TEMPORAL LOBE SOFT SIGNS AS INDICATORS OF FANTASY PRONENESS

by

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Temporal Lobe Soft Signs as Indicators of Fantasy Proneness

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Abstract

This study investigated the possibility that soft temporal lobe indicators are also indicators of fantasy proneness. As well, individual beliefs in the paranormal and vividness of conventional imagery were measured, the first as a theoretical effect of fantasy proneness and the second as a possible correlate of degree of fantasy proneness. Fifty subjects completed the Creative Imagination Scale, Questionnaire on Mental Imagery, Personal Philosophy Inventory, and Belief in the Paranormal Scale. Subjects were divided into high- or low imagers according to their score on the Creative Imagination Scale, and one-way analyses of variance carried out. Results failed to support the thesis that temporal lobe signs in the general population are indicators of fantasy proneness, or that beliefs are strongly related to degree of fantasy proneness. Degree of fantasy proneness and conventional imagery ability are found to be correlated moderately strongly, indicating that the abilities are most likely distinct but related.

"The desire to explain the mystical in terms of the physical is nowhere more apparent than in the epilepsy literature. Temporal lobe epilepsy is the obvious place to look." (Fenwick, 1983a, p. 209)

"[Transcendental Meditation] is very agreeable, like scuba diving in warm bouillon. Nothing much happens. Every so often, a scarf floats by. And that's big news down there." (Vonnegut, 1991)

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Chapter 1. Introduction

Beginnings - Temporal Lobe Epilepsy and Mystic Experiences

The connection of mysticism with epilepsy is, as Fenwick (1983a) points out, a longstanding one. Epilepsy was known during Greek and Roman times as the 'sacred disease', albeit to the ire of Galen. More recently, the descriptions of epileptic seizures by Fodor Dostoevsky in both his novel The Idiot and his personal journals have strengthened this association, especially in light of the widespread retrospective diagnosis of the great author's temporal lobe epilepsy (TLE). This diagnosis has been the starting point of several academic authors' analysis of the possible link between temporal lobe states and mystic experience.

Fodor, St Paul, and Soren

Since the time of Dostoevsky, the diagnosis-in-hindsight of many religious (and other) figures has been a popular pursuit, and historical figures ranging from St. Paul and Mohammed to Peter the Great and Soren Kierkegaard have been cast as temporal lobe epileptics. The starting point of many a comparison is, predictably, Dostoevsky himself (e.g., Hansen and Hansen, 1988). This despite the fact that in his extensive personal diaries the Russian author never recorded any ecstatic auras, although describing his seizures in some detail (Fenwick, 1983a, p. 214). Gastaut (1978) doubts for a number of cogent reasons that Dostoevsky was a victim of TLE, instead considering him to have suffered from idiopathic grand mal epilepsy. Despite this, Dostoevsky is continually referred to, if only by implication, as almost certainly a temporal lobe epileptic (e.g., Bear, 1979; Bear and Fedio, 1977; Hansen and Hansen, 1988). So it can be seen that

this "diagnosis" has indeed been one of the main bases of the traditional association of positive, even ecstatic epileptic auras with TLE.

In actuality, as Fenwick (1983a), and earlier Gastaut (1954), point out, the incidence of positive auras of any degree associated with TLE is extremely rare. Fenwick cites only one study where any pleasurable auras, let alone ecstatic ones, were reported. These instances constituted a small minority (less than 0.9%) of a sample of 1,017 epileptic individuals (Lennox, 1960). Fenwick (1983a) further states that "Until 1980 no cases of temporal lobe epilepsy (TLE) and an ecstatic aura had been reported." (Fenwick, 1983a, p. 208, emphasis added). It was Cirignotta, Todesco, and Lugharesi (1980), in the case referred to by Fenwick above, who observed that most elusive of data: an individual reporting an ecstatic aura, together with EEG evidence of a right-hemisphere temporal lobe seizure. Given the singularity of this evidence however, it is difficult to know whether it should be taken as support for the "Dostoevskian" theory of TLE, or as an anomaly which actually discredits it.

Chapter 2. Mysticism and Religion

What is mysticism?

At this point it is probably best to pause and consider what is meant by 'religiosity,' 'mysticism,' 'god-experience' and other terms that have been connected with TLE. Both Sensky (1983) and Fenwick (1983a) have raised the spectre of divergent operational definitions of this central concept. Sensky (1983) notes that, besides the lack of definition of religiosity in several studies, descriptions of mystical states *per se* often conspicuously lack a reference to God or to religion and that some commentators on mysticism (e.g., Laski, 1980) regard such experiences as secular ones, albeit sometimes interpreted in the light of religious beliefs. Hay and Morisy (1978) and Hay (1979) emphasized this very point in their surveys of the incidence rates of mystic experiences: a consistent feature of these two reports is that up to a third of respondents who indicated having some form of mystic experience regarded themselves as agnostics or atheists. Additionally, reporting of mystic experiences by agnostics and atheists far outweighed the number of subjects with even a casual religious practice.

Finally, many subjects explicitly rejected the association of God or religion with their experiences (Hay, 1979). These facts diverge greatly from the description of 'religiosity' used by Bear *et al.* (1982): "Holding deep religious beliefs, often idiosyncratic; multiple conversions, cosmic consciousness" (p. 482). In fact, these two attitudes towards mystic experiences - often easily divided into those of people who have mystic experiences versus those who theorize about those that have mystic experiences - are almost diametrically opposed.

Mystic Experiences - Dimensions

Sensky (1983) proposes that definitions similar to that of Bear (1982) belong to the 'ritualistic' dimension of religion, while the mystic state is part of the 'experiential' dimension. This division was first proposed by Glock and Stark (1965, in Hay, 1979). The division seems helpful, although it must be kept in mind that agnostics and atheists often report such experiences, and that the degree of reporting such experiences does not seem to be related to the degree of general population involvement in organized religion. This suggests that the ritualistic dimension is of secondary, if any importance to true mystic experiences.

The importance of the division into experiential and ritualistic dimensions is obvious when, for instance, sudden conversion experiences in epileptics (e.g., Slater and Beard, 1963) are considered. As Sensky (1983) enumerates, all but one of his six such patients were known to have either a personal or family religious background, or both. Clearly this qualifies as experience in the 'ritual' facet of religion. As such, it is quite plausible that the ritual experience in such cases shapes interpretation of later, direct, experiences. Also, the fact that subjects in these studies were selected because they exhibited signs of both epilepsy and psychosis (Slater and Beard, 1963; Dewhurst and Beard, 1970) is a serious flaw; it can only be with strong reservations that we relate these individuals' experiences to either mysticism in particular or religiosity in general.

Evidence that mystic experience is felt separate from the everyday religious abounds. Hay (1979), in a study of 100 individuals who returned a 65% rate of report of mystical experiences, totalling 101 episodes in all, reports only 4 conversion experiences, and at least one rejection of such an experience by a

respondent - that is, the person felt the experience was a chance to 'convert', but rejected the opportunity. It seems very clear indeed from such figures that the mystic experience, in at least a personal sense, is in fact dissociated from religion. In this vein, it should be noted that Cirignotta, Todesco, and Lugaresi's (1980) observations of a man displaying temporal lobe seizures with an ecstatic aura do not contain any reference to overt religious reports or beliefs of any kind. Their subject instead insisted that the ecstatic sensation could only be compared to those evoked by music.

It seems overall that the experiential dimension of mysticism is most relevant to the current study. After all, the psychological literature has focussed most frequently on religious (i.e., mystic) experience, rather than religious practice. The experiences characteristically investigated by the authors mentioned here seem to share at least three of Russell's (1959) four characteristics of mystic philosophy: (i) "the belief in insight as against discursive analytic knowledge," (ii) "belief in unity," (iii) denial of the reality of time. In some form or other, these marks are common in almost every account of mystic experience. Russell's fourth characteristic of mystic experiences, a "belief that all evil is mere appearance, an illusion produced by the divisions and oppositions of the analytic intellect," is infrequently reported, but does not seem so much a defining characteristic of the mystic experience as a corollary of having experienced such a state. For this reason, Russell's fourth characteristic does not seem crucial to describing the mystic experience. Its status as a conviction arising from the mystic experience does not give it primacy over any other sequalae of such states. In any case, Russell's definition of the "mystic philosophy" seems more than sufficient to define "mystic experiences".

Science versus Religion

In the light of the ritual versus experiential division of religious phenomena, it is interesting to note that at least one author (Persinger, 1989) has targeted the conclusions of his work at the organizational portion of religion, rather than the experience of the individual per se. Persinger seems to consider organized religious activity a subversion of people's efforts to live fully and without delusions. This is in accord with Ellis' (1988) proposed criterion for the relationship between religious practice and mental health. The (theorized) ability of people to bring on temporal microseizures deliberately, says Persinger, is their active participation in this subversion. In this respect, he would probably agree wholeheartedly with Vonnegut's (1991) statement quoted at the beginning of this work. In fact, Fenwick (1983b) has reported TLE patients who could bring on a seizure at will, sometimes - notably - by evoking certain emotions. Such a report does support the notion that temporal seizure experiences may be regarded by some as an end in themselves, if their experiential correlates are felt to be beneficial in some way. However, it is a long leap from this to, for instance, the evil of the Vatican.

Ellis (1988), who considers orthodox religious practice conducive to many serious adjustment problems for the practitioner, also stands in contrast to Hay and Morisy (1978) on the matter of the effects of religion on mental health. Contrary also to Ellis, Greeley and McCready (1979) reported that 600 subjects in a national, representative survey who reported mystic experiences were administered the Psychological Well-Being Scale, also developed by Bradburn (1969). Frequent ecstatic experiences were correlated with psychological well-being at the level of 0.40. According to the Greeley and McCready, this was the highest correlation with the Scale seen up to that point in time in any research. It

would seem that Ellis' theoretical position, that subscription to religious ideas will result in mental ill-health, is so far unsupported by the small amount of data gathered. Ellis, as a clinical psychologist, is no doubt prone to encounter the negative extremes of individual adjustment coincident with religious beliefs, which could well have contributed to his conclusions. However, Ellis may take some comfort in the knowledge that research indicates that subscription to religious orthodoxies and the having of ecstatic experiences is at best a tenuous one.

It remains to be seen, however, whether very slight fluctuations in neural functioning can be detected by individuals, although there is some indirect evidence of this. That is, there is some evidence to suggest that very dilute electromagnetic fields can be directly detected by human subjects. Persinger and Makarec (1987) observed a subject who appeared to be able to use a 4Hz magnetic field generated over the temporal region as a signal that a certain stimulus (one of five possible) was about to be presented. Feelings of "being correct" were associated with the magnetic field by the subject, who also scored above chance in identifying the card type whose presentation was matched with that of the magnetic field.

The experience of TLE has also been linked to non-obvious aspects of the individual's behaviour. Cirignotta, Todesco, and Lugharesi (1980) observed a man whose "absences" were up to three times more frequent while he was playing cards or draughts than when he was undertaking a wide variety of other activities. If temporal lobe seizure experiences were felt to be enjoyable, such patterns may be consciously or unconsciously evoked for their own sake. Fenwick's (1983b) report (see above) of voluntary control of seizures is most relevant here. It is obvious that at least some individuals are capable of manipulating aberrant brain states quite selectively and deliberately.

The observations by Zusne and Jones (1982) and Jones, Russell, and Nickel (1977), linking subjectivist world-views with the tendency to believe in the paranormal, support the temporal lobe-mysticism theory in another way. If individuals are influenced by temporal lobe experiences into believing in the paranormal, they may well extend their beliefs to the religious and mystical. This may particularly be the case if the experiences are prone to deliberate, ritualised "triggering" by the individual. Persinger (1983) hypothesizes such a process.

Overall, the direct evidence for an association of TLE with mysticism or its distant cousin "religiosity" does not seem strong. The most recent work has tended to be unsupportive of such a link, and additionally at least one researcher in the area has moved from supporting the TLE-mysticism theory (Gastaut, 1954) to presenting evidence against it (Gastaut, 1978). In this way, the history of the controversy must be at least a little informative. Additionally, no research results, before or since Cirignotta, *et al.*, (1980), seem to clearly support the association between TLE and ecstatic auras of a religious, or any other, nature. The simplicity of a direct connection between TLE and religious or mystic beliefs seems, alas, too simple to be true.

TLE and Religion

Dewhurst and Beard (1970) pinpointed an area crucial to the theory of TLE and religiosity: the question of whether TLE sufferers and those who had significant religious experiences have a third factor in common. Their study found a high correlation between TLE, religious conversion experiences, and diagnoses of psychosis. In an earlier study, Slater and Beard (1963) had also found such a link to psychosis, using some of the patients who later would take part in the

Dewhurst and Beard (1970) study. Slater and Beard (1963) came to the conclusion that the number of individuals suffering from epilepsy (of any kind) as well as schizophrenic psychosis was much greater than would be expected by simply combining the population base rates for these disorders. Additionally, their observations of patients led them to believe that the epilepsy, in a great number of cases, was the cause of the psychosis (p. 99)[1]. Slater and Beard came to the conclusion that such patients suffer from an "epileptic psychosis" (p. 144), rather than either what is normally regarded as schizophrenia or psychosis precipitated by epilepsy.

