

Shamanic-Like Journeying and Psi: II. Mental Boundaries, Phenomenology, and the Picture-Identification Task

ADAM J. ROCK AND LANCE STORM

Abstract: Storm and Rock (2009a) argued that it would be worthwhile investigating psi-conducive treatments other than the Ganzfeld. We thus proposed our *imagery cultivation model*. To test our model, Storm and Rock (2009b) randomly assigned non-shaman participants ($N = 108$) to one of two conditions: (1) a control condition ($n = 53$) consisting of sitting quietly with eyes open; or (2) a treatment condition ($n = 55$) involving shamanic-like journeying instructions followed by 15 minutes of monotonous drumming (8 bps). Participants described verbally, and then ranked, a randomly-selected concealed line-drawing held during the condition. The direct hit rate was significant, 34.5% ($P_{MCE} = 25\%$) in the shamanic-like condition, but the hit rate for the control condition was at chance, 22.6%. In the present study, we hypothesised that direct hits correlates with Mental Boundaries (Rawlings, 2001-2002; *Boundary Questionnaire Short Form*) and subjective experience (Pekala, 1991; *Phenomenology of Consciousness Inventory*). We also investigated differences between conditions and ‘thin’ vs. ‘thick’ Mental Boundary participants regarding subjective experience. Direct hits did not correlate significantly with Mental Boundaries, but correlated significantly with PCI major dimension, Internal Dialogue, for the shamanic-like group, but not the control group. Significant differences between the shamanic-like and control groups were found on three PCI major dimensions (higher Negative Affect, Altered Experience, and Imagery in the shamanic-like group) and four minor dimensions (higher Anger, Body Image, Perception, and Meaning in the shamanic-like group). Significant differences between ‘thin’ and ‘thick’ Mental Boundaries were found on two PCI major dimensions (lower Negative Affect and higher Volitional Control in thin Mental Boundaries), but not on minor dimensions. Our findings suggest that subjective experience can be changed using a shamanic-like journeying treatment, and aspects of these changes may be psi-conducive.

Keywords: mental boundaries, phenomenology, Phenomenology of Consciousness Inventory, psi, shamanic-like journeying, shamanism.

INTRODUCTION

In our previous paper (see Storm & Rock, 2009b), we argued that it would be prudent to investigate test conditions that might produce psi effects at least as strong as those produced in the Ganzfeld condition, especially if procedures were less complex than the Ganzfeld. We based our argument on the likelihood that the Ganzfeld does not produce relatively more psi than non-Ganzfeld noise-reduction techniques because it does not produce sufficient levels of visual imagery (which is related to the psi signal). Indeed, due to some possibly inherent ceiling effect in the Ganzfeld design, Storm, Tressoldi, and Di Risio (2010) have shown that the Ganzfeld psi effect, though significant in itself, is not significantly higher than the significant mean effect size of the non-Ganzfeld noise-reduction studies. Alternatively, research using non-shamans (see Rock, Abbott, Childargushi, & Kiehne, 2008; Rock, Wilson, Johnston, & Levesque, 2008; Woodside, Kumar, & Pekala, 1997) has shown that participants exposed to a shamanic-like stimulus condition (i.e., ‘journeying’ with the aid of monotonous drumming) reported significantly more visual imagery compared to a control group. As a consequence, since psi effects (PK and ESP) induced during shamanic-states have also been reported extensively in the literature (e.g., Krippner, 1984; Nelson, Jahn, Dunne, Dobyns & Bradish, 1998; Nelson & Radin, 2003; Saklani, 1988), we developed the so-called ‘imagery cultivation model’ as a means by which a shamanic-like technique might elicit psi effects in the laboratory *at least* as strong as the Ganzfeld, and perhaps stronger, but with less procedural complexity.

Our model regards shamanic techniques and, similarly, shamanic-like techniques, as being psi-conducive, with the alleged psi signal being somehow embedded in the cultivated imagery. The present study reports psi test results other than those reported previously in Storm and Rock (2009b). Specifically, we set out to examine the relationships between psi (i.e., direct hits) and (i) Mental Boundaries, and (ii) subjective experience (i.e., phenomenology).¹ We were also interested in group differences in (ii). Mental Boundaries and phenomenology are now discussed.

Mental Boundaries

In the 1920s, Paul Federn first introduced the concept of ‘mental boundaries’. He suggested that mental boundaries— notions of self awareness, self-determination, and individual integrity—are essential for

¹ For a detailed report on hit rates, see Storm and Rock (2009b, pp. 177-178).

proper ego functioning in order that the ego (or self) might be differentiated from every other psychic constituent. The so-called mental boundary essentially divides the real from the unreal (Federn, 1952). Mental boundaries are considered prerequisites for the full functioning of the individual. The ‘thinness’ or ‘thickness’ of mental boundaries determines the degree to which one becomes absorbed with work, one’s social life, and how one experiences joy and love. Mental Boundaries correlates moderately and significantly with a conceptually similar variable, Transliminality (Houran, Ashe, & Thalbourne, 2003; Houran, Thalbourne, & Hartmann, 2003; Sherwood & Milner, 2004; Thalbourne & Houran, 2000). However, we refer readers to Part I of this study (Storm & Rock, 2009b), in which Transliminality did not correlate significantly with direct hits (Storm & Rock, 2009b).

Individuals with more permeable boundaries do not readily differentiate thoughts and feelings; they are empathic to others, have a tendency to dislike precision and neatness, and have a preference for flexible living spaces (Hartmann, Russ, Oldfield, Sivan, & Cooper, 1987). Moreover, they do not believe in distinct organisational roles in society, and do not feel that gender, race and religious groups are clearly distinguishable, and they do not readily distinguish right from wrong. These individuals frequently report unusual and strange experiences in many situations, and often have difficulty distinguishing sleep from waking states (Rawlings, 2001-2002).

