



# Temporal lobe lability in the highly transliminal mind

Michael A. Thalbourne<sup>a,\*</sup>, Susan E. Crawley<sup>b</sup>, James Houran<sup>a</sup>

<sup>a</sup>*Department of Psychology, Adelaide University, Adelaide 5005, Australia*

<sup>b</sup>*Goldsmiths College, University of London, New Cross, London SE14 6NW, UK*

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## Abstract

Transliminality is “a hypothesized tendency for psychological material to cross thresholds into or out of consciousness,” which has been proposed to derive from hyperconnectivity between temporal-limbic structures and sensory association cortices. Accordingly, it might be expected that transliminality would positively correlate with temporal lobe lability. To test this hypothesis, 135 undergraduate psychology students at an Australian and a British university completed the Revised Transliminality Scale (Lange et al., 2000) and the Personal Philosophy Inventory (Persinger, 1984a), a validated measure of temporal lobe lability. As predicted, scores on transliminality showed a strong association with the general temporal lobe scale ( $r=0.72$ ), as well as moderate correlations with a number of other scalar variables and individual items. The findings are consistent with the idea that transliminality is related to more ungated processing related to temporal lobe functioning, and furthermore that temporal lobe phenomenology promotes transliminal experiences with mystical or religious overtones.

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## 1. Introduction

The concept of *transliminality* was previously described in this journal as “...a hypothesised tendency for psychological material to cross (*trans*) thresholds (*limines*) into or out of consciousness” (Thalbourne & Houran, 2000, p. 853). This definition derives from the finding of a single dimension that underlies seven psychological variables: magical ideation, mystical experience, absorption, hyperesthesia, manic experience, dream interpretation, and fantasy proneness. As a

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\* Corresponding author. Tel.: +61-8-8303-5693; fax: +61-8-8303-3770.

*E-mail address:* michael.thalbourne@psychology.adelaide.edu.au (M.A. Thalbourne).

result, the phrase “psychological material” is intended to cover a wide range of imagery, ideation, affect and perception. At first this psychological material was thought to flow from the subliminal to the supraliminal consciousness (Thalbourne & Delin, 1994), but later research suggested a flow in the opposite direction and even from the external environment to the supraliminal consciousness (Thalbourne, Bartemucci, Delin, Fox, & Nofi, 1997). Thus, the concept of transliminality as a consciousness variable is a very broad one. Interested readers are referred to Thalbourne (2000) for a comprehensive review of the previous research on transliminality, but since that review a good deal of research has been published. Therefore, we review some of this literature next since the progression of the recent studies on transliminality nicely illustrates the rationale for expecting a positive relationship between transliminality and temporal lobe lability.

One of the most important pieces of research on the transliminality construct was published in *Consciousness and Cognition* by Lange, Thalbourne, Houran, and Storm (2000). The 29-item true/false Transliminality Scale (Thalbourne, 1998) was subjected to a process of “top-down purification.” This procedure involves Rasch scaling (see e.g. Wright & Stone, 1979), combined with tests for dimensionality (Nandakumar, 1991), and the removal of biased items (Shealy & Stout, 1993) in an iterative fashion. In other words, the top-down purification approach aims to create a reliable and unidimensional interval measure of a latent variable that has a known fit to the Rasch (1960) model and clearly defined scaling properties (cf. Lange, Irwin, & Houran, 2001). The result is that the original 29-item scale is administered to provide context, but only 17 items are scored and subsequently converted into a Rasch scaled score with a mean of 25 (S.D. = 5). The following studies are mostly based on this new 17-item Revised Transliminality Scale, which is being increasingly used in research and should be the only scoring scheme used in future work due to its psychometric superiority.

