

## SHAMANIC-LIKE JOURNEYING AND PSI SIGNAL DETECTION: II. PHENOMENOLOGICAL DIMENSIONS

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**ABSTRACT:** Storm and Rock’s imagery cultivation (IC) model regards shamanic-like techniques as being psi-conducive, with the alleged psi signal being somehow embedded in the cultivated imagery. In the first replication study, hit rates were above chance (not significantly) in all three shamanic-like conditions, and below chance in the control condition. In the present study, we aimed to replicate these findings with regards to phenomenological correlates of psi performance and phenomenological differences between stimulus conditions. While the present study failed to replicate the results of Rock and Storm, post hoc analyses demonstrated that, for the instructions + drumming group, direct hits were significantly positively correlated with altered time sense, altered perception, and altered experience; and significantly negatively correlated with memory. In addition, an analysis of phenomenological data revealed that the treatment groups reported an “altered state of consciousness” relative to the control group. Our findings suggest that phenomenology can be changed using a shamanic-like journeying treatment, and these changes are conducive to the generation of source material that can be an aid to psi processes.

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*Keywords:* phenomenology, Phenomenology of Consciousness Inventory, shamanic-like journeying, shamanism

Shamanism has been referred to as humankind’s oldest religion (Eliade, 1964). Fundamentally, shamanism is a social construct that emerged during an era of pre-literacy and, thus, its precise origins are unclear (Rock & Krippner, 2011a). Although the term “shaman” is of uncertain derivation, it is regularly traced to the Tungus-speaking Siberian reindeer herders, among whom the term “šaman” translates into “one who is excited, moved, or raised” (Lewis, 1990, pp. 10–12). Shamanism may be defined as a set of practices that purportedly enable its practitioners to produce alterations in phenomenology (subjective experience) for the purpose of obtaining information intended to benefit the members of their community (Krippner, 2000, 2002). This information is often acquired by the shaman engaging in what is variously termed soul-flight, ecstatic journeying, or simply journeying whereby the shaman’s “soul” purportedly leaves the physical body and travels to independently existing (i.e., exosomatic) “spirit” worlds (Rock & Krippner, 2008; Walsh, 1995, 2007). A variety of methods may be used to elicit journeying states, such as sleep deprivation (Achterberg, 1987), cultivating visual mental imagery (e.g., entering “tunnels” leading to the “underworld”; Noll, 1985), ingesting psychoactive substances (e.g., ayahuasca, psilocybin; Harner, 1987), sweat lodges (Jilek, 1982), and sensory deprivation (Achterberg, 1987). However, the most commonly used method is auditory driving, a technique in which the shaman listens to a monotonous percussive sound, most frequently drumming (Harner, 1990).

There is a long-standing link in the anthropological literature, based on informal observations and interviews, between shamanism and psi (Krippner, 1989; Storm & Rock, 2011). However, few experimental studies have been conducted. For example, Rose (1956) reported a significant psi effect whereby Australian Aborigines were able to guess correctly the design on cards focused on by an experimenter, but concealed from the participant. In a series of three studies Geisler (1985a, 1985b, 1986) investigated psi among “Afro-Brazilian cultists.” It was reported that the control group (non-cult participants) demonstrated significant psi-hitting, whereas the cult shamans group and initiates group scored at chance levels. In another study, Saklani (1988) tested the PK ability of five adult Shamans in Garhwal Himalaya, and reported that the participants were “able to influence plant germination and protect seeds from the deleterious effects of saline” (p. 60).

Given the claim that shamans use ostensibly paranormal information in order to “meet the needs

of [their] group and its members” (Rock & Krippner, 2011a, p. 7; see also, Rogo, 1987), Storm and Rock (2009a) developed their Imagery Cultivation (IC) Model which incorporates a shamanic-like journeying protocol based on shamanic practice. They expressly designed this protocol in such a way as to facilitate and stimulate the imagination (see Harner, 1990), thereby cultivating the production of images from the unconscious, said to be the source of psi (see Storm & Rock, 2009a, for details on the IC Model).

In Part 1 of this two-part study, we (Rock, Storm, Harris, & Friedman, 2012) tested our IC model, which we regard as psi-conducive, on the assumption that an alleged psi signal is embedded in the cultivated imagery. With an express process-oriented aim in mind, we tested the full-treatment (i.e., shamanic-like instructions + drumming) and two sub-components (instructions only; and drumming only) of the journeying procedure to ascertain the psi-conduciveness of each. We found that psi hit rates were above chance (not significantly) in all three treatment conditions, but were below chance in the control condition (no instructions; no drumming).

Subsequently, we combined the data-set from our initial study (i.e., Storm & Rock, 2009b) with the corresponding dataset from Rock et al. (2012), to obtain a more up-to-date and reliable indication of the situation as it stands for our IC model. It was found that for the combined shamanic-like group ( $N = 107$ ), which is the same as the shamanic-like instructions + drumming condition, the direct-hit rate was approximately 31% (33 hits). However, this statistic did not reach significance ( $p = .10$ , one-tailed).

Continuing our process-oriented aim for this the present study, we report here the results for psi tests other than those reported previously in Rock et al. (2012). At this stage, however, some background information about altered states of consciousness (ASCs) and subjective experience is necessary. Concerning ASCs, Rock and Krippner (2012) argue “altered states of consciousness” are more accurately described as “altered states of phenomenology.” However, for the purpose of the present paper, the commonly accepted nomenclature will be used.

### **Altered States of Consciousness and Psi**

It might be assumed that shamanic-like journeying states are altered states of consciousness (ASCs), both of which have been associated with psi. For example, psi/shamanic-states relationships have been reported in the literature (e.g., Nelson, Jahn, Dunne, Dobyms, & Bradish, 1998). More generally, researchers have made claims for psi effects as a result of other ASCs, such as the Ganzfeld (e.g., Bierman, 2001), hypnosis (e.g., Marcusson-Clavertz & Cardeña, 2011), dreaming (see Storm, 2006, for a review of dream-ESP studies), meditation (e.g., Roney-Dougal & Solfvin, 2006), and relaxation (see Storm & Thalbourne, 2001, for a review).

Occasionally, inadequate measures of “altered states” were taken, if at all (e.g., Honorton & Harper, 1974), or the measures of same were dubious and/or confusing (especially in some meditation studies), or (overwhelmingly) control groups were not used. Occasionally, psi effects, which have been attributed to ASCs, were significant but not always in the hypothesized direction, or were only significant for sub-groups in the samples. For example, Parker (1975) reported “psi missing effects” for those participants who experienced “large alterations of state” (p. 41; see also, Palmer, Khamashta, & Israelson, 1979), and more recently, Marcusson-Clavertz and Cardeña (2011), in their Ganzfeld study, found that “psi z scores correlated strongly to moderately positive with experiencing an altered state and other changes in consciousness, *but only for high hypnotizables*” (p. 235; emphasis added). This ambiguous finding suggests ASCs do not make a sufficient (i.e., measurable) contribution to the psi process for low hypnotizables, or ASCs were not induced at all for low hypnotizables. Like Alvarado (1998), Marcusson-Clavertz and Cardeña raise the issue of expectancy effects: “... ganzfeld may work because experimenters and participants believe in it, a kind of placebo effect” (p. 236; see also, Stanford, 1992, p. 53, on placebo and expectancy effects). Perhaps high hypnotizables are particularly vulnerable to these effects, whereas low hypnotizables are not.