Such characteristics may be ideal for receiving psi signals, for if an individual’s mental boundaries are thin and soft (less thick and rigid), then they are less likely to hold a consistent perspective on reality, and may be more likely to receive anomalous transfers of information such as other’s thoughts or precognitive signals (Ehrenwald, 1971). In fact, Richards (1996) found that a permeable mental boundary, characterised by empathy and fluidity of thoughts and feelings, is a good predictor of success rates in psi tasks.

The Phenomenology of Consciousness Inventory

Shamanic-like experiences may be quantified using a methodology that was developed by Pekala (1985) to “operationally define, map and diagram states and altered states of consciousness” (p. 207).² The methodology consists, in part, of a novel retrospective phenomenological assessment instrument referred to as the Phenomenology of Consciousness

² Rock and Krippner (2007a,b, in press) have argued that ‘altered states of consciousness’ may be more appropriately described as ‘altered patterns of phenomenal properties’.

Inventory (PCI; Pekala, 1991). The PCI is a 53-item questionnaire consisting of 12 major dimensions or phenomenological (i.e., subjective) elements (e.g., Positive Effect, Altered Experience, Visual Imagery, Rationality), and 14 minor dimensions (e.g., Fear, Joy, Altered Body Image, Absorption). One may operationally define or 'map' phenomena typically referred to as states of consciousness and altered states of consciousness (ASCs) by quantifying: (1) the intensity of each phenomenological element; and (2) the strength of relationships between pairs of phenomenological elements. The PCI has been used to map and diagram phenomenology facilitated by, for example, progressive relaxation (e.g., Pekala, Forbes, & Contrisciani, 1989), hypnosis (Pekala & Kumar, 1984, 1986, 1989), and eyes closed sitting quietly (e.g., Pekala & Kumar, 1989). Recent experimental research (e.g., Woodside et al., 1997) has applied this methodology to shamanic-like journeying experiences. However, to date, no published studies have applied Pekala's (1985) methodology to map the phenomenological effects of a shamanic-like condition designed to assess psi performance.

Furthermore, one may use PCI data to construct graphs referred to as 'psygrams' that pictorially represent the intensity and pattern of relationships between pairs of phenomenological elements derived from a squared correlation matrix (Pekala, 1991). A psygram depicts two types of information associated with exposure to a stimulus condition: (1) the average intensity values (ranging from 0-6) for each PCI major dimension; and (2) the strength of association between pairs of PCI major dimensions (Pekala & Kumar, 1986).

The performative function of a psygram directly impinges on Tart's (1975) notion of a discrete (i.e., specific) state of consciousness (d-SoC), which may be defined as a "unique configuration or system of psychological structures or subsystems . . . that maintains its integrity or identity as a recognizable system in spite of variations in input from the environment and in spite of various (small) changes in the subsystems" (p. 62).

Pekala (1985) states that, in Tart's view, it is the pattern formed by these various psychological structures (i.e., phenomenological elements) that comprises a d-SoC. Consequently, if the psygram associated with a baseline or control condition is significantly different from a psygram associated with, for example, a shamanic-like journeying condition, then one may conclude that the journeying condition was associated with a "major reorganization in pattern structure that is hypothesised by Tart (1975) to be associated with an altered state of consciousness" (Woodside et al., 1997, p. 84). That is, the pattern structure of the d-SoC associated with the journeying condition would be considered significantly altered relative to the pattern structure of the d-SoC associated with the control condition.

Aims of the Study

The present study had three aims: (i) to determine if the Mental Boundaries measure correlated with psi performance, (ii) to determine if any PCI variables correlated with psi performance, and (iii) to determine if there were main effects, and an interaction effect, for condition and Mental Boundaries regarding phenomenology. The following hypotheses were proposed:

H1: Mental Boundaries scores correlate with psi performance.

H2: PCI major and minor variables correlate with psi performance.

H3: There is a difference between shamanic-like and control groups with regards to: (a) the combined PCI major dimensions scores; and (b) the combined PCI minor dimension scores.

H4: There is a difference between thin mental boundary participants vs. thick mental boundary participants with regards to: (a) the combined PCI major dimension scores; and (b) the combined PCI minor dimension scores.

H5: Condition interacts with Mental Boundaries with regards to: (a) the combined PCI major dimension scores; and (b) the combined PCI minor dimension scores.

(Regarding Hypotheses 3, 4, and 5, we point out that it is more parsimonious to perform multivariate, rather than univariate analyses when one wishes to examine group differences on multiple, related dependent variables. Consequently, in the case of the PCI major and minor dimensions, multivariate analyses of variance (MANOVAs) were performed. MANOVAs yield multivariate results (i.e., results concerning the *combined* dependent variables). If a significant multivariate effect is found, then examination of the various univariate effects (i.e., results concerning each *individual* dependent variable) is warranted. Thus, a 'multivariate effect' refers to an effect on combined dependent variables (on MANOVA, see Tabachnick & Fidell, 2007).

METHOD

Participants

The sample consisted of 108 participants, most of whom were students from Deakin University, Melbourne, or family members and

friends of Deakin students. Participants were recruited by all five researchers in the experiment.³ 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 21 years, and the 75th percentile was 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). Participation in the present study was voluntary. Two participants (one from each group) did not complete the PCI thus reducing the group sizes to $n = 52$ (control) and $n = 54$ (shamanic-like) for tests on PCI data.

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, with eyes masked.);⁴ 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. This procedure follows the recommendations of Harner (1990).

Two students (M.H. and E.S.) 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

³ Shoshana Grossman (S.G.), Monica Hainal (M.H.), Kristy Jensen (K.J.), Aaron McNaughton (A.M.), and Emile Sido (E.S.).

⁴ Monotonous drumming at 8 b.p.s. for 15 minutes was used in the present study because Rock, Baynes and Casey (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.

target picture was selected from the four (thus, a target set was comprised of the target picture plus three decoys).⁵

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.

Materials

Three sets of material were used in the experiment: (1) PLS (instructions and provision for personal details) with Consent Form; (2) the *Boundary Questionnaire Short Form* (Rawlings, 2001-2002); and (3) the *Phenomenology of Consciousness Inventory* (Pekala, 1991).