The Transliminality Scale shows particularly strong correlations with paranormal belief and paranormal experience variables (Thalbourne & Houran, 2000). Houran and Thalbourne (2001a) used two scales derived from the work of Kumar and Pekala (Kumar & Pekala, 2001; Pekala, Kumar, & Marcano, 1995): (1) the “Encounters” subscale, which deals with alleged encounters with beings and entities such as angels, the dead, and UFOs; (2) the “Poltergeist” subscale, whose items deal with general phenomena associated with hauntings and poltergeists; and (3) a single item on apparitions. For a first-year student sample the Revised Transliminality Scale correlated 0.61 with the Encounters subscale, 0.51 with the Poltergeist subscale, and 0.38 with seeing a ghost, all significant at  $P < 0.001$ .

In that article a psychophysiological explanation of transliminality was adumbrated (and modified to a state-trait construct where transliminality is thought to be mediated by intense emotional states: Houran and Thalbourne, 2001b). This initial psychophysiological description of transliminality identified the limbic system as providing source material for phenomena such as apparitional and visionary experiences. This proposal strongly paralleled Persinger’s long-standing hypothesis that experiences of sensed presences, apparitions, and mystical experiences stem from temporal lobe functioning (for an overview see: Persinger & Koren, 2001). Thalbourne, Houran, Alias, and Brugger (2001) expanded upon the suggestions by Houran and Thalbourne (2001b) and speculated that a much greater degree of “interconnectedness” or “fluidity” was present in the brains of highly transliminal persons. Specifically, the items that comprised the Revised Transliminality Scale suggested a hyperconnectivity between temporal-limbic structures and sensory association cortices.

This view predicts that those with theoretically greater levels of transliminality will experience perceptual anomalies. For example, *synaesthesia* has been described as the situation where “an inducing stimulus produces, at the same time, two kinds of sensory response: the primary sensory experience that is normally associated with that stimulus and, anomalously, a secondary experience in another modality,” such as seeing a color in response to a sound (Marks, 2000). Likewise, Abraham (2000) noted that synaesthesia probably reflects heightened connectivity between adjacent cerebral regions. Therefore, synaesthesia is a theoretical consequence of enhanced transliminality.

Thalbourne et al. (2001) tested this hypothesis in two correlational studies. The first study involved 115 persons from the Australian general population who had taken part in the study of absorption (Thalbourne et al., 1997). Transliminality was here measured by a factor score, and synaesthesia by Tellegen’s seven-item scale. The Spearman rank correlation between scores on transliminality and synaesthesia was a highly significant 0.47. The second study used 242 psychology students who were administered the original Transliminality Scale (Thalbourne, 1998). The rank order correlation between scores on transliminality and synaesthesia was also a highly significant 0.57. Notwithstanding these results, profound synaesthesia is a rare condition (Goffman, 1999). Thus, a collaborative effort is in progress between researchers in Zürich and the United States in which a sample of extreme, laboratory-validated synaesthetes will be compared to a control group on the Revised Transliminality Scale.

There is stronger reason to believe that temporal lobe lability contributes to transliminality. Neppe (1990) noted that the temporal lobes, which constitute 40% of the cerebrum, are

well situated for their major physiologic function of integrating polymodal perceptual inputs of all kinds, including those from the . . . sense organs. For example, smell, balance, hearing, and taste are processed by temporolimbic structures; and vision, . . . touch, position sense, and pain by neighboring areas. In addition the temporal lobes are responsible for interpreting various aspects of affective, conative, and cognitive functions such as memory, learning, language interpretation, and sense of self. . . Thus, complex symptomatology results from firing within a temporal lobe or non-functional atrophic lesions of parts of a temporal lobe. This may be further complicated by alterations in states of consciousness (pp. 170–171).

