton, 1988-9), and four describe a non-significant advantage for telepathy conditions compared with clairvoyance conditions (Dunne, Warnock & Bisaha, 1977; Kanthamani & Khilji, nd, described in Kanthamani & Palmer, 1993; Milton, 1988-9; and Williams, Roe, Upchurch, & Lawrence, 1994). Although Morris, Dalton, Delanoy and Watt (1995) concluded that there were no significant differences overall, the reported target ranks give rise to z scores of 1.028 and .237 for their informed sender and uninformed no sender conditions respectively. Roe, Sherwood and Holt (2003) reported a slightly improved performance for sender trials compared with no sender trials in terms of direct hits but the reverse pattern when considering sums of ranks and z-scores of similarity ratings.

Taken together, these findings may offer some encouragement for the suggestion that the sender serves some active role in a typical Ganzfeld ESP session, particularly given that the experimental manipulations of the independent variable here are rather gross; for example in not systematically taking into account the possible moderating effect of variables such as the sender-receiver relationship (see Honorton, 1985, but also Bem & Honorton, 1994). The designs also tend to assume that any sender effect will be readily apparent in the receiver's overall performance, despite this relationship being dependent upon the receiver not only being able to detect any sender mediated impressions, but also to accurately interpret them and to be able to discriminate them from internally generated 'noise' during judging. Recently we reported on an alternative method for gauging any potential sender effect that promised to circumvent such complications by replacing the receiver with a random number generator (RNG) 'virtual receiver' that would generate a virtual mentation by randomly selecting statements from among an array of descriptors. Although a somewhat unusual procedure, a variant of this approach had previously met with some success (Roe, 1996).

Roe, Holt and Simmonds (2003) conducted an initial test of this method within a ganzfeld setting. Here, 40 pairs of participants experienced a 'standard' autoganzfeld, but during the sending period a 'virtual' receiver in the form of an RNG located in the receiver's room operated to generate random numbers corresponding to members of a pool of 768 statements. These had been coined to describe all of the clips in the whole pool (i.e. 8 descriptors for each of the 96 video clips). A virtual mentation was generated consisting of the 20 statements that were most frequently selected during the sending period. An independent judge rank ordered the four clips in each target set in the same manner as the actual receivers had done, but using correspondences derived from the virtual mentation as a basis for selection. Overall, the 'live' receiver selected the correct clip as the target on 14 occasions (35% hit rate where MCE is 25%), and by pre-planned sum-of-ranks analysis performed significantly better than chance expectation (Z = 1.77, p = .038). More interestingly in the present discussion, the ratings based on the RNG-generated virtual mentations gave an encouraging 13 hits (32.5%), and a suggestive sum-of-ranks outcome (Z = 1.48, p = .069). While not wishing to over-interpret a non-significant outcome, it may be interesting to note that the associated effect size, r, of .234 is of a comparable magnitude to that reported in previous research that utilised an RNG as a proxy psychic reader, and from which this study was adapted (Roe, 1996, r = .257). It is also orders of magnitude larger than typical effect sizes for other RNG-based studies, which Steinkamp, Boller and Bösch (2002) estimated at 6×10^{-5}, and may be more in keeping with those associated with the DMILS protocol, estimated at 0.33 (Braud & Schlitz, 1991). The outcome was regarded as sufficiently promising to warrant further investigation. In the

present study we planned to compare performance of the RNG on sender trials with performance on trials when there was no sender (or at least where a nominal sender was unaware of the target). In this case the mentation would presumably consist of random noise and might provide a more suitable control against which to evaluate performance in the experimental condition.