The *Boundary Questionnaire Short Form* (BQ-Sh; Rawlings, 2001-2002) was used in the present study to quantify the 'thinness' of participants' Mental Boundaries. The BQ-Sh consists of 46 items with a five-point Likert scale and contains six subscales: Unusual Experiences, Need for Order, Childlikeness, Perceived Competence, Trust, and Sensitivity (Rawlings, 2001-2002). BQ-Sh items include "In my daydreams, people kind of merge into one another or one person turns into another" and "I have had the experience of someone calling me or speaking my name and not being sure whether it was really happening or I was imagining it." The BQ-Sh has adequate reliability (with alpha coefficients ranging from .69 to .80) and is strongly correlated with the original Boundary Questionnaire ($r = .88$), indicating adequate validity (Rawlings, 2001-2002). In the present study, a median-split was performed on participants' Boundary scores. Participants who scored equal to, or greater than, the median were allocated to the 'thin' Boundary group, while participants who scored below the median were allocated to the 'thick' Boundary group. A median split was preferred to a mean split for distinguishing between thin and thick Boundary scorers primarily because, with 4 cells in the subsequent multivariate analysis of variance and a relatively small sample size, it was important that the cell sizes were as equal as possible. The median split resulted in the following group sizes for each factorial combination: thin Boundary/shamanic-like group ($n = 22$), thick Boundary/shamanic-like group ($n = 32$), thin

⁵ As there are 45 pictures sets, and 108 participants, some sets were used more than once.

Boundary/control group ($n = 31$), and thick Boundary/control group ($n = 21$).

The *Phenomenology of Consciousness Inventory* (PCI; Pekala, 1991) is a 53-item scale used to assess the phenomenological effects of different stimulus conditions (i.e. hypnosis, meditation). The PCI contains 26 (sub) dimensions including 12 major dimensions (Positive Affect, Negative Affect, Altered Experience, Visual Imagery, Attention, Self Awareness, Altered State of Awareness, Internal Dialogue, Rationality, Volitional Control, Memory and Arousal), and 14 minor dimensions (Joy, Sexual Excitement, Love, Anger, Sadness, Fear, Altered Body Image, Altered Time Sense, Altered Perception, Altered or Unusual Meaning, Amount of Imagery, Vividness of Imagery, Direction of Attention and Absorption) (Pekala, 1985). Participants are asked to respond to each item on a seven-point Likert scale. The PCI has respectable psychometric properties (e.g., Pekala, 1991). For example, the PCI has been shown to reliably discriminate between qualitatively different states of consciousness (thus supporting the scale's criterion validity), and has demonstrated good internal consistency, yielding coefficient alphas between .70 and .90 (Pekala, Steinberg, & Kumar, 1986).

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.⁶ Each picture had a four-digit number written on the back for use in the randomization process. The set of 180 pictures was 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.

⁶ 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, 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: Each experimenter tested participants in small groups two or three at a time with a different set for each participant; they also administered the Plain Language Statement (PLS), Consent Form, personality questionnaires, and the PCI to each participant. 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, which they wore for the full 19 minutes; (v) played the CD-R recording which consisted of instructions adapted from Harner (1990, p. 32—these are given in full in Storm and Rock, 2009b, pp. 173-174).

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. Finally, each participant completed the PCI.

Testing was conducted between June and August 2009. Participants were debriefed after testing. 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.

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 (iv) 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.⁷

RESULTS

Planned Analyses

H1: Mental Boundaries scores correlate with psi performance. For the whole sample ($N = 108$), the Pearson's correlation between Mental Boundaries (Total) scores and direct hits was negative, but extremely weak and not significant, $r(106) = -0.03$, $p = .784$ (two-tailed; note that $N = 108$, except for PCI data analyses, where $N = 106$, as pointed out above on p. 46). For the shamanic-like condition, the correlation between Mental Boundary scores and direct hits was negative, $r(53) = -0.11$, $p = .420$ (two-tailed), and for the control condition, the correlation was positive, $r(51) = 0.05$, $p = .749$ (two-tailed). For the six Mental Boundary subscales (i.e., Unusual Experiences, Need for Order, Childlikeness, Perceived Competence, Trust, and Sensitivity), no tests yielded significant results, for the whole sample, or for the two groups. The hypothesis was not supported.

⁷ Both reviewers of our paper critiqued our control condition. Our *Procedure* indicates that controls did not (i) lie down, (ii) close their eyes, (iii) wear eye masks, (iv) follow the visualization instructions, or (v) listen to monotonous drumming, but these are all integral components of Harner's (1990) journeying method. Consequently, matching treatment with control with any of these components would be unwise because it would potentially contaminate the control. Indeed, there may be interaction effects or additive effects between the various components of Harner's (1990) method and it is currently unclear which, if any, component(s) is(are) psi-conductive.