Guerrant (1962) also found that Minnesota Multiphasic Personality Inventory (MMPI) personality profiles of TLE sufferers differed from those with chronic medical (i.e., non-neurological) disorders, specifically falling more in the psychotic range, while medical patients were more neurotic. It should be noted that none of Guerrant's subjects had a 'normal' MMPI profile. Further, TLE and Grand Mal sufferers did not differ significantly in their profiles, a result contrary to those of Perez and Trimble (1980) and Trimble (1990). Both Fedio (1986) and Bolwig (1986) note the continual debate over the existence of both the 'epileptic personality' and epileptic psychosis, commenting that both areas require much further exploration before any conclusions may be reached.

Speaking to the idea of "religiosity", Sensky and Fenwick (1982) found that temporal lobe epileptics did not report more religious ideas or mystic episodes than did generalized epileptics. In fact, a lesser percentage of those who had been diagnosed with TLE reported religious inclinations, conversions or mystical experiences. An average of 36% of TLE suffers reported these experiences, while the average amongst generalised epileptics was 56%. Subjects suffering

1. Perhaps contrary to expectations, the onset of the diagnosed mental disturbance often came at a time when the individual's epileptic seizures were decreasing in frequency, or had even been absent for some months.

from generalised epilepsy did not differ from the general population, when compared to the reports made by Hay and Morisy's (1978) 1,865 subjects, who averaged 57% positive responses - that is, 57% of respondents answered that they had had at least one mystic experience, as defined by the authors. Sensky, Petty, Wilson, Fenwick and Rose (1984) found similar patterns in a study which included classical and common migraineurs in addition to temporal lobe and generalised epilepsy sufferers. TLE sufferers did not differ form the general population, while the most difference was shown between classical migraineurs and the general population.

Tucker, Price, Johnson and McAllister (1986), in a very well-considered and thoroughly conducted study of refractory psychiatric patients, found that a number of patients who had been chronically unresponsive to antipsychotic drugs showed remarkable improvement during treatment with anticonvulsants. Their study revealed that many such people will frequently be put into a number of different diagnostic categories at different times, with a large number of "atypical" diagnoses. Their data suggest strongly that the "atypical" diagnosis, or changeable diagnosis, may well be a catch-all category, ensnaring many people who have subtle, non-stereotypical manifestations of seizure disorders. Such patients, upon responding to anticonvulsant medication (e.g., phenotoin, carbamezapine) may possibly be classed as suffering from "epileptic psychosis". While this term may be valid in a strict sense, the underlying situation is quite different from the "epileptic psychosis" hypothesized by Bear (1979), Trimble (1990) and others. In one, what seems to be a psychosis is a seizure disorder; in the other, a psychosis is supposedly induced by the events of the clinically subtle seizure disorder, a result of the interaction between psychological function and neurological dysfunction. Shenk and Bear (1981) explore these possibilities, and propose what is effectively a hybrid of the two hypotheses: seizure experiences

may cause defensive or self-protective reactions in the individual, leading to dissociative states which are eventually diagnosed as psychological disorders, the underlying organic syndrome being lost to the clinician's view. Shenk and Bear themselves were however careful to point out that: "the dissociative episodes are not seizures but responses to deepened interictal affects produced by the limbic epileptic focus" (p. 1315). In doing so, they are emphasizing the interactionist idea of epileptic psychosis.

Chapter 3. Temporal Lobe Epilepsy

TLE - Qualitatively Different?

As can be seen, it is a subject of much debate whether TLE sufferers *per se* are differentiable from victims of other forms of epilepsy, or even from the general psychiatric population. Bear, *et al.*, (1982) determined that TLE sufferers may be differentiable from these other two groups on a cluster of characteristics, including social viscosity, circumstantiality, religiosity and general philosophical interests (i.e., "metaphysical or cosmological preoccupations"). Although the number of criteria statistically differentiating TLE patients from the other two groups ranged only from one (TLE and schizophrenia) to six (TLE and affective disorders) out of a possible twelve, the overall profiles of patients from different populations were judged to be reliably different by these authors. However, this study was of hospitalized patients, and so the authors did not attempt to extend their findings to the behavioural symptoms of TLE and other sufferers 'at large', as it were.

All of these findings must be evaluated in light of the fact that the breakdown of epilepsies into Temporal Lobe, Petit Mal etcetera, is becoming less popular. Seizure disorders are more and more being classified according to the functional signs of the seizures, rather than by focus site. Thus, stereotypical TLE is called by Complex Partial Epilepsy, Ideomotor Epilepsy, or some similar term, denoting the actual seizure signs (e.g., Neppe and Tucker, 19). The change in terminology is motivated mostly by pragmatic considerations; however, it is useful also as it tends to avoid the reification of clinical terms, such as occurred with TLE. With this in mind, we now review some of the literature on differential symptoms in the TLE population.

TLE - Types and Localisation of Symptoms

(i) Types

On occasion, in conjunction with the TLE-and-mysticism debate, the question of whether TLE may be differentiated according to whether it occurs with a right, left or bilateral temporal lobe focus has arisen in the last twenty years. Specifically, it has been posited that right temporal lobe abnormalities may be associated with mystical experiences, although again strong no evidence in support of this has been found (Fenwick, 1983a). Slater and Beard (1963), in a study of epilepsy and psychosis, found that in epileptics with some psychiatric diagnosis, there were 48 out of a total 60 (69.5%) subjects showing EEG evidence of TLE. Among these, the greatest number showed bilateral seizure foci, although there was generally an even distribution of patients with respect to locality of seizure focus. This does not support the right- versus left-temporal lobe distinction with respect to either mystic experiences or behavioural disturbances. Combined EEG and clinical evidence raised the proportion of suspected TLE patients in the sample to 80% (p. 123), and served mainly to highlight the fact that TLE cases are often difficult to recognise, requiring specialized attention to be detected.

In a well-planned study of normal people, generalised epileptics, and left- and right-focal TLE sufferers, Brandt, Seidman and Kohl (1980) found that left-focal TLE patients seemed more markedly affected in their self-reports on Bear's (Bear and Fedio, 1977; Bear *et al.*, 1982) Personal Inventory. They described themselves as brooding, obsessional, and overly concerned with detail, observations supported by some clinicians (e.g., Bear, 1979). One explanation of

this that has been put forward is that of Mayeux *et al.* (1980), who found that left-focus TLE patients have difficulty producing names as per the Boston Naming Test, and this may contribute to circumstantiality, viscosity, and perhaps even humourlessness. Seidman and Mirsky (1980) found the same pattern of language difficulty in those with left-focal TLE, but made a more cautious statement with regard to the direction of causality between the two observed deficits. It is impossible to say from such evidence whether the difficulty with language gives rise to the personality characteristics or vice-versa, or whether the physical syndrome gives rise directly to both. In addition to the language-difficulty hypothesis, Brandt *et al.* (1980) made note of evidence that the left temporal region is important for the processing of temporal relationships. This, they suggest, may result in confusion with respect to the temporal order of events, and may lead to the pattern of personality traits evident in left-focus TLE sufferers, noted in their own and other studies mentioned above. This is an innovative and plausible theory, despite being acknowledged by the authors to be quite speculative at the time of publication.

Perez and Trimble (1980) and Trimble (1990) present evidence that TLE sufferers with dominant hemisphere foci show more interictal symptoms of schizophrenia than any other affective disorder. These data fit nicely with knowledge of lateralization of function, given the Schneiderian first-rank symptoms used as criteria by these authors. Such symptoms involve functions recognized to be generally localized in the dominant hemisphere.

(ii) Localization of symptoms

With respect to location of seizure foci as a determinant of affective seizure symptoms, all but one of the TLE patients involved in the study by Brandt,

et al., (1985) showed bilateral focus, leading to the supposition by the authors that bilateral seizure foci may be associated with more exaggerated behavioural disruptions. It should be noted that this is somewhat contrary to the data produced by Slater and Beard (1963) as related above. Also, Brandt *et al.* (1980) found differences in some of the same dimensions, but in the opposite direction to Bear *et al.* (1982) - TLE patients were lower on viscosity and circumstantiality that generalised epileptics. In this last, so-called 'religiosity' was conspicuous by its *absence* as a significant difference between those with TLE and normal subjects or generalised epileptic patients.

To add to the confusion, Rachov and Yatsuk (1986), in a study of 226 TLE patients, found that epileptic foci either in the dominant hemisphere or in both hemispheres was associated with larger dysfunctions of affect. They also concluded, from observations of an unreported number of patients who had undergone neurosurgery, that involvement of subcortical (i.e., limbic) brain areas was associated with the most disturbed cases. Additionally, "extraverted dysphoric states" were found in association with dominant temporal lobe foci, while "introverted dysphoric states" were associated with non-dominant hemisphere foci (p. 69). Their investigation did not include any version of religiosity.

Trimble (1986), in a review of studies concerning hypergraphia, suggests that "disturbances of function in the non-dominant temporal lobe" may be associated with a syndrome of hypergraphia, manic and religious tendencies, hyposexuality and deja vu experiences. Although some cases of hypergraphia have been documented (Joseph, 1986), it is also the case that the definitions and clinical observations of several of these symptoms solely in cases of TLE is widely contested. Joseph's observations were of two individuals who met the

DSM-III criteria for affective disorder, which places them in the same category as those observed by Slater and Beard (1963). This means that his observations certainly cannot be limited, or even attributed directly to, TLE. In this vein, discussion of Trimble's (1986) article consists of a note by Robert Post that "many of our [NIMH Bethesda] manics have a box full of writing, often of a religious nature". Elsewhere, discussion of the links between the various epilepsies and diagnosis of psychological disorders (e.g., Guerrant, 1962; Slater and Beard, 1963; Dewhurst and Beard 1970; Sensky and Fenwick, 1982a; Bolwig, 1986; Fedio, 1986 - see discussion above) has made the attribution of hypergraphia to TLE specifically seem at best doubtful. It seems very much more likely that instances of hypergraphia in TLE sufferers may be linked with concomitant psychological disorders, rather than TLE *per se*[1].

To round out the discussion here, it should be noted that in a 1979 paper, Bear noted the prevalence of psychiatric diagnosis of epileptics in general, with the attendant controversy over whether TLE patients are differentiable, on this basis, from other epileptics. The earlier discussion with respect to the work of Tucker *et al.* (1986) is particularly relevant here. Further, Bear also notes that some (e.g., Hill, 1953a, 1953b; Gibbs, 1951) claim that TLE victims display more psychotic functioning than other epileptics, while others (e.g., Waxman and Geschwind, 1974) seem to have observed the opposite. This area of knowledge is currently murky, to say the least, although in general it can be seen than more recent opinions and data have tended to go against theories linking TLE with mysticism and specific personality types. At the same time, findings on the link between TLE and affective symptoms have seemed to depend on the way in

1. With respect to another supposed feature of TLE, hyposexuality, is has been argued that 'hyposexuality' may in fact be 'displaced', or inappropriately expressed, sexuality (Bear, 1986).

which the affective symptoms are measured and categorised. Classic Schneiderian classification tends to return a correspondence (e.g., Trimble, 1990), while personality measurement approaches do not (e.g., Guerrant, 1962).

Chapter 4. Temporal Lobe Transients

Temporal Lobe Transients - the debate moves to greener pastures

With the strength of the relationship between TLE and religiosity under serious question, it may have become time to look elsewhere for a materialist explanation of mystic experiences. Rather than shifting sites from the temporal lobes to another part of the brain, the debate has instead moved to focus - so to speak - on the question of degree of seizure activity. That is, some recent research (e.g., Persinger, 1983, 1984a, 1984b, 1984c; Makarec and Persinger, 1985) has concentrated on the proposition that it is intense temporal lobe activity of a "more organized," and perhaps more subtle nature than a TLE seizure which is the cause of mystical experiences (Persinger, 1989, p. 19).

Persinger (1983) labels these outbursts temporal lobe transients (TLTs), and describes them as being:

> "analogous to electrical microseizures without any obvious motor components... Lip smacking, facial distortions, automatisms, and vagal glossopharyngeal-mediated vocalizations (speaking in tongues) followed by amnesia, would occur in the more extreme conditions." (p. 1257).

Persinger goes on to give many specific details of why the context and associations of such transient 'microseizures' would lead the individual to attribute the experience to some mystic state or divine presence. It is notable that an extreme "microseizure" as described here would not be readily distinguishable from an actual complex partial epileptic seizure.