It was also found previously that whatever degree of success could be attributed to the RNG condition, this was not a result of the RNG actually selecting statements that were originally coined for the target clip more often than would be expected by chance. Rather, since the statements were purposely phrased so as to be somewhat vague or open to interpretation or which reflected themes that might be represented in a number of clips (e.g., "feeling really cold, freezing", "Floating gently down as if with a parachute", "Sounds of screeching or squealing") it seemed that the independent judge had been able to use statements originally intended for other clips to enable them to identify the target clip. Thus we could not discount the possibility that any above chance scoring was a function of the judge's psychic ability, with the mentation simply providing a Rorschach-like medium for her own psi in what might amount to little more than an elaborate forced choice ESP test. It was not practicable to assess this possibility in Study 1, for example by involving a second independent judge, and so in this study we planned to recruit a second independent judge to rate the transcripts for comparison.

We have previously (Roe, Sherwood & Holt, 2003) reported on aspects of the present study that were concerned with the human receiver's performance when comparing sender and no sender conditions. In this paper we report on a second aspect of that study which concerns the performance of an RNG that served as a virtual receiver during the ganzfeld session, generating an alternative mentation to be rated by independent judges. Data for the receiver are included for comparison but are presented in more detail by Roe Sherwood & Holt (2003).

Study aims

Two predictions were hypothesised using sum of target ranks as the primary outcome measure. Predictions given below are directional but alpha levels for other, exploratory, analyses were conservatively kept as two-tailed:

1. RNG mentations will allow each independent judge to identify the target clip to a greater degree than expected by chance

2. Each independent judge's sum of ranks for sender trials will be lower than for no-sender trials

We also planned to conduct exploratory analyses considering covariation of RNG and receiver performance with receiver and sender personality and attitude measures. These correlations were pre-specified as two-tailed.

METHOD

Design

The present study is the second of a series that is intended to systematically explore the utility of using an RNG as a proxy receiver within a ganzfeld GESP protocol, and consists of a comparison of sender and no sender conditions. The dependent variable for planned analyses

is the sum of target ranks awarded by the independent judge; the DV for exploratory analyses is the z score of target ratings.

Participants

The sample used in this study is the same as that reported by Roe, Sherwood & Holt (2003). An opportunity sampling method was used to draw 40 pairs of participants (mean age of senders = 29.7 [range = 18 – 60], 14 males and 26 females; mean age of receivers = 28.0 [range = 18 – 60], 15 males and 25 females). These mainly consisted of friends and acquaintances of the experimenters, and staff and students at UCN, although attempts were made to recruit participants from the wider community using posters and media appeals. Each participant provided his or her own sender. Lab personnel did not serve as participants. The mean Australian Sheep-Goat Scale belief score for receivers in this sample was 44.5 (*SD* = 10.4) and for senders was 46.6 (11.27). These figures are somewhat below the score of 54 that participants would achieve if they were to respond neutrally to every item, suggesting that the sample is moderately sceptical. Three experimenters conducted trials in this study; Nicola Holt conducting 17 trials, Chris Roe 13 trials and Simon Sherwood 10 trials [11].

Apparatus and Materials

Details of the experimental suite, including distances between rooms have been described previously (Roe, Sherwood & Holt, 2003). This study used an automated ganzfeld computer system developed by Dr Paul Stevens and written in Microsoft Visual Basic v5 that presented video material using Media Player v7. Video clips are stored digitally as MPEG files, labelled 1a, 1b, 1c etc. Three separate monitors for the experimenter, sender and receiver are controlled by the experimenter PC via separate video cards, which prevents video leakage. Security measures within the program lock the experimenter out of system completely during a session, so that it is not possible to switch to another application or access the computer except by aborting the session. Audio signals are split into left and right stereo channels with the separate mono signals thus produced being sent to the sender and experimenter/receiver respectively, so that it should not be possible for audio leakage to occur.

A revised target set was used for this study, consisting of 116 minute-long digital video clips that were drawn from commercial films to reflect a range of emotions and themes. Clips were arranged in 29 sets of 4 so that members of a set were as distinct as possible. Copies of the target pool are available on CD or DVD from the first author on request. Ganzfeld randomisation is achieved using the Visual Basic pseudo-random algorithm (rnd), seeded using the timer at the start of the program (RANDOMIZE TIMER). Once the 'Start' button has been pressed, the computer first selects a target set, then selects one of the four clips within that set. The order of presentation of the four clips at judging is similarly randomised.

