

Shamanic-Like Journeying and Psi: I. Imagery Cultivation, Paranormal Belief, and the Picture-Identification Task

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Abstract: In a previous article (Storm & Rock, 2009) we proposed an *imagery cultivation model* to be at least as psi-conducive as the Ganzfeld, based on anthropological and parapsychological claims concerning alleged psi effects during shamanic practices. Imagery cultivation is associated with shamanic states during which state the percipient actively propagates or cultivates psi-related images. Since psi-modifying variables should also be investigated in psi research, paranormal belief/experience (as measured on Thalbourne's, 1995, Australian Sheep-Goat Scale), and Transliminality (the tendency for psychological material to cross into or out of consciousness; see Thalbourne & Houran, 2000) were tested in the present study as possible predictors of psi. Non-shaman participants ($N = 108$) were randomly assigned to one of two conditions: (1) a control condition ($n = 53$) consisting of sitting quietly with eyes open; or (2) a treatment condition ($n = 55$) that involved shamanic-like journeying instructions followed by 15 minutes of monotonous drumming (8 b.p.s.). Participants were required to describe verbally, and then rank a randomly-selected concealed line-drawing, which they held throughout the condition. Number of direct hits (34.5% where $P_{MCE} = 25\%$) in the shamanic-like condition was significant, $z = 1.66$ ($p = .048$, one-tailed), but the hit rate for control-condition participants was at chance (22.6%, $z = -0.40$, $p = .345$, one-tailed). Post hoc, we found significant extreme effects—that is, preferences for ranks #1 and #4 independent of condition for the whole sample ($N = 108$, 65 hits, 60%, $p = .042$, two-tailed). Neither transliminality nor ASGS scores predicted hit rates.

Keywords: Australian Sheep-Goat Scale, ASGS, paranormal belief, psi, shamanism, transliminality.

INTRODUCTION

The Ganzfeld

Bem and Honorton (1994) asserted that, “psi has often been associated with meditation, hypnosis, dreaming, and other naturally occurring or deliberately induced altered states of consciousness” (p. 5). These assumptions were made over 40 years ago. At that time, the so-called Ganzfeld (“total field”) experimental design was born based on the idea that increasing the signal-to-noise ratio would be psi-conducive. The Ganzfeld consists of an undifferentiated visual field created by viewing red light through halved translucent ping-pong balls taped over one’s eyes. Additionally, an analogous auditory field is produced by listening to white noise (i.e., a monotonous hissing sound; Bem, 1993).¹

While a number of meta-analytic results on Ganzfeld studies have generally proved consistent, with an accumulative and highly significant hit rate of 32% as of 2004 ($N = 88$ studies; Storm, 2006),² the Ganzfeld studies have come to be “the most controversial and frequently analysed group of parapsychological studies” (Henry, 2004, p. 43). For example, Braud (2005) formulated cogent methodological and statistical arguments that cast doubt on whether purportedly “psi-favourable test conditions such as ganzfeld procedures really *facilitate* psi” (p. 48—see also, Alvarado, 1998, Scimeca, Boca, & Iannuzzo, 2001). We (Storm & Rock, 2009) therefore argued that it might prove prudent to investigate other test conditions that are ostensibly psi-conducive in order to advance the field of parapsychology by (i) minimizing the controversy over the validity of the Ganzfeld procedure, and (ii) finding other procedures that produce effects at least as strong as (if not stronger than) those produced thus far by the Ganzfeld. In this context, it is noteworthy that psi effects (PK and ESP) induced during shamanic-states have been reported extensively in the literature (e.g., Krippner, 1984; Nelson, Jahn, Dunne, Dobyns & Bradish, 1998; Nelson & Radin, 2003; Saklani, 1988). This avenue of research has not been fully investigated.

Shamanism

Shamanism may be defined as “a family of traditions whose practitioners focus on voluntarily entering altered states of consciousness in

¹ For a more thorough account of the Ganzfeld history, see Storm and Rock (2009).

² See also Honorton (1985), Bem and Honorton (1994), Milton and Wiseman (1999), Storm and Ertel (2001), and Bem, Palmer and Honorton (2001).

which they experience themselves, or their spirit(s), travelling to other realms at will and interacting with other entities in order to serve their community” (Walsh, 1989, p. 5).³ Ostensible altered states of consciousness (ASCs) induced by shamanic practices are typically referred to as “soul-flight,” “ecstatic journeying” or simply “shamanic journeying” (Krippner, 2002). Arguably the most common technique used to induce shamanic states is sonic driving (i.e., monotonous drumming). The purpose of shamanic techniques such as monotonous drumming is to “block out the noise produced by the external stimuli or perception and to attend to internal imagery processes, thus bringing them more clearly into focus” (Noll, 1985, p. 445). Indeed, Woodside, Kumar and Pekala (1997) state that there is empirical evidence (Maxfield, 1990; Neher, 1961, 1962) that monotonous drumming alters brain rhythms which, in turn facilitates production of visual perceptions. This is inconsistent with the noise-reduction model of the Ganzfeld which de-emphasizes active cognitive processes (Storm & Rock, 2009). Given the previously stated link between shamanic states and psi (e.g., Nelson & Radin, 2003; Saklani, 1988), it may be pertinent to test ostensible psi effects of “shamanic-like” practices on non-shamans.⁴ However, despite a series of recent studies (e.g., Rock, 2006; Rock, Baynes & Casey, 2005; Rock, Casey & Baynes, 2006; Woodside et al., 1997) experimentally investigating the phenomenological effects of shamanic-like techniques (e.g., listening to monotonous drumming while visualising), potential psi effects have not been evaluated. We acknowledge that psi-modifying variables should also be investigated in psi research involving shamanic-like stimulus conditions. Indeed, it would be edifying to assess whether paranormal belief and transliminality predict psi in a shamanic-like context.

Paranormal Belief and Psi

The so-called sheep-goat effect is claimed to be one of the most consistent effects in parapsychological literature (see Lawrence, 1993, for a

³ Rock and Krippner (2007a,b) contend that “altered states of consciousness” may be more accurately described as “altered patterns of phenomenal properties.”