Thus, for over 40 years, it has often been implied, or even boldly stated, that induced ASCs account for psi effects, as if the lack of control groups in many studies, as well as “expectancy effects,” and

other “design and individual differences problems” (Alvarado, 1998, p. 45; see also, Braud, 2005) were of no consequence. (Note that we also acknowledge the role that noise reduction [Braud, 1978; Honorton, 1977] might play in eliciting psi, but see our comments in Storm & Rock, 2009a, pp. 6–7, 13–15.) On ASC induction, we find support from Cardeña (2011) who warns researchers not to assume that the induction processes of hypnosis, meditation, Ganzfeld, etc., guarantee changes in consciousness. And, as noted above, nor do they guarantee planned (i.e., hypothesized) psi effects, if at all. Clearly, at the very outset, researchers must seek evidence of ASCs in psi studies, and we endorse the efforts of those researchers who have endeavored to hone in on the subjective (i.e., “phenomenological”) experiences of participants as a means by which much-needed information about ASCs can be gleaned. Naturally, we acknowledge the importance of objective measures of ASCs (e.g., EEG), but on pragmatic grounds no such measure can compare to the participant’s account of his/her subjective experience in terms of its richness and detail. A major aim of the present study, therefore, was to measure participants’ subjective experiences (particularly ASCs) during the IC treatment and, by so doing, gauge and possibly map the relationships between those ASCs and psi. Specifically, we set out to investigate the phenomenological correlates of psi (i.e., direct hits) and group differences in phenomenology. A quantitative measure of phenomenology is now discussed.

### **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). The methodology consists, in part, of a novel retrospective phenomenological assessment instrument referred to as the Phenomenology of Consciousness 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 Affect, Altered Experience, Visual Imagery, Rationality), and 14 minor dimensions (e.g., Fear, Joy, Altered Body Image, Absorption).

The PCI allows one to define operationally or ‘map’ phenomena typically referred to as states of consciousness and ASCs by producing “psygrams” (graphs) that provide two types of information associated with exposure to a stimulus condition: (a) the average intensity values (ranging from 0–6) for each PCI major dimension; and (b) the strength of association between pairs of PCI major dimensions (Pekala & Kumar, 1986). One creates a psygram by first producing a correlation matrix consisting of the 12 PCI major dimensions. The non-significant correlations ( $p > .05$ ) are removed and the significant obtained  $r$  values are converted to  $r^2$  values (i.e., coefficients of determination). Subsequently, the  $r^2$  values are converted to percentages. Each line linking a pair of major dimensions constitutes 5% of the  $r^2$  or variance in common (Pekala, 1991).

The PCI has been used to quantify phenomenology associated with, for example, hypnosis (e.g., Pekala & Kumar, 2007; Pekala, Kumar, Maurer, Elliott-Carter, Moon, & Mullen, 2010a, 2010b; Terhune & Cardeña, 2010), progressive relaxation (e.g., Pekala, Forbes, & Contrisciani, 1989), partial epileptic seizures (e.g., Johanson, Valli, Revonsuo, Chaplin, & Wedlund, 2008), and sitting quietly with eyes closed (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, only one study (Rock & Storm, 2010, discussed below) has applied Pekala’s (1985) methodology to map the phenomenological effects of a shamanic-like condition designed to assess psi performance.

The performative function of a psygram directly aligns with 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) stated 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 pattern structure associated with a baseline or control condition is significantly different relative to the pattern

structure 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 hypothesized by Tart (1975) to be associated with an altered state of consciousness” (Woodside et al., 1997, p. 84). Thus, a significant change in the pattern structure (irrespective of its nature) of phenomenological elements that constitute a d-SoC compared to the pattern structure of an ordinary waking state allows one to conclude that the d-SoC is an ASC.

### **Shamanic-Like Journeying, Phenomenology, and Psi**

In a recent study, Rock and Storm (2010) randomly assigned 108 non-shamans to either a control condition (sitting quietly with eyes open) or a treatment condition (shamanic like-journeying instructions followed by listening to monotonous drumming). 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). In addition, direct hits correlated significantly with PCI major dimension, Internal Dialog, for the shamanic-like group, but not the control group. We note that the treatment condition used by Rock and Storm (2010) consisted of a composite activity: following shamanic-like journeying instructions *and* listening to monotonous drumming.

Consequently, it would be edifying for future research to isolate each component of the aforementioned composite activity and explore its potential psi-conduciveness with a focus on the phenomenological correlates of psi performance.

### **Aims of the Study and Hypotheses**

In order to investigate whether or not the present study replicated the findings of Rock and Storm (2010), we formulated the following two confirmatory hypotheses:

- H1: The PCI major variable Internal Dialog correlates positively with psi performance in the voice/drum group, but not in the control group. The voice/drum condition of the present study (i.e., shamanic-like instructions coupled with listening to monotonous drumming) was identical to the shamanic-like condition administered by Rock and Storm (2010).
- H2: After controlling for pre-test PCI scores, there is a difference between the voice-drum and control groups on the three PCI major dimensions with higher Negative Affect, Altered Experience, and Imagery in the voice/drum group; and four minor dimensions with higher Anger, Body Image, Perception, and Meaning in the voice-drum group.

### **Method**

#### **Participants**

The sample ( $N = 200$ ) consisted mainly of students from the Phoenix Institute of Australia, Melbourne. The first three authors of the present paper were affiliated with the Phoenix Institute of Australia at the time the study was conducted. The last author was, and remains, retired. This institution did not have an IRB or require IRB approval. Participants were recruited by the third author (KH). Participation was voluntary. The method of recruitment was snowball sampling (i.e., word-of-mouth) and convenience sampling using a ballot box placed in the Institute’s library.

The participants ranged in age from 17 to 67 years ( $M = 39$  years,  $SD = 11$  years, median age = 39 years). The 25th percentile was aged 30 years, and the 75th percentile was aged 46 years. The minimum age requirement for the study was 18 years (consenting age). Fifty-two participants were randomly assigned to the instructions + drumming condition (“voice/drum” = “shamanic-like” as described in Storm & Rock, 2009a, 2009b), 51 to the instructions condition (i.e., “voice”), 54 to the drumming condition (i.e., “drum”), and 43 to the control condition. The experimenter (KH) supervised participants in all conditions

as described below. The mean age was 39 years for voice/drum group ( $SD = 11$  years), 39 years for the voice group ( $SD = 10$  years), 40 years for the drum group ( $SD = 12$  years), and 36 years for the control group ( $SD = 11$  years).

The sample was comprised of 48 males (24%) and 152 females (76%). A chi-square test showed no significant difference in these sex proportions across conditions,  $\chi^2(3, N = 200) = 2.19, p = .53$ , two-tailed.

Utts (1986) examined and listed the power of a series of ganzfeld studies, 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, it is reasonably expected that the hit rate will 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  $\beta$  values of .45 and .82, for the two proportions 33% and 38%, respectively. It was anticipated that the four factorial combinations (voice/drum:  $n = 52$ ; voice:  $n = 51$ ; drum:  $n = 54$ ; control:  $n = 43$ ) would therefore be of sufficient size.