The theory of "temporal lobe transients" is much more a variation on some previous hypotheses than an alternative to them. It may be seen that, for instance, Bear's (1979) theory of "sensory-limbic hyperconnection" is a theoretical bridge between the TLE theory of mysticism and Persinger's hypothesis. In this

way, neurally-based theories of mystic experiences have grown ever more subtle. Given that early attempts to study the phenomenon of mystic experiences from a neuropsychological point of view lacked a clear definition of the target experience, this is most likely for the best. By the same token, it can also be seen that the various theories, including Persinger's, have stuck fast to the classic scientific form of positing a specific physical cause underlying a specific mental state.

With the aid of a paper-and-pencil instrument composed of subscales culled from various existing tests and subjective descriptions of complex partial epileptic seizures, Persinger has explored the relationship between TLTs and religious-mystical experiences (Persinger 1984b; Persinger and Makarec, 1987). On the assumption that people subject to TLTs lie on a continuum from temporal lobe epileptics up to and including 'normals', subjects have been tested with this instrument for so-called 'soft signs' of temporal lobe dysfunction, and these scores compared with scores on various personality test subscales. The overall test, dubbed the Personal Philosophy Inventory (PPI) by Persinger and Makarec (1987, p. 183), consists of 140 items in clusters of general information, beliefs, a number of entire scales from the California Personality Inventory (CPI) and MMPI, mundane (i.e., control) experiences, and a cluster of possible temporal lobe indicators. This last is a major subscale, Complex Partial Epileptic Signs (CPES), whose items are all similar or analogous to experiences of those with confirmed temporal lobe epileptic foci.

The Personal Philosophy Inventory - some earlier results

PPI results had previously been compared with the EEG recordings of 28 subjects, and its CPES subscale was found to reliably reflect the amounts of both

temporal lobe spiking and seconds per minute of alpha activity (Makarec and Persinger, 1985). This general pattern of correlations was replicated in another study (Makarec and Persinger, 1987), which also included items from the Wilson-Barber Inventory of Childhood Memories and imaginings (Wilson and Barber, 1983). Neppe (1983) also reported a greater occurrence of possible temporal lobe signs in those who report subjective paranormal experiences.

A total of 414 subjects in six groups (Persinger and Makarec, 1987) showed overall variation in their responses in the way expected by the authors. Subjects' high scores on the CPES scale of the PPI correlated consistently strongly and positively with paranormal experiences (Pearson *r* from 0.48 to 0.66), somewhat less consistently with reports of having had a sense of 'presence[1]' (*r* = 0.18 to 0.73), and CPES results from subgroups of subjects correlated negatively with the CPI scales of Well-being, Tolerance, Achievement-Independence and Intellectual Efficiency (*r* = -0.36 to -0.60). As well, CPES scores correlated positively with MMPI scales of Paranoia, Psychesthenia, Schizophrenia and Mania (*r* = 0.20 to 0.66). This evidence may be in contrast to that presented by Hay and Morisy (1978), who observed that reports of religious or mystic experiences correlated with more positive scores on the Bradburn Balanced Affect Scale. The PPI however does not include the entire MMPI. Because of this, comparisons over the whole range of MMPI scale results cannot be made for each subject, and so interpretations of PPI results with respect to psychological function can only be, at best, approximate.

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1. The authors do not provide a definition of sensation of "a presence", but group it with a number of other experiences such as *deja vu*, out-of-body (OBE), and precognition, which they label "paranormal or mystical". Unfortunately, neither is a list of PPI items in the "presence cluster" (p. 187) provided in the paper. An example of the items referred to as the "presence cluster" may be: "An inner voice has told me where to find something and it was actually there." (PPI item 17 - see Appendix III).

In an earlier study (Persinger and Valliant, 1985), the answers of 101 subjects had failed to show a correlation between belief in paranormal-related (i.e., psi-related) items and endorsement of religious dogma or church-related items. As well, no significantly high correlation between the CPES items and the religious belief items were reported. These authors had also drawn a parallel between the temporal lobe signs and symptoms of schizophrenia as defined in the DSM-II, and to the work of Harper and Roth (1962), who hypothesized a "phobic anxiety-depersonalisation syndrome". Persinger and Valliant (1985) considered that certain people conforming to the proposed phobic-depersonalisation syndrome, and possibly those in the old DSM-II schizophrenia category may display electroencephalographic signs similar to the ones found in the subjects of previous studies (e.g., Persinger, 1984a, 1984b).

Persinger's (1987) study of MMPI profiles of high and low CPES scorers seems supportive of the second hypothesis: people endorsing various paranormally-related beliefs scored differently from others on selected MMPI scales. Higher CPES scorers scored significantly higher than low CPES scorers on the Psychaesthenia, Schizophrenia and Hypomania scales of the MMPI. The same differences between high- and low-CPES scorers on the first two of these scales were found also by Makarec and Persinger (1987). Given that personality and individual variables seem to play a part in experiences reported under electrical stimulation of the brain[2], the differences found in MMPI scores were taken by the authors in both cases to indicate that the two groups of subjects could be surmised to have characteristically different modes of brain function. High CPES scorers would be more prone to "absences", alteration (i.e., widening and deepening) of affect, and "compelling and repetitive thought and behaviours".

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2. Halgren, Walter, and Crandell (1978) - see later discussion.

EEG Measurement of TLTs

Persinger (1984a), observed two subjects, one a Transcendental Meditation (TM) practitioner, the other a Pentecostal churchgoer, as they displayed possible temporal lobe transients on EEG recordings made during periods of reportedly intense spiritual experience. These subjects were not diagnosed epileptics and so cannot be included in the population discussed earlier, studied by Fenwick (1983a). It is worth pointing out also that Persinger does not use the same apparent definition of "transients" for both these individuals, and so it is difficult to define the evidence that one may be looking for in the EEG tracings of future subjects. Aside from this reservation, these were encouraging results: subjects bought on the experiences and TLTs voluntarily; they evidently had been able to evoke similar experiences on numerous other occasions; and both felt that either the experiences or their concomitants to be worth pursuing in their own right.

Chapter 5. The Broader Picture

Cross-cultural study

Other facets of human behaviour taken to be indicative of possible abnormal temporal lobe states are tremors and convulsions, amnesia, and compulsive motor behaviour. As well, the way in which these symptoms may arise, either spontaneously of after deliberate effort, is a similar indicator of possible temporal lobe discharges or 'spikes'. If this is so, people sharing these signs should show a similar overall pattern, regardless of culture: :"...the general pattern of themes would be consistent across every human culture due to the similarities of temporal lobe functioning." (Persinger, 1983, p. 1257).

With a view to such cross cultural similarities, Winkelman (1986b) studied the characteristics of 59 shamanic practitioners from 45 societies for similarities in the physical manifestations of their various trances, and did indeed find support for the hypothesis that "... possession [as opposed to "flight"] trance states are associated with variables indicating temporal lobe discharges." (p. 139). On the basis that the presence or absence of certain physical signs can be used to reliably differentiate the "type" (i.e., subjective aspects) of the trance state - "possession" versus "soul-flight"[1] - Winkelman concluded that "... temporal lobe conditions lead to selection for some trance training." (p. 194). Furthermore, he concluded that selection of shamans is biased towards those who exhibit temporal lobe-type behaviours. Despite the fact that Winkelman derived his hypothesis after, rather than prior to, examination of the data (p. 186), the

1. The terms are somewhat self-explanatory: possession states involve the shaman being "possessed" for the purposes of making diagnoses, prescriptions, etc., while "soul-flight" states involved the spirit of the shaman travelling to other places (or worlds) in order to achieve the goal of the "consultation".

congruence of the segment of data included in his analysis with his hypothesis is provoking. Perhaps the main criticism may be that the "magico-religious practitioners" were examined after recognition as such by their societies, rather than during selection and training. This obviously dilutes further the predictive power of Winkelman's hypothesis, at least with respect to the data he presents. It is nontheless consistent with Persinger's propositions.

To make an obvious comparison, it may be posited that "soul-flight" trances are analogous to what we term "Out of Body Experiences" (OBEs). From Blackmore's (1987, 1988) descriptions of OBEs, it is no great leap to hypothesize that they and "soul flight" are in fact the same class of experience, taking place in radically different cultural settings. Winkelman (1986a) and Dobkin De Rois and Winkelman (1989) found that the "soul-flight" trance is used predominantly by shamans in hunter-gatherer societies, and that this implies that specific types of trance state may be selectively entrained in the individual. This training would be enhanced by selection of individuals also having a predisposition for the shamanic trances (Winkelman, 1989; Wright, 1989). The people in hunter-gatherer societies who are chosen for training as shamans may be similar to those who experience OBEs in western industrial society. The same possiblity exists in the case of Near Death Experiences (NDEs), which have been studied in detail from a psychological perspective by Blackmore (1982, 1987, 1988).

While Winkelman (1986b) does not specify that he is proposing a temporal lobe syndrome falling, in effect, somewhere between normal functioning and TLE, this is the implication of the hypothesis he presents. Wright (1989) further specifies that the Shamanic State of Consciousness (SSC) is an Altered State of Consciousness (ASC) characterized by involvement of the amygdala. The ASC is characterized by dominating slow-wave activity of the hippocampal-septal region, driven possibly by auditory stimuli, and parasympathetic dominance, involving the

biogenic amine systems of the temporal lobes (Mandell, 1980; Wright, 1989). It can be seen that some effort has been made to put shamanic and trance practice into the framework of western psychobiological theory. This should not surprise anyone, as Winkelman's (1986b) theory is rooted in the TLE-and-religiosity literature of Bear (1979; Bear and Fedio, 1977; Bear *et al.*, 1982), Geschwind (1979) and others, so he and Persinger have a common intellectual ancestry.

Interestingly, Winkelman makes reference to a number of trance induction techniques - for example, fasting, social isolation, physical stress, repetitive activity - which Persinger (1983, 1989) names as possible precipitating factors of TLTs. Laski (1980) discusses at some length "triggers" of ecstatic experiences, giving them an even more broad range of form than does Persinger. Such "triggers" are common to many cultures around the world, and have been for centuries (Palfai and Jankiewicz, 1991; Farthing, 1992). Just as common behavioural signs could indicate common physical processes, so could common induction techniques indicate similar physiological consequences (Sargant, 1957).

One aspect of Winkelman's theory which should be kept in mind is that it relates only to 'possession' trance states, leaving out the 'soul-flight' trances. This includes only half of the trance typology he defined for the purposes of his study. In addition, Winkelman approaches the subject from the point of view of the structure and place of the shaman's practice in his or her society, and so does not make statements regarding the causality or meaning of the experiences per se, other than the hypothesis of selection bias of potential shamans noted above[2].

2. Winkelman (1986a, 1986b) also noted that the degree of political integration of the shaman's culture was also an effective, albeit slightly lesser, predictor of the presence of possession trance states versus soul-flight states in the shaman's practice. Although he advanced no hypothesis regarding the cause of this pattern, it may have been interesting to compare this observation with the function that ecstatic or mystic experiences play in our own society. Also, the systematic use of

Also, it is clear that the trance states attained by shamans are a specific and separate part of their lives and the overall culture, rather than an aspect of everyday life for the population in general. To date, there has been no study of the distribution of soul-flight or possession states within the general population in these cultures.

Electrostimulation

Besides behavioural signs, reports of experiences evoked by electrical stimulation of the brain may be used to correlate temporal lobe discharges with mystic experiences. Jasper and Rasmussen (1958) found that TLE patients who were stimulated in the temporal cortex reported more experiences of psychical (hallucinations, illusions, emotions) and auditory or vestibular phenomena than did TLE patients subject to amygdaloid or periamygdaloid stimulation. At the same time, the latter group of patients displayed many more signs such as masticatory movements, tonic movements, trembling, turning, and psychoparetic signs (confusion, amnesia, unresponsiveness, automatism). It can be said at least that stimulation of the temporal lobe produces a small number of the experiences sometimes associated specifically with mystic experiences, while this is not so for cases of amygdaloid or periamygdaloid stimulation.

Jasper and Rasmussen's results are also interesting as an example because they are slightly contradictory to the specifics of Persinger's theory. Persinger specifically identifies the amygdaloid area as the one responsible for the experiences often interpreted as mystical, and so on and so forth, but the

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drugs to induce trance has been documented (Winkelman and Dobkin De Rois, 1989); this provides another point of comparison with western industrial society.

evidence from electrostimulation studies would seem to contradict this line of reasoning. Halgren, Walter, and Crandell (1978) also reported that only one of 3,500 electrostimulation sessions resulted in any significant positive or negative feeling, consistent with earlier findings (e.g., Mullan and Penfield, 1959). There seems to be little to indicate that amygdaloid stimulation alone is strongly connected to feelings of rage or of intense well-being.

