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EXPERIMENTAL FACILITATION OF THE SENSED PRESENCE IS PREDICTED BY THE SPECIFIC PATTERNS OF THE APPLIED MAGNETIC FIELDS, NOT BY SUGGESTIBILITY: RE-ANALYSES OF 19 EXPERIMENTS

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If all experiences are generated by brain activity, then experiences of God and spirits should also be produced by the appropriate cerebral stimulation. During the last 15 years experiments have shown that the sensed presence of a "Sentient Being" can be reliably evoked by very specific temporal patterns of weak (<1 microT) transcerebral magnetic fields applied across the temporoparietal region of the two hemispheres. Recently Granqvist et al. (2005) attributed these effects to suggestibility and exotic beliefs. Re-analyses with additional data for 407 subjects (19 experiments) showed that the magnetic configurations, not the subjects' exotic beliefs or suggestibility, were responsible for the experimental facilitation of sensing a presence. On the other hand, the subjects' histories of sensed presences *before* exposure to the experimental setting were moderately correlated with exotic beliefs and temporal lobe sensitivity. Several recent experiments have shown that the side attributed to the presence at the time of the experience is sensitive to the temporal parameters of the fields, the hemisphere to which they are maximized, and the person's *a priori* beliefs. The importance of verifying the specific timing and temporal pattern of the software-generated fields and following an effective protocol is emphasized.

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INTRODUCTION

Throughout human history the experience of the personal proximity of a Sentient Being, a presence, or "another consciousness" has been attributed to gods, spirits (Evans, 1984), and even the Muses (Persinger & Makarec, 1992). These phenomena are reported frequently and considered valid by very creative individuals (Persinger & Makarec, 1993), people prone to complex partial epileptic seizures involving the temporal-limbic regions (Bancaud et al., 1994), patients who have sustained "mild" brain traumas (Persinger, 1994a), and several large religious subpopulations. These people also endorse strong personal beliefs (Persinger, 1997) in either specific cultural deities such as God or Allah or more exotic god surrogates such as "a Universal Sentience."

However, if all experiences are generated by the brain, then experiences of all Sentient Beings, including God, should be generated by brain activity. During the last 15 years experiments from the authors' laboratory (Persinger, 2003 a,b; Persinger & Healey, 2002) have involved several hundreds of volunteers for whom substantial psychometric and electroencephalographic data were collected. Specific temporal patterns of weak (1 to 5 microT) spatially heterogeneous magnetic fields were strategically applied along the horizontal plane through the temporoparietal lobes. These procedures increased the incidence of subjective reports of a sensed presence. As suggested by the results of Sandyk and Anninos (1992), the temporal shapes of these fields have been designed to imitate the natural, fundamental patterns or "algorithms" of brain activity. The authors have assumed that direct experimental manipulation of a phenomenon, particularly when it is derived from beliefs and opinions, is essential to understanding its processes and mechanisms.

The idea, a continuation from earlier thinkers (Edelman, 1989; Jaynes, 1976; Slaver & Rabin, 1997), is that the sense of self and the sense of the other are derived from the subtle but complex structural and neuroelectrical differences between the left and right hemispheres (Hoptman & Davidson, 1994; Persinger, 1983, 1993). Whereas traditional left, more linguistic, hemispheric processes are strongly coupled to the sense of self (Joseph, 1982) the transient intrusion of the right hemispheric equivalents of the self into awareness is associated with the sensed presence (Persinger, 1993). Any process that facilitates a disruption in the normal state of reciprocal inhibition between the two hemispheres (whose time frame is within the millisec and range) should increase the incidence of a sensed presence.

The working model has been that slightly more intense stimulation of the right hemisphere followed by equal bilateral stimulation of both hemispheres should facilitate intracerebral intercalation through the corpus callosum (Schuz & Perissel, 1996), the anterior commissure, and particularly the dorsal hippocampal commissure (Gloor et al., 1993). Right hemispheric dominance has been associated with enhanced spirituality (Kurup & Kurup, 2003). There is also evidence that either the right hemisphere or a component of it may be more sensitive the effects of weak magnetic fields (Sandyk, 1992, 1995) as well as increased geomagnetic activity (Belisheva et al., 1995).