### Experimenter

Given that the experimenter was directly involved in testing participants, the experimenter was administered the Australian Sheep-Goat Scale (ASGS; sheep = high-ASGS score; goat = low-ASGS score). The raw range for ASGS data is 0 to 36; Raw mean = 18. The experimenter obtained a raw score of 36. The ASGS data are also Rasch-scaled (Lange & Thalbourne, 2002). The Rasch-scaled score for the experimenter was  $M_{RASGS} = 23.69$ . This RASGS score is above the sample mean.

### Analysis

Hypothesis 1 (H1) was tested using a Pearson's correlation. Hypothesis 2 (H2) was addressed using a one-way between-subjects multivariate analysis of covariance (MANCOVA). Separate MANCOVAs were performed for the PCI major dimensions and PCI minor dimensions in order to avoid violating the assumption of multi-collinearity (Woodside et al., 1997).

Regarding H2, 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 covariance (MANCOVAs) were performed. MANCOVAs 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 MANCOVA, see Tabachnick & Fidell, 2007).

### Design

The present study consisted of a  $2 \times 2$  between-subjects factorial design. The first factor, instructions, had two levels (shamanic-like journeying instructions vs. no instructions) and the second factor, drumming, had two levels (drumming vs. no drumming). This design resulted in four factorial combinations:

1. Shamanic-like journeying instructions + drumming (i.e., voice/drum)
2. Shamanic-like journeying instructions + no drumming (i.e., voice)
3. No shamanic-like journeying instructions + drumming (i.e., drum)
4. No shamanic-like journeying instructions + no drumming (i.e., a control condition).

In the drumming conditions, monotonous drumming was maintained at 8-beats-per-second (b.p.s.; total time: 19 minutes.). 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 num-

ber 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) recommended a drumming tempo of 205 to 220 beats-per-minute. 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. One research assistant was assigned to prepare the target sets and target. The other research assistant was the experimenter.

In advance of the session, the target-setter randomly selected a four-picture set from the pool of 45 picture sets using random number tables (<http://stattrek.com/statistics/random-number-generator.aspx>) 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). As there are 45 pictures sets, and 200 participants, some sets were used more than once. The target-setter photocopied the target picture, which was then wrapped in aluminum foil, and concealed in a target envelope (the four-picture set was also wrapped in foil and sealed in an envelope in aluminum-foil). The prepared and numbered sets were then placed in a filing cabinet for subsequent retrieval by the experimenter. The experimenter was 'blind' to the targets during the trials. The experimenter tested participants in small groups two or three at a time with a different set for each participant; they administered the Plain Language Statement (PLS) and consent form to each participant.

### **Questionnaires**

Two questionnaires were used in the experiment: (a) *Plain Language Statement* (PLS; a non-technical description of the research project), which included the Consent Form; and (b) the *Phenomenology of Consciousness Inventory* (Pekala, 1991).

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 Dialog, 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).

### **ESP Targets**

A gallery of 180 hand-drawn pictures by Thalbourne (1981) was used as the target pool; 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. 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 labor-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. Each picture had a four-digit number written on the back. The set of 180 pictures was randomly divided into 45 sets of four drawings each. For the ESP test, the target picture was wrapped in aluminum foil and placed inside a manila envelope that was sealed. The target set (one target picture + three decoys) was placed inside another manila envelope.

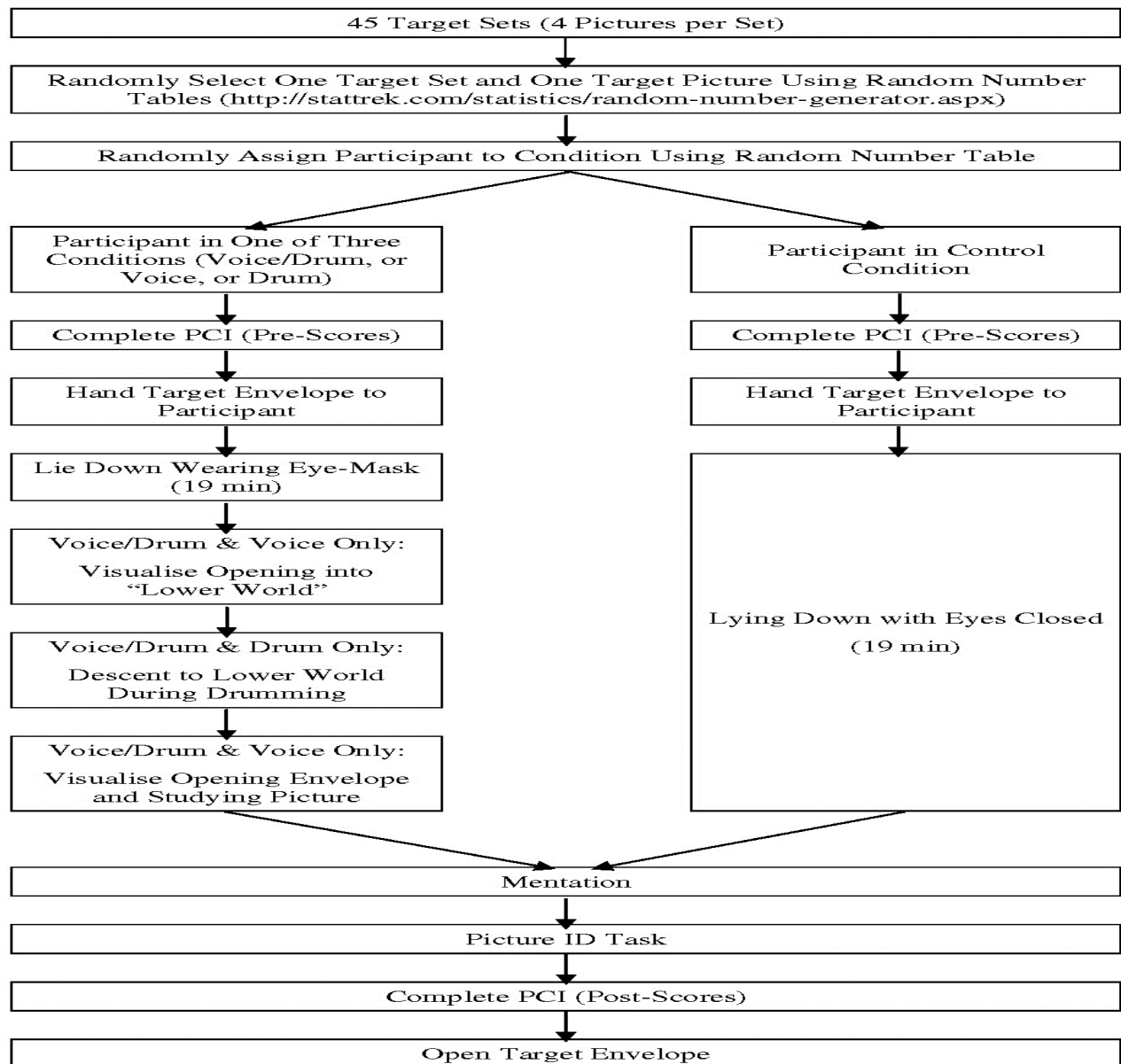


Figure 1. Schematic diagram of experimental protocol.