The descriptor pool from which the RNG draws was the same as that for the original study (Roe, Holt & Simmonds, 2003), and consists of eight statements for each of the 96 clips to give a total pool of 768. These statements were coined by the authors to describe the original target set, but were intended to be accurate but not overly-specific (e.g., "a sense of flying or floating" rather than "a flock of birds flying overhead") so that they were more characteristic of the kinds of descriptions given during ganzfeld stimulation, and also so that they could in principle help identify targets from other sets. This had been the case in the previous study. Statements were selected during the sending period by taking one sample a second from an

[11] We are grateful to Dr Sherwood for his assistance with this project.

Orion RNG v1.1 attached to a Pericom 386 PC running under DOS. At the end of the sending period, the 20 statements that had been selected most often formed the mentation. In the event of any ties at the cut-off point of 20 then the first selected was automatically taken.

Materials

The Participant Information Form (PIF) is a 55-item measure that was constructed for general use with parapsychological research at University College Northampton and includes questions concerning biographical and contact details (11-items); religious and parapsychological background (5 items); computer experience (2 items); practice of mental/physical disciplines (2 items); belief in luck (2 items); clumsiness and punctuality (2 items); competitiveness (1 item); absorption (2 items); sleep and dreams (4 items); imagination and fantasy-proneness (3 items); creativity (2 items); and physical and mental health (1 item). The remaining items relate specifically to knowledge, belief and experience of anomalous phenomena including telepathy, clairvoyance, precognition, psychokinesis, 'communication with the dead' and out of body experiences (18 items); and hypnagogic/hypnopompic experience in a range of modalities (10 items). The form concludes with an open question inviting descriptions of personal anomalous sleep-related experiences. Copies of all in-house measures are available from the first author on request.

Participants also completed the short extraversion and neuroticism subscales of the EPQ-R (Eysenck, Eysenck, & Barrett, 1985). Each subscale has 24 items with a dichotomous yes/no response format. The 18-item Australian Sheep-Goat Scale (ASGS, Thalbourne & Delin, 1993), with a 5-point Likert scale ranging from strongly agree to strongly disagree, was also completed.

Post-ganzfeld measures included a Sender Strategy Questionnaire that asked about the type of sending strategies used, whether this was active or passive, holistic or atomistic, focused on target clip or on the receiver, realistic or associative, and continuous or episodic.

Procedure

Potential participants were sent an information sheet illustrated with photographs that described most aspects of the study. This provided a rationale for the ganzfeld paradigm, outlined the stages of the experimental procedure, focusing on the roles of the experimenter, sender and receiver. Participants were made fully aware that their sender might not be required for the Ganzfeld trial, in which case an alternative activity had been set up for them. Prior to the trial, participants (senders and receivers) completed a battery of measures. Participants were greeted on arrival and escorted to a reception room that had been specially prepared with comfortable chairs, a coffee table, rugs and curtains so as to make participants feel as comfortable and relaxed as possible prior to the trial. Experimenters encouraged an informal and positive atmosphere, discussing the procedure and answering any questions arising while sharing refreshments. Participants were not informed of the RNG task. Participants were then given a guided tour of the facility as the roles of sender and receiver were again explained.

With the assistance of the senders, the experimenters prepared receivers for the ganzfeld and wished them success. Receivers were seated in a reclining chair and encouraged to relax. They were invited to remove their shoes and cover themselves with a blanket if desired. They wore headphones that had a microphone attached through which they could communicate with their experimenter and be heard by their sender. Halved ping-pong balls were placed over their eyes and held secure with micropore tape. A red light was shone on the receiver's face, positioned immediately in front of them at a distance that was comfortable for them

(typically one metre). A computer program was initiated that would sample an RNG during the sending period. The receiver was then locked in the room and the sender was guided back to their room.