In favour of a more general temporal lobe-mysticism theory, it can be said that stimulation of the temporal lobe produces a number of experiences sometimes associated specifically with mystic experiences, and also some of those associated specifically with TLE. There is also, however, some reason to suspect that the specific type of experience resulting from sub-epileptic seizures may depend on the personality or neurological predisposition of the individual. Heath, John, and Fontana (1968) found that intense pleasure was reported during electrostimulation mainly by patients suffering intense pain, and Kim and Umback (1978) reported that stimulation evoked feelings of aggression only in "aggressive patients". Some studies have returned even more equivocal results: for example, Chapman, Schroeder, Geyer, Brazier, Fager, Poppen, Solomon, and Yakelov (1954) observed paranoid rage reactions after amygdaloid electrostimulation, but Chapman (1960) observed that no feelings of aggression were evoked through amygdaloid stimulation of patients who were suspected to suffer from "assaultive behaviour" associated with psychomotor epilepsy.

In general, though, there seems to be a consensus that individual variables, such as previous behaviour, current experience, and even fearful expectations about the stimulation itself (e.g., Van Buren, 1961) can markedly influence the types of experiences reported as a result of stimulation. This certainly is possible, given the variation in types of sensations evoked by stimulation (Pampliglione and Falconer, 1960; Van Buren, 1961), the variable

consistency of individual reports, and variation in evoked sensations between individuals (Penfield and Perot, 1963).

The Physiology of Transcendance

The possibility of finding a physiological correlate of mystic experiences has long been admitted by researchers in religion. In his research on religious experience Hay (1979), referring to Hardy (1966), speaks of "...the possibility of a biological or "deep structural" basis for religious experiences" (p. 167), noting both his own and Starbuck's (1899) data showing that religious experiences often begin in the individual's mid-adolescence. This progression parallels the emergence of TLE in a person's lifespan. However, these observations, even if they are extendable to TLTs, do not support Persinger's (1989) argument that religious experiences ("God Experiences") are largely a regression to childish modes of relating, driven by temporal lobe-mediated evocation of childhood associations and desires. More likely, we can say that the neural systems and connections involved with mystical experiences usually mature during this stage of a person's lifetime, or that the experiential and cognitive motivations for such an experience coalesce at this time.

Nonetheless, Persinger's analysis, very similar to the Freudian analysis of religious practice as regression to childlike states of ego functioning, is supported by the Group for Advancement of Psychiatry in their description of mysticism (GAP - 1976, in Goleman and Davidson, 1979). However, the GAP has come into some intense criticism of the scope and depth of their definition of 'mysticism' from Deikman (1979), and Deikman's critique is, in spirit, supported by Emmet's (1956) analysis of the function, place and preparation of the shaman in his or her native culture.

The life-changing nature of mystical experiences is one of the most striking aspects of the phenomenon. If this is regarded as a purely psychological result of the experience, then the necessary level of equivalent electrode stimulation may be roughly estimated. Halgren *et al.*, (1978) observed that none of their stimulations, of a maximum of 10mA, resulted in lasting changes in the subject's experience or EEG output. Stimulation resulting in such changes would perhaps have to be several times more strong than the stimuli used to elicit mental experiences (Heath and Mickle, 1960; Pudenz, Bullara, Jacques and Hambrecht, 1975; Brown, Babb, Soper, Lieb, Ottino and Crandell, 1977). Animal studies of kindling, which are utilized to investigate one common model of mental processes, commonly employ repeated electrostimulation-induced seizures to effect lasting changes in behaviour and brain function (Mandell, 1980). This level of stimulation is many times more intense than that used with any human subjects.

Mandell's (1980) broad review of the mechanisms that may play a part in the processes we refer to as transcendence and mystic experiences includes a number of relevant facets of psychobiology. These include precursors to Tucker *et al.*'s (1986) work on differential diagnosis of subtle seizure disorders and atypical psychological syndromes, referred to earlier. For example, as early as 1952 (Mulder and Daly) and 1959 (Monroe), investigators had questioned whether many individuals given diagnoses of general schizophrenia might instead be epileptic. The many neurochemical pathways and mechanisms implicated in mystic experiences, such as hippocampal-septal glucocorticoid action (Pfaff, Silva, and Wiess, 1971) and enkephalin-rich hippocampal-limbic connections also are deserving of attention when hypothesizing neural mechanisms of transcendence. The fact that the latter areas support self-stimulation (e.g., Parent

and Olivier, 1970; Stein and Belluzzi, 1978) underlines the likely involvement of these structures in mystic experiences.

It is quite clear that modern science is seeking the cause of mystic experiences, rather than simple correlates. However, we should consider the possibility that the association which Persinger (1983) proposes between TLTs and mystic states would by no means be a clinching one, were it discovered to exist. A physical syndrome may indeed manifest very similarly to some other state or experience, but this does not mean those who report the experience are merely suffering from the physical syndrome (or delusions).

TLTs - what could they really mean?

So far the link between TLTs and mystic experiences is a proposed one only. Temporal lobe signs have been connected with psychiatric diagnosis previously (e.g., Falconer, 1973; Geshwind, 1973) but there are only two instances of suspected TLT activity being observed simultaneously with subjects reporting some type of mystic experiences (Persinger, 1984a). Although there is no clear report of how many subjects were tested for these two positive results, it is estimable from the published data that there were at least 250, and so the positive data would seem relatively thin on the ground. A salutory observation is that such a detection rate, if generalised, would account for only a small fraction of the population of those reporting some type of "mystic experience": stratified sample surveys taken in the US suggest that 40 per cent of the population may have at some time had what the individual regards as a mystic experience (Greeley and McCready, 1979).

There are many unexplained aspects of the proposal to equate TLTs with mystic experiences: what is the actual distribution of the occurrence of TLTs in the population at large? Do we expect every transient invariably to evoke in the individual some form of mental absence or mystic state? Does every anomalous experience correspond to a TLT burst? All of these questions are relevant to the proposed association between TLTs and mysticism.

Finally, there is the question of the meaning of an experience or event. Do the presence of TLTs invalidate the individual's claim to having a mystic experience, as opposed to a neural aberration? Further, as long as TLTs and mystic states are only correlated, questions of causality and meaning rest on

argument and opinion. Also there is the question of spontaneous TLTs versus practiced experiences: are they equivalent? These last questions are, in the broad picture, the most important, as it concerns the interpretation of mystic states - their meaning and import - the basic grounds for disagreement amongst scientists, religious philosophers and mystics.

Chapter 6. The Study

TLTs, OBEs, Hypnotism and Fantasy Proneness

It is important to try to place investigations of mystic experiences within the broader framework of states-of-consciousness research. With respect to Persinger's (1984a) obtaining of suspected temporal lobe spikes from "meditating" subjects, a link is suggested with work done by Ernest Hilgard and Charles Tart (Hilgard, 1979; Hilgard and Tart, 1966; Tart, 1967; Tart and Hilgard, 1966). Tart used a hypnotic induction he labelled "mutual hypnosis", taking subjects to much "deeper" states of trance than is experienced by the usual hypnotic subject. At the most involved stages of hypnosis - judged reliably by subjects to be between 10 and 20 times more intense than a conventional experimental or therapeutic trance - subjects reported depersonalization, feelings of universal merging, leaving the body, the distortion and meaninglessness of time, and ultimately a sense of heightened reality. Journeys of the soul from the body were also described by a number of subjects. These descriptions very closely resemble many descriptions of mystical experience (e.g., Hay, 1979).

The parallel in these descriptions suggests an obvious fit with the TLT-mysticism theory: if the experiential descriptions are so similar, could the underlying cause be the same? That is, is the "deep hypnosis" state triggering TLTs, giving rise to the experiences Persinger says are caused by Temporal Lobe Transients in other people? It is appealing to think that a similar physical phenomenon is involved in all three cases - mystic experiences, deep hypnosis, and TLTs.

In considering the possible parallels between apparently distinct states of consciousness, the overlap between intrapersonal variables of those who

experience them has proved worthy of attention. Barber and Wilson (1979) note that the large majority of subjects testing as highly hypnotically susceptible also tested as being within the top 5% of the population on a scale of creative visualisation abilities. This small portion of people with exceptional visualisation skills has been dubbed by the authors "fantasy prone personalities", a slightly misleading term which does not communicate the underlying situation - these individuals function socially within every index of 'normality' while at the same time maintaining an extremely rich, and sometimes nearly continuous, fantasy life. If many adept hypnotic subjects are also fantasy prone, such a quality may also be associated with religious experiences and beliefs.

(i) OBEs and NDEs

Writing on the physical basis of these Out-of-Body Experiences and Near Death Experiences, Blackmore (1988) has proposed a possible common basis of the experiences had during meditation, intense prayer, hypnosis, and other circumstances. In her analysis of the work done on near-death experiences, Blackmore suggests that in the time of incredible stress and unusual activity that characterizes the near-death experience, the perceptual system which we rely upon to form an impression of what is going on "out there" - to tell us what is real - is thrown into chaos, and so our perceptions may be radically refocussed. This process uses as its basis the most coherent information available.

Blackmore suggests that in the near-death experience, the refocussing takes its new model of reality from the stressed activity of the visual cortex. The cells of the visual cortex, deprived of oxygen, may begin to convulse in columns - hence the tunnels and round lights frequently reported, as there is evidence to suggest that round visual stimuli are mapped onto the visual cortex in columns.

This allows us to speculate that random firing of the organized columns may be misinterpreted as external circular or round stimuli. In other words, the death process massively disrupts our habitual reality-construction processes, and so our experience becomes redefined by whatever provides the most stable, understandable and coherent interpretation of the world. Since we are prevented from comparing internally created images with external reality, the images created internally become "real". Interestingly, many of the neural systems implicated in reality-construction processes - sensory integration, memory, affect regulation to name a few, are located primarily in the temporal-limbic area of the brain (e.g., Pinel, 1990).

The results of three studies of Out-of-Body Experiences (OBEs) by Blackmore (1987) go some way to supporting her construction-of-reality hypothesis for near-death experiences. Subjects who reported having at least one out-of-body experience were more likely to recall dreams from the 'vantage point' (i.e., overhead) perspective. Further, the subjects overall tended to recall bad dreams from the observer perspective more often than they did pleasant dreams. Subjects reporting OBEs also were more adept at switching viewpoints in visual imaging tasks, and for subjects overall the easiest alternative viewpoint to the most common behind-the-eyes one was the vantage point viewpoint. While not relating directly to near-death experiences, these results do support the general idea that these subjective states may be the result of a confused system attempting to make sense out of the information available to it, or of a deliberately altered system delivering a different interpretation, and hence meaning, of the world.

Blackmore's model is interesting in itself, and also because it may potentially be applied in its general form to experiences such as meditation,

sensory and social isolation, deep hypnosis and others. Deikman (1963, 1966) used a similar idea in relation to the experiences of subjects who undertook multiple sessions of intense, meditative-style concentration exercises. He says:

> "since...the object world as a perceptual experience is broken down or de-differentiated, the cognitive organisation based on that world is disrupted in a parallel fashion" (1966, p. 110).

Deikman uses the term 'de-automatisation' to describe the process leading to his subjects' frequent unusual sensory and perceptual experiences, many involving changes in how reality was experienced at an 'immediate' level. The process he suggests and the theory that Blackmore (1988) advances seem remarkably similar.

Investigation by Stanford (1987) of the self-reports of those who experienced an OBE versus those of non-OBE individuals revealed some quite suggestive differences. Those who had had OBEs reported more reading as children ($r = 0.43$). more imaginary playmates ($r = .43$) and less play with other children ($r = -.39$). The results of this investigation, based on the work of Barber and Wilson (1982) and J. Hilgard (1974, 1979) supported the hypothesis that OBEs may be related to the imaginal and fantasy abilities of the experiencer. Stanford also sought, but failed to link OBEs with degree and severity of childhood discipline. Although failing to correlate OBEs with reports of the degree of discipline experienced, it may have been that (a) Stanford's operationalisation of discipline did not conform to the definition of "traumatic childhood circumstances" as used by Wilson and Barber (1981) or Lynn and Rhue (1988), or; (b) subjects were reluctant to reveal such details within the context of an experiment in which they were taking part as members of a "subject pool".

(ii) Hypnosis and fantasy proneness

There is an initial similarity in the proportion of population who are fantasy prone and who supposedly experience TLTs. Wilson and Barber (1983) report that the 'fantasy-prone personality', who also shows extreme hypnotic susceptibility, occurs at the rate of approximately 4% of the general population. Experiences of TLTs are, in theory, distributed evenly throughout the population. If true, this would result in a distribution similar to that of fantasy prone individuals indicated in the fantasy prone personality literature, with the extreme cases, so to speak, constituting a small minority. Although subsequent research (e.g., Lynn and Rhue, 1986, 1988) has shown that the overlap between hypnotic adepts and fantasy prone subjects is by no means perfect, the hypothesis of overlapping distributions of these is still appealing in its simplicity.