## Procedure

Using a random number table (<http://stattrek.com/statistics/random-number-generator.aspx>), participants were randomly assigned to one of the four aforementioned factorial combinations:

**1. Shamanic-like instructions + drumming (voice/drum) condition.** After reading the Instruction Sheet, the participant signed the consent form. The experimenter then (a) instructed participants to sit on the floor; (b) handed over a concealed target picture to each participant (each participant had their own set); (c) instructed participants *not* to open the envelope (instead, participants placed the envelope in front of them); (d) directed participants to lie on the floor, and instructed participants to place a light-proof eye mask over their eyes; (e) played the CD-R recording which consists of instructions adapted from Harner (1990, p. 32; see Appendix for a transcription of the recorded instructions).

Table 1  
*Participants' Rank Scores*

Voice/Drum Group Data ( <i>n</i> = 52)		
Rank Score	Frequency	%
1	14	26.9
2	15	28.8
3	11	21.2
4	12	23.1
Total	52	100.0
Voice Group Data ( <i>n</i> = 51)		
Rank Score	Frequency	%
1	15	29.4
2	13	25.5
3	9	17.6
4	14	27.5
Total	51	100.0
Drum Group Data ( <i>n</i> = 54)		
Rank Score	Frequency	%
1	14	25.9
2	13	24.1
3	14	25.9
4	13	24.1
Total	54	100.0
Control Group Data ( <i>n</i> = 43)		
Rank Score	Frequency	%
1	10	23.3
2	11	25.6
3	12	27.9
4	10	23.3
Total	43	100.0

After the CD-R recording was finished, the experimenter then: (a) instructed the participants to spend a few minutes writing down their impressions of the line drawing still concealed in aluminum-foil inside the envelope (the participants were permitted to re-read the record of their mentation, in order to prompt their memory, thereby assisting them in the ranking process; the experimenter did not offer personal interpretations of mentations as this may have misled participants); and (b) instructed the participants 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. Throughout testing, the exper-



imenter monitored participants to ensure that they did not advertently or inadvertently open the envelope and look at the line drawing.

**2. Shamanic-like instructions + no drumming (voice) condition.** Procedures and instructions were the same for participants as in condition 1 except there was no drumming.

**3. No shamanic-like instructions + drumming (drum) condition.** Procedures and instructions were the same as for participants in condition 1 except there were no shamanic-like journeying instructions. Participants were instructed to do nothing other than lie on the floor with their eyes closed and remain silent.

**4. No shamanic-like instructions + no drumming (i.e., control) condition.** Participants were instructed to do nothing other than lie on the floor with their eyes closed and remain silent.

**Psi hitting.** Hit rates for the four groups are shown in Table 1. The hit rate for the control condition was 23.3% ( $N = 43$ ), which is below chance, and lower than the direct hit rates for all three experimental conditions (i.e., 26.9%, 29.4%, 25.9%), all three rates being above chance, where  $P_{MCE} = 25\%$ . However, no significant differences were found between the four groups,  $\chi^2(3, N = 200) = .47, p = .463$  (one-tailed).

Figure 1 illustrates the sequence of steps for the conditions.

## Results

### Preliminary Data

Testing was conducted between June and December 2011. 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. Neither age nor sex correlated with direct hitting or rank scores. There were 52 participants in the voice/drum group, 51 participants in the voice group, 54 participants in the drum group, and 43 participants in the control group.

### Planned Analyses

H1: The PCI major variable Internal Dialog correlates positively with psi performance in the voice/drum group, but on the control group. The significant direct hitting correlation with Internal Dialog did not replicate,  $r(51) = .01, p > .05$ . The hypothesis was not supported.

H2: There is a difference between the voice/drum and control groups on three PCI major dimensions with higher Negative Affect, Altered Experience, and Visual Imagery in the voice/drum group; and four minor dimensions with higher Anger, Body Image, Perception, and Meaning in the voice/drum group.

A one-way between-subjects MANCOVA was conducted with condition (voice/drum vs. control) as the independent variable (IV) and the post-test scores on Negative Affect, Altered Experience, and Imagery as the dependent variables (DVs). The pre-test scores for Negative Affect, Altered Experience, and Visual imagery were the covariates. After controlling for pre-test scores, a significant multivariate effect was not found for condition on the post-test scores,  $F(3, 87) = 2.10, p = .106$  (*Wilks' Lambda* = .93; *partial*  $\eta^2 = .07$ ). There was a strong relationship between the pre-test and post-test scores for Negative Affect, Altered Experience and, Visual Imagery, as indicated by a partial  $\eta^2$  value of .37, .12, and .11, respectively. The hypothesis was not supported.

A one-way between-subjects MANCOVA was conducted with condition (voice/drum vs. control) as the IV and the post-test scores on Anger, Altered Body Image, Altered Perception, and Altered Meaning as the DVs. The pre-test scores for Anger, Altered Body Image, Altered Perception, and Altered Meaning were the covariates. After controlling for pre-test scores, a non-significant multivariate effect was found for condition on the post-test scores,  $F(4, 85) = 1.96, p = .11$  (*Wilks' Lambda* = .92; *partial*  $\eta^2 = .08$ ). There was a medium to strong relationship between the pre-test and post-test scores for Anger, Altered Body Image, Altered Perception, and Altered Meaning, as indicated by partial  $\eta^2$  values of .20, .04, .19, and .20,

Table 2  
*PCI Variable Means and Standard Deviations for all Four Conditions*

PCI Dimension	Voice/Drum		Voice		Drum		Control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Negative Affect	1.34	0.94	1.42	1.10	1.12	0.95	1.07	1.03
Anger	1.16	1.08	1.32	1.21	.96	1.03	.94	1.05
Altered Experience	3.26	1.26	3.05	0.96	3.26	0.96	2.95	1.03
Body Image	3.44	1.25	3.32	1.14	3.56	1.05	3.38	1.26
Perception	3.22	1.41	2.97	1.24	2.86	1.09	2.67	1.23
Meaning	2.82	1.22	2.65	1.06	2.97	1.27	2.50	1.06
Visual Imagery	4.14	1.05	3.97	1.24	4.13	1.26	3.66	1.55

respectively. The hypothesis was not supported. The means and standard deviations for the PCI variables are shown in Table 2.

### Post Hoc Analyses

In the interests of exploring the possibility that various PCI dimensions might be correlates of psi, we conducted a series of post hoc tests. The inflation of the Type 1 error rate due to multiple correlations was corrected using the Benjamini-Hochberg (1995) procedure for controlling the false discovery rate in which each individual  $p$ -value is compared to  $(i/m)Q$ , where  $i$  is the rank of each individual  $p$ -value ordered from the smallest (i.e., 1) to the largest,  $m$  is the total number of correlation tests performed and  $Q$  denotes the chosen false discovery rate. In the present study, 26 correlations were performed for each condition. Results are presented in Table 2. After controlling for the false-discovery rate due to multiple tests (Benjamini & Hochberg (1995), for the Voice/Drum group psi hit rates were positively and significantly correlated with Altered Time Sense,  $r(51) = .37, p = .008$ ; Altered Perception,  $r(51) = .33, p = .017$ ; and Altered Experience,  $r(51) = .37, p = .007$ . In addition, psi hit rates were negatively and significantly correlated with Memory,  $r(51) = -.31, p = .03$ .