The trial commenced with receivers listening to and following a series of progressive relaxation instructions. At the end of the relaxation period the computer program determined whether the session would be a sender or no sender trial. Receiver and experimenters heard a pre-recorded message indicating whether the trial would involve a sender or no sender condition[12]. For no sender trials senders received an on-screen message asking them to remove their headphones and move over to the other computer in the sender's room to complete an alternative task. The monitor in the sender's room did not show the target clip during no sender trials. For sender trials senders watched a randomly selected video clip that was played fifteen times with one-minute intervals between plays. Drawing materials were provided for them should they wish to sketch elements of the target clip during these 'quiet' periods. During this thirty-minute mentation period receivers listened to white noise being played through their headphones and reported on any impressions or sensations that they experienced. The experimenter listened to the receiver's mentation via headphones from the experimenter's room and took notes. In the sender condition, senders could also hear any comments made by receivers during the mentation period. The RNG was sampled once per second for the duration of the sending period, generating a number between 1 and 768, corresponding to one of the clip descriptions. Subsequently, the 20 statements that were most often selected were automatically combined to produce a text file that constituted the RNG mentation. In the event of ties, the statement that had been selected first was included.

Following the mentation period, the experimenter reviewed the receiver's mentation. Simultaneously, senders completed a questionnaire concerning their interaction with the target and sending strategies employed. At the judging stage receivers were asked to remove their eye-shields but were encouraged to remain in a relaxed state as they watched four video clips, giving each one a percentage similarity rating. After viewing all four clips, they were able to view any or all of them as many times as they wished and to alter their ratings if necessary. Senders were able to listen to the clip soundtracks and the interaction between receiver and experimenter during the judging stage, but did not view the dummy clips. Once receivers were satisfied with their ratings, these were confirmed and saved as a permanent record. Only after the data were saved was the target clip revealed and replayed. The sender, experimenter and receiver then convened for a discussion and debriefing session in the receiver's room. A copy of the trial data record was printed off and signed by all parties to confirm the details of the session.

After completion of all trials in the series, two judges who were otherwise uninvolved with the study[13] independently rated the four clips in each set according to the degree to which they reflected the content of the RNG mentation (in the same manner as described for the receiver above).

[12] This message could have been true or false, and was intended to manipulate the receiver's expectancy. This is not a focus of the present study and the interested reader is referred to Roe, Sherwood & Holt (2003).

[13] We are grateful to Russell Davey and Jacqui Wilson for serving as independent judges.

RESULTS

RNG data were not available for four sender trials because of technical malfunctions or failure to initiate the program. Analyses are presented for the remaining 36 trials.

Inter-rater reliability in ranking clips

We were concerned to assess the degree to which the independent judges' ratings would be determined by the mentation, with the alternative being that there was sufficient scope for 'interpretation' that judging may reduce to an elaborate forced choice ESP task for the independent judge. Comparing the target rankings of the two independent judges gives a Cohen's kappa[14] of .202, which is considered poor. As a consequence it was decided not to combine the judges' ratings but rather to consider them separately.

Sender/no sender effects upon ganzfeld/RNG performance

The ranks allocated to target clips by the receiver are reported in Table 1. These data have already been described in detail by Roe, Sherwood and Holt (2003) and are included here primarily for comparison purposes. Also included in Table 1 is a summary of the ranks allocated to the target by the independent judges using the RNG-generated mentations. We can see from this that the overall hit rate achieved by the receivers in the Ganzfeld, at 25%, is exactly as one would expect by chance. Performance on trials with a sender was only marginally better than on those without (26.1% versus 23.5%). For the independent judges, JW — who had worked on our previous study — gave an above MCE overall direct hit rate (30.6%), whereas our newly-recruited judge, RD, gave a below MCE direct hit rate (16.7%). For both independent judges the hit rate for the sender condition was superior to that for the no sender condition but not significantly so (for JW, 42.1% versus 17.6%, $\chi^2 = 2.54$, p = .4; for RD, 26.3% versus 5.9%, $\chi^2 = 1.59$, p = .6).[15]

In terms of sums of ranks, better Receiver performance was found in no sender trials, although these differences are not significant, $Z = .639$, $p = 261$. For the independent judges there is little difference in their sums of ranks (for JW, $Z = 1.11$, $p = .134$; for RD, $Z = .824$, $p = .206$). Figure 1 illustrates the range of z-scores for target ratings awarded by the independent judges. This confirms the nonsignificant trend in favour of sender versus no sender trials.