⁴ Rock, Abbott, Childargushi, and Kiehne (2008) suggest that, “Techniques may be conceptualized as ‘shamanic-like’ insofar as they bear some relation to shamanic techniques and yet depart from what may properly be called shamanism” (p. 80). For example, ingesting psilocybin in order to ascend to the “upper world” and consult one’s power animal with the aim of serving one’s social group may be considered a shamanic technique, whereas recreationally using psilocybin to enter an ostensible ASC and explore the “upper world” is merely shamanic-like.

meta-analysis). Originally, the terms *sheep* and *goat* were used to categorize participants as either those who believed in the ability to demonstrate ESP under a given experimental condition ('sheep'), or those who rejected this possibility ('goats'; see Schmeidler, 1943). Nowadays, the definitions have a somewhat broader meaning (generally, sheep are those who believe in psi, whereas goats are not), and these definitions have been used in the broader sense in numerous studies since the mid-1940s.

Lawrence found 73 studies dating back to 1947, and he calculated an accumulative sheep-goat effect that was moderate in size and highly significant—sheep consistently scored better than goats. In other words, sheep tend to 'psi hit' and goats tend to 'psi miss'. We decided to administer Thalbourne's (1995) Australian-Sheep-Goat Scale (ASGS) to participants in our sample, particularly in order to assess whether a sheep-goat effect might occur in our novel treatment (for details about the ASGS, see *Measures*).

Transliminality and Psi

Transliminality is defined as the "hypothesized tendency for psychological material to cross (*trans*) thresholds (*limines*) into or out of consciousness" (Thalbourne & Houran, 2000, p. 853). Thalbourne and Delin (1994) suggested that transliminality might correlate with paranormal effects on the basis that it was a process that drew mainly upon unconscious (endo-psychic) sources. A number of studies have been conducted to see whether transliminality could predict psi outcomes (for a review, see Del Prete & Tressoldi, 2005). For example, in a study based on the ancient Chinese system of divination, the *I Ching*, Storm (2002a,b) found transliminality positively and significantly correlated with outcomes in a psi-task that required participants to pre-select *I Ching* hexagrams before the outcomes were known, $r(241) = 0.12, p = .034$ (one-tailed).

In the present study, the Transliminality Scale (Form B) was administered to participants as a possible predictor of psi effects (for details about the Transliminality Scale, see *Measures*).

The Psi Task—Anomalous Picture Identification

The experimental component of this study involves testing the ability of participants to rank correctly (i.e., at Rank #1) a randomly-selected and concealed target picture. This target picture is a copy of one of four pictures, the original of which is concealed in an envelope amongst three other pictures (decoys). Picture-identification tasks figure prominently in parapsychology as a more efficient test of psi than the forced-choice

paradigm in spite of the judging (ranking) process that is required in order to quantify the selections. This is indicated in the meta-analyses by the higher mean effect size of 0.17 for the free-response paradigm compared to 0.012 for the forced-choice paradigm (Storm, 2006, p. 139). Also, the free-response design has some advantages over the forced-choice design. For example, Thalbourne (1981) points out the ecological validity of the design in terms of the more life-like and more interesting attributes of free-response.

In an initial study by Storm and Thalbourne (2001b) using the picture-identification task on sighted and vision-impaired participants, the sum-of-ranks statistic for the whole sample was significantly positive, $z = 2.98$ ($p = .004$, one-tailed). In a follow-up study (Storm & Barrett-Woodbridge, 2007) the effect did not replicate. However, when the data from the two studies were pooled, the effect was significant for sighted participants only, $z = 1.75$ ($p = .040$, one-tailed).

Given the high degree of visualisation often experienced by participants in relaxed states such as the Ganzfeld, it is theorised that performances on the picture identification task will be enhanced or facilitated by the imagery evoked during the shamanic-like treatment. More specifically, in our previous paper (Storm & Rock, 2009) we contended that active processes such as shamanic-like journeying may facilitate access to the unconscious, via visualising descent into the Earth, which is arguably a well-spring of psi images. The present study, therefore, had two aims: (i) to determine if imagery cultivation using a shamanic-like journeying protocol was psi-conducive, and (ii) to determine if paranormal belief/experience and transliminality would predict psi performance. The following hypotheses are proposed:

H1: For participants in the shamanic-like condition, the direct hit rate⁵ (as a percent correct, where $P_{MCE} = .25$, and as an effect size π where $P_{MCE} = .50$) is above chance (tests: Exact Binomial, one-tailed as we are proposing a directional or psi-hitting effect; Rosenthal & Rubin's, 1989, Formula 1 to calculate a π value).⁶

⁵ According to Honorton (1985), the direct hit measure provides a more "conservative" result (p. 54), and is easier to grasp intuitively.

⁶ Formula 1: $\pi = P(k - 1) / [1 + P(k - 2)]$. The effect size measure π "depends simply on k , the number of alternative choices available, and P , the raw proportion of hits" (Rosenthal & Rubin, 1989, p. 333). Bem and Honorton (1994, p. 8) point out the advantage this measure has in providing a "straightforward intuitive interpretation" of the effect size, because π is the "proportion correct, transformed to a two-choice standard situation" so that $P_{MCE} = P_{test} = .50$ (Rosenthal & Rubin, 1989, p. 333).

H2: Participants in the shamanic-like condition will perform better than participants in the control condition on direct hits (test: chi-square, one-tailed).

H3: There is a positive relationship between paranormal belief (measured on the ASGS) and direct hits. These relationships will be stronger in the shamanic-like condition.

H4: There is a positive relationship between transliminality and direct hits. These relationships will be stronger in the shamanic-like condition.

METHOD

Participants

The sample consisted of 108 participants, most of whom were students from Deakin University, Melbourne. Participants were recruited by all five researchers in the experiment.⁷ Method of recruitment was by snowball sampling (i.e., word-of-mouth) and convenience sampling using a ballot box placed in the university library. The participants ranged in age from 18 to 63 years ($M = 27$ years, $SD = 11$ years, Median age = 23 years). The 25th percentile was aged 21 years, and the 75th percentile was aged 29 years. The minimum age requirement for the study was 18 years (consenting age). Fifty-five participants were randomly assigned to the shamanic-like condition, and 53 were randomly assigned to the control condition. Each experimenter supervised participants in both conditions (see *Procedure* for details). The mean age was 27 years for both groups ($SD = 11$ years). The sample was comprised of 42 males (39%) and 66 females (61%). A chi-square test showed no significant difference in these sex proportions across conditions. Participation in the present study was voluntary.