Using a Fischer  $r$  to  $z$  transformation, the correlation for the Voice/Drum group was significantly different to that of the Control group for Altered Time Sense,  $z = 1.67, p = .048$  (one-tailed), but only approached significance for Altered Experience,  $z = 1.64, p = .051$  (one-tailed), and Altered Perception,  $z = 1.52, p = .064$  (one-tailed). In addition, the correlation for the Voice/Drum group was significantly different to that of the Control group for Memory,  $z = -2.04, p = .021$  (one-tailed).

There were no significant correlations for the Drum condition, Voice condition, or the Control condition.

Given the long-standing assumption that various psi-conducive stimulus conditions (e.g., the Ganzfeld) induce ASCs (Alvarado, 1998), it seemed prudent to assess whether the pattern structure (i.e., the patterns of relationships between pairs of PCI major dimensions in the form of a covariance matrix referred to as a "psygram") associated with each of the shamanic-like conditions was significantly different relative to the control condition. 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). We note that 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 minimum of 60 participants per condition (provided that all 12 major dimensions of the PCI are being examined). Given that the present study

Table 3  
*Pearson Correlations Between Psi (Direct Hits) and the PCI Dimensions  
 for the Four Conditions (Voice/Drum, Voice, Drum, and Control)*

	Voice/Drum	Voice	Drum	Control
Positive Affect	.19	-.00	.25	-.06
Joy	.20	.12	.32	.03
Sexual Excitement	.19	-.18	.02	-.07
Love	.08	.05	.30	-.13
Negative Affect	-.05	-.08	.12	-.11
Anger	-.13	-.12	.11	-.05
Sadness	.05	-.09	.17	-.08
Fear	-.06	-.02	.04	-.18
Altered Experience	.37***	.06	-.06	.04
Body Image	.23	.06	-.14	-.04
Time Sense	.37**	.06	-.05	.03
Perception	.33*	.04	-.01	.02
Meaning	.16	.02	.01	.14
Visual Imagery	-.02	-.12	-.12	-.13
Amount	-.03	-.10	-.12	-.20
Vividness	-.02	-.12	-.12	.07
Attention	.12	.17	.00	-.12
Direction	.18	.09	.04	-.17
Absorption	.01	.19	-.03	.13
Self-Awareness	-.28	-.23	-.02	.30
Altered State	.23	.10	-.01	.11
Internal Dialog	.01	-.26	.22	.11
Rationality	-.26	-.06	.06	.02
Volitional Control	-.28	-.01	.18	.19
Memory	-.31*	.06	-.04	.12
Arousal	-.00	-.09	-.03	.20

\*  $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

did not meet this sample size requirement, the Jenrich Test was not appropriate. Consequently, a Box Test comparison was performed (Pekala, 1991).

The pattern structure associated with each of the four conditions is depicted in Figures 2 through 5. Box M tests of equality of covariance matrices were performed to evaluate the pattern structure of each of the three treatment conditions relative to the control condition (note that the Box M statistic “tests the homogeneity of variance-covariance matrices”—Tabachnick & Fidell, 2007, p. 252). A Box test of the equality of covariance matrices revealed that the difference between the covariation matrices of the four

conditions was significant,  $F(234, 75943.42) = 2.43, p < .001$ ; Box M = 637.75. More specifically, the covariation matrices of the voice/drum,  $F(78, 24358.88) = 1.75, p < .001$ ; Box M = 159.01, voice only,  $F(78, 24207.57) = 2.45, p < .001$ ; Box M = 222.86, and drum only,  $F(78, 24580.05) = 1.68, p < .001$ ; Box M = 152.14. The Box M values for all the experimental groups were significantly different from that for the control group.

### Discussion

We have argued that accurate measurement of the induction of shamanic-like states may be achieved by administering scales to participants that measure subjective (i.e., phenomenological) experience. To that effect, we used Pekala's (1991) *Phenomenology of Consciousness Inventory* (PCI) in the present study. In addition, the PCI allows one to investigate the phenomenological correlates of psi.

In contrast to the findings of Rock and Storm (2010), direct hitting was not significantly correlated with the PCI Internal Dialog dimension (see H1). Thus, in the present study, cognitive activity in the form of auditory mental imagery (i.e., internal "chatter" that the participant experiences as he/she dialogs or "thinks" silently to him- or herself) was not linked to psi performance. We note that Rock and Storm (2010) stated that, "the significant correlation between Internal Dialog and direct hitting may be an artifact of performing multiple tests (e.g., 52 correlations), and thus a Type I error" (p. 59).

The present study found a non-significant multivariate effect for condition with regards to various PCI dimensions (H2). This finding is inconsistent with the results of Rock and Storm (2010) who reported significant post-test PCI effects for Negative Affect, Altered Experience, Imagery, and Altered State of Awareness, Anger, Altered Body Image, Altered Perception, and Altered Meaning. This result suggests that there was not a significant overall effect for the condition factor on the post-test PCI dimensions, while partialing out the influence of pre-test PCI dimension scores. We note, however, that (1) Rock and Storm (2010) did not treat pre-test PCI scores as a covariate, and (2) in the present study, pre-test PCI scores were highly correlated with post-test PCI scores and, thus pre-test scores may have influenced post-test scores.

Post Hoc tests revealed that numerous PCI variables correlated significantly with our psi measure, "direct hitting." More specifically, for the Voice/Drum group, direct hitting was significantly positively correlated with Altered Time Sense, Altered Perception, and Altered Experience. These outcomes replicate similar altered-consciousness/psi effects found by Marcusson-Clavertz and Cardeña (2011) in their sub-group of participants. The Altered Time Sense dimension assesses the degree to which "the flow of time changed drastically" or whether it appeared to "speed up or slow down" (Pekala, 1991, p. 132). The Altered Perception dimension evaluates "changes in the perception of the world in terms of color, form, size, shape, or perspective" (p. 132). Whereas the Altered Experience dimension consists of the four minor dimensions: Altered Body Image, Time Sense, Perception, and Meaning. In addition, for the Voice/Drum group, direct hitting was significantly negatively correlated with Memory. The Memory dimension assesses the extent to which the percipient can remember their experience.

The pattern differences between the treatment conditions and the control condition were significant. These results suggest that compared to the control group the treatment groups reported a "major ical elements (e.g., visual imagery, positive affect, rationality) that constituted a d-SoC associated with the treatment conditions was significantly altered relative to the pattern structure of the d-SoC associated with the control condition. This finding suggests that participants' cognition in the treatment groups was fundamentally different relative to participants' cognition in the control group.