Rather than relying on classical models of current induction by the applied magnetic fields, the authors have assumed that the complexity and information within these fields (analogous to the content of a spoken sentence rather than its loudness) directly interact with the global cerebral magnetic fields associated with consciousness (Edelman, 1989; Tononi & Edelman, 1998). Such complexity might require the functional operations of cerebral activity to occur within the pT range, as suggested by Anninos et al. (1991) and Sandyk (1995).

Externally applied complex magnetic fields, particularly when they simulate neuroelectrophysiological patterns, elicit paroxysmal electroencephalographic activity concomitant with experiences of a "powerful presence" in special subjects (Cook & Persinger, 1997; Persinger et al., 2000). Although the strengths of these fields are about one microTesla (10 mG) at the level of the skull, they have been calculated to be within the nanoTesla range (when skull impedance and distance from the applied sources are considered) at the depths of the cerebral cortices and within the nT to pT range where the hippocampus and amygdala are located. These fields can entrain electroencephalographic activity in normal volunteers (Persinger et al., 1997) and produce differential amounts of alpha rhythms when preferentially applied over the left or right hemispheres (Persinger, 1999).

The magnetic field patterns most effective for these responses have also produced powerful analgesia (equivalent to 5 mg/kg of morphine) in rats after 30 min of exposure (Fleming et al., 1994; Martin et al., 2004a), synergism with clinical dosages of clonidine (Martin & Persinger, 2004), and enhanced expression of ERK-1, ERK-2, and MAPK in cell lines (Martin et al., 2004b) after only one hour of exposure. Although the elicitation of cellular and pharmacological responses by the same patterns and intensity fields that evoke the sensed presence does not prove the specific neurophysiological connection, these capacities suggest their potential for affecting phenomena,

such as consciousness, that is based on complexity (Tononi & Edelman, 1998).

Recently, Granqvist et al. (2005) reported no significant difference between subjects assigned to an experimental magnetic field that was supposed to simulate the present authors' procedures and those subjects exposed to sham-field conditions. They concluded there was no evidence for the effects of the magnetic fields and that sensed presences reported by their subjects (n = 89) could be predicted by suggestibility, signs of temporal lobe sensitivity, and "new age"–oriented life styles.

However, the present authors have controlled for the subjects' suggestibility by the performance-based (Spiegel & Spiegel, 1978) Hypnosis Induction Profile (HIP) as well as their temporal lobe sensitivity and religious or exotic ("new age") beliefs. The authors discerned experimentally the effects of contextual innuendo and HIP scores upon delayed intrusion errors for narratives (O'Gorman & Persinger, 1998). In all experiments the subjects were blind to the application of the fields. For 19 different experiments the 14 female and 5 male experimenters were blind to the hypotheses. In about half of these experiments subjects were either exposed to only one of three or more different configurations of magnetic fields or to a sham field and the experimenters were also blind to which particular magnetic field should be effective.

The mean and standard deviation for the scores for the incidence of sensed presence for the Granqvist et al. (2005) study for both their experimental (magnetic field) and sham groups ($M = 0.3$, $SD = 0.5$ and $M = 0.3$, $SD = 0.5$) were similar to scores for the present study's sham field groups. The means have ranged between 0.1 and 0.3. The mean scores for this scale when the appropriate fields are applied are 0.8 or larger. That Swedish and Canadian students differ in their temporal lobe sensitivity was not likely because the equivalent scores for the former were 0.34 (10.3/30) and for the latter (n = 1,500 over a 20-year period) have been 0.32 (SD = .15). Both scores were similar (items translated to Thai) for university students in Bangkok (Murphy & Persinger, 2001).

Exposure Procedures and Re-Analyses of Data

In order to discern possible sources responsible for the discrepancy between the authors' work and Granqvist et al. (2005), re-analyses of 19 experiments and 407 subjects (ages 17 through 55 years; median = 20 years old) from the authors' databases were completed. Subjects volunteered for 2 bonus points for final grades in first year university psychology classes and were told the experiments involved relaxation or related phenomena.

