

Evidence for transliminality from a subliminal card-guessing task

Susan E Crawley, Christopher C French, Steven A Yesson

Department of Psychology, Goldsmiths College, University of London, New Cross, London SE14 6NW, UK, e-mail: psp01sec@gold.ac.uk; psa01ccf@gold.ac.uk

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Abstract. In this experiment we sought to provide evidence for transliminality from a test of subliminal perception that was disguised as a computerised ESP card-guessing task. It was predicted that highly transliminal individuals would outperform those with low levels of transliminality when given subliminal primes or 'clues' to the correct choice of card, but not when no primes were given. In line with the prediction, higher levels of transliminality were found to be associated with a greater number of correct selections of the target card on the primed trials, but not on the unprimed trials. In addition, a positive correlation was obtained between transliminality and detection accuracy, suggesting that higher levels of transliminality are associated with a greater sensitivity to visual stimulation. The results are discussed with reference to the possibility that transliminality might offer an alternative explanation for some ostensibly psychic perceptual experiences if subliminally acquired material is wrongly attributed to psychic sources.

Introduction

"Transliminality is a hypothesized tendency for psychological material to cross (*trans*) the threshold (*limen*) into or out of consciousness."

(Thalbourne 2000a, page 31)

The search for further correlates of paranormal belief and experience led Thalbourne and Delin (1994) to the chance discovery of a concept which may offer a useful bridge between the disciplines of psychology and parapsychology (Thalbourne and Houran 2000). Thalbourne and Delin identified a single factor which appeared to underlie paranormal belief, creative personality, mystical experience, magical ideation, and psychopathology of the schizotypal and manic-depressive kind. Thalbourne chose to name this factor *transliminality* and it was initially defined as "a largely involuntary susceptibility to, and awareness of, large volumes of inwardly generated psychological phenomena of an ideational and affective kind" (Thalbourne and Delin 1994, page 25).

Later research has uncovered further correlates of transliminality, including schizotypy, fantasy-proneness, absorption, hyperaesthesia (a heightened sensitivity to environmental stimulation), and frequency of panic attacks (Thalbourne et al 1997). The currently identified correlates and constituents of transliminality are discussed in more detail in Thalbourne (2000a). More recently, a relationship has been found between transliminality and a history of childhood trauma (Thalbourne et al, forthcoming).

The nature of some of the correlates (hyperaesthesia and absorption, for example) has necessitated the redefinition of transliminality to encompass additional thresholds—"transliminality is a hypothesized tendency for psychological material to cross the threshold into or out of consciousness" (Thalbourne 2000a, page 31). This definition is less explicit than earlier definitions from which it evolved. 'Psychological material' is, according to Thalbourne (personal communication), intended to cover a wide range of territory including perception, imagery, ideation, and affect.

Although transliminality is a fairly new area of research, the idea that many of the contents of consciousness have their origins or influence in unconscious or preconscious processes dates back to the late nineteenth and early twentieth century and writers,

such as Freud (1917/1973), who gave a central role to the unconscious in determining behaviour. Myers (1903) introduced the term 'subliminal consciousness' to refer to the area below the level of habitual consciousness. While Myers preferred to think of this subliminal area as conscious, James used the word 'subliminal' to refer to the "memories, thoughts and feelings which are extra-marginal and outside of the primary consciousness altogether but yet ... able to reveal their presence by unmistakable signs" (James 1902/1982, page 233). James, like Freud but unlike Myers, preferred to think of the subliminal as unconscious or sometimes preconscious (ie available to consciousness).

Many years later, the educationalist Rugg (1963) used the word 'transliminal' to describe a borderline state of mind which he believed to be conducive to creative insight. Whereas Rugg stressed the passage of material from the unconscious to consciousness, MacKinnon (1971) referred to the passage of material out of consciousness into the unconscious. MacKinnon observed that "people appear to differ widely in the ease with which they can relinquish conscious control and face, without fear or anxiety, impulses and imagery arising from more primitive, unconscious layers of personality" (page 227).