Utts (1986) examined and listed the power of a series of Ganzfeld studies (see Honorton, 1985), and placed the expected proportion of hits for a typical study between 33% (Rosenthal, 1986) and 38% (Hyman, 1985), where $P_{MCE} = 25\%$. For the present study, we reasonably expected our hit rate to fall in this range. Utts's Table 1 (p. 396) gives a recommended N of 100, with critical limit of at least 33 participants, with corresponding β values of .45 and .82, for the two proportions 33% and 38%, respectively. We note that our two conditions (shamanic-like: $n = 55$; control; $n = 53$)

⁷ Shoshana Grossman (S.G.), Monica Hainal (M.H.), Kristy Jensen (K.J.), Aaron McNaughton (A.M.), and Emile Sido (E.S.).

were therefore of sufficient size given the critical limit of at least 33 participants per group.

Design

The present study consisted of a between-subjects design with two conditions: (1) listening to shamanic-like journeying instructions followed by 15 minutes of listening to monotonous drumming at 8-beats-per-second (b.p.s.; total time: 19 minutes.);⁸ and (2) a control condition consisting of sitting quietly with eyes open for 19 minutes. Low-level warm lighting was the standard room illumination during the shamanic-like condition, but the control group sat with eyes-open in normal fluorescent-light.

Two students (M.H. and E.S.) were prepared the target sets and target. The other three students (S.G., K.J., and A.M.) were the experimenters. In advance of the session, target-setters randomly selected a four-picture set from the pool of 45 picture sets using random number tables (Jackson, 2009, pp. 375-379, Table A.1) and, using the same random number tables, a target picture was selected from the four (thus, a target set was comprised of the target picture plus three decoys).⁹

Target-setters photocopied the target picture, which was then wrapped in aluminium foil, and concealed in a target envelope (the four-picture set was also wrapped in foil and sealed in an envelope in aluminium-foil). The prepared and numbered sets were placed in a filing cabinet for subsequent retrieval by the experimenters.

The three experimenters were 'blind' to the targets during the trials. Each experimenter tested participants in small groups two or three at a time with a different set for each participant; they administered the PLS, Consent Form, and personality questionnaires to each participant.

Materials

Three sets of material were used in the experiment: (1) Plain Language Statement (PLS) with Consent Form; (2) *Transliminality Scale*

⁸ Monotonous drumming at 8 b.p.s. for 15 minutes was used in the present study because Rock et al. (2005) found that that it was associated with a statistically significantly higher number of ostensibly shamanic journeying images reported by non-shamans compared to a control condition, whereas, for example, 4 b.p.s. for 10 or 15 minutes and 8 b.p.s. for 10 minutes were not. We acknowledge that Harner (1990) recommends a drumming tempo of 205 to 220 beats-per minute (< 4 b.p.s.). However, we also note that Rock et al.'s findings suggest that a more rapid tempo may be required to elicit shamanic-like experiences in non-shamans.

⁹ As there are 45 pictures sets, and 108 participants, some sets were used more than once.

Revised (Form B) consisting of twenty-nine true/false items, of which 17 are scored and top-down purified using Rasch-scaling techniques to eliminate age and gender bias from the scale.¹⁰ Rasch-scaling alters the scoring range and mean. Raw range is 0 to 29; Raw mean = 14.5. The KR-20 reliability coefficient of the scale is 0.85 (Lange, Thalbourne, Houran, & Storm, 2000); and (3) the *Australian Sheep-Goat Scale* (ASGS; Thalbourne, 1995), comprised of 18 items, each scored 0, 1, or 2 (0 = false, 1 = uncertain, and 2 = true). Raw range is 0 to 36; Raw mean = 18. The ASGS data are also Rasch-scaled (Lange & Thalbourne, 2002). This procedure alters the scoring range and mean. In a large sample ($N = 131$; Storm & Thalbourne, 2005), the ASGS had a high reliability coefficient, Cronbach's alpha = 0.91.

Apparatus

Apparatus used in the present study were: (1) A gallery of 180 hand-drawn pictures by Thalbourne (1981; words were randomly selected from a dictionary and then hand-drawn, and thus included a random array of many different types of images ranging from simple shapes, everyday items, and animals large and small.¹¹ Each picture had a four-digit number written on the back. The set of 180 pictures was then randomly divided into 45 sets of four drawings each; (2) CD-player, (3) CD-R disc, and (4) stop-watch; and for each participant: (5) a manila envelope containing a target set (one target picture + three decoys); (6) a manila envelope containing a concealed drawing (target) wrapped in aluminium foil; (7) a blanket; and (8) an eye-mask.

¹⁰ "Top-down purification" refers to a set of Rasch scaling procedures that identify and remedy differential item functioning in questionnaires, i.e., response biases related to extraneous variables such as respondents' ages, genders, or even cultures. Furthermore, Rasch scaling yields measures that have *interval-level* properties. These biases can elicit spurious factor structures of test items, as well as erroneous findings from statistical analyses. Therefore, the techniques overcome the limitations of classical test theory.

¹¹ We acknowledge that line drawings could be replaced with more realistic pictures (e.g., photos, paintings), but we note that random access to dictionary words, as a valid means of generating an objectively determined range of diverse subject matter, does become a labour-intensive and possibly restrictive process in itself in terms of finding pictorial material that matches the randomly selected words. Inevitably, however, future research will no doubt feature realistic stimuli (e.g., still photos and even movie film) as has been done in the Ganzfeld.

Procedure

Approval for the experiment was sought from the Human Ethics Advisory Group of the Faculty of Health, Medicine, Nursing and Behavioural Sciences at Deakin University. Once ethics approval was granted, invitation letters were placed in the Deakin University Library. The letter briefly described the concept of ESP, and offered students the chance to test their ESP ability in a picture-identification task (the task was briefly outlined to participants).

Tear-off response slips were placed in a ballot box, and volunteers were then contacted by telephone to arrange a time and day for testing. Prior to testing, participants were randomly assigned to either the shamanic-like journeying condition or the control condition.

Shamanic-like condition: After reading the PLS, the participant signed the Consent Form. Each experimenter then (i) instructed participants to sit on the floor; (ii) handed over a concealed target picture to each participant (each participant had their own set); (iii) instructed participants NOT to open the envelope (instead, participants placed the envelope in front of them); (iv) directed participants to lie on the floor, placing a light-proof eye mask over their eyes; (v) played the CD-R recording which consisted of the following instructions adapted from Harner (1990, p. 32):

Visualise an opening into the earth that you remember from some time in your life. It can be an opening that you remember from your childhood, or one you saw last week, or even today. Any kind of entry into the ground will do—it may be a hole made by a burrowing animal, a cave, a hollow tree stump, a spring, or even a swamp. It can even be a man-made opening. The right opening is one that really feels comfortable to you, and one that you can visualise. Spend a couple of minutes seeing the hole without going in it. Note its details clearly.