All of the subjects had also completed the PPI or Personal Philosophy Inventory (Persinger & Makarec, 1993) (as well as several other psychometric tests) while attending introduction to psychology classes about two to four months *before* the experiments. Clusters of items from this inventory, employed to infer temporal lobe sensitivity, are reliably correlated with the proportion of alpha rhythms over the temporal lobes (Makarec & Persinger, 1985, 1990). Specific subclusters included a history of sensed presence, verbal meaningfulness, religious beliefs, and exotic beliefs (Persinger & Makarec, 1993).

Subjects had been assigned to treatments in a repeated sequential order so that treatment groups were equally distributed over time. The sensed presence theme was never mentioned. The topics of the laboratories in which the subjects were tested included semantic and episodic memory processes, creativity, auditory processing, visual illusions, and sex differences. No more than two subjects were tested per day. Each subject sat on a comfortable arm chair, facing eastward, that was housed within a completely darkened, double-walled metal acoustic chamber (which was also a grounded Faraday cage) with the dimensions 2.74 m $\times$ 2.54 m $\times$ 1.98 m, high. The subjects were also blindfolded because this enhanced the occurrence of a sensed presence.

The subjects were told that any experiences they might have would be subtle and that they should not try to label them, just experience them. They were given the option to either verbally report (via a lapel microphone) any experience (which was tape recorded) or remain quiet. A modified helmet through which the fields were generated was worn by every subject. At the end of the exposure, the blindfold was removed. The subject remained seated and immediately completed items from an exit questionnaire. On the first side of the sheet were 20 items reflecting the primary experiences (0 = never, 1 = once, 2 = several times) reported by the original subjects ($n = 60$) who were exposed to the burst-firing magnetic fields. The second side of the questionnaire queried (no, yes) if any visual phenomena occurred along the left or right or lower or upper visual fields as well as reports for sexual arousal, headache, and meaningfulness.

In about half of all experiments (more than 250 subjects) bipolar electroencephalographic activity was recorded from the occipital (O1,O2), temporal (T3,T4), and frontal (F7, F8) lobes. Intense, very emotional presences have been most typical when the subjects generated greater proportions of alpha rhythms over the temporal relative to the occipital lobes *and* the burst-firing fields were applied bilaterally. The proportions of alpha rhythms per unit time over the temporal lobes were moderately and positively correlated (rhos between .5 to .6) with the incidence of sensed presences and the absence or presence of the applied magnetic fields. There have been reliable moderate

strength correlations (.40 to .60) between global geomagnetic activity over 20 to 30 nT and both the proportion of alpha rhythms over the temporal lobes (Booth et al., 2005), the sensed presence (Persinger, 1988), and the type of vestibular experiences (Persinger & Richards, 1995) that often precede the felt presence. Temporal lobe sensitivity, which was moderately and positively correlated (rhos = .30 to .49) with HIP scores (Persinger, 1994b; Ross & Persinger, 1987) potentiated specific magnetic field effects (Cook & Persinger, 2001).

The magnetic fields generated through the subject's brain by the solenoids in the helmet were delivered from outside the chamber through an interface to the helmet. Graded voltages, reflecting a column of numbers (between 0 and 255; below 127 = negative polarity; above 127 positive polarity) contained within computer files were transformed by specific software (various versions of Koren's Complex software) to voltages (± 5 V) through custom built direct to alternating current converters (DACs), and sent by a separate commutator to one of four pairs of solenoids embedded in a elliptical pattern on each side of a helmet (Persinger et al., 2000). The fields were generated through the brain between each pair of solenoids for 0.5 s before moving to the next pair (complete cycle 2 s). The point duration, the time each value between 0 and 255 was maintained at the particular voltage, was either 1 ms or 3 ms with a port latency of about 100 micro-s. The peak field strengths (Metex N380 Meter coupled to a magnetic sensor, 140-3-60-1499, from Electric Field Measurements) at distances equivalent to within the cerebrum were 1 microT (10 mG).

Two types of sham field conditions have been employed. The most frequent has involved identical procedures including the activation of the computer for a specific file but the computer program was never activated. The second involved the computer in the resting state and the circuits to the helmet turned off. The former was associated with a 20–40 nT increase (as measured by a MEDA FM-300 magnetometer) in the steady-state (d.c.) magnetic field over the right hemisphere compared to the left when the helmet switches were set for this procedure (Booth et al., 2005). Mean values for the sensed presence for groups exposed to the sham field in the former were about 0.3 whereas for the latter were about 0.1 to 0.2. The percentages of subjects reporting a presence (no, yes) in the two shams were 15 and 6, respectively (Persinger, 2003b).