Taking up an earlier idea put forward by Leibniz (and others), Thalbourne and Houran (2000) hypothesised that, in order to reach consciousness, subliminally stored material must attain a certain threshold in the same way that sensory stimulation must reach a certain threshold of disinhibition before an individual becomes conscious of it. Similarly, the contents of consciousness may weaken and disappear into subliminal regions through various mechanisms such as inattention, repression, and dissociation, perhaps later to reappear, possibly in a transformed state depending on the action of inhibiting mechanisms.

Thalbourne (2000a) drew attention to the need for evidence of transliminality from studies of subliminal perception. Some indirect evidence had come from an experiment which examined subliminal perception in individuals with either high or low levels of creativity. Shaw and Conway (1990) found that individuals with high creativity made greater use of the subliminal clues provided to help them to solve anagrams, and they also showed significantly lower thresholds. It may be, Thalbourne suggested, that individual-difference factors related to creativity may influence the processing of information presented in a nonconscious form. One contender for this is transliminality, itself a correlate of creativity (Thalbourne 2000b).

In the current experiment we aimed to examine more directly the relationship between transliminality and subliminal perception. The expectation was that highly transliminal persons would benefit most from subliminal priming, and would also demonstrate a lower subjective threshold of awareness in an experiment disguised as an ESP (extrasensory perception) card-guessing task.

2 Method

2.1 Participants

One hundred undergraduate students and staff members from the Psychology Department, Goldsmiths College, University of London were recruited for the experiment. The twenty-one males ranged in age from 18 to 27 years (mean of 20.95 years). The seventy-nine females were aged between 18 and 65 years (mean of 24.57 years). Two other participants were dropped from the analysis for failing to complete the task. First-year undergraduates received course credits in return for their participation.

2.2 Materials and apparatus

2.2.1 Questionnaire. The Transliminality Scale (Form B) (Thalbourne 1998) was used. This 29-item true/false questionnaire contains items taken from the Absorption Scale (Tellegen and Atkinson 1974), the Inventory of Childhood Memories and Imaginings—Children's Form (Myers 1983), the Magical Ideation Scale (Eckblad and Chapman 1983),

the Australian Sheep–Goat Scale (Thalbourne and Delin 1993), the Mystical Experience Scale (Thalbourne 1991), the Hyperaesthesia Scale (Thalbourne 1996), the Creative Personality Scale (Thalbourne and Delin 1994), and the Manic–Depressiveness Scale (Thalbourne et al 1994), together with an item assessing attitudes to dream interpretation. This was taken from the Minnesota Multiphasic Personality Inventory (Dahlstrom et al 1972). One point is awarded for each ‘true’ response to give a total scale score in the range of 0 to 29.

Thalbourne (2000b) reported a test–retest reliability of 0.88 over an average of seven weeks. Thalbourne (1998) reported that scores on the scale follow a normal distribution with a mean in the region of 14 to 15. Cronbach’s alpha for internal reliability is given as 0.87.

2.2.2 Stimuli. The stimuli used for the experiment were the well-known ESP cards depicting the Zener symbols (shown in figure 1) which have been widely used in tests of ESP. The standard pack contains twenty-five cards, five of each design (ie circle, square, cross, star, and wavy lines). The patterned mask (also depicted in figure 1) was designed to resemble the reverse of a playing card in order to retain the authenticity of the task. The stimuli were presented as grey-on-white images on the special 70 Hz monitor required to produce a 14.3 ms subliminal image. An open-deck design was adopted, meaning that on each trial the computer was free to select any of the five cards regardless of how many times it had been selected previously.