[2 minute pause]

When the drumming begins, visualise your opening into the earth ... [5- second pause] ...enter it ... [5-second pause] ... and begin the journey. Are you ready, OK, here we go.

[Drumming begins.]

Go down through the opening and enter the Tunnel ... [5-second pause] ... At first the tunnel may be dark and dim ... [5-second pause] ... It usually goes underground at a slight angle, but occasionally it descends steeply ... [5-second pause] ... The Tunnel sometimes appears ribbed, and often it bends ... [5-second pause] ... Occasionally one passes through the Tunnel so fast it is not even seen ... [5-second pause] ... In following the Tunnel you may run up against a natural wall of stone or some other obstacle ... [5-second pause] ... When this happens, just go around it or through a crack in it ... [5-second pause] ... If this fails, simply come back and try again ... [5-second pause] ... Now continue this journey down the Tunnel until I give you further instructions.

[Approx. 9 minutes of drumming without accompanying instructions]

You are now reaching the end of the Tunnel ... [15-second pause] ... you will see a set of doors ... [15-second pause] ... now visualise the doors in front of you ... [15-second pause] ... Now push open the doors ... [15-second pause] ... Now visualise your envelope before you ... [30-second pause] ... Imagine opening the envelope and look at the picture ... [1-minute pause] ... Study the picture in all its detail ... [1-minute pause] ... Remember this information for later.

The journey is now almost over ... [15-second pause] ... The drum tempo will now become very rapid for the next half a minute to accompany you on your return journey ... [5-second pause] ... come back up through the Tunnel . . [5-second pause] ... The session will conclude with four sharp strikes of the drum to signal that the journey is over.

After the CD-R recording was finished, each experimenter then: (a) instructed his/her assigned participant to spend a few minutes writing down his/her impressions of the line drawing that was still concealed in aluminium-foil inside the envelope (the participant was permitted to re-read his/her mentation, in order to prompt his/her memory, thereby assisting him/her in the ranking process; experimenters did not offer personal interpretations of mentations as this may have misled participants); and (b) instructed the participant to rank the four pictures from 1 to 4 (#1 being the 'most likely' picture concealed in the envelope, #4 being the 'least likely') using the Picture Identification Scoring Sheet.

Control condition. Procedures and instructions were mostly the same for participants in the Control condition except there was no CD-R recording treatment. Instead, experimenters (i) instructed participants to sit on a chair; (ii) handed them a concealed target picture; (iii) instructed participants NOT to open the envelope, but place it in front of them; and (iii) directed participants to sit quietly in the chair with their eyes open for 19 minutes (timed with a stop watch). After the 19 minutes had elapsed, instructions were the same for control participants as steps (a) and (b) above for participants in the shamanic-like condition. Figure 1 illustrates the sequence of steps for the shamanic-like and control conditions.

RESULTS

Descriptive Data

Testing was conducted between June and August 2009. Participants were debriefed after testing. The average time taken to complete the experiment ranged between 40 and 90 minutes, but only because some participants were slower than others. No adverse events or side-effects of the treatment were reported by any participant. There were 55 participants in the shamanic-like condition, and 53 in the control condition. Neither Age nor Sex correlated with direct hitting or rank scores. There were three experimenters: S.G. tested 32 participants, K.J. tested 35 participants, and A.M. tested 41 participants.

The mean score for the raw-score version of the ASGS was 12.61 ($SD = 7.17$). The skew of the distribution of scores was normal (skew = 0.03, $SE = 0.24$). The mean score for the Rasch-scaled version (i.e., RASGS) was 22.72 ($SD = 5.81$). The theoretical range is 8.13 to 43.39, and the observed range was 8.13 to 33.12. Reliability of the scale was high: Cronbach's alpha = 0.91. Of the two demographic variables Age and Sex, only Age correlated with RASGS, $r(104) = 0.26, p = .008$ (two-tailed).¹²

In the interests of testing for experimenter effects, given that three experimenters were directly involved in testing participants, the three experimenters were administered the ASGS. RASGS scores for the experimenters were as follows: S.G., $M_{RASGS} = 23.69$, K.J., $M_{RASGS} = 30.57$, and A.M., $M_{RASGS} = 23.69$. Note that all three experimenters RASGS scores were above the sample mean.

¹² ASGS data for two participants were missing.

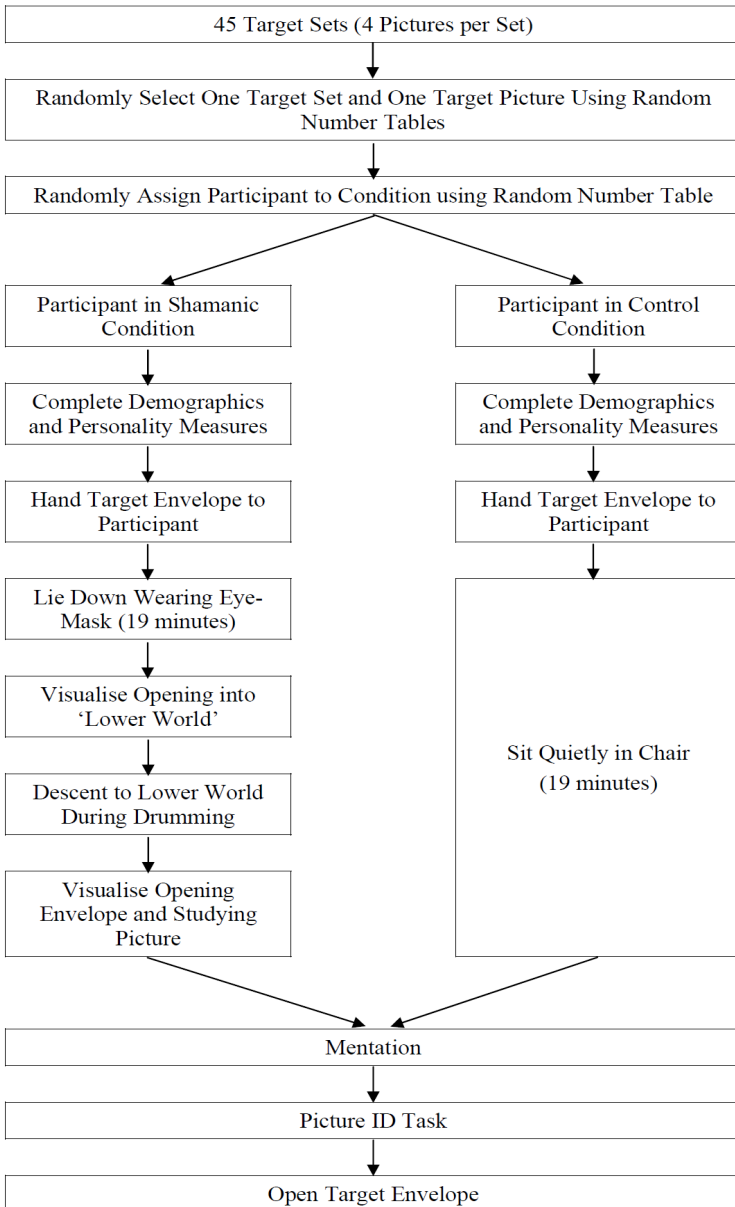


Figure 1. Schematic diagram of experimental protocol.