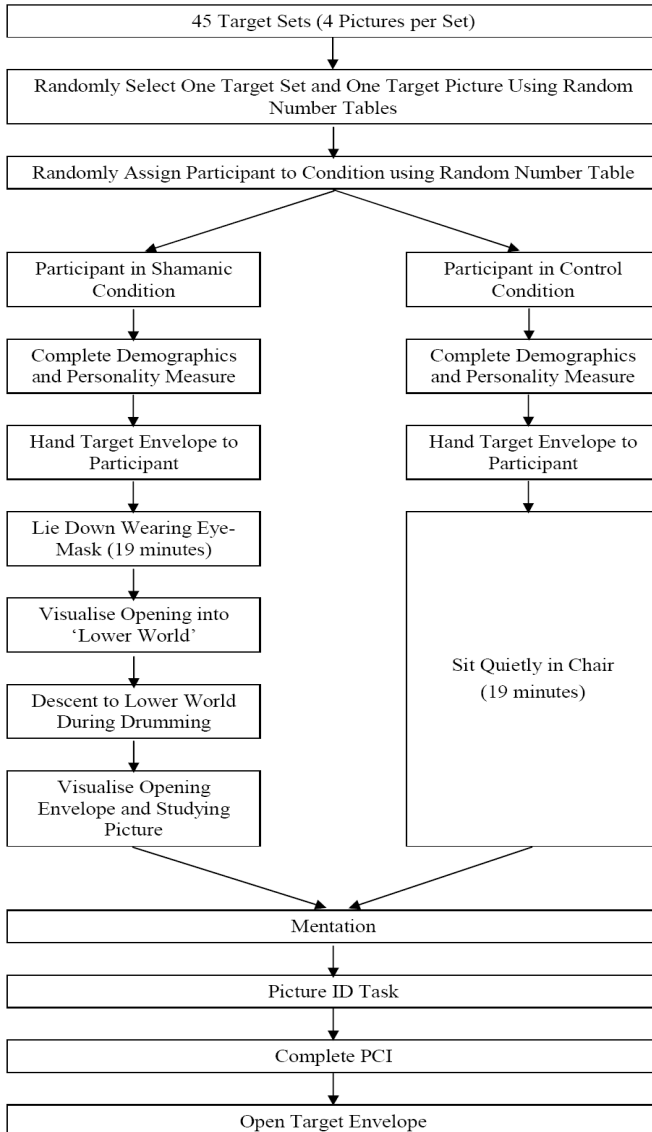


Figure 1. Schematic diagram of experimental protocol.

H2: PCI major and minor variables correlate with psi performance. Results are presented in Table 1. A relationship between direct hit rates and PCI-Internal Dialogue was positive and significant for the shamanic-like group, $r(52) = .28, p < .05$. Using a Fisher r to z transformation, the correlation for the shamanic-like condition was not significantly different to that of the control condition ($r[50] = .14, p > .05$), $z = 0.71, p = .239$ (one-tailed). No other correlations were significant.

H3: There is a difference between shamanic-like and control groups with regards to: (a) the combined PCI major dimension scores; and (b) the combined PCI minor dimension scores.

(a) A two-way between-subjects MANOVA was conducted with condition (shamanic-like and control) and Mental Boundaries (thin and thick) as independent variables (IVs) and the 12 PCI major dimensions as dependent variables (DVs).⁸ A significant difference was found between conditions with regards to the combined PCI major dimension variables, $F(12, 91) = 2.99, p = .001$ (Wilks' Lambda = .72; partial $\eta^2 = .28$). After Bonferroni adjustments (adjusted alpha = .004), separate univariate analyses revealed significant results for Negative Affect, $p = .001$; Altered Experience, $p < .001$; Imagery, $p < .001$; and Altered State, $p < .001$. As can be seen from Table 2, the shamanic-like group reported significantly higher Negative Affect, Altered Experience, Imagery, and Altered State intensity ratings compared to the control group.

(b) A separate two-way between-subjects MANOVA was conducted with condition and Mental Boundaries as IVs and the 14 PCI minor dimensions as DVs. A significant difference was found between conditions with regards to the combined PCI minor dimension variables, $F(13, 90) = 5.09, p < .001$ (Wilks' Lambda = .576; partial $\eta^2 = .424$). After Bonferroni adjustments (adjusted alpha = .004), separate univariate analyses revealed significant results for Anger, $p < .001$; Body Image, $p = .002$; Perception, $p < .001$; Meaning, $p < .001$; and Amount, $p < .001$. As can be seen from Table 2, the shamanic-like group reported significantly higher Anger, Body Image, Perception, Meaning, and Amount intensity ratings compared to the control group.

⁸ In order to avoid violating the assumption of multicollinearity, separate two-way between-groups MANOVAS were performed on PCI major and minor dimension scores (Woodside et al., 1997).

Table 1
Correlations: Direct Hits with PCI Dimensions (Shamanic-Like & Control)

PCI Dimensions	Shamanic-Like Direct Hits	Control Direct Hits
Positive Affect	.032	.061
Joy	-.019	.095
Sexual Excitement	.138	.091
Love	-.041	-.022
Negative Affect	-.090	-.101
Anger	-.049	.077
Sadness	-.055	-.133
Fear	-.082	-.232
Altered Experience	.075	-.129
Body Image	.142	-.090
Time Sense	.023	-.133
Perception	-.021	-.107
Meaning	.088	-.090
Visual Imagery	-.064	.004
Amount	.088	-.090
Vividness	-.156	.083
Attention	-.123	.056
Direction	-.197	.026
Absorption	.016	.065
Self-Awareness	-.122	-.148
Altered State	.014	-.209
Internal Dialogue	.278*	.142
Rationality	.232	.171
Volitional Control	.092	.037
Memory	.054	-.051
Arousal	.022	-.049

* $p < .05$

Table 2
Mean Differences on Major/Minor PCI Dimensions (Shamanic-Like & Control)