If transliminality is an index of the degree of neurological interconnectedness, including more functional connections both within the temporal lobes and with other areas of the brain, then we should expect scores on transliminality to correlate with direct and indirect indicators of temporal lobe symptomatology. Michael Persinger has argued that such temporal lobe symptomatology accounts for a wide range of experiences, most notably of the paranormal (Persinger, 1984a) and religious and mystical experiences (Persinger, 1983, 1984b). He devised the Personal Philosophy Inventory (PPI: Persinger, 1984b) to measure a postulated continuum of temporal lobe lability and its putative associated phenomena. As Neppe (1990, p. 177) noted, “There are already construct validity [data] for Persinger’s temporal lobe scale; normal people who report more subjective experiences similar to those stated by patients whose deep temporal lobes are stimulated surgically show enhanced EEG lability within the temporal lobes but not the occipital lobes (Makarec & Persinger, 1985, 1990).” Accordingly, we predict that scores on the Revised Transliminality Scale correlate positively with measures of temporal lobe lability and with aspects of its symptomatology.

## 2. Method

### 2.1. Measures

We administered two measures in counterbalanced order. One instrument was the 29-item true-false *Transliminality Scale* (Thalbourne, 1998) revised and scored according to Lange et al.'s (2000) Rasch scheme. In this implementation only 17 items are scored, which subsequently constitute a unidimensional scale with good reliability (Rasch reliability = 0.82, and this translates to a KR-20 reliability coefficient of 0.85) and an interval scale of measurement.

The other measure was the Personal Philosophy Inventory (Persinger, 1984b). This Inventory is a true/false instrument containing 140 statements grouped into a large number of (sometimes overlapping) clusters measuring: (1) a control for acquiescence response bias (15 items); (2) the tendency to lie (reverse scored: 9 items); (3) paranormal experiences (4 items); (4) general temporal lobe epilepsy (30 items); (5) complex partial epileptic signs (16 items); (6) all signs involving temporal-lobe like factors (56 items); (7) exotic beliefs (9 items); (8) fear (6 items); (9) egocentrism (12 items); (10) rare (psychotic-like) statements (5 items); (11) perseveration (4 items); (12) limbic-motor statements (4 items); (13) automatic behaviours (3 items); (14) intense meaning (3 items); (15) hypergraphia, or writing (3 items); (16) visual imagery (3 items); (17) depersonalisation (4 items); (18) auditory-vestibular experiences (4 items); (19) sense of presence (3 items); (20) suggestibility (3 items); (21) olfactory experiences (4 items); and (22) hypomania (3 items). Note that all clusters were divided by the number of statements in them and multiplied by 100 so that the score of each participant could range from 0 to 100.

### 2.2. Descriptive statistics

Table 1 shows the range of scores and the mean and standard deviation for each of the measures. Note that scores on the Rasch Transliminality Scale ranged right across the potential scoring range, and have, as expected, a mean of 25 and a standard deviation of 5.

### 2.3. Subjects and procedure

Data derived from a convenience sample consisting of 135 undergraduate psychology students ( $M_{\text{age}} = 22.7$  years,  $S.D. = 6.5$ , range = 17–50 years, 76% women). Twenty of the participants came from Adelaide University (Australia) and 115 came from Goldsmiths College (UK).

## 3. Results

### 3.1. Correlational data for the clusters

Pearson correlations (two-tailed) were calculated between the Revised Transliminality Scale and all of the clusters in the Personal Philosophy Inventory. Seventeen out of the resulting 23 correlations were statistically significant and in the predicted direction. Table 2 lists these significant correlations in order of magnitude.

We should first note that transliminality correlated significantly though at a low level with acquiescence response bias (shared variance = 5%) and therefore an adjustment was made to two of the highest correlations, using the technique of partial correlation. The partial correlation for the correlation between transliminality and the general temporal lobe epilepsy scale decreased minimally from 0.72 to 0.70, while the partial correlation between transliminality and all signs involving temporal lobe factors likewise showed a minor decrease from 0.70 to 0.68. These changes suggest that acquiescence response bias had a negligible effect on the relevant correlations.

As predicted, scores on the Revised Transliminality Scale were positively and significantly correlated with the general temporal lobe epilepsy scale, number of complex partial epileptic signs (which is a part of the former), all signs involving temporal lobe factors, sense of presence, liberal (exotic) beliefs, depersonalisation, auditory-vestibular experiences, visual images, paranormal experiences, hypomania, intense meaning, olfactory experiences, perseveration, hypergraphia, rare (potentially psychotic-like) features, limbic motor processes, acquiescence response bias, and conservative religious beliefs.