Hit rates for each experimenter's group were quite variable (S.G.: 38%, K.J.: 26%, and A.M.: 24%). However, there was no indication of experimenter effect, for the whole sample, $\chi^2(2, N = 108) = 1.74, p = .420$ (two-tailed), the shamanic-like condition, $\chi^2(2, N = 55) = 2.39, p = .302$ (two-sided), or the control condition, $\chi^2(2, N = 53) = 3.42, p = .181$ (two-tailed).

The mean score for the raw-score version of the Transliminality Scale was 13.22 ($SD = 6.04$). The skew of the distribution of scores was normal (skew = 0.30, $SE = 0.23$). The mean score for the Rasch-scaled Transliminality Scale (i.e., RTS) was 25.19 ($SD = 4.34$). The theoretical range is 13.70 to 37.30, and the observed range was 13.70 to 35.00. A reliability test of the RTS gave a Cronbach's alpha of 0.81. Neither Age nor Sex correlated with RTS. The RTS correlated significantly with the RASGS, $r(104) = 0.54, p < .001$ (two-tailed). Note that the RTS contains no paranormal items (Thalbourne & Houran, 2003), which is not the case for the 29-item raw-score version of the Transliminality Scale, 14% items of which measure paranormal factors.

Planned Analyses

H1: The direct hit rate is above chance for participants in the shamanic-like condition. Participants in the shamanic-like condition ($n = 55$) produced an accumulative hit rate of 34.5% (19 hits, $\pi = 0.612$; 95%CI: 22% to 48%), which was marginally significant, $p = .073$ (one-tailed). We note that the hit rate $P = .345$ and the π value of .612 is significant when used in Rosenthal and Rubin's (1989, p. 334) Formula 4 to calculate a z statistic:

$$Z = \frac{n^{1/2}(\pi - .50)}{\pi(1 - \pi)/[P(1 - P)]^{1/2}},$$

where $n = 55$ subjects tested. The z score was 1.66. A score this extreme is not likely to have occurred by chance ($p = .048$, one-tailed),¹³ and we find a corresponding effect size (ES) of 0.22 (using the formula $ES = z/\sqrt{n}$). As far as effect size is concerned, the hypothesis was supported. The Control condition ($n = 53$), however, produced at-chance hitting (12 hits; 22.6%, $p = .416$; $\pi = 0.467$), and Formula 4 gives $z = -0.40, p = .345$ (one-tailed) and a very weak $ES = 0.05$.

¹³ For similar tests of hit rates using this formula, see Lawrence (1994), and Storm and Thalbourne (2001a).

H2: Participants in the shamanic-like condition will perform better than participants in the control condition on direct hits. Direct hitting was in the right direction, but a difference that only approached significance was found between the shamanic-like condition and the control condition using a chi-square test, $\chi^2(1, N = 108) = 1.87, p = .087$ (one-tailed). The hypothesis was not supported.

H3: There is a positive relationship between paranormal belief (i.e., RASGS scores) and direct hits. For the whole sample, the correlation was not positive, $r(104) = -0.10, p = .144$ (one-tailed). For the shamanic-like group, and for the control condition, the correlations between RASGS scores and direct hits were not positive: shamanic-like condition, $r(53) = -0.07, p = .315$ (one-tailed); control condition: $r(49) = -0.19, p = .086$ (one-tailed).

Differences in strength of correlations between the conditions were assessed for significance using Fischer r to z transformations. The correlations were not significantly different for the shamanic-like condition compared to the control condition, $z = 0.61, p = .271$ (one-tailed).

H4: There is a positive relationship between transliminality (i.e., RTS scores) and direct hits. For the whole sample, the Pearson's correlation between RTS scores and direct hits was positive, but extremely weak and not significant, $r(104) = 0.001, p = .496$ (one-tailed). For the shamanic-like condition, the correlation between RTS scores and direct hits was not positive, $r(53) = -0.02, p = .442$ (one-tailed). And for the control condition, the correlation was not positive, $r(49) = -0.06, p = .344$ (one-tailed). Again using Fischer r to z transformations, the correlation between transliminality and direct hitting was not significantly different for the shamanic-like condition compared to the control condition, $z = 0.20, p = .421$ (one-tailed).

Post Hoc Analyses

An alternative psi measure—sum-of-ranks. Given that the imagery cultivation model is a new paradigm, there was no absolutely objective means or precedent by which we could decide on the appropriate tests on our data, other than to follow Honorton's (1985) advice that the direct hits measure gives a more "conservative" result (p. 54) compared to similar measures.¹⁴ Thus did we decide on direct hits as our measure of choice.

¹⁴ We note that Sargent (1980) describes the alternative to direct hits (i.e., binary hits) as "very insensitive" (p. 7).

Using a conservative measure may seem a reasonable way to proceed, and direct hits is widely used in the Ganzfeld, but the validity of its use rests partly on the proviso that psi is an “all-or-none” phenomenon (Hansen & Utts, 1987, p. 322). However, it is “unclear just how ESP should be expected to manifest in free-response situations” (Hansen & Utts, 1987, p. 322). For example, if items in the target pool are very similar, and two such items happen to find their way by chance into a single target set, then target selection for a given participant may prove difficult. On this basis, the option of giving partial credit to a second (i.e., default) choice, or even third choice, might be adopted in deference to direct hits. With this caveat in mind, Storm and Thalbourne (2001b) initially used the sum-of-ranks test using the sum of ordinal weighted ranks formula (see Solfvin, Kelly, & Burdick, 1978),¹⁵ whereas direct-hits testing was confined to post hoc analyses. Ultimately, Storm and Barrett-Woodbridge (2007) planned the use of both tests, but only for comparative purposes in order to resolve conjectures about how psi might manifest. These two studies (Storm & Barrett-Woodbridge, 2007; Storm & Thalbourne, 2001b) did show that rank data could yield evidence about the phenomenology of psi that was not apparent in a single percent score (i.e., a direct hit rate).