Experimental-Induced Presence vs. History of Presence: Controlling for Beliefs and Temporal Lobe Sensitivity

All subjects ($n = 201$) that had been exposed to variations of the optimal field parameters that produced the presence and to sham fields were compared with

those subjects who had been exposed to different environmental conditions that did not elicit an elevated incidence of a presence. The purpose was to discern if beliefs or temporal lobe sensitivity predicted outcome as reported by Granqvist et al. (2005).

In two of the experiments (two different experimenters) that employed the optimal magnetic field configurations all subjects ($n = 75$) received the exit questionnaire after 30 min of exposure to the bilateral burst-firing magnetic field (see Persinger, 2003b for field shapes) or sham field (all equipment operating, but no field generated). The incidence of a presence (0 never, 1 once, 2 several times), and the relative presence (incidence score divided by the mean of the scores for all 20 scores) to control for "non-specific" reporting of odd experiences, were employed as dependent variables.

Three-way analyses of variance for the absolute and relative incidence of a sensed presence as a function of field treatment (sham, field), sex of subject (male, female), and experimenter showed that the subjects exposed to the burst-firing field reported significantly [$F(1,67) = 6,22, 7.15, p < .01$; etas $= .32$] more frequent absolute ($M = .6, SD = .6$) and relative sensed presences ($M = 1.0, SD = 1.1$), relative to sham field groups ($M = .2, SD = .4$; $M = .3, SD = .5$, respectively). There was no statistically significant difference in the scores for temporal lobe sensitivity between groups exposed to the sham or magnetic field conditions. Covariance for the subjects' scores for temporal lobe sensitivity, religious beliefs, exotic (new age) beliefs, and history of a sensed presence ($M = .30, SD = .32$) from the PPI before the ANOVA did not change the level of statistical significance for the two measures [$F(1,63) = 5.88, 6.84, p < .01$; etas $= .28, .30$). The covariates were not significantly correlated ($p > .05$) with either measure of sensed presence.

However, the subjects' *histories* of sensed presences as measured by the PPI (in the class setting 2 to 4 months previously) were significantly correlated (Spearman rho) with enhanced scores for temporal lobe sensitivity (.43), religious beliefs (.38), and exotic beliefs (.45) but not with a variable controlling for simple yes responding (−.10). These clusters were also from the PPI. Similarly, the reported histories of sensed presence before the experiments for the remaining 126 subjects (of the original 201) from 6 experiments involved with the initial isolation of the optimal contingencies (they were exposed to continuous fields or sine-wave patterns) to generate sensed presences (these non-optimal fields generated sham field–level reports) were significantly ($p < .01$) correlated (Spearman rhos that were almost always similar to Pearson rs) with temporal lobe signs (.40), exotic beliefs, such as the validity of reincarnation, UFOs are controlled by alien intelligence and the existence

of time travel (.44), and traditional (Christian) religious beliefs, such as the second coming of Christ, the existence of a devil, and, people must be guided to ensure their spiritual development (.29). The scores for the absolute (M = .2, SD = .3) and relative incidence (M = .3, SD = .4) for the sensed presence within the experimental setting for these subjects were weakly correlated (*rhos* = .17, .16, $p < .01$)) with the strength of traditional religious beliefs only and *not* with temporal lobe sensitivity, control for yes responding, or exotic beliefs.

Multiple regression analyses were completed to predict the contributions to a history of sensed presence (before the experiment) and the incidence of experimental sensed presence by all of the 12 major subclusters (Persinger & Makarec, 1993) of the PPI and scores for all 201 subjects. The equation for a history of sensed presence was composed of four variables (beta values in parentheses) a history of auditory vestibular experiences (.29), religious convictions (.28), paranormal experiences (.22), and a preference to keep personal written histories (.20) with a multiple r = .63 [$F(4,197) = 33.10$, $p < .001$]. The only subcluster that entered the equations for the occurrence of presences (absolute and relative) within the experimental setting was a slightly elevated egocentrism score (r = .20, 23, $p < .01$).