PCI Dimension	Shamanic-Like		Control		<i>F</i>	<i>p</i>	Partial η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Positive Affect	1.73	1.11	1.77	1.09	0.09	.769	.001
Joy	2.12	1.39	1.59	0.99	4.05	.047	.038
Sexual Excitement	0.99	1.29	1.36	1.65	1.61	.208	.016
Love	2.07	1.74	2.37	1.52	0.88	.350	.009
Negative Affect	2.36	0.99	1.63	0.94	11.23	.001	.099
Anger	4.41	1.50	3.04	1.52	17.31	.000	.145
Sadness	1.28	1.43	1.14	1.29	0.04	.836	.000
Fear	1.40	1.53	0.70	0.98	5.21	.025	.049
Altered Experience	2.61	1.05	1.74	1.00	15.37	.000	.131
Body Image	2.85	1.43	1.87	1.27	10.31	.002	.092
Time Sense	3.19	1.53	2.78	1.64	0.96	.331	.009
Perception	2.32	1.24	1.14	1.02	23.99	.000	.190
Meaning	2.10	1.20	1.14	0.89	17.85	.000	.149
Visual Imagery	2.83	1.09	2.01	0.79	15.48	.000	.132
Amount	2.10	1.20	1.14	0.89	17.85	.000	.149
Vividness	3.57	1.56	2.89	1.05	5.04	.027	.047
Attention	3.09	1.00	3.36	1.07	1.74	.190	.017
Direction	3.36	1.39	3.47	1.26	0.07	.790	.001
Absorption	2.82	1.61	3.26	1.33	2.62	.109	.025
Self-Awareness	3.75	1.34	4.33	1.04	4.20	.043	.040
Altered State	2.80	1.58	1.58	1.38	14.55	.000	.125
Internal Dialogue	3.15	1.90	3.02	1.88	0.03	.873	.000
Rationality	3.75	1.29	4.25	1.17	3.12	.081	.030
Volitional Control	3.25	1.48	4.03	1.26	4.97	.028	.046
Memory	4.49	1.15	4.44	0.88	0.14	.713	.001
Arousal	1.82	1.53	1.74	1.30	0.07	.797	.001

Table 3

Mean Differences on Major/Minor PCI Dimensions: Thin/Thick Scores (Mental Boundaries)

PCI Dimension	BQ Thin		BQ Thick		<i>F</i>	<i>p</i>	Partial η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Positive Affect	1.69	1.08	1.81	1.13	0.33	.568	.003
Joy	1.68	1.13	2.04	1.32	1.23	.270	.012
Sexual Excitement	1.18	1.53	1.16	1.44	0.03	.874	.000
Love	2.22	1.49	2.22	1.78	0.04	.843	.000
Negative Affect	1.60	0.92	2.40	0.98	14.28	.000	.123
Anger	3.16	1.73	4.31	1.37	10.54	.002	.094
Sadness	1.00	1.24	1.43	1.45	2.34	.129	.022
Fear	0.65	0.92	1.46	1.55	8.05	.005	.073
Altered Experience	1.83	1.06	2.53	1.06	8.08	.005	.073
Body Image	1.91	1.20	2.83	1.50	8.99	.003	.081
Time Sense	2.69	1.69	3.30	1.43	3.28	.073	.031
Perception	1.41	1.19	2.07	1.29	4.29	.041	.040
Meaning	1.33	1.07	1.94	1.17	4.70	.033	.044
Visual Imagery	2.13	0.96	2.73	1.04	6.33	.013	.058
Amount	1.33	1.07	1.94	1.17	4.70	.033	.044
Vividness	2.93	1.35	3.53	1.35	3.44	.066	.033
Attention	3.24	1.07	3.21	1.02	0.01	.930	.000
Direction	3.52	1.38	3.32	1.27	0.48	.488	.005
Absorption	2.97	1.52	3.10	1.47	0.56	.458	.005
Self-Awareness	4.37	1.04	3.70	1.32	6.49	.012	.060
Altered State	1.78	1.53	2.62	1.58	4.79	.031	.045
Internal Dialogue	2.90	1.93	3.27	1.83	0.94	.334	.009
Rationality	4.23	1.27	3.76	1.20	2.50	.117	.024
Volitional Control	4.26	1.29	3.01	1.28	21.58	.000	.175
Memory	4.53	1.06	4.40	0.99	0.53	.469	.005
Arousal	1.40	1.16	2.16	1.56	8.03	.006	.073

H4: There is a difference between thin mental boundary participants vs. thick mental boundary participants with regards to: (a) the combined PCI major dimension scores; and (b) the combined PCI minor dimension scores.

(a) A significant difference was found between the Mental Boundaries thin and thick scorers with regards to the combined PCI major dimension variables, $F(12, 91) = 2.67, p = .004$ (Wilks' Lambda = .74; partial $\eta^2 = .26$). After Bonferroni adjustments (adjusted alpha = .004), separate univariate analyses revealed significant results for Negative Affect, $p < .001$, and Volitional Control, $p < .001$. Arousal, $p = .006$ (thick were higher), and Altered Experience, $p = .005$ (thick were higher), also approached significance. As can be seen from Table 3, the thin Mental Boundaries scorers reported significantly lower Negative Affect intensity ratings and significantly higher Volitional Control intensity ratings compared to the thick Mental Boundaries scorers.

(b) No significant difference was found between thin and thick scorers with regards to the combined PCI minor dimension variables, $F(13, 90) = 1.63, p = .092$ (Wilks' Lambda = .81; partial $\eta^2 = .19$).

H5: Condition interacts with Mental Boundaries with regards to: (a) the combined PCI major dimension scores; and (b) the combined PCI minor dimension scores.

The interactions between condition and Mental Boundaries were not significant with regards to the combined PCI major dimensions: $F(12, 91) = .66, p = .79$ (Wilks' Lambda = .92; partial $\eta^2 = .08$); or minor dimensions: $F(13, 90) = .71, p = .75$ (Wilks' Lambda = .91; partial $\eta^2 = .09$).

Post Hoc Analyses

Psygrams were constructed to evaluate the patterns of relationships between pairs of phenomenological elements (i.e., PCI major dimensions) for the control (Figure 2) and shamanic-like journeying conditions (Figure 3), respectively. The pattern of PCI major dimensions is noticeably different for the shamanic-like journeying group relative to the control group. A Box test of the equality of covariance matrices⁹ revealed that the difference

⁹ The Jenrich (1970) Test is the appropriate statistical procedure to assess pattern differences associated with the 12 major dimensions of the PCI (Pekala, 1991). However, Pekala (1991, p. 235) asserts that the Jenrich Test is a "large-sample multivariate procedure" requiring a

between psygrams was marginally significant, $F(78, 34053.43) = 1.59, p = .001$; Box M = 140.77.^{10, 11}