Covariation of RNG performance with Receiver performance

Previously we reported a non-significant positive correlation between the independent judge's ratings based on the RNG mentation and those by the receiver using their own mentation. Here there was even less agreement between the receiver and independent judges (for JW, $\kappa = -.174$; for RD, $\kappa = -.186$). This is thus not consistent with the notion of a general sender effect that is reflected in both the receiver's and the RNG-based mentation.

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[14] An anonymous reviewer queried the use of Cohen's kappa in preference to Spearman's rank correlation to calculate inter-rater agreement. In this decision we followed Clark-Carter's (1997, p. 533) suggestion that kappa is preferable since Spearman's rank correlation simply measures the direction in which two sets of scores move relative to each other rather than actual agreement. Take for example the case in which Rater 1 ranks the target clips for four trials as 1, 2, 1 and 3, whereas Rater 2 ranks them 2, 3, 2 and 4; these scores would exhibit a perfect (nonparametric) correlation despite the raters showing no exact agreement at all.

[15] We are grateful to an anonymous reviewer for pointing out that if the ratings from both judges are combined then the hit rate for sender trials is significantly higher than for no sender trials (13 hits and 25 misses versus 4 hits and 30 misses, $\chi^2 = 5.01$, p = .03).

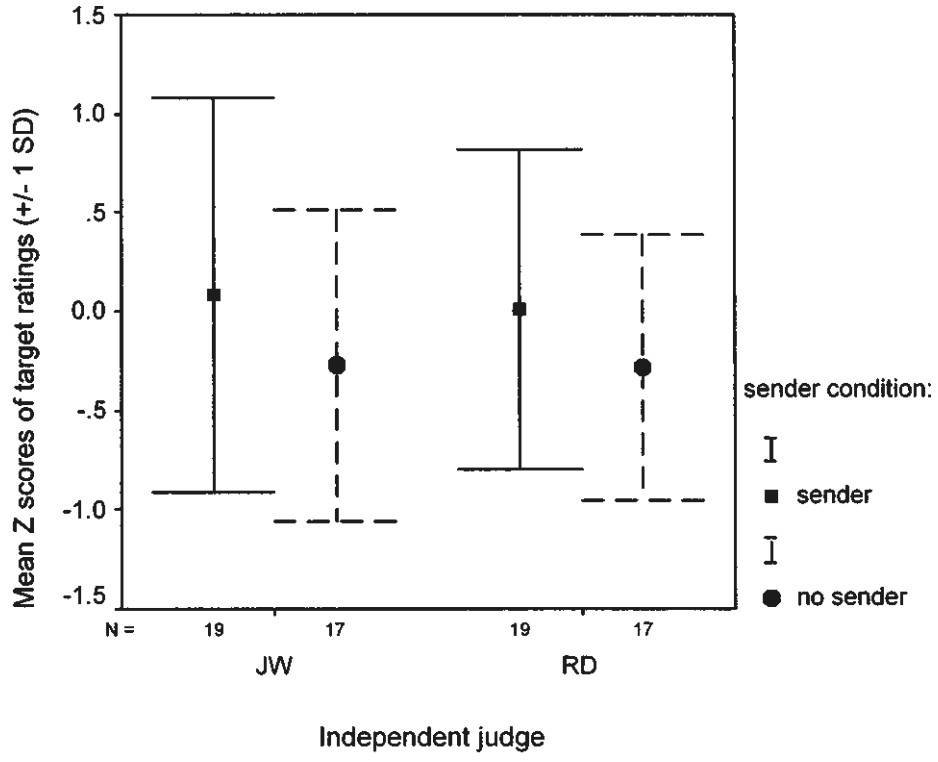
TABLE 1:

A COMPARISON OF TARGET RANK FREQUENCIES FOR THE RECEIVER- AND RNG-BASED MENTATIONS

			Rank						p
		N	1	2	3	4	SOR	Z	(2-tail)
Receiver	Sender	23	6 (26.1%)	3 (13.0%)	5 (21.7%)	9 (39.1%)	63	-.559	.509
	No sender	17	4 (23.5%)	8 (47.1%)	0 (0.0%)	5 (29.4%)	40	.434	.667
Independent Judge JW	Sender	19	8 (42.1%)	2 (10.5%)	5 (26.3%)	4 (21.1%)	43	.821	.412
	No sender	17	3 (17.6%)	2 (11.8%)	8 (47.1%)	4 (23.5%)	47	-.868	.384
Independent Judge RD	Sender	19	5 (26.3%)	5 (26.3%)	7 (36.8%)	2 (10.5%)	44	.616	.535
	No sender	17	1 (5.9%)	8 (47.1%)	3 (17.6%)	5 (29.4%)	46	-.651	.516

FIGURE 1:

MEAN Z SCORES OF TARGET RATINGS FOR SENDER AND NO SENDER TRIALS



Covariation of performance with Sender personality variables

When considering covariation of psi task performance with personality and attitudinal factors it was planned to use the *z* score of the target clip's similarity rating as the outcome variable. This was deemed preferable to using the simple rank, since it is more sensitive and allows for greater variance across participants, which is essential when considering covariation. The relationships between sender personality and attitude scores and performance for both the receiver and the RNG are summarized in Table 2. We can see that only one of the correlations with receiver ratings exceeds .25, which represents a similar pattern to that found previously (Roe, Holt & Simmonds, 2003). Collectively they offer little promise of identifying actual correlates of performance.

Covariation of performance with Sender strategy variables

Finally, we were interested to see whether the sender's choice of strategy could be used as a predictor of task success. These analyses are presented in Table 3. We can see that once again there are no relationships with receiver performance but that there is a suggestive relationship between RNG performance and method of focusing, with better results when using drawing materials to re-enact aspects of the target. There is a significant correlation with method of sending, with episodic sending giving rise to better performance. Although these effect sizes are relatively healthy (>.4), they are clearly only marginally significant at best and would be reduced to nonsignificance if corrected for multiple analyses. Nevertheless they may prove interesting if reproduced in subsequent replications.

TABLE 2:

SPEARMAN RHO CORRELATIONS BETWEEN SENDER PERSONALITY AND ATTITUDE MEASURES AND PERFORMANCE (AND 2-TAILED PROBABILITIES)

	Receiver ratings z scores	RNG-based ratings z scores (JW)	RNG-based ratings z scores (RD)
Do you think you can be psychic in the conditions of this study?	.167	-.006	.037
	(.330)	(.972)	(.839)
Sender's score on belief in paranormal scale	.259	.112	.176
	(.128)	(.534)	(.327)
How creative are you?	-.012	.001	-.117
	(.942)	(.994)	(.508)
EPQ neuroticism	-.053	.210	.112
	(.764)	(.249)	(.541)
EPQ extraversion	-.070	-.006	-.093
	(.685)	(.974)	(.415)

TABLE 3:

SPEARMAN RHO CORRELATIONS BETWEEN SENDER STRATEGY MEASURES AND PERFORMANCE (AND 2-TAILED PROBABILITIES)