There are other parallels in the demographic characteristics of the two populations, fantasy prone and "TLT-prone". Persinger and Valliant (1985) note that 8% of 300 subjects tested have reported deeply influential psi experiences. This portion of the population is theorised to be the portion most often affected by TLTs. If TLTs are a cause or correlate of fantasy-prone experience, then such reports, correlated with high TLT indicator scores, should be present in the self-reports of fantasy prone people. That is, if fantasy proneness and TLT experiences are correlated or even causally connected, one would expect a large majority of fantasy prone individuals to report psychic experiences. In fact, this is the case. Wilson and Barber (1983) and Bartholomew, Basterfield and Howard (1991) both observe that a large number of various psychic experiences are characteristic of the autobiographic descriptions individuals known to be, or suspected of being, fantasy prone.

The parallel between TLTs and the 'fantasy-prone personality' does not end here. There are also similarities in the early life experiences of the two populations. Wilson and Barber (1981) list four patterns of early life experience which, they theorize, dispose people to fantasy-prone existence as adults. The four conditions, briefly described, were: (1) encouragement by adults to fantasize; (2) loneliness and isolation; (3) escape from an unpleasant environment; (4) 'special circumstances', usually entailing minimization of ordinary childhood experiences and surrounds (1983, p. 349). The last three of these resemble very strongly some of the conditions Persinger (1983, 1989) lists as potential precipitating factors of "TLT-personalities". Lynn and Rhue (1988) reduced Wilson and Barber's (1978, 1981, 1983) four precipitating factors into two: traumatic childhood experiences and involvement in reading. There is, however, still a substantial correspondence between the first of Lynn and Rhue's precipitating factors and Persinger's theoretical aetiology of TLT experiences. If Persinger is correct, and childhood trauma does predispose one to TLT experiences, then it might be supposed that these are the same thing as fantasy proneness. After all, fantasy proneness must be identifiable with some physical processes, and TLTs may be a good place to search for these processes, even though, at this stage, the existence of TLTs is largely a matter of speculation.

There has been a previous comparison between measures of fantasy proneness and other direct and indirect measures of brain function. Persinger and De Sano (1986) compared scores on the CPES scale of the PPI with scores on the Wilson-Barber Inventory of Childhood Memories and Imaginings. They found that CPES items that had previously correlated highest (0.54) with the number of eyes-closed alpha seconds per minute of EEG in normal subjects

correlated 0.62 with Wilson-Barber scores. However, CPES items which had previously correlated highest (r = 0.40) with temporal lobe spikes (TLTs) correlated not at all (r = 0.03) with the Wilson-Barber scores (p. 349).

Fantasy proneness indicators and brain function

A discussion of the physical correlates of fantasy proneness would be incomplete without a brief reference to research on alpha production and visualisation. The proportion of alpha time produced over the temporal-occipital cortex has been shown to be most strongly associated with nonattendance to visual stimuli. Further, difficult mental tasks (e.g., mathematical calculations) which prevent attention to internally generated images suppress alpha time (Short, 1953; Short and Walter, 1954; Walter and Yeager, 1956; Costello and McGregor, 1957; Mundy-Castle, 1957; Slatter, 1960; West, 1980). Evidence such as this very strongly suggests that attentional processes seem vitally related to alpha proportion.

The correlations reported by Persinger and De Sano (1986) are strikingly selective. They suggest that in relation to fantasy proneness, the CPES items of the PPI, when administered to a non-pathological (i.e., non-epileptic) population are a surrogate measure of the subjects' ability to disregard visual stimuli. That is, to the degree that CPES scores may be indicative of the individual's degree of fantasy proneness, it may be through correlating with subjects' ability to selectively not-attend to visual stimuli. It seems quite plausible to suggest that CPES scores in the case of Persinger and De Sano (1986) were correlated partially with subjects' propensity to recall and vividness of recall - that is, with their tendency to not-attend to visual stimuli. Specifically, the correlation of CPES

scores with fantasy proneness may not be an indicator of TLT activity. This interpretation of the pattern of correlations reported by Persinger and De Sano (1986) goes directly against the most straightforward theory that fantasy proneness and related experiences are caused by TLT activity in the brain.

The possibility that different CPES items are selectively correlated with quite different aspects of fantasy proneness makes simple interpretation of other data difficult. Hypnotic induction susceptibility as defined by Speigel & Speigel's Hypnotic Induction Profile (HIP, 1978) correlated with CPES (.49) and with a cluster on the Wilson-Barber Inventory defined by Persinger and De Sano as "adult imaginings" (1986, p. 348). However, from the results summarized above, it can be seen that this may consist of a correlation of certain CPES items with hypnotic subjects' ability to engage in imagery and disengage from external stimuli, rather than correlation with any particular pattern of brain function of individuals in the hypnotic routine. It is well established that absorptive ability is well-correlated with hypnotic ability. Induction susceptibility as measured by the HIP was not correlated with responses to the "paranormal" clusters on either the PPI or the Wilson-Barber test, a result which tends to support the contra-TLT interpretation. If hypnotic susceptibility was due to a pattern of brain function which also brought about belief in paranormal events, then hypnotic susceptibility should also have been correlated with the "paranormal" clusters on both tests used.

It seems that there is some consistency in the way subjects scored on the PPI and the Wilson-Barber Inventory, although this consistency does not extend to the hypnotic induction performance by Persinger and De Sano's (1986) subjects. Also, the lack of correlation between previous TLT indicators and

Wilson-Barber scores is problematic with respect to the simplest hypothesis that a single physical basis exists for all the behaviours measured by these various tests. The most stringent test of such a hypothesis, measurement of EEG profiles of hypnotic subjects and fantasy-proneness to check for the presence of TLTs, has not yet been carried out.

The different possible interpretations of the data make it possible also to pose two alternative lines of hypothesis regarding Complex Partial Epilepsy Sign reports and measures of mental function. It may be that CPES scores correlate with fantasy proneness, and that temporal lobe signs indicate the processes underlying fantasy proneness. Alternatively, it may be that CPES scores correlate with fantasy proneness, and that temporal lobe signs indicate the individual's ability to disengage from external visual stimuli. These alternatives will be revisited in more detail later.

Other possible connections

Although the possible connection between "deep" hypnotic states and EEG changes is so far unexplored, there are some signs that the link may be more complex than it seems at first glance. Fenwick, Donaldson, Gillis, Bushman, Fenton, Perry, Tilsley and Serafinowicz (1977) observed that EEG changes during meditation by 10 experienced (some years of experience or instructor status) meditators did not differ from the changes found in ordinary Stage 1 sleep onset. The data for oxygen consumption and carbon dioxide production decreases were similar, and these results were supported by Throll (1982). Two reviews (Walsh, 1979; West, 1980) fail to mention findings of specific brain activity (e.g., spikes) associated with experiences during meditation.

It is not clear whether researchers such as Fenwick *et al.* (1977) were monitoring the same specific brain activity as Persinger (1984a), neither is it certain that such activity would have been detected were it not being specifically monitored. It is clear however, that with his "TLTs" Persinger is hypothesizing activity different from the alpha bursts reported in meditation research (e.g., Walsh, 1979; West, 1980). Makarec and Persinger (1987) did also report increased alpha activity similar to this widely observed finding, and the exact difference between intermittent alpha and TLTs remains unclear.

Other factors that must be taken into account when comparing the meditation research literature with Persinger's TLTs include the fact that effects of various types of brain activity may vary significantly with the experience level of the meditating subject (Sugi and Akutsu, 1968). Also, the quality of experience may vary greatly during recording of the same characteristic EEG signals. Finally, Persinger's claims concern a quite specific portion of the total EEG output of any individual, rather than an overall characteristic. Taking these points into consideration, there would seem to be plenty of leeway for the two areas of research to prove consistent with each other.

Philosophical Implications

At the bottom of the research and theory relating temporal lobe states and mystical experiences is the question of causality. That is, at issue is whether we can say that these experiences are simply caused by the brain's electrochemistry, or whether there are other levels of causality at work, whether mental, emotional, or even spiritual. As a rough division, most psychologists and psychiatrists may be put in the former camp of opinion, while many other commentators fall into the latter.

As Schwarz (1980) and Davidson and Davidson (1980) point out, the basic principle of science on this matter takes as its starting point William James' (1958) opinion that the brain is the source and cause of all human behaviour. That is, the physical substrate is, in principle, the beginning and the end of the story. This position is also known as the material monist position, or the psychoneural identity theory (e.g., Hubbard, 1975; Churchland, 1986). As best can be discerned, most theories proposing the origins of states of consciousness outside the physical bounds of orthodox science are dualistic in nature (e.g., Tart, 1980). The theistic explanations of mystic experiences advanced by many individuals are, of course, slightly different from classical dualism, but fall into the same general category.

To this can be added that some forms of explanation make appeal to principles which are completely at odds to any rational investigation. Psychic powers of transcendence and other 'supernatural' phenomena are often specified, in deliberately unexplainable and/or unexplorable terms, a resort to, in Frankel's (1973) terms "... bowdlerised versions of views that go back to the Greek mystery cults and the pre-Socratic philosophers Heraclitus and Parmenedes." (p. 927). Many philosophies which are describable in Russell's (1959) criteria can also be described in these terms.

The strength of the monist position would seem to be the greater of the two, not only logically but also in terms of current popularity. This is probably not a coincidence. Without a sound theory as to how something defined as immaterial (e.g., "God") can affect material phenomena, or a sound theoretical base which makes such a construction necessary, the skeptical attitude prescribed by science leads to the conclusion that there is nothing besides the material to bother investigating. Together with a preference for parsimonious explanation - the explanation with the least number of moving parts or unproven

assumptions generally being chosen over one with more - the conclusion seems inescapable that what we are investigating is not a mysterious, psychical phenomenon.

What makes a theory monistic or dualistic, or possessive of any other quality, is not its conclusions but its assumptions at the start of the investigative process. That is, monist theories, or any other, begin with axioms about the way the world exists - the nature of reality - and proceed on that basis. Investigation and theory-building take place within the limitations imposed by the assumptions employed at the very start of the process. Each broad type of theory has its limitations. The limits of classical - Cartesian - dualism are widely known: how do the two types of phenomena - extended matter and intensional mind - interact? Dualism solves this problem by positing the presence of God, or through some parallel device for ensuring coordination of the two universes of matter. Varieties of this school include the Parallelist and Occasionalist schools, which differed mainly in terms of how often the supreme being or guiding principle had to interfere with the world to keep things in mind and material happening in a synchronized manner.

Monism, on the other hand, does not suffer from this fault, but may be questioned in terms of where the (purely physical) process is supposed to begin. How far do we have to go back in the chain of events or time before we can discern the beginning of any individual event? This is related in a way to the more serious question of free will versus determinism, a monkey on the backs of many philosophers. If all processes are materially determined and have material outcomes which will be the basis of further processes and outcomes, where and how does human awareness and choice fit in? In some cases, the latter considerations are done away with as epiphenomena, a solution that hints at another sticking point for material monist theory, the one of meaning. With

material processes being the basis for every event and object, upon what bases are value and moral judgements made? What standards do we have for assigning any value to any object, event, opinion, act, or thought?

Such limitations of conventional scientific theory are, of course, difficult to explore empirically. They tend to be illuminating by what is not exposed by research results, rather than what is. They can, perhaps, be expressed by the recognition that the most parsimonious explanation of science itself is that scientific endeavour is on the whole incomplete - in other words, that there are still some things that we cannot explain.

Hypotheses

There are two lines of hypothesis, quite divergent from each other, which may be made at this stage. The first is the most simple, namely that TLTs are the underlying cause of fantasy proneness, as well as of the experiences of mystic states and beliefs in the paranormal. By this hypothesis temporal lobe indicators, beliefs in the paranormal, complex partial epilepsy signs, and creative imagery (i.e., fantasy proneness) reports should all be extremely well correlated, sharing as they do a common cause.

One could extend this hypothesis, and include in this principle mystic experiences, religious beliefs, hypnotic states, experiences such as *deja vu* and *jamais vu*, and multiple personality disorder, as all of these have been grouped together and compared in various combinations by a variety of authors (e.g., Persinger, 1983, 1984, 1989; Beyerstein, 1988; Reed, 1988; Zusne and Jones, 1989). Although the sheer range of phenomena listed here makes a single valid explanation of them unlikely, besides which the authors differ markedly in the method of their divisions of the phenomena, it is worthwhile to begin with the

most simple explanation and elaborate from there. This first hypothesis might be labelled the "hard" temporal lobe hypothesis.

The second hypothesis, the "soft" temporal lobe hypothesis, proceeds by the reasoning that so-called complex partial epilepsy signs, as measured by the CPES, are in fact surrogate measures of the individual's ability to produce alpha time in EEG recordings. It is based in part on the observation (above) that CPES items correlating with TLTs did not correspond to fantasy-proneness (as measured by the ICMI) at all. It would further specify that many unusual experiences and abilities may share similar brain function, but that the relationships between the experiences and abilities are far more complicated than such a simple underlying single cause as abnormal, perhaps even pathological, microseizures in the temporal-limbic area of the brain.