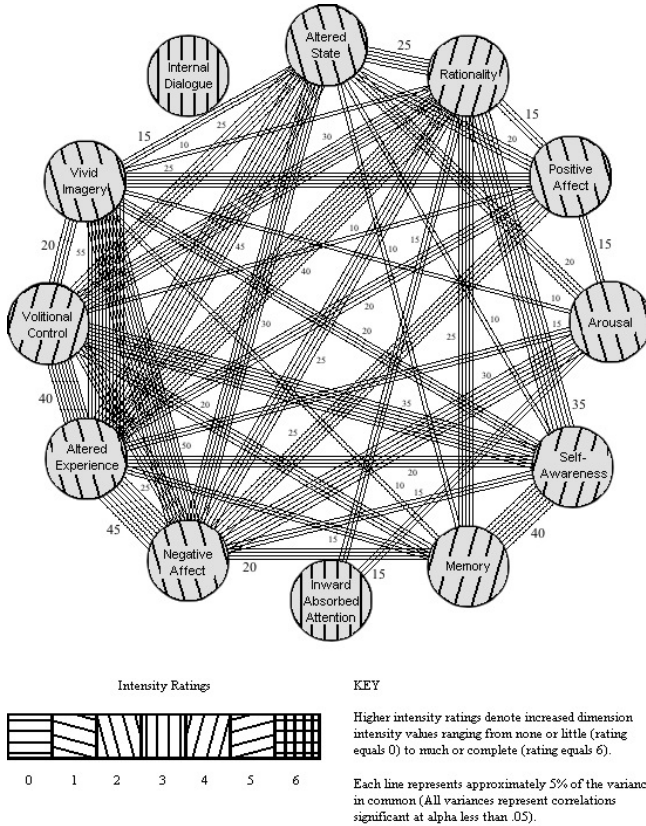


Figure 2. Psygram for control group.

minimum of 60 participants per condition (provided that all 12 major dimensions of the PCI are being examined). Given that the present study did not meet this sample size requirement, the Jenrich Test was not appropriate. Consequently, a Box Test comparison was performed (Pekala, 1991).

¹⁰ The Box M statistic “tests the homogeneity of variance-covariance matrices” (Tabachnick & Fidell, 2007, p. 252).

¹¹ The Box Test is typically held to be overly sensitive with regards to the detection of differences between independent correlation matrices. Consequently, convention dictates that the alpha level associated with the Box Test should be set at $p < .001$ (Tabachnick & Fidell, 2007).

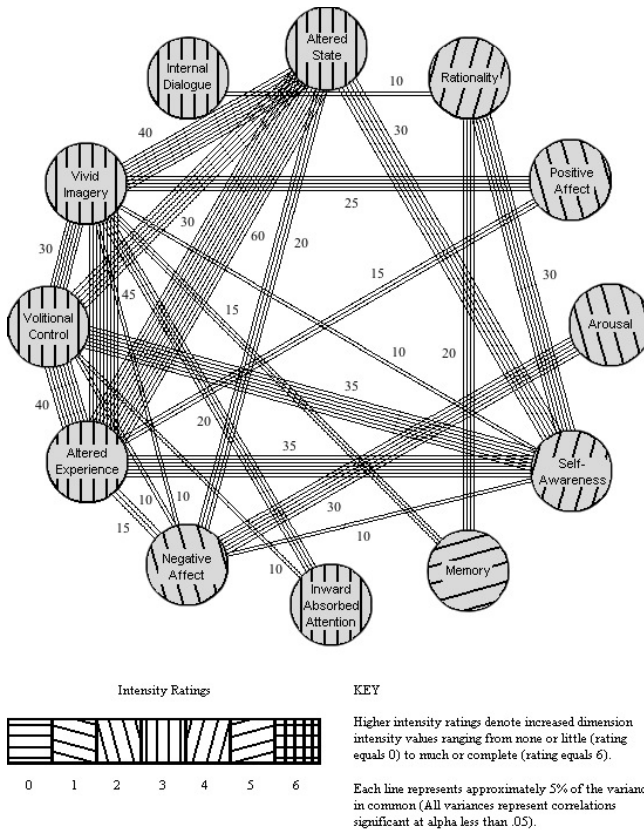


Figure 3. Psygram for shamanic-like group.

In the control condition (Figure 2), we can see a relatively weaker coupling between Altered State and Altered Experience compared to the shamanic-like condition (see Figure 3). Also, the coupling is stronger in the shamanic-like condition for Altered State and Self-Awareness, and Altered Experience and Self-Awareness. These differences suggest that the subsystems of consciousness differ between the two conditions. It is also observed that there a reduced number of couplings for Altered State, Altered Experience, Vivid Imagery, Negative Affect, Positive Affect, Memory, Arousal, and Rationality, in the shamanic-like condition compared to the control condition. Again, these differences in the number of couplings

may indicate relatively different states of ‘dissociation’ of consciousness for the two conditions (see DISCUSSION for further comment).

DISCUSSION

We hypothesized that psi (direct hits) would correlate with Mental Boundaries (total score, and sub-scale scores), but our test results were not significant. If thin Mental Boundaries are conducive to anomalous transfers of information, and may thereby be a good predictor of success rates in psi tasks (Ehrenwald, 1971; Richards, 1996), we found no evidence for it in our study. We note too that Transliminality, a related concept, did not correlate significantly in our previous study (see Storm & Rock, 2009b). However, given the moderate relationship between Transliminality and Mental Boundaries (i.e., their non-independence), we can see that what holds true for one variable may hold true for another since it is likely that Transliminality and Mental Boundaries are underscored by a common ‘threshold’ factor, as is implied by Houran, Ashe, and Thalbourne (2003).