Since we have rank data, and in the interest of exploring the possibility that ranks might tell us more about the nature of psi, we conducted a series of post hoc tests. In the first instance, the following results were obtained: For the shamanic-like condition, the sum-of-ranks statistic was $z = 0.00$, $p = .500$ (one-tailed), and for the control condition, the sum-of-ranks statistic was $z = 0.61$, $p = .271$ (one-tailed). There was no evidence of a psi effect in the shamanic condition. Rank information for the two conditions is given in Tables 1 and 2.

We also found no significant difference between the shamanic-like condition and the control condition on the ranks measure using a Mann-Whitney U test, $z = -0.60$, $p = .275$ (one-tailed).

Bidirectional effects in rank scores. Psi researchers acknowledge that psi effects can manifest in polarized forms—usually as psi hitting and psi missing (e.g., Nash, 1976; Rao, 1965), and on this account, Timm (1983) advises that psi researchers conduct bidirectional rather than unidirectional tests on their data. We note the strategy employed by Storm and Ertel

¹⁵ Level of scoring is determined from the sum-of-ranks score and the corresponding Z score. $Z = (M - U_M \pm 0.5) / \sigma_M$, “where M is the observed sum-of-ranks, $U_M = N(R+1)/2$, and $\sigma_M^2 = N(R - 1)/12$. The 0.5 is the usual continuity correction and has sign opposite to that of $(M - U_M)$ ” (Solfvin, Kelly, & Burdick, 1978, p. 99). Psi-hitting is indicated by a significant sum-of-ranks score that is lower (better) than $MCE = 2.50$. The Z score will be negative because U_M is greater than M .

(2001) of ignoring absolute values and considering magnitudes only in z scores in a 30-study Ganzfeld meta-analysis conducted by Milton and Wiseman (1999). By adopting this strategy, Storm and Ertel found a significant bidirectional effect.

Table 1
Participants' Rank Scores: Shamanic-Like Group ($n = 55$)

Rank Score	Frequency	%
1	19	34.5
2	8	14.5
3	11	20.0
4	17	31.0
Total	55	100.0

Table 2
Participants' Rank Scores: Control Group ($n = 53$)

Rank Score	Frequency	%
1	12	22.6
2	14	26.4
3	10	18.9
4	17	32.1
Total	53	100.0

Following this example, we classified rank #4 as a possible indicator of psi (i.e., psi-missing). As Table 1 indicates for the shamanic-like condition, target selection outcomes appear to be over-represented by ranks #1 and #4, suggesting extreme scoring, which also suggests that psi-hitting *and* psi-missing may have been elicited. Table 2 indicates for the control condition, only rank #4 appears to be over-represented. Figures 2 and 3 show the observed distributions for the shamanic-like condition and the control condition (for actual values, see Tables 1 and 2 above).

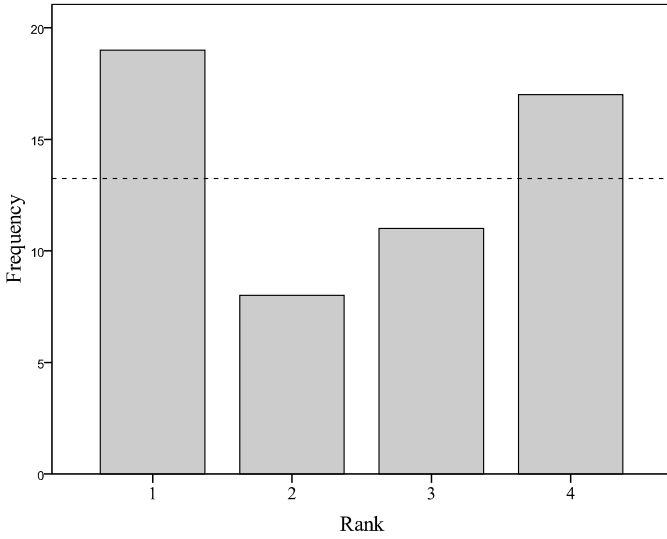


Figure 2. Uniformity distribution for the shamanic-like condition ($n = 53$).

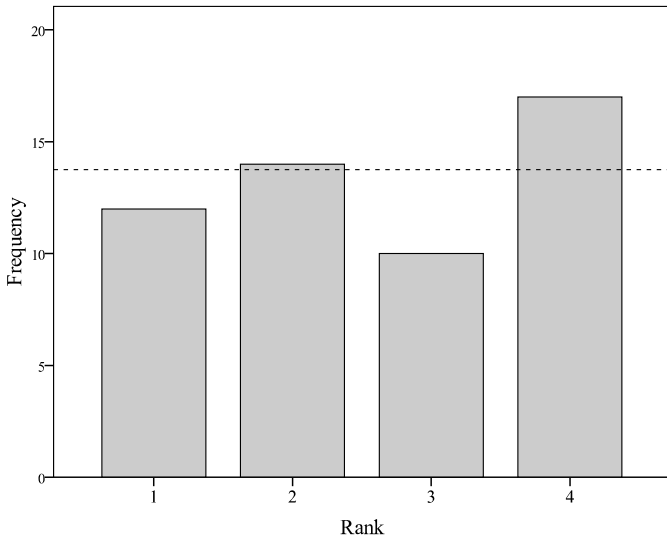


Figure 3. Uniformity distribution for the control condition ($n = 55$).

The expected (flat or uniform) distributions in Figures 2 and 3 are shown as dotted lines. The uniformities of the distributions of target rank scores were tested using a one-sample Kolmogorov-Smirnov test. The four ranks for the shamanic-like condition showed significant deviations from uniformity, $z = 1.66$, $p = .008$ (two-tailed). Thirty-six participants chose either rank #1 or rank #4, which we classified as ‘bidirectional’ or ‘extreme’ psi, yielding a significant overall hit rate of 65.5%, where $P_{MCE} = .50$ (36 hits, $n = 55$, $p = .031$, two-tailed). However, the hit rate on rank #4 only was not significant, 31.0% ($p = .390$, two-tailed).

The four ranks for the control condition also showed significant deviations from uniformity, $z = 1.49$, $p = .023$ (two-tailed). Twenty-nine participants chose either rank #1 or rank #4, yielding an overall hit rate of 54.7%, which was not significant (29 hits, $n = 53$, $p = .582$, two-tailed). Note that the hit rate on rank #4 only was not significant, 32.1% ($p = .303$, two-tailed).