Direct Experimental Control for Suggestibility

Although Granqvist et al. (2005) concluded that suggestibility was responsible for the effects of the magnetic fields in the present authors' previous studies, they did not directly measure this capacity for each subject. Published and unpublished studies involving 4 different experimenters and 139 male and female subjects who were individually administered the HIP by the experimenter before (grand mean = 6.0, SD = 2.1) and after (grand mean = 6.8, SD = 2.7) different magnetic field treatments showed that suggestibility was *not* responsible for the magnetic field effects. The subjects were blind to the purpose of the study. In all these studies the changes in the HIP scores were correlated with the subjects' scores for the PPI exotic beliefs (.50) and Tobacyk's total score (Persinger & Richards, 1991) for Religious Beliefs (.45). The correlations between sensed presence and HIP scores for the sham groups or the most affected groups in all of four studies were not significant statistically ($p > .05$) and ranged between − .17 and .33.

In the Healey study (Persinger & Healey, 2002) involving four treatments (one sham; three different field arrangements) the experimenter believed the experiment was about suggestibility and did not know which field was supposed to be most effective. The mean and standard deviation for the sensed presence

scores for the various groups were sham ($M = .3$, $SD = .5$), left hemisphere exposure (0), right hemispheric exposure ($M = .6$, $SD = .8$) and bilateral stimulation ($M = .8$, $SD = .6$). Reanalyses of these data for the significant treatment effects [$F(3,40) = 3.67$, $p < .05$; *eta* = .47] showed that the initial covariance for the HIP score [$F(3,39) = 3.60$, $p < .05$] and/or the combined history of a sensed presence, exotic beliefs, religious beliefs, or temporal lobe sensitivity [$F(3,36) = 3.07$, $p < .05$; eta = .50] did *not* alter the statistical significance of the magnetic field effect. The treatment differences for the relative presence scores also remained significant [$F = 4.09$, $p < .01$].

In the Hurban (Persinger, 2003b) study the field effect was *unmasked* by covarying for suggestibility and temporal lobe sensitivity. That study involved applying either a sham, burst-firing, reverse ringing, or, frequency-modulated field over the right hemisphere for 30 min after the Hypnosis Induction Profile had been obtained. The experimenter believed the experiment was about magnetic fields and hypnosis and that the "reverse ringing" pattern was most potent. Although a two-way analysis of variance as a function of the treatments showed the usual greater numbers of absolute presences [$F(1,24) = 8.33$, $p < .01$] and relative presences [$F = 7.20$] for women compared to men the treatment effects were not statistically significant [$F(3,24) = 2.11$, 2.20, respectively; *eta* = .38, .39].

However, when the subjects' changes in HIP scores and temporal sensitivity scores were first covaried, a statistically significant [$F(3,22) = 4.25$, 8.38, $p < .01$; *eta* = .50; .55] treatment effect emerged. *Post hoc* analyses indicated that the subjects who received the frequency-modulated pattern over the right hemisphere reported significantly more presences ($M = .8$, $SD = .4$) than the reverse ring ($M = 0$), continuous burst-firing pattern ($M = .1$, $SD = .4$), or sham group ($M = .3$, $SD = .8$) who did not differ significantly from each other.

Expecting a Presence and the Presentation of Multiple, Sequential Fields During the Same Setting: The Subject as His/Her Own Control

The author's most recent studies (5 experimenters; 2 male; 3 female; 47 subjects each employed as their own controls) have been designed to isolate specifically the controlling parameters for the sensed presence. The sensed presence was defined for the subjects. In the usual setting they were asked to press buttons held in their left and right hands to refer to which side the "presence" occurred. The subjects were then exposed to 6 to 8 successive (counterbalanced between

subjects) 5-min sequences of different very complex magnetic fields or blank fields (all point values = 127) to discern which was most effective.

The responses were recorded in real time along with the subjects' EEG activity. The range in latencies of response after the field onset for the most effective patterns ranged between 20 and 60 s. The subjects were blind to which and if a field was present (between 75 and 90% of the subjects displayed at least two button presses). The experimenters were blind to the contents of the specific batch file that generated the fields.