Having tested for phenomenological correlates of psi (see results for Hypothesis 2), we found that only Internal Dialogue correlated significantly with direct hitting. More specifically, this correlation was positive and significant for the shamanic-like group, but not the control group. This finding suggests that, for the shamanic-like group, as auditory mental imagery increases (or better, internal ‘chatter’ that the participant experiences as he/she dialogues or ‘thinks’ silently to him- or herself), so does the direct hit rate. This result is not consistent with the Ganzfeld *noise-reduction model* which argues that mental quietude renders the psi signal more easily detected. In contrast, the finding regarding Internal Dialogue broadly supports our *imagery cultivation model* which suggests that cognitive activity may be psi-conducive. It is noteworthy, however, that the significant correlation between Internal Dialogue and direct hitting may be an artefact of performing multiple tests (e.g., 52 correlations), and thus a Type I error. In any event, the Fisher r to z transformation revealed that the correlation between Internal Dialogue and direct hitting was not significantly stronger for the shamanic-like group compared to the control group.¹² We also note, however, that Internal Dialogue does not

¹² One referee of this article noted that there were no significant correlations between Internal Dialogue and the other 11 PCI dimensions in the control condition, but there was a significant correlation between Internal Dialogue and rationality in the shamanic-like group. He notes too that the only PCI dimension that distinguished between the two groups for direct hitting was Internal Dialogue (R. J. Pekala, personal communication, June 4, 2010). Given that shamanic-

discriminate between: (i) auditory, verbal mental imagery *concerning journeying*; and (ii) *extraneous* auditory, verbal mental imagery. That is, this PCI dimension merely quantifies the extent to which “I was silently talking to myself a great deal” (Pekala, 1991, p. 355). Consequently, it is unclear whether or not (i) and/or (ii) facilitate psi-hitting.

A significant multivariate effect was found for condition with regards to the PCI major dimensions. This finding suggests that there was a significant overall effect for the condition factor on the PCI major dimensions, while ignoring the influence of Mental Boundaries. More specifically, a significant difference was found between the shamanic-like group and the control group with regards to the PCI major dimensions of Negative Affect, Altered Experience, Imagery, and Altered State of Awareness. The shamanic-like group reported significantly higher negative affect compared to the control group. Walsh (1989, 1995) suggests that ‘journeying’ may promote intensifications in positive or negative affect depending on the nature of the mental imagery reported by the percipient. Indeed, it is noteworthy that in the anthropological literature the ‘lower world’ is frequently characterized as ‘funerary’ and a “place of tests and challenges” Walsh (1990, p. 147; e.g., battles with predatory creatures, encounters with treacherous obstacles such as rivers) that may induce negative affect. In contrast, the ‘upper world’ is typically conceptualized as a ‘heavenly realm’ (Rock, Wilson, Johnston, & Levesque, 2008), and, therefore, linked to positive affect. Consequently, the present study’s finding regarding negative affect is consistent with the fact that participants were instructed to journey to the ‘lower world’.

The shamanic-like group also reported significantly higher altered experience ratings relative to the control group. The altered experience major dimension consists of the following minor dimensions: Altered Time Sense (e.g., dilation, the eternal ‘now’), Altered Body Image (e.g., spatial expansion), Altered Perception (i.e., changes in the size or shape of external stimuli, e.g., a table), and Altered Meaning (e.g., a sense of sacredness). Thus, the shamanic-like group was associated with alterations in phenomenology relative to ordinary waking consciousness. This result is consistent with previous research (e.g., Rock, Abbott, Childargushi, & Kiehne, 2008).

The shamanic-like group reported significantly higher ratings concerning Visual Imagery (i.e., Vividness and Amount) compared to the control group. This is not a surprising finding given that shamanic-like participants were instructed to cultivate a series of visual mental imagery

like journeying elicits a cognitive ‘activity’, we might expect some degree of increased relationship between Internal Dialogue and rationality.

sequences whereas controls were not. This finding is also consistent with previous experimental studies that have linked journeying to increases in the intensity of Visual Imagery ratings (e.g., Rock, Wilson, Johnston, & Levesque, 2008).

Finally, the shamanic-like group reported a significantly higher Altered State of Awareness rating compared to controls. This suggests that shamanic-like participants experienced a subjective sense of an Altered State of Awareness relative to ordinary waking states. This finding is broadly consistent with the notion that journeying experiences constitute ASCs (e.g., Walsh, 1995; but also see Krippner, 2002 for a different view).

A significant multivariate effect was also found for condition with regards to the PCI minor dimensions. More specifically, a significant difference was found between the shamanic-like group and the control group with regards to the PCI major dimensions of Anger, Body Image, Perception, Meaning, and Amount. The shamanic-like group reported significantly higher Anger compared to the control group. As previously stated, this finding is consistent with the fact that journeying to the 'lower world' is often characterized by negative affect. Semi-structured interviews with participants may reveal which aspects of their journeying experience promoted anger.

The shamanic-like group also reported significantly higher Altered Body Image ratings relative to the control group. This finding is consistent with the notion that during 'journeys' the shaman's self-sense is experienced as a 'soul' distinct from the physical body (see, for example, Walsh, 1995). However, the present study's findings need to be interpreted with caution given that the PCI-Altered Body Image minor dimension ostensibly measures, for example, unitive absorption in a metaphysical entity (Pekala, 1991), but not Mental Boundaries 'soul-flight'.

The shamanic-like group reported significantly higher Altered Perception ratings relative to the control group. This finding suggests that shamanic-like participants experienced dramatic changes in the world around them compared to control participants. This finding is consistent with the fact that shamanic-like participants were instructed to journey from ordinary reality (i.e., the terrestrial world; Earth) to non-ordinary reality (i.e., the 'lower world') whereas control participants were not.

The shamanic-like group reported significantly higher Altered Meaning ratings relative to the control group. Consequently, shamanic-like participants were more likely to label their experience as 'religious', 'spiritual' or 'sacred' compared to control participants. Indeed, the monotonous drumming may have functioned as a contextual variable (i.e., the drumming may have had a ritualistic or ceremonial connotation for many participants) that increased the probability that shamanic-like participants would label their experiences in this manner (i.e., applying

terms such as ‘sacred’) during the post-experiential phase of auto-interpretation.

The shamanic-like group reported significantly higher Visual Imagery Amount ratings relative to the control group. As previously stated, this result is consistent with the fact that shamanic-like participants were administered guided imagery instructions whereas control participants were not.