Despite the promising results of the present study, we caution the reader that 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,

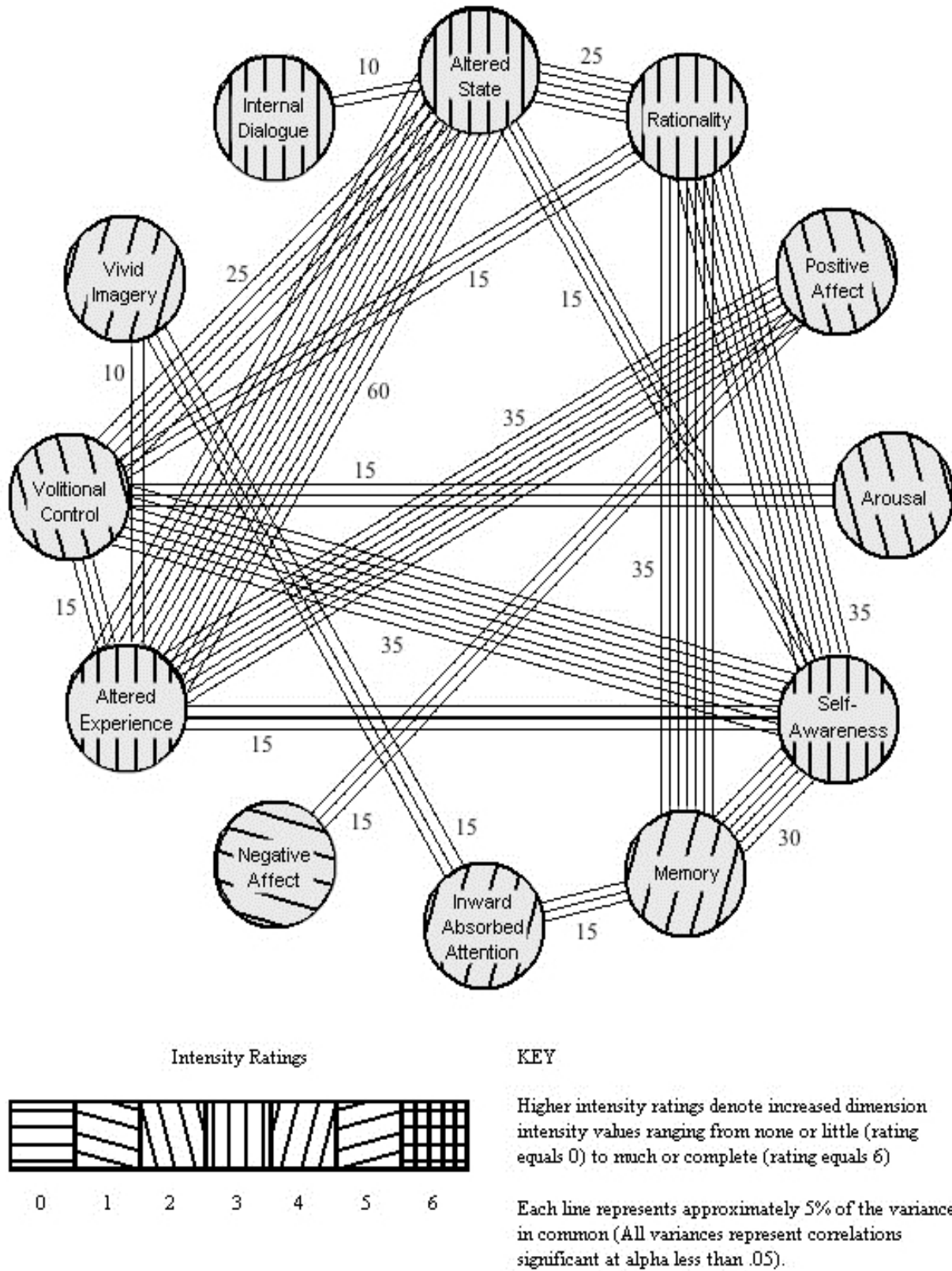


Figure 2. Psygram of Control Condition

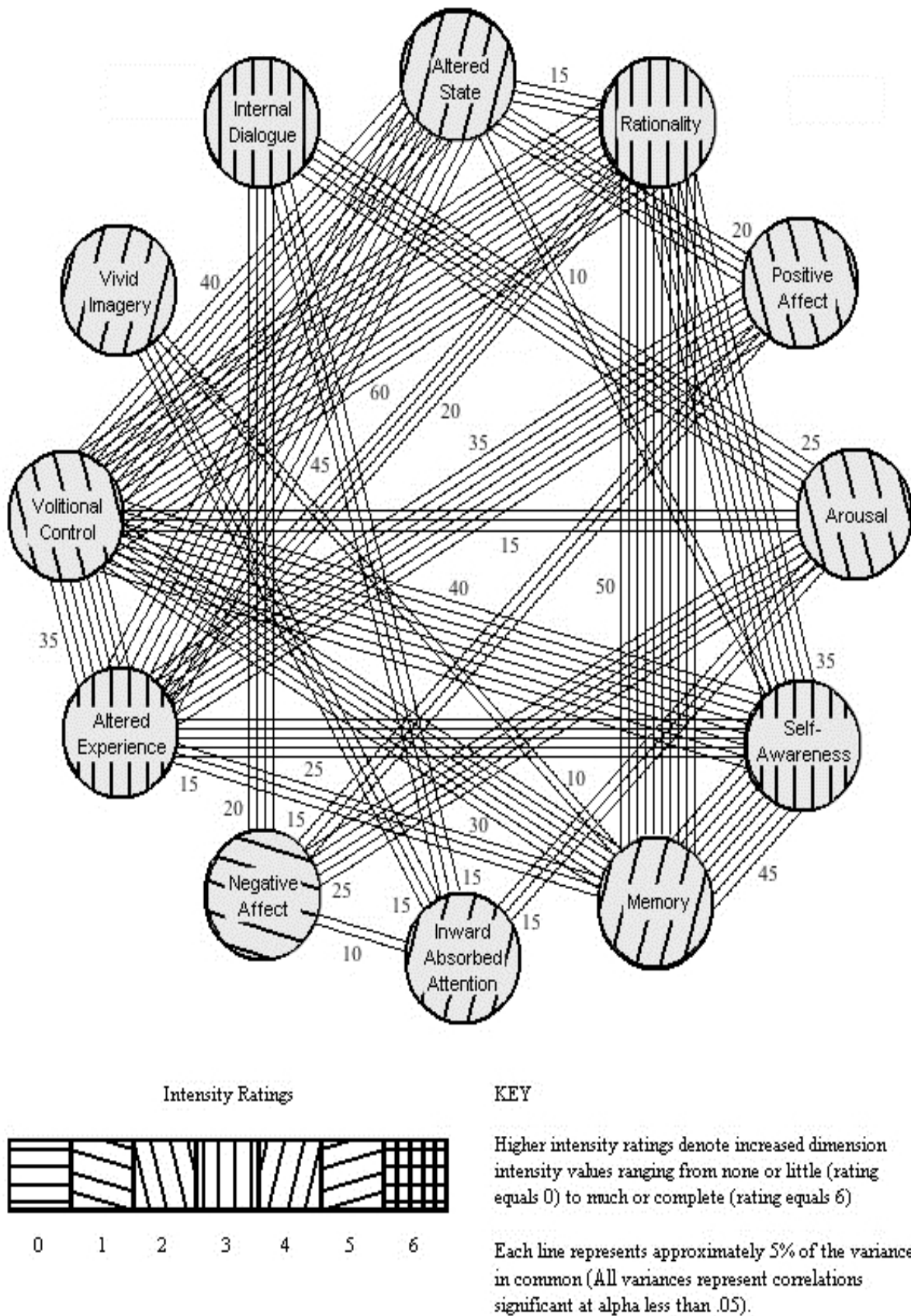


Figure 3. Psygram of Voice/Drum Condition

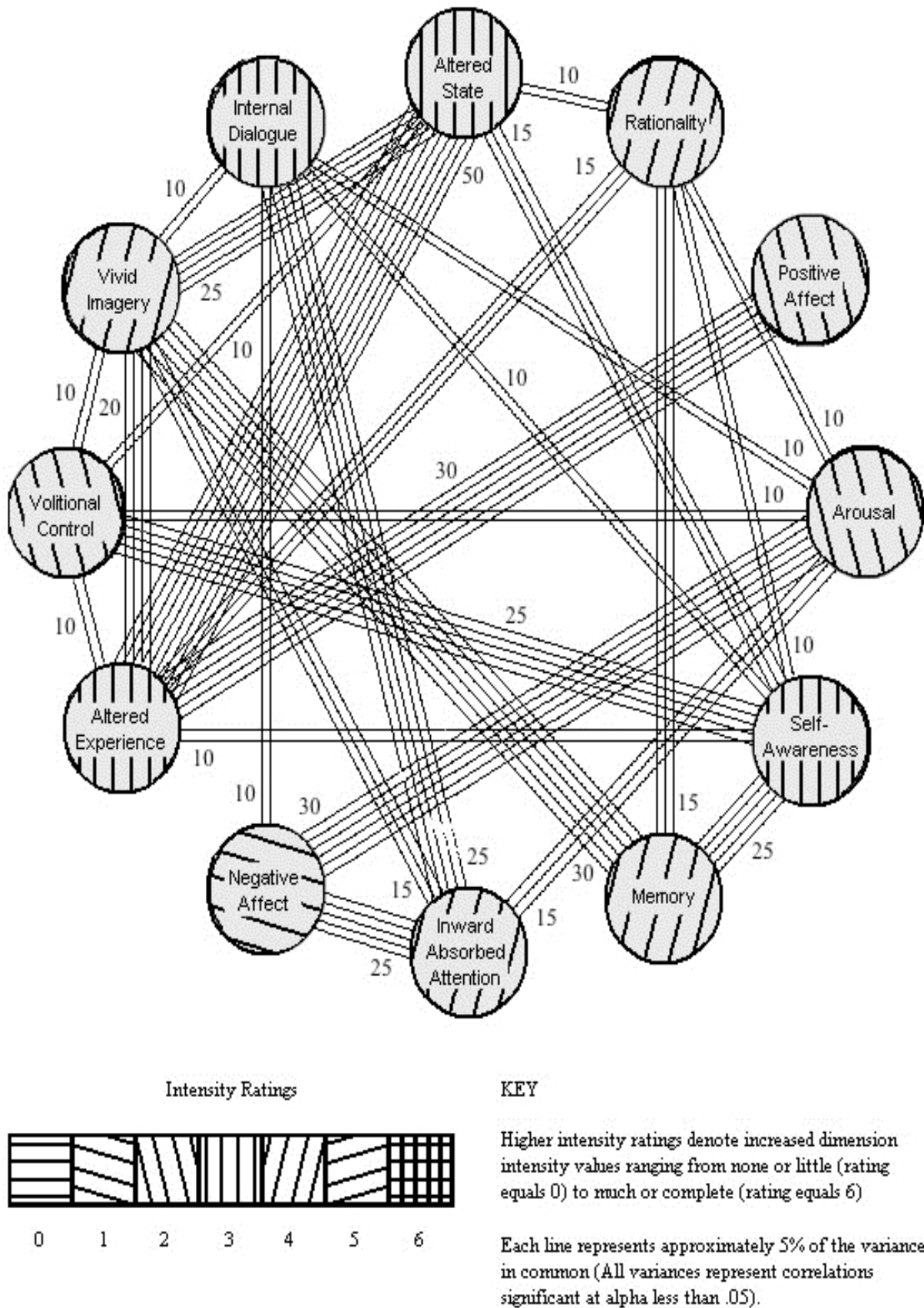
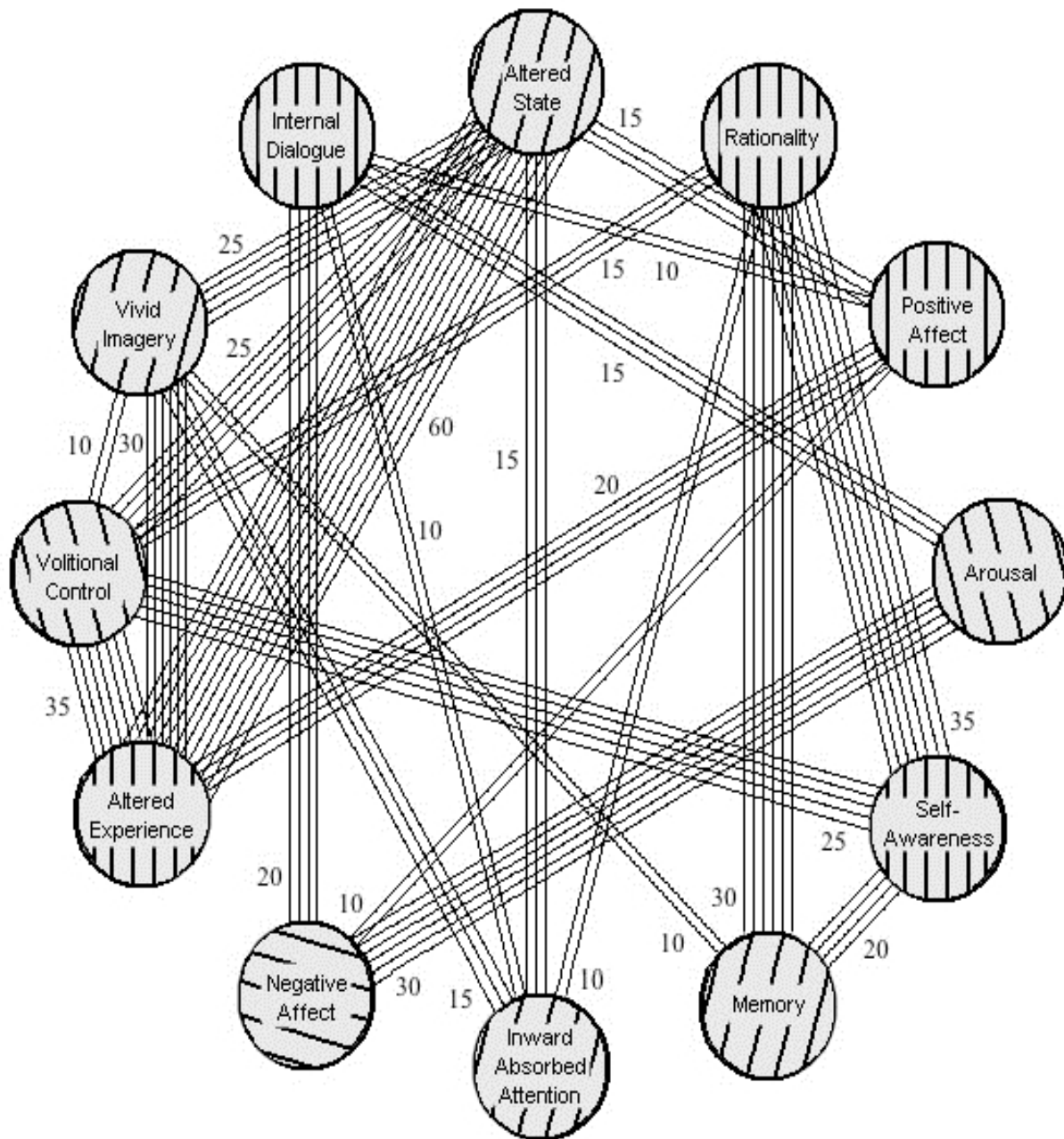


Figure 4. Psygram of Voice Condition



Intensity Ratings



0 1 2 3 4 5 6

KEY

Higher intensity ratings denote increased dimension intensity values ranging from none or little (rating equals 0) to much or complete (rating equals 6)

Each line represents approximately 5% of the variance in common (All variances represent correlations significant at alpha less than .05).