Preferential right hemispheric stimulation with the frequency-modulated field (3 ms point duration, 3 ms interstimulus interval) for 30 min resulted (in more than 80% of cases) with the sensed presence felt along the left side. Subsequent bilateral stimulation with the burst-firing pattern (3 ms point duration, 4000 ms interstimulus interval) resulted in experiences attributed to the right (35%), left (45%), or behind/above (20%) the person (Persinger & Healey, 2002). Ego-alien experiences (the feeling that "someone is in your mind" or "inserting information into your awareness") were correlated with the numbers of right-sided ($rho = .46$) but not left-sided ($rho = .19$) presences while experiences of being somewhere else were correlated with the numbers of left-sided ($rho = .73$) but not right-sided ($rho = .23$) presences. Point durations of 1 ms or 10 ms but not 3, 5, 7, or 20 ms for matched-frequency 7-Hz sine-wave fields to test Cherry's (2002) Schumann Resonance hypothesis applied more intensely over the right hemisphere (Sandyk, 1992, 1995) compared to the left produced more EEG spikes in the occipital region that were correlated ($r = .80$) with the numbers of left but not right ($r = .34$) presences (Booth et al., 2003).

For the last five years the first author has been pursuing the hypothesis that people with *different* beliefs may be more susceptible to *specific* temporal parameters of the field, analogous to the differential efficacy of medications for subtypes of depression. She tested 20 subjects who were exposed to the frequency-modulated patterns with different interstimulus intervals (3, 10, 20, 40 ms) designed to overlap with the timing of Llinas' and Pare's (1991) phase-modulations for consciousness. Those that had endorsed PPI exotic beliefs reported more presences (button presses) during the 10 ms interstimulus intervals while those that endorsed beliefs in Celtic (Wicka) types of spiritualism, involving "witches," showed more sensed presences ($rho = .70$) to 3 ms intervals.

Subjective Experiences

Subjects exposed to the optimal magnetic fields report experiences that are personally very meaningful, emotional, and "real." Ongoing or *post hoc*

narratives of these experiences reflect the richness and complexity of cognitive dimensions. The apparent overwhelming numbers of details and individual differences contained within these reports can be minimized by assessing basic themes or by quantitatively analyzing their emotional dimensions. For example, Richards et al. (1993) found that the narratives of subjects exposed to the burst-firing field presented at intervals to induce "analgesic" effects contained words whose meaning scores were significantly more pleasant and less active (typical of pleasurable experiences) compared to a sham field reference group.

Specific examples of the narratives from selected subjects are shown in Appendix A. Appendix B shows the common themes and statements reported by subjects exposed to the multiple-sequenced patterns, discussed in the last section, over the right hemisphere. Such qualitative differences are also typical of subjects who receive psychotropic drugs versus placebos (McKim, 1991). Whereas both of the latter groups reported colors and lattices, the type of color and the form of the percepts differed. In about 20% of the cases the presence appeared to move when the subject tried cognitively to "focus" or attend to its location. If the field was stopped without the person's knowledge the "presence" faded in about 2 to 3 s.

A sense of "evil," particularly for left-sided experiences and marked personal pleasantness, for right-sided presences, occurred in about 40% of the more than 200 subjects who were queried about these details. Almost all subjects with a history of using "mind-altering" drugs stated the experiences produced by the magnetic fields were similar to these states. More than three-quarters of individuals who had histories of "visitations by Sentient Beings" reported the latter as re-appearing during the application of experimental magnetic fields.

The Importance of Precise Field Patterns and Signal Timing

The most probable explanation for the discrepancy between the results of Granqvist et al. (2005) and the present studies is the manner in which they attempted to generate the critical patterns of the magnetic fields. The software (Complex 1.15) to generate the magnetic field configurations was designed for XT and 286 IBM PCs using DOS. Granqvist et al. (2005) employed a Pentium-level computer. Faster computers and WINDOWS in particular distort the timing of the point durations and disconfigure the temporal patterns of the applied magnetic fields (Koren & Persinger, 2002) and eliminate their bioeffectiveness (Martin et al., 2004; Tiller & Persinger, 2002). In several rat studies (Martin et al., 2004a) the potency of analgesia from these applied fields

can be eliminated, similar to changing the impact of a drug by changing the position of an atom, by subtle changes in timing. The presence and the fidelity of the appropriate field in the present experiments were also verified before every subject was tested.