It might be assumed that extreme scoring was unique to the shamanic-like condition, but we point out that the shamanic-like condition and the control condition were not significantly different on extreme scoring, $\chi^2(1, N = 108) = 1.30$, $p = .254$ (two-tailed). In other words, it is only because of the greater number of rank #1 scores in the shamanic-like condition that extreme scoring is significant in the shamanic-like condition. As far as rank scores are concerned, there is no statistical reason to assume that the two conditions represent two heterogeneous groups. Therefore the full sample can be tested as a whole. Using the Kolmogorov-Smirnov test again, ranks for the whole sample showed significant deviations from uniformity, $z = 2.09$, $p < .001$ (two-tailed), as is shown in Figure 4. For the whole sample ($N = 108$), 65 participants (60%) chose either rank #1 or rank #4, which was significant, $p = .042$ (two-tailed). (For hit counts for the whole sample, see Table 3.)

Table 3
Participants’ Rank Scores: Whole Sample ($n = 108$)

Rank Score	Frequency	%
1	31	28.7
2	22	20.4
3	21	19.4
4	34	31.5
Total	108	100.0

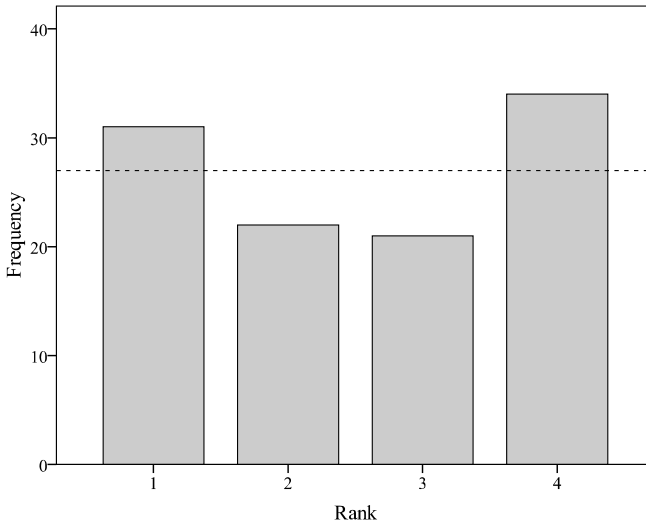


Figure 4. Uniformity distribution for the whole sample ($N = 108$).

This bidirectional effect gives cause to retest Hypotheses 3 and 4, given that the effect compromises the linearity assumption of the tests that were run to test those two hypotheses. Consequently, we re-ran the two bivariate correlational analyses on the RTS and RASGS variables, respectively, but used the extreme scoring variable (i.e., ranks #1 + ranks #4) instead of direct hits.

For the RTS measure, the correlations were not significant for the whole sample, the shamanic-like condition, and the control condition. However, for the RASGS measure in the whole sample, the correlation was negative and significant, $r(104) = -0.19$, $p = .048$ (two-tailed), for the shamanic-like condition the correlation was also negative but only marginally significant, $r(53) = -0.25$, $p = .061$ (two-tailed), and for the control condition the correlation was negative but not significant, $r(49) = -0.20$, $p = .171$ (two-tailed).

The difference in strength between the two correlation coefficients for the respective conditions was assessed using Fischer r to z transformations. The correlation between RASGS scores and extreme scoring was not significantly different for the shamanic-like condition compared to the control condition, $z = -0.26$, $p = .397$ (one-tailed). There was no evidence that psi is influenced by a RASGS/Condition interaction, but it is a sobering thought indeed for the sheep-goat theory that there was a

tendency for low-scorers on the RASGS (i.e., goats) to extreme score rather than sheep.

Effect size—imagery cultivation vs. ganzfeld. In this first study using imagery cultivation as opposed to the noise-reduction model that typifies the Ganzfeld paradigm, we (Storm & Rock, 2009) initially proposed that “parapsychologists must go beyond the assumption that psi effects are optimised under conditions that are inherently passive procedures, and foster techniques that require cognitive action from test participants” (p. 5). In addition, we argued that psi effects obtained using imagery cultivation would be at least as strong as those in the Ganzfeld.

The percent hit rate in our study for the shamanic-like condition ($n = 55$) was 34.5% (19 hits, $\pi = 0.61$), with a corresponding z score of 1.66 ($p = .048$, one-tailed). This z score corresponds to an ES (z/\sqrt{n}) of 0.22. We note that four major independent Ganzfeld meta-analyses report comparable effects as mean values (see Table 4).¹⁶ Specifically, for the present study, the hit rate as a percentage correct of 34.5% falls within the range of percent values given for the four Ganzfeld meta-analyses (i.e., between 31.6% and 36.7%). For the present study, the ES of 0.22 also falls within the range of ES values given for the four Ganzfeld meta-analyses (i.e., between 0.13 and 0.61).

Table 4
Performance Comparisons: Four Independent Ganzfeld Meta-Analyses

Author (Year)	Studies	Hit %	π	ES	z	p
1. Honorton (1985) ^a	28	35.0	0.62	0.24	1.25	.107
2. Bem & Honorton (1994)	10	32.2	0.59	0.61	2.89	.002
3. Storm & Ertel (2001) ^b	11	31.6	0.58	0.21	0.90	.184
4. Bem, Palmer, & Broughton (2001)	10	36.7	0.59	0.13	1.26	.104

^a Cited in Bem and Honorton (1994); ^b z scores and effect sizes are adjusted from those given in Storm and Ertel’s Table 1 (2001, p. 428).

¹⁶ One meta-analysis (Milton & Wiseman, 1999) is effectively an outlier with a very low $ES = 0.013$ (mean $z = 0.13$), so that including this value would inflate the range of values and thus give an invalid indication of the level of success of the present study.

DISCUSSION

In our previous theoretical paper (Storm & Rock, 2009), we made reference to the long and successful history of the Ganzfeld procedure, but we noted its controversial nature, and the ongoing debate over methodology that has been spawned as a result of the Ganzfeld design (Alvarado, 1998; Braud, 2005; Henry, 2004; Scimeca, Boca, & Iannuzzo, 2001). Primarily, criticism of the Ganzfeld revolves around issues to do with the validity of the claims that the Ganzfeld procedure is a test condition that facilitates psi. While these issues are worthy of debate, valuable research time could, however, be spent on developing alternative paradigms and we believe we have made a positive move in this direction—a move that encourages active cognitive processes rather than adherence to passive processes typical of the Ganzfeld. In the present study, we provide both methodological reasons and statistical evidence which support our argument that a shamanic-like journeying protocol of imagery cultivation is at least as effective and efficient as the Ganzfeld.