	Receiver ratings z scores	RNG-based ratings z scores (JW)	RNG-based ratings z scores (RD)
Sending strategy (active versus passive)	.088	-.237	-.194
	(.711)	(.344)	(.441)
Holistic or atomistic (whole clip versus elements)	.221	-.354	-.158
	(.336)	(.149)	(.531)
Focus (on the target versus on the receiver)	.053	.141	.159
	(.821)	(.578)	(.529)
Aspects of clip sent (actual content versus associations with the receiver)	.281	.229	.115
	(.217)	(.361)	(.650)
Sending continuous (continuous versus episodic)	.263	.281	.471
	(.249)	(.259)	(.049)
Focus tools (mental images versus images and drawings)	-.153	-.036	-.406
	(.508)	(.886)	(.094)

DISCUSSION

In this study receivers were only able to correctly select the target clip on 25% of trials, and so were not able to replicate the previously reported above-chance performance of the receiver (Roe, Holt & Simmonds, 2003). Neither were we able to replicate the suggestive overall finding of that study, in which an independent judge was able to produce a 32.5% hit rate based only on RNG-derived mentations, although the independent judge who served previously did give a similar hit rate (30.6%). Our newly-recruited judge, RD, gave a below MCE direct hit rate (16.7%).

However, this tells only part of the story, since in this study half the trials did not involve a sender and were considered here to constitute a control condition in which there would be no RNG effect and perhaps a lower hit rate for receivers. It was true that the receiver hit rate was slightly higher in the sender condition than in the no sender condition, though this difference is only marginal (26.1% versus 23.5%) and does not provide confirmation of previously reported sender superiority (e.g., Raburn & Manning, 1977; Sargent et al., unpub, cited in Milton, 1988-9). For independent judges there seems to be an advantage in favour of sender trials, with the hit rate for JW at 42.1% comparing favourably with the previous study (admittedly over only 19 trials and not significantly different from MCE). Although RD scored below chance overall there was again a nonsignificant advantage for sender trials (26.3% hit rate versus 5.9%). In terms of sums of ranks, the associated effect sizes for JW and RD for the sender trials are positive, at .188 and .141 respectively, but smaller than reported previously (.234). Nevertheless, on the basis of results for sender trials it might be argued that the findings are sufficient to warrant further study, and two more experiments are planned.

Study power is a perennial issue with a protocol as labour intensive as that adopted here. Clearly in ideal circumstances it would be desirable to recruit larger samples and run more sessions.[16] However, it has proven difficult to co-ordinate and run a sufficient number of sessions for studies to be completed in a reasonable time period (the current study was completed in 12 months). It may be worthwhile to consider whether pairs of participants are needed with this procedure. If senders were accurately briefed that their task was to influence a computer generated mentation then this would obviate the need for a receiver participant and for the Ganzfeld induction that goes along with their role. This would give rise to a simplified protocol for which participants could be recruited and scheduled singly. It also offers the opportunity to give immediate feedback to participants on performance by presenting them with the selected statements, which may outweigh any increase in scepticism on the part of participants in having to interact with a machine rather than another human.

The analysis of sender personality, attitude and experiential variables were again disappointing and suggest that the measures used to date are not adequately tapping into individual factors that bear on success at the task. It may be that other measures will prove more successful. At this stage it seems equally likely that pencil-and-paper measures are inadequate *per se* to gauge the complex interplay between factors.

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[16] One reviewer commented that differences in hit rates of 42.1% and 17.6% were "as large ... as you could ever hope to find" suggesting that the biggest failing of this study was in terms of study power. While we are sympathetic to this view, we would note that the mean number of trials in ganzfeld studies reviewed by Milton and Wiseman (1999) is 39.9 (*Mdn* = 40) so that this study's sample size is very typical for the protocol adopted. We would also comment that we are wary of researcher 'burnout', whereby the initial enthusiasm of experimenters may begin to wane over time and this could be communicated to participants (cf. Broughton & Alexander, 1997). To guard against this, we prefer to adopt a strategy in which a number of smaller studies are conducted that share common features so as to allow their outcomes to be considered together as a kind of 'mini meta-analysis' once the experimental series is completed.

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