However, scores on the Revised Transliminality Scale did *not* significantly correlate with the lie scale, fear or phobia, egocentrism, automatic behaviours or suggestibility.

Table 1  
Descriptive statistics for transliminality and PPI clusters ( $N = 135$ )

| Variable                                  | Min. | Max. | Mean | S.D. |
|---|------|------|------|------|
| Revised Transliminality Scale             | 13.7 | 37.3 | 24.2 | 4.1  |
| Acquiescence response bias                | 0.47 | 1.00 | 0.75 | 0.11 |
| Lie scale (reversed)                      | 0.11 | 1.00 | 0.74 | 0.16 |
| General temporal lobe epilepsy scale      | 0.00 | 0.80 | 0.34 | 0.17 |
| No. of complex partial epileptic signs    | 0.00 | 0.81 | 0.31 | 0.20 |
| All signs involving temporal lobe factors | 0.09 | 0.68 | 0.37 | 0.14 |
| Liberal (exotic) beliefs                  | 0.00 | 1.00 | 0.49 | 0.22 |
| Conservative religious beliefs            | 0.00 | 0.91 | 0.30 | 0.19 |
| Fear or phobia                            | 0.00 | 1.00 | 0.45 | 0.25 |
| Egocentrism                               | 0.00 | 0.83 | 0.39 | 0.17 |
| Rare (psychotic-like)                     | 0.00 | 0.60 | 0.12 | 0.15 |
| Perseveration                             | 0.00 | 1.00 | 0.68 | 0.25 |
| Paranormal experiences                    | 0.00 | 1.00 | 0.36 | 0.25 |
| Limbic motor                              | 0.00 | 1.00 | 0.40 | 0.26 |
| Automatic behaviors                       | 0.00 | 1.00 | 0.40 | 0.28 |
| Hypergraphia                              | 0.00 | 1.00 | 0.47 | 0.35 |
| Intense meaning                           | 0.00 | 1.00 | 0.41 | 0.31 |
| Depersonalization                         | 0.00 | 1.00 | 0.42 | 0.34 |
| Visual images                             | 0.00 | 1.00 | 0.22 | 0.26 |
| Auditory-vestibular experiences           | 0.00 | 1.00 | 0.33 | 0.25 |
| Sense of presence                         | 0.00 | 1.00 | 0.25 | 0.32 |
| Suggestibility                            | 0.00 | 1.00 | 0.41 | 0.21 |
| Olfactory experiences                     | 0.00 | 0.75 | 0.15 | 0.19 |
| Hypomania                                 | 0.00 | 1.00 | 0.33 | 0.29 |

Table 2

Pearson correlations between transliminality and 18 PPI clusters ( $N=135$ ), two-tailed

| Cluster                                   | <i>r</i> | <i>P</i> |
|---|----------|----------|
| General Temporal Epilepsy Scale           | 0.72     | <0.001   |
| No. of complex partial epileptic signs    | 0.71     | <0.001   |
| All signs involving temporal lobe factors | 0.70     | <0.001   |
| Sense of presence                         | 0.57     | <0.001   |
| Liberal (exotic) beliefs                  | 0.56     | <0.001   |
| Depersonalization                         | 0.55     | <0.001   |
| Auditory-vestibular experiences           | 0.53     | <0.001   |
| Visual images                             | 0.52     | <0.001   |
| Paranormal experiences                    | 0.48     | <0.001   |
| Hypomania                                 | 0.39     | <0.001   |
| Intense meaning                           | 0.38     | <0.001   |
| Olfactory experiences                     | 0.37     | <0.001   |
| Perseveration                             | 0.36     | <0.001   |
| Hypergraphia                              | 0.26     | 0.002    |
| Rare (psychotic-like)                     | 0.24     | 0.006    |
| Limbic motor                              | 0.23     | 0.007    |
| Acquiescence response bias                | 0.23     | 0.008    |
| Conservative religious beliefs            | 0.21     | 0.014    |