First, we consider the statistical evidence: In terms of effect size, Hypothesis 1 was supported—the shamanic-like condition did produce a significant effect on the direct hits measure, but the sample was too small for the proportion of direct hits to reach significance. Nevertheless, the direct hit effect was comparable to the mean effect sizes reported in four major independent ganzfeld meta-analyses (see Table 4).

In testing Hypothesis 2, direct hitting for the shamanic-like condition was superior to that of the Control condition, but evidence was only suggestive that the shamanic-like condition facilitated direct hitting significantly better than the control condition ($p = .087$). Failure to find a significant difference may simply be due to insufficient power. While a minimal number of 33 participants in each condition was recommended in our power analysis, we only recruited just over 50% of the recommended maximum number of 100 participants for each condition. We note too that control conditions are rarely implemented for comparative purposes in Ganzfeld experiments (for a brief review, see Parra & Villanueva, 2006), so we are not yet able to make a judgement about the shamanic-journeying technique compared to the Ganzfeld from the perspective of which of the two perform better relative to control conditions. Future experimentation would require comparison of the two procedures in the same study as well as a control condition.

In the search for correlates of psi (see results for Hypotheses 3 and 4), there was no evidence that either paranormal belief (i.e., RASGS scores) or transliminality predict psi. It must be stated that, given the non-independence of the RASGS and the RTS, it might be expected that failure to find statistical support for Hypothesis 3 would mean there was a strong

likelihood of not finding statistical support for Hypothesis 4, and *vice versa*. Even so, it seems atypical that our paranormal belief measure (i.e., RASGS) in our post hoc analyses should indicate a reversal of the sheep-goat effect, whereby goats tended to score more extremely than sheep (i.e., hit more on both ranks #1 and #4). Given the long history of the sheep-goat effect, we cannot attribute too much weight to such a reversal as the finding is only post hoc, and it would have to be replicated before more thought was needed on the matter. More importantly, this effect was not the result of a Sheep-Goat/Condition interaction.

In our post hoc tests, the rank data did not yield a significant z score for the shamanic-like condition, but we add that the distributions of ranks for both conditions (shamanic-like and control), and for the full sample, significantly deviated from uniformity. We also found evidence of a bidirectional effect (i.e., an ‘extreme’ scoring effect—significant preferences for ranks #1 and #4, but only when the two ranks were combined). This effect was independent of condition because rank #4 scoring was effectively identical between conditions, and never significant on its own for either condition (i.e., relative to MCE), so that significant extreme scoring for the shamanic-like condition was mainly attributable to the relatively higher number of rank #1 scores. These results, taken together, mean that there was no statistical evidence of psi-missing *per se*, but the higher than expected number of rank #4 scores in the sample contributes to a general (i.e., extreme) psi effect.

Second, in terms of efficiency, we described above, and gave the experimental parameters of the design for the shamanic-like journeying protocol (see also Storm & Rock, 2009). Researchers are free to make their own judgements as to how easy they think the protocol is to implement in their laboratories, but we point out a number of advantages over the Ganzfeld: First and foremost, in terms of procedure, there is no need for a percipient/agent pair, and individual testing was not necessary—we tested single participants in a group setting (up to three at a time). Second, in terms of materials and apparatus, minimal costs were incurred: (i) target sets of pictures can be hand-drawn or downloaded from the Internet, and envelopes and aluminium foil are readily available; (ii) a photocopy machine is a fixture of most modern offices, (iii) an audio device (CD or cassette player) is easily accessed; and (iv) the pre-recorded CD-R disc or cassette tape with instructions/drumming takes minimal time to produce. Extras such as eye-masks, blankets, pillows, scented candles, etc., might be considered optional, but we stress that participants’ comfort should always be a priority.

Other audio-playing devices (e.g., computer) could be used, and the instructions/drumming can be converted to mp3 format or similar. We note the convenience in using iPods and similar portable audio devices that

might be afforded some researchers with limited laboratory space and equipment. On the issue of technology, our design thus far is primarily non-automated, but it should be clear that much of the procedure can be computer-automated, as is the case with the autoganzfeld procedure, though additional costs would be incurred.

As imagery cultivation using shamanic-like journeying techniques is relatively new territory for psi research, we are of the opinion that (i) the experience of shamanic-like journeying, and/or (ii) instructions for such journeying, and/or (iii) repetitive drumming, and/or (iv) testing participants in small groups, may have variable effects on psi performance in participants. Therefore, future research should investigate which component(s) of the shamanic-like journeying protocol facilitate(s) psi hitting. Furthermore, we intend to investigate other personality traits such as anxiety, openness to experience, and extraversion, in later studies. In particular, it is noted that the so-called ‘lower world’ is often associated with negative affect (Rock, Wilson, Johnson, & Levesque, 2008). For example, Rock et al. (2006) found that a shamanic-like journeying to the lower world group reported significantly higher scores on fear compared to a control group (i.e., sitting quietly with eyes open). Consequently, test participants with, for example, lower trait anxiety may be more suited to the shamanic-like condition.

With regard to instructions, feedback from some participants in the present study indicated that the staggered nature of the verbal instructions may have compromised some participants’ ability to become absorbed. It would be wise to give all instructions at the beginning of the session so that the process of a participant becoming increasingly absorbed in the stimulus condition might continue uninterrupted.

We also acknowledge that imagery cultivation itself need not be “shamanic-like” in nature. Thus, future research should examine whether other imagery cultivation techniques (e.g., Jungian active imagination, Wolberg’s “Theatre Visualisation Technique”) facilitate psi hitting.

It would also be edifying to conduct semi-structured interviews with test participants to obtain feedback about the phenomenological effects of shamanic-like stimulus conditions. Thematic analyses may reveal the experiential qualities associated with identifying psi targets during shamanic-like states.

While it is too early to draw firm conclusions, there is good evidence that the shamanic-like journeying technique may be *at least* as effective and efficient as the Ganzfeld procedure, but we cannot state for certain that shamanic-like journeying facilitates psi any better than a control condition. For these reasons, and on the premise that parapsychologists can reach a greater understanding of paranormal functioning by investigating innovative theory-driven experimental designs that may reveal the nature of psi

processes, we see good reason for further research using imagery cultivation techniques.

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