In the section *Post Hoc Analyses*, we found that the two psygrams give some support to the statistical differences between groups reported above. In addition, the coupling between Altered Experience and Altered State was stronger for the shamanic-like group. Also, the reduced number of couplings in the shamanic-like group suggests that “the ‘loosening up’ of the association among PCI dimensions (possibly as a result of the shamanic-like practice) may be related to the increased psi-hitting of this group” (R. J. Pekala, personal communication, June 4, 2010). We would tentatively agree with Pekala given that the shamanic-like journeying practice was designed as a psi-conducive treatment that would alter the subjective experience of participants, which in turn would facilitate the cultivation of psi-related imagery.

A significant multivariate effect was found for Mental Boundaries with regards to the PCI major dimensions. This finding suggests that there was a significant overall effect for the Mental Boundaries factor on the PCI major dimensions, while ignoring the influence of condition. More specifically, participants with thin Mental Boundaries reported significantly lower Negative Affect intensity ratings compared to participants with thick Mental Boundaries. People with very thin boundaries typically exhibit a fluidity regarding imagery and move effortlessly into fantasy and daydream (Hartmann, 1991). In the case of the shamanic-like stimulus, participants were essentially required to engage in a directed-daydreaming task, whereas, for instance, daydreaming may have given participants a reprieve from the ostensible banality of the control task. According to this reasoning, participants with thick boundaries may have reported more negative affect (e.g., anger, frustration) in both the shamanic-like and control stimulus conditions due, at least in part, to their inability to daydream with ease.

Participants with thin Mental Boundaries also reported significantly higher Volitional Control intensity ratings compared to participants with thick Mental Boundaries. Thus, thin boundary participants were more adept at exerting influence over their thought-forms. However, Volitional Control was not related to direct hitting (see Table 1).

A significant multivariate effect was not found for Mental Boundaries with regards to the combined PCI minor dimension variables. This result suggests that there was not a significant overall effect for the

Mental Boundaries factor on the PCI minor dimensions, when the influence of condition was ignored.

There was no significant multivariate interaction between condition and Mental Boundaries with regards to the combined PCI major or minor dimensions. The result suggests that the effect of condition on the PCI major and minor dimensions was, broadly speaking, the same for participants with thin and thick Mental Boundaries.

It is salient that shamans typically undergo mental imagery training in order to facilitate journeying to non-ordinary reality (see, for example, Noll, 1985). Consequently, it may be prudent for future shamanic-like participants to undergo mental imagery training prior to descending to the 'lower world' and completing the picture identification task.

The PCI is a general measure of phenomenological responses to stimulus conditions and was, therefore, not specifically designed to quantify the phenomenology of journeying states. Thus, there may be phenomenological variables that are integral to journeying states and thus correlates of psi that are not measured by the PCI. Future research might use Walsh's (1995) phenomenological mapping technique that consists of a number of key dimensions pertinent to journeying and has been used successfully to distinguish between shamanic, Buddhist, yogic and schizophrenic states. Alternatively, other measures such as the APZ-OAV Questionnaire (*Abnormer Psychischer Zustand* = altered states of consciousness; Dittrich, von Arx, & Staub, 1985) might be used to quantify the phenomenological effects of journeying.

Anecdotal reports from various shamanic-like participants suggested that the staggered journeying instructions compromised some participants' abilities to become 'absorbed' in the journey. Future research might revise the pacing of the journeying instructions in order to optimise percipients' state absorption levels.

Conclusion

In our previous study (Storm & Rock, 2009b), we found that a significant psi effect could be induced by a shamanic-like 'journeying' condition. However, we found that neither Thalbourne's psychological construct of transliminality—a measure of flow of mental contents between conscious and unconscious domains (see Thalbourne & Houran, 2000); nor Thalbourne's (1995) paranormal belief measure, the Australian Sheep-Goat Scale (ASGS), predicted direct hit rates. These results were atypical, especially in the case of the ASGS measure, since paranormal belief is a noted correlate of psi performance (see Lawrence, 1993).

Our present study, however, was more fruitful in terms of finding hypothesised phenomenological dimensions that *may underlie* the psi process. First, the fact that the PCI measure, Internal Dialogue, correlated significantly with direct hitting, and only in the shamanic-like group, suggesting that psi may be elicited using *imagery cultivation techniques*, which Ganzfeld pundits might regard as counter-intuitive to the assumptions made in regard to their *noise-reduction model*. Second, and in further support of our claim, we reported higher levels on the PCI major dimensions of Negative Affect, Altered Experience, Visual Imagery, and Altered State of Awareness, in the shamanic-like condition. For PCI minor dimensions, the shamanic-like group reported significantly higher Anger, Altered Body Image, Altered Perception, Altered Meaning, and higher Visual Imagery. Also, participants with thin Mental Boundaries tend to have lower Negative Affect, but higher Volitional Control (i.e., they had more control over their thoughts). Of course, we are not saying that our control condition is in any way identical to the Ganzfeld condition, but the noise-reduction parameters of sensory homogenisation in the Ganzfeld are to some degree comparable to our control condition, though our control condition does not appear to be psi-conductive (see *Procedure* above). We stress however, that we found little evidence that PCI dimensions were related to the psi process to the degree that we tested for psi, but it may be the case that some number of PCI dimensions had influences on psi that were too weak to detect in our experiment. We argue, therefore, that the conditions under which psi can be elicited are perhaps more phenomenologically variable than we yet know or fully understand. Certainly, the phenomenological differences we reported in our test participants (particularly those in the shamanic-like journeying condition) suggest that psi is not simply sensitive to noise—it may be more robust than that, perhaps more capable of being induced by conscious intention than has been suspected in the past. On this conjecture alone, there is ample reason for further research using our imagery cultivation model.

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School of Psychology
University of Adelaide
South Australia 5005
AUSTRALIA

Email: lance.storm@adelaide.edu.au