The plausibility of the "soft" hypothesis is enhanced by the body of work indicating that alpha production is closely connected with type and difficulty of imagery and attentional task in which the subject is engaged (e.g., Short, 1953; Short and Grey Walter, 1954; Walter and Yeager, 1956; Mundy-Castle, 1957; Oswald, 1957; McBain, 1983). Accordingly, there should be some correlation between CPES items and CIS scores, but this would be an artifact of the subjects who score higher on the CIS being able to better de-attend to visual stimuli, and so coincidentally produce more alpha time.

One question provoked by this supposition is: what would be the expected relationship between Complex Partial Epilepsy Signs and conventional imagery, as measured by the Betts Questionnaire on Mental Imagery? Possibly, the answer lies in the supposition that Creative Imagery, as used by fantasy-prone individuals, is different in nature from imagery used by the rest of the population, or by the fantasy-prone at times when Creative Imagery is not a viable option.

This supposition is justified by the results of a number of studies into the effects of imagery upon EEG output. It is probably warranted to reason that conventional imagery was the mode employed by Oswald's (1957) subjects in his study of the effects of problem-solving imagery on alpha production. What Oswald found was that attention to (presumably conventional) imagery during problem solving affected alpha rhythm in the same way as attention to visual stimuli. Walter and Yeager (1956) in the meantime had observed that attempts to recall previously studied drawings suppressed alpha production in a similar manner to that of the original study period, but that recall-induced suppression was of a lessor percentage than was the study-induced suppression.

The expected answer to the question of the CPES-QMI score relationship would therefore appear to be: CPES and QMI scores should be negatively correlated, given that a large number of CPES scores have been shown to correlate with alpha production, and that conventional imaging tasks have been observed to reduce alpha time. Such a correlation would further strengthen the hypothesis that conventional imagery and Creative Imaging are qualitatively different processes, as embodied in the literature on fantasy-prone persons.

On the relationship between imaging styles and personal beliefs, as measured by the PPI Main Scale and Belief in the Paranormal Inventory (BPI), one would expect first that the two scale scores would be very well correlated. This is because they are intended to measure the same thing - the degree of the individual's belief in the paranormal. Secondly, according to which of the two lines of hypothesis outlined above one follows, one would expect somewhat different things of the CIS-PPI and CIS-BPI relationships. By the "hard" hypothesis, degree of paranormal belief should correspond very closely to relative CIS scores. This would be expected as both Creative Imaging and paranormal beliefs are, in this hypothesis, directly caused by temporal lobe transients. According to

the "soft" temporal lobe hypothesis, while there may be some correlation between CIS scores and both PPI and BPI scores, there probably should not be a significant difference between the level of paranormal beliefs held by high and low Creative Imagers. This would be expected because of the degree of voluntariness of the creative imaging experience, and because the pattern of brain activity characteristic of creative imaging would not be considered the actual cause of paranormal beliefs. Because Creative Imaginers are not so 'doomed', so to speak, to believe in the paranormal in this way, it would be expected that they would not differ from others in the prevalence of their beliefs in the paranormal.

Summary of Hypotheses

The hypotheses to be used in this study are listed here. For the sake of investigation, where "hard" and "soft" hypotheses differ, the former will be used as the experimental hypotheses, with the latter serving as theoretical alternatives. It is anticipated that should the experimental hypotheses fail to be supported, then results will favour the alternative, "soft", hypotheses.

1. Subjects will show a significant difference on CPES scores according to high or low CIS scores.
[Alternative: subjects will **not** show such a difference.]

2. Subjects will show significant differences on both PPI (Main and Paranormal scales) and BPI scores according to CIS scores, high or low.
[Alternative: subjects will **not** show such differences]

3. PPI (Main and Paranormal scales) and BPI scores will be very strongly and positively correlated. This assumes that the BPI and relevant PPI scales are measuring the same thing, and will provide a validity check of the PPI scales.

4. Subjects will not show a significant difference on QMI scores according to CIS scores, high or low - that is, the correlation of these two scores will be small.

5. CPES scores should be negatively correlated with QMI scores.

6. PPI (Main and Paranormal scales) and BPI scores will not correlate strongly with QMI scores.

Chapter 7. Method

Subjects were 50 students (38 female, 12 male) from the Simon Fraser University Psychology Department Subject Pool. The subjects took part in the study in return for credit towards a first- or second-year undergraduate Psychology course, and were recruited through placing a blank timetable on a public notice board reserved for that purpose. Subjects participated at times available to the experimenter which were convenient to them. All subjects claimed to be naive to the purpose of the experiment before participating.

According to Persinger's previous findings, the incidence of temporal lobe signs (i.e., TLT symptoms) is distributed normally throughout the population. To be consistent with this theory, behaviours associated with these signs must also be normally distributed. To test this hypothesis, the Creative Imagination Scale, score which has been shown to be correlative of degree of fantasy proneness (Barber and Wilson, 1981; Wilson and Barber, 1983), was administered to all subjects. The CIS sections were recorded onto a cassette tape by the experimenter, with the taped sections conforming in length to published guides (Wilson and Barber, 1978) to within 2 seconds, the taped sections being fractionally shorter then the recommended length when there was a difference. The recorded CIS was replayed to each subject over a portable stereo cassette player through 2 detachable speakers, which were positioned within the room for clearest speech reproduction. The entire CIS routine was played uninterrupted, at the same volume, and with sound balance settings and speaker positions identical for each participant. Subjects' CIS scores were used to place them into high- (i.e., above median CIS score) or low-imaging (i.e., below median CIS score) categories, according to the degree to which they reported fantasy-prone type imagery.

Also administered was the Personal Philosophy Inventory (PPI) (Persinger and Makarec, 1987b). Of primary interest here was the Complex Partial Epilepsy Signs (CPES) subscale, the Paranormal experiences subscale, and results on the main body of the PPI. The first two of these measure the degree of reporting of the experiences for which the subscales are named, while the last is a measure of reports of beliefs which, according to Persinger, are either anomalous or patently erroneous.

In order to check the validity of the PPI Main and Paranormal subscales, the Belief in the Paranormal Inventory (BPI, Jones, Russell and Nickel, 1977) was also administered to all subjects. This provided a check on the content of the corresponding PPI subscales. It was expected that scores on the PPI and BPI would correlate extremely highly, given that they purportedly measure the same thing.

From studies of fantasy proneness, it is widely considered that the ability of interest is an unusual one, and does not qualitatively resemble normal imagination and visualisation techniques. As well, TLTs are clearly intended as an explanation appealing to anomalous if not dysfunctional brain processes, causing various experiences and beliefs. In order to provide a comparison of conventional imaginative processes with the ones of interest in this study, the shortened form of Betts' Questionnaire on Mental Imagery (QMI, Sheehan, 1967) was given to subjects to complete. It was anticipated for the above reasons that QMI scores would not correlate with CIS scores or with CPES and Paranormal subscale scores.

Subjects were administered the various tasks in the order: Creative Imagination Scale (CIS), Belief in the Paranormal Inventory (BPI), Questionnaire on Metal Imagery (QMI), and Personal Philosophy Inventory (PPI). All

performance measures and Questionnaire form completion was carried out in one of two experimental rooms identical in size (1.3m by 1.84m). The rooms were large enough to comfortably seat the subject, along with a table on which to rest Questionnaire material, tape player, and any other material needed. Subjects completed the CIS in the first room, in which was arranged the sound equipment, and then were asked to move to the second room, in order that the first be prepared for the arrival of the next subject.

Completion time for all tasks was in the range of 55-85 minutes, the variability being due to subjects' relative speed in completing the Questionnaire format material. Upon finishing all the tasks given, subjects were asked whether or not they had any questions, and these were answered, if there were any. Subjects were then verbally debriefed, and before leaving were asked once more whether they had any enquiries.

Chapter 8. Results

Insert Table 1 about here

Table (1) shows the results of simple data description for subjects taking part in the study.

Insert Table 2 about here

Table (2) shows the correlations found between the various scales, and in the case of the PPI, subscales used to measure subjects' performance and beliefs.

Analysis of variance

Histograms of CPES scores showed them to vary systematically, relative to CIS total scores. When the subject scores were divided both into the planned upper and lower halves according to CIS scores, both the sub-sample means and standard deviations rose with the average CIS scale score.

One-way ANOVA was completed on subject scores for the BPI, QMI, for the Mundane, CPES, and Paranormal subscales of the PPI, and for PPI total score minus the CPES and Mundane subscales. Subjects' scores were split at

Scale	Min	Max	Mean	S. Dev.
CIS	4	31	19.94	6.40
QMI	53	164	94.68	24.04
BPI	29	100	64.86	15.78
PPI	41	89	63.32	12.52
Mundane	7	15	12.10	1.75
CPES	0	15	6.20	3.59
Paranormal	0	6	2.98	1.49
CPES factor 1	0	5	0.92	1.37
CPES factor 2	0	6	2.80	2.03
CPES factor 3	0	3	1.90	0.91
CPES factor 4	0	2	0.63	0.78
QMI factor 1	15	73	36.12	11.01
QMI factor 2	8	35	17.68	6.24
QMI factor 3	7	34	15.18	5.95
QMI factor 4	6	19	12.12	3.00

Table 1: Means and standard deviations of the various scale scores.

	CIS	QMI	CPES	BPI	MUNDANE	PARAN.	PPI
CIS	1.0000	-.4460	.2017	.0068	-.0816	.1035	.2576
QMI		1.0000	-.3602	-.3668	.0703	-.2779	-.3902
CPES			1.0000	.3800	.0863	.5887	.6256
BPI				1.0000	-.0276	.3353	.4314
MUNDANE					1.0000	.0863	.1149
PARAN.						1.0000	.6961
PPI							1.0000

Table 2: Correlations between scale and subscale scores.

CIS - Creative Imagination Scale; QMI - Questionnaire on Mental Imagery; PPI - Personal Philosophical Inventory {minus Paranormal and CPES subscale scores}; CPES - Complex Partial Epilepsy Sign subscale; Mundane - Mundane Experiences subscale of PPI; Paran. - Paranormal Experiences subscale of PPI; BPI - Belief in the Paranormal Inventory.

the median of the CIS scores (21). Subjects in the upper half of the sample of CIS scores were labelled "high-imaginers", while subjects in the lower half were "low-imaginers" for the purpose of analysis.

Of these analyses, the scores of high- and low-imaginers on the QMI differed significantly (*alpha* = .05). This is in accord with the correlation between CIS and QMI scale scores of -.4460, the largest magnitude correlation between any two measurements made in the study (see above). The CPES scores showed a significant difference in variance between the high- and low-imaginers [Levene's test], but the ANOVA test did not reach significance. Subjects' scores on the remainder of the PPI scale (i.e., after the CPES and Paranormal subscale scores were subtracted) also differed significantly between high- and low-imaginers.

Factor Analysis

Following Persinger and De Sano (1986), CPES cluster scores were broken down into factors. The BMDP principal components routine was used, and from this four factors accounting for 58% of variance (89% of variance in the factor space) were chosen. Sorted and rotated factor loading patterns were used to simplify the choices of items for each factor, and factor scores were compared for high- and low-imaginers via one-way ANOVA. CPES Scale factor items appear in Appendix I. Of the four CPES factors used, only Factor 2 scores differed significantly between high- and low-imaginers.

In order to examine more thoroughly the comparative results of CIS and QMI scores, the QMI scores were also factor analysed, using the same method

as for the CPES cluster scores. Four factors were also chosen. The four factors accounted for 53% of data variance (69% of factor space). The QMI factor items appear in Appendix II. Of the four factors, scores on Factors 1, 2 and 4 differed significantly between high- and low-imaginers (*alpha* = .05).

Chapter 9. Discussion

Main Scale Score Relationships

The results of the main planned comparisons were divided: just one reached significance, as did one *post hoc* comparison. As we shall see, the overall pattern of results fits quite elegantly with the alternative hypotheses and with previous research. The hypothesis that high- and low-CIS scorers [high and low Creative Imaginers] would differ on the number of temporal lobe-like experiences (CPES scale) was not supported, whilst the hypothesis that Creative Imagining and more garden-variety imagination (as measured by the QMI) are two different processes and abilities was rejected. No other of the main scale or subscale scores showed significant differences according to high and low Creative Imagining. The CPES and QMI scores were divided into factors, and the result of analysis of the patterns of these factors will be discussed later in this section.

General Discussion

Although the pattern of results amongst the main scale scores [i.e., CPES, CIS, QMI] may seem uninformative, they actually provide a number of insights into the psychological and physical processes at work in the tasks studied. Taking the results of ANOVA analyses in the order described above, we see that CPES scores did not differ significantly between the two groups of Creative Imagers. This is a most interesting result, for two reasons: first, it would seem that the overall weight of circumstantial evidence, as reviewed earlier, would lead one to expect the opposite, and this is the way the hypotheses were formulated.