CONCLUSIONS

The results of the present re-analyses of 19 major studies by the authors over the last 15 years indicate that the sensed presence, a feeling of a Sentient Being, can be experimentally produced within the laboratory. The experience is most frequent when the appropriate, temporally patterned magnetic fields are applied through the temporal lobes with particular enhancement over the right hemisphere. The effect sizes of the phenomena across experiments were similar in magnitude for experiments that were completed under double-blind conditions.

When experimenters were told or not told the purpose of the study or were actually given "erroneous" expectations, specific temporal patterns of magnetic fields were still most effective. Even when the subjects expected a presence (but were not aware if they were being exposed to sham fields or to different patterns of fields), specific applied magnetic field patterns were associated with more frequent button presses that indicated a felt sensed presence. Although individuals with elevated temporal lobe sensitivity were sometimes more responsive to some patterns (Cook & Persinger, 2001), suggestibility was not a significant correlate in the report of sensed presences within this experimental context.

The sensed presence has been associated with creativity, inspiration, mystical states, and contact from "other-dimensional" sentient processes for centuries. Variants have been reported in all human cultures. The profound and personal experiences that subjects report following a brief exposure to the appropriately patterned, experimentally generated magnetic fields through their temporal plane suggests the procedures may simulate the essential theme of "natural" experiences. If all experiences are generated by the brain, then the temporal patterns and spatial configurations that generate the experience of gods should be produced experimentally within controlled experimental settings.

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APPENDIX A

Examples of narratives (from audiotape) of subjects participating in "relaxation" studies who were exposed to various parameters of the applied magnetic fields designed to generate the sensed presence.

Subject A

Middle-aged professional journalist. Frequency-modulated pattern (3 ms point durations) applied over right hemisphere.

"I see shadows along my left side . . . there is someone touching my left side . . . there is a flash of light . . . a tunnel experience. I feel as if I am shrinking

and expanding. There is a tingling inside of my thigh . . . sexual excitement. There's a cold rush (subject shivered; EEG showed paroxysmal activity). I see a visual . . . it's an apparition."

Subject B

21-year-old female with history of diabetes. Burst-firing pattern (3 ms point durations) applied bilaterally.

"I felt a presence behind me and then along the left side. When I tried to focus on its position, the presence moved. Every time I tried to sense where it was, it moved around. When it moved to the right side, I experienced a deep sense of security like I had not experienced before. I started to cry when I felt it slowly fade away" (the field parameters had been changed).

Subject C

30-year-old woman. Frequency-modulated field (3 ms point durations) enhanced over the right hemisphere.

"I feel detached from my body. I am floating up . . . there is a kind of vibration moving through my sternum . . . there are odd lights or faces along my left side. My body is becoming very hot. . . . tingling sensations in my chest and stomach . . . now both arms. There is something feeling my ovaries. I can feel my left foot jerk. I feel there is someone in the room behind me."

Subject D

25-year-old man, childhood history of three "mild" head injuries. Bilateral application of frequency-modulated pattern (1 ms point durations).

"I feel as if there was a bright white light in front of me. I saw a black spot that became a kind of funnel . . . no tunnel that I felt drawn into. I felt moving, like spinning forward through it. I began to feel the presence of people, but I could not see them; they were along my sides. There were colourless, grey-looking. I know I was in the chamber but it was very real. I suddenly felt intense fear and felt ice cold."

APPENDIX B

The most frequent themes and events reported or displayed by subjects who were asked to press one of two hand buttons when they felt a presence while being exposed to successive sequences of different magnetic field patterns over

the right hemisphere or periods of no field. These themes occurred when the fields were present.

1. A dark, ominous force looming right above the person (as if it was going to descend).
2. A feeling of suffocation or pressure on the chest.
3. The sensation of "blacker than black" during brief periods within a minute of the onset of a specific pattern.
4. Re-experiencing previous altered states, such as haunts, kundalini, and psychotropic drug experiences. (These individuals had not experienced the unusual events again until they were exposed to the fields.)
5. About 20% of the participants clicked one or two buttons indicating they were experiencing a sensed presence but had no memory of the experience about 15 to 20 min later.
6. Religious figures, images of "priests," and, human skeletons, occurred as "flickering" but repeated phenomena.