### 3.2. Correlational data for the Personal Philosophy Inventory items

There are 140 items in the Personal Philosophy Inventory, and in order to ascertain which of them were related to transliminality two-tailed Pearson correlations were computed between the Revised Transliminality Scale and each of the 140 items. Fifty-five correlations were significant at the 0.05 level or less. To control for Type I error, attention was focused on those 28 correlations that were significant at the 0.001 level or better. The wording of the relevant items and their correlation coefficients are given in Table 3.

A common theme appears amongst many if not most of the items in Table 3, which we tentatively identify as “spirituality”. Even the items concerning physical symptoms might be thought to be a part of the psychophysiological syndrome known in the East as “kundalini”, which is another correlate of transliminality (Thalbourne & Fox, 1999). Moreover, it is already known that transliminality is associated with non-sectarian religiosity (Thalbourne, 1998; Thalbourne & Delin, 1999).

## 4. Discussion

The robust pattern of findings clearly supports our hypothesis that transliminality involves aspects of temporal lobe lability. In particular, scores on the Revised Transliminality Scale significantly correlated with 17 clusters and 55 single items from the Personal Philosophy Inventory. Of the clusters, highly transliminal participants tended to experience a sense of presence [conceptually replicating the findings of Houran and Thalbourne (Houran & Thalbourne, 2001a;

Table 3

Two-tailed Pearson correlations ( $P < 0.001$  or better) between transliminality and 28 PPI items ( $N = 135$ )

| No.  | Item  | <i>r</i> |
|------|---|----------|
| 137. | Two or three times in my life, there have been a few brief moments when I felt very close to a Universal Consciousness. | 0.55     |
| 15.  | I have had a vision.  | 0.49     |
| 29.  | While sitting quietly, I have had uplifting sensations as if I were driving quickly over a rolling road.                | 0.44     |
| 60.  | Sometimes I am so full of pep and energy that I feel superhuman.  | 0.43     |
| 94.  | Telepathy (ESP) is a real phenomenon.   | 0.43     |
| 109. | I have had experiences when I felt as if I were somewhere else.   | 0.43     |
| 88.  | I often feel as if things are not real.   | 0.42     |
| 38.  | At least once in my life very late at night, I have felt the presence of another Being.                                 | 0.42     |
| 20.  | Sometimes I am sure that people can tell what I am thinking.  | 0.41     |
| 17.  | An inner voice has told me where to find something and it was actually there.   | 0.41     |
| 104. | Although I am not sure, there is a good possibility that I have lived in a previous time.                               | 0.39     |
| 71.  | My soul sometimes leaves my body.   | 0.39     |
| 40.  | When I have a tough decision to make, a sign will be given and I will know what to do.                                  | 0.39     |
| 63.  | Sometimes in the early morning hours between midnight and 4.00 A.M., my experiences are very meaningful.                | 0.38     |
| 23.  | There have been times when I have stared at an object and it appeared to become larger and larger.                      | 0.38     |
| 12.  | Sometimes an event will occur that has special significance for me only.  | 0.37     |
| 133. | I have been visited by Spiritual Beings.  | 0.36     |
| 35.  | I have had a religious experience that I know was real.   | 0.36     |
| 101. | There is an Eternal and Infinite Force.   | 0.35     |
| 76.  | I have heard an inner voice call my name.   | 0.35     |
| 25.  | Once I start talking in an enjoyable setting, I have a hard time leaving.   | 0.33     |
| 62.  | When relaxed or just before falling asleep, I sometimes feel pleasant vibrations moving through my whole body.          | 0.32     |
| 128. | Most people should be guided to insure their spiritual development.   | 0.31     |
| 138. | My first religious or mystical experience occurred before I was a teenager.   | 0.28     |
| 106. | Once in a while, I think of things too bad to talk about.   | 0.28     |
| 103. | I have learned to meditate.   | 0.28     |
| 97.  | I sometimes feel a sensation or a bulge in my abdomen.  | 0.28     |
| 82.  | At least once a month, I experience intense smells that do not have an obvious source.                                  | 0.27     |