Second, some previous results, specifically Persinger and De Sano (1986) and Makarec and Persinger (1987) have given clues as to why the results obtained here might be so. The former were reviewed in the Introduction; as to the latter, the observations made in the specified studies indicated that CPES scores, rather than being a surrogate measure of transient temporal-lobe signs, may, in fact, be a correlate of the ability (or tendency) to either fixate and defocus the gaze, or to deliberately non-attend to visual stimuli and images. This follows from the observation that scores obtained on the Wilson-Barber Inventory of Childhood Memories and Imaginings (ICMI) correlated only in part with CPES scores (Persinger and De Sano, 1986). In fact, Persinger and De Sano observed that the specific items of the CPES which correlated strongly with EEG transient spiking did not correlate with ICMI scores at all. In effect, CPES cluster scores had already failed one test of whether they could be a surrogate measure of fantasy proneness with the outcome of Persinger and De Sano's study.

It is telling also that CPES items which did correlate with ICMI scores quite strongly were the items which correlated the most strongly with and positively with the proportion of alpha time per minute recorded over the temporal lobes of the same subjects (Persinger and De Sano, 1986). Telling, because proportion of alpha time has been shown to be most strongly associated with nonattendance to visual stimuli. Non-attention to visual stimuli is correlated with alpha production, and, as discussed earlier (see Introduction), mental tasks which interfere with attention to internal images (e.g., more complex mathematical calculations) also interferes with alpha production (Short, 1953; Short and Walter, 1954; Walter and Yeager, 1956; Costello and McGregor, 1957; Mundy-Castle, 1957; Slatter, 1960; West, 1980).

The majority of CPES items, in fact, correlated with both ICMI and alpha time, rather than with ICMI and temporal lobe transients signs. It seems quite

plausible to suggest that CPES scores in the case of Persinger and De Sano (1986) were correlated partially with subjects' propensity to recall and vividness of recall - that is, with their tendency to not-attend to external visual stimuli. Recall that Persinger and De Sano also found that the minority of CPES items correlating strongly with TLTs did not correlate with ICMI total scores. Thus, the strongest correlates of the supposed underlying cause of fantasy-proneness did not correlate with one of the accepted indicators of fantasy-proneness.

Main results

The picture emerging is that CPES scores are positively correlated with proportion of alpha time, rather than with fantasy-proneness. That means also that CPES scores should be negatively correlated with tests of conventional imagery, as conventional imagery tasks have been consistently shown to measure activity which suppresses alpha production. A variety of mechanisms have been proposed for this effect (Barratt, 1956; Oswald, 1957). Both of the correlations should be attenuated, particularly that of CPES with alpha time, because CPES items have been shown to correlate with TLTs and alpha production, as described above. This two-way split of CPES item correlations should moderate overall CPES correlations with either TLT-behaviours or alpha production.

The second correlation, that of CPES with QMI scores, is observed here. While there is no direct test of the relationship between CPES and alpha time, the observation made here is the correlation of CPES with CIS, the CIS being an equivalent of the ICMI used by Persinger and De Sano (1986). The CIS and the ICMI are both used as indicators of fantasy-proneness, the CIS being a more time-economic but somewhat less thorough test of this ability than the ICMI. This

being the case, a moderate positive correlation between CIS and CPES scores would be expected, according to the alternative hypothesis. This was observed.

To summarize the pattern of results: the correlation of CPES with CIS scores was 0.2017, while that of CPES with QMI scores was -0.3602. Post hoc ANOVA of CPES scores, with QMI scores as the independent variable was significant (*alpha* = .05), the higher scorers (i.e., above median) on the QMI scoring significantly lower on the CPES than the lower QMI scorers. Low scores on the QMI indicate more vivid imagery performance. Thus, higher scorers on the CPES scored significantly lower on the QMI, indicating more vivid imagery performance.

The overall pattern of results suggests strongly that: (a) temporal lobe transients, defined variously by Persinger (1984a), Persinger and De Sano (1986) and Makarec and Persinger (1987) are not reliable indicators of fantasy proneness, and; (b) the processes underlying Creative Imagery and more mundane remembering and visualisation activities may be somewhat different in quality. Further, the reporting of temporal lobe-like experiences in a non-epileptic population would seem to indicate tendencies to not-attend to visual stimuli, perhaps in the act of remembering, rather than seizure experiences *per se*.

It is important to note that the hypothesis that CPES scores are also a valid measure of fantasy-proneness would have predicted a similar pattern of results. However, for this hypothesis to have been supported, the relationship between CPES scores and CIS scores would be required to be stronger than that found here. That is, it would be expected to have reached significance. This was not the case. Such an hypothesis would in its strongest form demand that the observed CPES-CIS relationship be stronger than the CIS-QMI relationship. After all, temporal lobe transient waves are the hypothesized cause of fantasy

proneness, and not of conventional imagery. This, likewise, was not observed; rather the reverse was found to be the case. The CPES-CIS relationship was not significant, while the CPES-QMI one was.

In this way, the hypothesis that CPES scores are measuring concomitant experiential aspects of the physiological processes *causing* fantasy-proneness, demanding that there be a one-to-one relationship between the performance aspects [i.e., CIS scores] and the experiential aspects [CPES scores] of the underlying phenomenon [TLTs], is not supported. According to this and previous data, CPES scores are in fact a better surrogate measure of the non-epileptic individual's propensity to disengage from ongoing visual stimuli or conventional internal imagery than they are of any other variable of interest.

Experience and belief

The portion of the planned comparison results that was consistent with Persinger's general hypothesis was the CIS-PPI comparison. Here we find that high-imaginers scored significantly higher on the Personal Philosophy Inventory than low-imaginers, after PPI scores were adjusted by subtracting CPES and Paranormal subscale scores. This indicates that those scoring in the top half of the CIS scores were significantly more likely to answer true to questions about slightly unusual sensory experiences and beliefs that may be considered unusual. An example of the latter is: "There is a good possibility that I have lived in a previous time".

This result supports the hypothesis that those who are capable of generating, or prone to experiencing, qualitatively more intense imaginative experiences are more likely to subscribe to more esoteric beliefs. However, there are two qualifications that should be made to this support. First, some items in the

main section of the PPI are based on sensory experiences (see Appendix VI). By definition, those scoring higher on the CIS are more capable of creating and distorting sensory experiences, so it should be expected that they report more such unusual experiences. Second, some other items of the PPI are questions of belief in unusual, but not bizarre or extreme, beliefs. An example of this type of item is: "Animals should not be killed just for the benefit of mankind". Agreement to such a statement cannot be definitively classified as subscription to "magical thinking" or a fantastic belief system.

Further, these two points serve to illuminate another qualification upon what scores on the PPI may actually indicate. Both of the items examplified above are consistent with the belief system known as Buddhism; many subjects (approximately one third) were of ethnic Chinese extraction, if not Chinese, Taiwanese, or Singaporean extraction. These subjects could reasonably be expected to be Buddhist, in terms of their general cultural background, if not explicit belief and practice. Unfortunately, subjects were not questioned as to their specific cultural background while being tested, but the chance that many were of a "cultural Buddhist" background should be taken seriously. This being the case, there is the possibility that a significant proportion of subjects may have had backgrounds where statements such as the two example items are definitive norms, rather than eccentric or aberrant beliefs.

These qualifications aside, this result does support the hypothesis as described: those who are capable of generating, or prone to experiencing, qualitatively more intense imaginative experiences are more likely to subscribe to more esoteric beliefs. This being the case, the intuitive argument that the personal belief follows personal experience can be made. This should be a familiar point of view; the influence of personal experience - in other words, of personal anecdotal evidence - on an individual's beliefs is an universally

acknowledged, even notorious effect. While this point may seem self-evident, even trivially so, it is important here for two reasons: (i) that personal beliefs vary clearly with demonstrated ability to manufacture experience is a new observation, and; (ii) the absence of any significant variation of CPES scores with CIS scores, which is further evidence of the non-existence of an underlying temporal lobe syndrome. The general theory of the temporal lobe's causal role in religious beliefs and experiences, and the specific hypothesis of a "TLT syndrome" is thus dealt another blow. This of course does not count against the possibility that the temporal-limbic area of the brain is involved in the experience of mystic and other unusual states. Given that experience influences belief, this is still a crucial role.

BPI results

The correlations of the CIS and PPI scores with scores on the Belief in the Paranormal Inventory (BPI) also threw a shadow on the validity of the PPI main scale. The PPI correlated with the BPI at only a moderate level (0.4314). While this correlation is strong enough to indicate significant variation of one scale's score relative to the other, had a *post hoc* ANOVA been carried out, it is much less than the level of correlation one would desire if seeking to validate one scale - the PPI - against the other.

Added to this, subject scores on the CIS did not correlate with BPI scores ($r. = 0.0068$). This is an indication that, as far as the BPI results are concerned, high imagining subjects do not show a tendency to hold more (or less) magical or anomalous beliefs. This directly contradicts Persinger's general and specific hypotheses, and is contrary to PPI results.

An inspection of the contents of the BPI (see Appendix X) reveals that its items are exclusively concerned with events and abilities regarded as supernatural or plainly anomalous, or with attitudes towards beliefs in such events and abilities. An example of this last is: "Only the uneducated or demented believe in the supernatural and the occult." [item 7]. The development and standardization information available for the BPI (Jones, Russell and Nickel, 1977) indicate that its items were tested to reliably sample subjects' beliefs in several domains of the paranormal, without referring directly to matters of religious doctrine.

Items of the BPI also refer to beliefs which directly contradict scientific evidence and basic scientific assumptions, rather than matters of experience or opinions based on experience. By contrast, it is likely that PPI scores are influenced by a number of variables besides the subject's belief in the paranormal *per se.* The BPI's standardization data and very narrow focus on paranormal matters and irrational beliefs relative to the PPI Main scale make it a stronger standard for measuring the extent to which subjects hold such beliefs. Given the very strong face and construct validity of the BPI, and the qualifications specified with respect to the PPI main scale above, it seems appropriate to be cautious in interpreting the results of the PPI main scale.

CIS - QMI Correlation

Rather than a correlation approaching zero and a lack of significant difference between high and low Creative Imagers, we observed a significant difference in QMI scores according to level of Creative Imagery performance. QMI performance correlated moderately with CIS performance, indicating some relationship between the two abilities under observation. Given that the types of

tasks and method of scoring for these tests were quite different, this is a strong indicator that there may be some measure of ability common to those who do well on either task. The correlation was not high enough to suggest that the two measures are surrogates.

Overall, the result supports the intuition that visualisation abilities of different types should be somehow connected, whilst encouraging the view that fantasy-proneness is a quite different experience than conventional imagery. While it may have been tempting to think of fantasy proneness and conventional imagery as quite different capacities, it seems much more likely that there is some relationship between the two.

QMI and CPES factors

The decomposition of CPES and QMI scales into factors by the method described above resulted in some quite interesting comparisons. We will look at the single CPES factor that differed significantly according to level of Creative Imagining, then the various QMI factors for which this was the case.

The initial breakdown of CPES scores into factors proved to be interesting in itself. Items separated into factors consisting of visions (Factor 4), experiences of a markedly extrasensory (ESP) or temporal lobe epileptic nature, including smell sensations typical of seizure auras (Factor 1), hunches and special knowledge (Factor 3) and more general, odd sensations (Factor 2). That is, all the items that may be associated with stereotypically psi-like experiences or ictal TLE episodes clustered separately from generalized sensations and cognitive oddities. None of the first type of factor [Factors 1, 3 or 4] differed significantly in their scores according to high or low Creative Imagining. Factor 2, composed of

the more general experiential and cognitive items, did show such a difference in scores.

Despite the *post hoc* nature of this analysis, the clear differentiation of amongst factor scores supports the results of other analyses. Portions of the CPES involved in paranormal and TLE-type experiences did not show systematic variation with CIS scores, whilst other less anomalous items, which clustered as a factor, did. This clearly is in line with the conclusion that the CPES scale of the PPI does not represent another way to measure fantasy proneness. To the degree that CPES scores do correlate with measures of fantasy proneness, the items which appear to be mainly responsible for this are clearly differentiable in nature from other groups of factors. Factor 2 items are items which refer to more normal aspects of experience than items on other CPES factors (see App. I).

Insert Table 3 about here

Added to this point is the relatively low correlation between the CPES factor scores. This also is evidence that items and factors of the CPES may in fact be indicators of widely divergent underlying situations, rather than a facets of a more unitary phenomenon. The factors of the CPES would seem to be "tapping into" phenomena ranging from personal beliefs to experiences perhaps associated with Creative Imaging - that is, fantasy proneness. However, the wide divergence between the factor and item correlations would seem to devalue the CPES as a whole as far as fantasy proneness is considered.