Figure 5. Psychogram of Drum Condition



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.

It is noteworthy that shamans typically undergo mental imagery training in order to facilitate journeying to non-ordinary reality (see, for example, Noll, 1985; however, we emphasize that not all shamans engage in journeying). Consequently, it may be useful for future shamanic-like participants to undergo mental imagery training prior to descending to the ‘lower world’ and completing the picture identification task.

### Conclusion

In our previous study (Rock, Storm, Harris, & Friedman, 2012), we found that psi hit rates were above chance (not significantly) in all three treatment conditions, and below chance (not significantly) in the control condition. In addition, 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); Thalbourne’s (1995) paranormal belief measure, the Australian Sheep-Goat Scale (ASGS); or Friedman’s (1983) Self-Expansiveness Level Form, predicted direct hit rates. These findings were uncharacteristic, particularly in the case of the ASGS measure, given that paranormal belief is a noted correlate of psi performance (see Lawrence, 1993).

Our present study, however, was more fruitful in terms of identifying phenomenological dimensions that may underlie the psi process. First, various PCI major and/or minor dimensions were significantly correlated with direct hitting for the voice/drum condition. In a number of instances these correlations were significantly different relative to the corresponding correlations for the control group. Second, an analysis of pattern differences revealed that the treatment groups reported what has traditionally been referred to as an “altered state of consciousness” relative to the control group. Taken together, the results of the present study highlight the usefulness of applying a process-oriented approach to the study of ostensibly anomalistic cognition. We caution, however, that significant results that are not replications should be regarded as tentative pending replication, and corrections for multiple analyses do not qualify as a substitute for replication. In the present study, none of the significant results were replications and thus, in the context of this study, this qualification is universal.

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## Appendix

### Instructions to Participants

Visualize 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 visualize. Spend a couple of minutes seeing the hole without going in it. Note its details clearly.

[2 minute pause]

When the drumming begins, visualize 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.

[Approximately 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 visualize the doors in front of you ... [15 second pause] ... Now push open the doors ... [15 second pause] ... Now visualize your envelope before you ... [30 second pause] ... Imagine opening the envelope and look at the picture ... [1 min 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 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.

### **Abstracts in Other Languages**

#### *Spanish*

#### **VIAJES TIPO CHAMÁNICO Y DETECCIÓN DE SEÑAL PSI: II. DIMENSIONES FENOMENOLÓGICAS**

RESUMEN: El modelo de Storm y Rock del cultivo de imaginación considera a las técnicas chamánicas como propicia para psi, con la presunta señal psi incrustada de alguna manera en la imaginación cultivada. En el primer estudio de replicación, los aciertos estuvieron por encima del azar (no significativamente) en las tres condiciones de tipo chamánico, y por debajo del azar en la condición control. En el presente estudio, intentamos replicar estos hallazgos con respecto a los correlatos fenomenológicos con el acierto psi y con las diferencias fenomenológicas entre las condiciones de estímulo. Aunque el presente estudio no replicó los resultados de Rock y Storm, los análisis post-hoc demostraron que para las instrucciones + el grupo de tambores, los aciertos directos correlacionaron positiva y significativamente con el sentido del tiempo alterado, la percepción alterada, y la experiencia alterada, y significativa y negativamente con la memoria. Además, un análisis de los datos fenomenológicos reveló que los grupos tratados informaron estar un “estado alterado de conciencia” en comparación con el grupo control. Nuestros hallazgos sugieren que la fenomenología puede cambiar con un tratamiento de viaje tipo chamánico y que estos cambios son propicios para la generación de material que puede ayudar a los procesos psi.

*French*

## RITUEL SIMILI-CHAMANIQUE ET DÉTECTION DU SIGNAL PSI : II. DIMENSIONS PHÉNOMÉNOLOGIQUES

**RESUME :** Le modèle de culture de l'imagerie (IC) de Storm et Rock considère les techniques simili-chamaniques comme étant facilitatrices du psi, avec le supposé signal psi qui se retrouve en quelque sorte intégré dans l'imagerie cultivée. Dans la première étude de répliation, les taux de succès étaient au-dessus du hasard (bien que non significatifs) dans les trois conditions simili-chamaniques, et en dessous du hasard dans la condition contrôle. Dans la présente étude, nous avons souhaité répliquer ces résultats en prêtant attention aux corrélats phénoménologiques de la performance psi et aux différences phénoménologiques entre les conditions de stimulation. Bien que la présente étude échoue à répliquer les résultats de Rock et Storm, des analyses post hoc démontrent que, pour le groupe avec instructions + percussions, les succès directs étaient significativement corrélés positivement avec la sensation d'une altération du temps, une perception modifiée et un vécu modifié ; et significativement corrélés négativement avec la mémoire. De plus, une analyse des données phénoménologiques a révélé que les groupes avec traitement relataient un « état modifié de conscience » par rapport au groupe contrôle. Nos résultats suggèrent que la phénoménologie peut être modifiée en employant un traitement de rituel simili-chamanique, et que ces modifications facilitent la génération de matériel psychique qui peut être une aide pour les processus psi.

*German*

## SCHAMANENÄHNLICHE REISEN UND DIE DETEKTION DES PSI-SIGNALS: II. PHÄNOMENOLOGISCHE DIMENSIONEN

**ZUSAMMENFASSUNG:** Das von Storm und Rock entwickelte Modell der Imagery Cultivation (IC) (Kultivierung geistiger Bilder) betrachtete schamanenähnliche Techniken als psi-förderlich, wobei das mutmassliche Psi-Signal in den hervorgebrachten mentalen Bildern irgendwie enthalten ist. In der ersten Wiederholungsstudie ergaben sich in allen drei schamanenähnlichen Bedingungen überzufällige (nicht-signifikante) Trefferwerte, unterzufällige in der Kontrollbedingung. Die vorliegende Studie wurde mit dem Ziel unternommen, diese Ergebnisse in Bezug auf die phänomenologischen Korrelate der Psi-Leistungen und die phänomenologischen Unterschiede zwischen den Stimulusbedingungen zu replizieren. Die Ergebnisse von Rock und Storm konnten mit der vorliegenden Studie nicht repliziert werden, wobei post hoc-Analysen ergaben, dass bei der Gruppe aus Instruktionen + Trommeln direkte Treffer signifikant positiv mit einem veränderten Zeitempfinden, einer veränderten Wahrnehmung und veränderten Erfahrung korreliert waren; und signifikant negativ mit Erinnerungsvermögen. Weiterhin ergab eine Analyse der phänomenologischen Daten, dass die Experimentalgruppen verglichen mit der Kontrollgruppe über einen „veränderten Bewusstseinszustand“ berichteten. Unsere Ergebnisse legen nahe, dass die Phänomenologie durch die Bedingung einer schamanenähnlichen Reise verändert werden kann, und diese Veränderungen tragen zur Produktion von Primärmaterial bei, das für Psi-Prozesse förderlich ist.