Houran, Kumar, Thalbourne, & Lavertue, 2002; Houran, Wiseman, & Thalbourne, in press)], they have beliefs about such phenomena as reincarnation, telepathy and clairvoyance, they depersonalize, they have auditory-vestibular experiences (e.g. “I have heard an inner voice call my name”, “While sitting quietly, I have had uplifting sensations as if I were driving quickly over a rolling road”), tend to be hypomanic (though the cluster may bear some improvement), they like intense meaning (e.g. “I like poetry”), display unusual olfactory experiences (there is one such item in the Revised Transliminality Scale), show perseveration (e.g. “At least once a month or so, I’ll keep singing or thinking a part of a song again and again”), display hypergraphia (e.g. “After writing prose or poetry, I feel better”), exhibit rare (potentially psychotic) symptoms (e.g. “Evil spirits possess me at times”), display limbic motor features (e.g. “When I get upset or angry, my legs feel weak”; cf. Houran et al., 2002), and, finally, display conservative religious beliefs (e.g. “I believe in the second coming of Christ”). These items arguably reflect a heightened



integration among thoughts, emotions, and sensory experience (i.e. hyperconnectivity between temporal-limbic structures and sensory association cortices)—a “synaesthetic-like” process we hypothesized to underlie transliminality (Thalbourne et al., 2001).

Given that this proposed hyperconnectivity seems to inherently involve temporal lobe functioning, it is only to be expected that temporal lobe symptomatology would color many of the resulting transliminal experiences. As the primary seat of a rich complex of memory and fantasy, the temporal lobe has been hypothesized to instigate physiological experiences reminiscent of a mystical or religious nature (Persinger, 1983, 1984a). One persistent observation is the propensity for temporal lobe experiences to be permeated by vague references to death and religious themes; they occur in both nonparanormal and paranormal contexts. Indeed, it has long been known that temporal lobe epileptics are characterized by their obsession with religiosity and morbid themes (Bear & Fedio, 1977), particularly if a psychotic element is involved (Slater & Beard, 1963).

Accordingly, it is not surprising that 28 out of the 55 single items from the Personal Philosophy Inventory that correlated with scores on the Revised Transliminality Scale concern themes related to “spirituality.” For example, highly transliminal individuals in the study tended to have learned to meditate. It would be interesting to know whether high transliminals are prone to taking up meditation, or whether meditation tends to make a person more transliminal by encouraging ‘cognitive kindling’ (see e.g. Persinger, 1993). The direction of cause and effect is unclear here. Certainly there is evidence that highly transliminal persons are more likely to be introspective (Thalbourne & Houran, 2000), so these findings appear consistent.

Translinal experiences with religious or spiritual themes might be expected to generally elicit happy or elevated states. However, profound depressive states also seem possible in light of the fact that temporal lobe symptomatology can promote experiences with morbid themes. It was initially thought that a high level of transliminality is a psychologically uncomfortable condition—a distinctive state of consciousness in which the individual is relentlessly bombarded with internal and external stimuli. Because of this, high transliminals might turn to illicit substance use to relieve this negative state (Thalbourne, 2001).

The present results suggest an alternative hypothesis. In some cases, it might be neither the amount of psychological material crossing thresholds into or out of consciousness nor poor coping abilities of high transliminals which promote a negative transliminal state. Instead, the degree of pleasantness or unpleasantness of a transliminal experience may be due in part to the themes that accompany the transliminal stimuli via temporal lobe symptomatology—and in this case individual differences are expected (Persinger & Cameron, 1986).

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