QMI scores divided with reasonable clarity into factors consisting predominantly of sounds and feelings (Factor 1), taste/food items (Factor 2),

CPES Factor	factor 1 (smells)	factor 2 (general)	factor 3 (hunches)	factor 4 (visions)
factor 1	**1.0000**	**0.4791**	**0.2339**	**0.2029**
factor 2		**1.0000**	**0.1403**	**0.2470**
factor 3			**1.0000**	**0.2239**

Table 3: Correlations between CPES factor scores.

smell and food items (Factor 3), and sensations (Factor 4). These factors showed a strong correspondence to the way in which the shortened Betts' QMI was first constructed (Sheehan, 1965). Both the original and shortened versions of the QMI were intended to survey imagery in seven sensory modalities[1], and items were selected for the shortened QMI according to uniform loadings on a single main scale, rather than for differential loadings on specific scales. The factor analysis reported here, however, confirms the conceptual validity of dividing imagery performance into categories corresponding to sensory modalities. With a larger sample, factors may emerge more clearly and shed further light on the mode-specificity of imagery performance.

Of the QMI factor scores, only Factor 2, taste/food items, failed to show significant differences according to level of CIS performance (post hoc 2-way ANOVA; $p < 0.05$). Differences in the group means for this factor score were in the same direction as the others (i.e., factor scores were higher for the group scoring in the lower half of CIS performance), but of lessor magnitude.

The consistency if the factor score differences was to be expected given that other results observed for CIS-QMI scores: a correlation of -0.4460 and a significant difference between high and low CIS performers was found.

Insert Table 4 about here

Intercorrelations between QMI factors were all strong to very strong. This gives some indication that the QMI scale is measuring facets of closely related

1. The seven modalities are: Visual, Auditory, Cutaneous, Kinaesthetic, Gustatory, Olfactory and Organic (Sheehan, 1965).

QMI factor	Factor 1 (sounds)	Factor 2 (taste)	Factor 3 (smell)	Factor 4 (sensations)
Factor 1	**1.0000**	**0.4585**	**0.5201**	**0.5567**
Factor 2		**1.0000**	**0.6593**	**0.5617**
Factor 3			**1.0000**	**0.5913**

Table 4: Correlations between QMI factor scores.

abilities and experiences, whilst maintaining enough divergence among these for them to properly be regarded as distinct factors.

Speculation as to why Factor 2 scores did not vary as the others did might lead to the observation that this factor held a high proportion of items related to a sense experience that may be the least often "created" by subjects scoring high on the CIS - taste. That is, taste may be either less often created, or less prone to creation - in other words, more difficult to create - as it involves imagery in more than one sensory modality in order to successfully recreate it. If this is so, the imagery of taste may be less subject to "replacement" by creative imagers than imagery in other sensory modalities. This would be consistent with the other results found here, but is obviously at least somewhat speculative.

Both the CPEs and QMI scale and factor scores would be easy to retest. This would provide confirmation or otherwise of the factors themselves, and of the patterns of their loadings. Original redevelopment of the QMI into its shortened form (Sheehan, 1967) did not, unfortunately, include investigation of QMI factors. However, if QMI items are found to reliably discriminate certain modes of conventional imagery, this would greatly aid, among other things, investigation of fantasy proneness and its relationships with other forms of human imagery performance.

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Appendix 1: CPES Scale factor items
(item number preceding)

Factor 1:

123. At least once in my life, just before falling down, I had the intense sensation of a smell from childhood.

91. When I walk up stairs, I sometimes note a strange smell from nowhere.

82. At least once a month, I experience intense smells that do not have an obvious source.

76. I have heard an inner voice call my name.

29. While sitting quietly, I have had uplifting sensations as if I were driving quickly over a rolling road.

Factor 2:

63. Sometimes, in the early morning hours between midnight and 4:00 a.m., my experiences are very meaningful.

62. When relaxed or just before falling asleep, I sometimes feel pleasant vibrations moving through my whole body.

23. There have been times when I have stared at an object and it appeared to become larger and larger.

88. I often feel as if things are not real.

109. I have had experiences when I felt as if I were somewhere else.

102. Once, in a crowded area, I suddenly could not recognize where I was.

Factor 3:

12. Sometimes an event will occur that has special significance for me only.

110. I have dreams of floating or flying through the air at least once a year.

84. I use "hunches" more than simple learning to solve new problems.

Factor 4:

15. I have had a vision.

40. When I have a tough decision to make, a sign will be given and I will know what to do.

Appendix II: Betts' Questionairre on Mental Imagery

(QMI) factor items

(item number preceding)

Factor 1: [List of items by factor]

the sound of:

6. The whistle of a locomotive ( )

7. The honk of an automobile ( )

8. The mewing of a cat ( )

9. The sound of escaping steam ( )

10. The clapping of hands in applause ( )

the picture of:

3. The precise carriage, length of step, etc. in walking [of a relative]

5. The sun as it is sinking below the horizon ( )

the feeling of:

13. Fur ( )

14. The prick of a pin ( )

15. The warmth of a tepid bath ( )

the sensation of:

19. Reaching up to a high shelf ( )

17. Springing across a gutter ( )

Factor 2:

the taste of:

22. Granulated (white) sugar ( )

23. Oranges ( )

24. Jelly ( )

25. Your favourite soup ( )

the feel of:

11. Sand ( )

the smell of:

27. Cooking cabbage ( )

the sound of:

9. The sound of escaping steam ( )

Factor 3:

the smell of:

28. Roast beef ( )

29. Fresh paint ( )

30. New leather ( )

the taste of:

21. Salt ( )

the sensation of:

16. Running upstairs ( )

32. Hunger ( )

Factor 4:

the sensation of:

31. Fatigue ( )

34. Drowsiness ( )

35. Stuffed full from over-eating ( )

the picture of:

1. The exact contour of face, head, shoulders and body [of a relative]

the feeling of:

12. linen ( )

Appendix III: Paranormal subscale of PPI
(item number preceding)

17. An inner voice has told me where to find something and it was actually there.

32. Sometimes I can read another person's thoughts.

36. Once I thought about a person whom I had not seen for a while and then saw the same person a few minutes later.

72. I am afraid of mice.

76. I have heard an inner voice call my name.

96. As a child, I played with an imaginary friend.

137. Two or three times in my life, there have been a few brief moments when I felt very close to a Universal Consciousness.

Appendix IV: Mundane subscale of PPI
(item number preceding)

1. Most nights I go to sleep without thoughts or ideas bothering me.

14. I like to buy new things.

22. I like to eat well-prepared meat.

28. Once in a while, I laugh at a dirty joke.

52. Most of the time, I am happy.

56. I gossip a little at times.

69. I have a good appetite.

73. I get angry sometimes.

78. When I am really upset, I feel my hands shaking.

81. At times, I feel like swearing.

85. There are some days when I accidently hit my hand on something, smash my fingers, or trip over my own two feet.

97. I sometimes feel a sensation or a bulge in my abdomen.

106. Once in a while, I think of things too bad to talk about.

112. At times I feel like smashing things.

114. Sometimes when I am not feeling well I am cross.

134. My face has never been paralysed.

Appendix V: Complex Partial Epilepsy Signs subscale of the PPI
(item number preceding)

12. Sometimes an event will occur that has special significance for me only.

15. I have had a vision.

23. There have been times when I have stared at an object and it appeared to become larger and larger.

29. While sitting quietly, I have had uplifting sensations as if I were driving quickly over a rolling road.

40. When I have a tough decision to make, a sign will be given and I will know what to do.

62. When relaxed or just before falling asleep, I sometimes feel pleasant vibrations moving through my whole body.

63. Sometimes, in the early morning hours between midnight and 4:00 a.m., my experiences are very meaningful.

76. I have heard an inner voice call my name.

82. At least once a month, I experience intense smells that do not have an obvious source.

84. I use "hunches" more than simple learning to solve new problems.

88. I often feel as if things are not reai.

91. When I walk up stairs, I sometimes note a strange smell from nowhere.

102. Once, in a crowded area, I suddenly could not recognize where I was.

109. I have had experiences when I felt as if I were somewhere else.

110. I have dreams of floating or flying through the air at least once a year.

123. At least once in my life, just before falling down, I had the intense sensation of a smell from childhood.

Appendix VI: Personal Philosophy Inventory Main Scale (Beliefs)
(item number preceding)

2. I like reading mechanics magazines.

3. I do not always tell the truth.

4. During important conversations, I stick to the topic more than most people.

5. When I get upset and angry, my legs feel weak.

6. I go to church at least once a month.

7. After writing prose or poetry, I feel better.

8. I do not read every editorial in the newspaper everyday.

9. I like to read or study while listening to the radio.

10. There is good evidence that life exists on other planets.

11. If I breathe quickly, I feel dizzy or odd.

13. I am afraid of earthquakes.

16. Once in a while I put off until tomorrow what I ought to do today.

18. At least once in the last ten years, I have fallen asleep and then awaken the next morning in another room.

19. I would rather go to a priest or minister than a psychologist for personal problems.

20. Sometimes I am sure that people can tell what I am thinking.

21. At least once during childhood, I hit my head (or was hit in the head) and blacked out.

24. If I could get into a movie without paying and be sure I was not seen, I would probably do it.

25. Once I start talking in an enjoyable sitting, I have a hard time leaving.

26. I believe there is a God.

27. About once a year, I will awaken during sleep and not be able to move.

30. I prefer to eat with my left hand.

31. Belief in science and belief in God are not compatible.

33. People tell me that I "blank out" sometimes when we are talking.

34. I would rather win than lose in a game.

35. I have had a religious experience that I know was real.

37. Compared to other people, my memory is excellent.

38. At least once in my life very late at night, I have felt the presence of another Being.

39. If I am not careful, a high pressure salesperson can sell me a "bill of goods".

41. I like to know some important people because it makes me feel important.

42. Intense smells bother me more than other people.

43. God has healed me or one of my family on at least one occasion.

44. I would like to time travel.

45. Evil spirits possess me sometimes.

46. There are no such things as ghosts or haunts.

47. I like to read about science.

48. I like to poke fun at people.

49. I do not like everyone I know.

50. I go to church at least once a week during most months.

51. There must be something more to life.

53. I keep a diary or notebook about my feelings and thoughts.

54. If there was a car accident, I believe I would have a better chance than most people to survive.

55. I have been known to walk in my sleep.

57. My spouse or (girl or boy) friend should do what I want out of love for me.

58. I have been taken aboard a spaceship.

59. People tell me that I become excited over insignificant events.

60. Sometimes I am so full of pep and energy that I feel superhuman.

61. Every so often I feel like gripping my thumb within the fingers of the same hand.

64. I am no different from anybody else.

65. Sometimes at elections, I vote for candidates about whom I know very little.

66. Christ has appeared to me in a vision.

67. I am not afraid of snakes.

68. There is something wrong with my mind.

70. When I have a headache, it is primarily along the sides of the head.

71. My soul sometimes leaves my body.

72. I am afraid of mice.

74. When I have personal problems, talking to an older person is more helpful than talking to my friends.

75. I have never had "memory blanks" where I could not recall previous events.

77. Criticism and scolding hurt me terribly.

79. Lightning is one of my fears.

80. Everything is turning out just like the prophets in the Bible said it would.

83. The existence of God cannot be explained by Science.

86. I prefer to write with my right hand.

87. When I lose an argument, I spend a lot of time thinking about what I should have said.

89. I love/loved my father.

90. People tell me that I imitate the characters in a movie I have just seen.

92. I like poetry.

93. I can "speak in tongues".

94. Telepathy (ESP) is a real phenomenon.

95. Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right.

98. My table manners are not quite as good at home as when I am out in company.

99. Animals should not be killed just for the benefit of mankind.

100. I have kept a diary.

101. There is an Eternal and Infinite Force.

103. I have learned to meditate.

104. There is a good possibility that I have lived in a previous time.

105. I like to spend time persuading people to do things.

107. After my religious conversion, I suddenly felt full of energy.

108. When I start something, I have a hard time stopping until it is finished.

110. I have dreams of floating or flying through the air at least once a year.

111. I am very religious (more than most people).

113. I have had an epileptic seizure.

115. Alien intelligence is probably responsible for UFOs.

116. Haunts and poltergeists are the works of the devil.

117. I have frequent headaches.

118. I have noticed tingling sensations along the back of my legs.

119. My parents should be obeyed and respected.

120. At least once a month or so, I'll keep singing or thinking a part of a song again and again.

121. I lack self-confidence.

122. When I am alone or feel really low, reciting poetry or prose is a pleasant experience.

124. I do not worry about catching diseases.

125. There are some things that Science should not investigate.

126. I believe in the second coming of Christ.

127. When I see a child starving from hunger on T.V. commercials, I feel sad.

128. Most people should be guided to insure their spiritual development.

129. I am a special agent of God.

130. Women should have the same opportunity as men for education.

131. I have experienced terror.

132. Most of the time, I study while listening to music.

133. I have been visited by a Spiritual Being.

135. I sincerely believe that I am very special.

136. If God told me to kill, I would do it in His name.

138. My first religious or mystical experience occurred before I was a teenager.

139. I have a tremor in one or both of my hands.

140. People say that I repeat myself often.