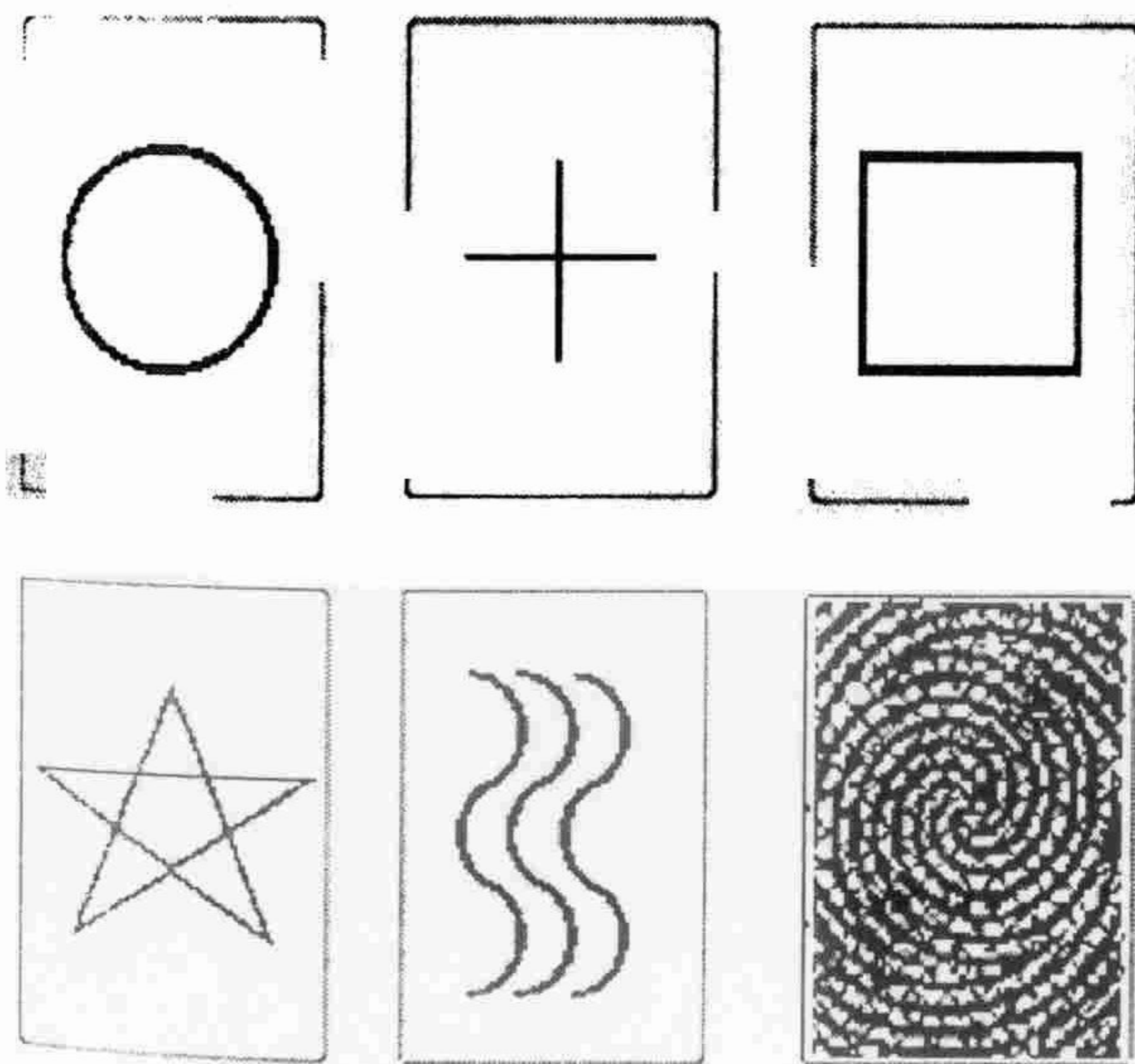


Figure 1. The ESP cards and patterned mask (reduced size)

The presentation order of the trials was achieved by means of a multiplicative congruential number generator with period 2^{32} to return successive pseudorandom numbers in the range from 0 to the Rand-Max set by the computer.

The programs for the experimental and detection tasks, and for the data extraction were written (by S Yesson) in Visual Basic 5.0 Professional for an IBM-compatible PC running Windows 95/98. The experiment was run on a MESH Pentium 433 MHz IBM clone with 64 megabytes of RAM. The display device was a 15 inch Super VGA monitor.

2.3 Procedure

Participants were informed that they would be taking part in an ESP card-guessing experiment. On each trial the computer would select one of the five ESP cards, the reverse of the card would be briefly displayed, and their task was simply to guess which card had been selected from the array of cards which would then appear on the screen. There would be ten practice trials followed by four blocks of twenty-five experimental trials, after which they should await further instruction. Participants recorded their choice by means of pressing the key corresponding to the selected card. The order of the cards in the array was randomly varied from trial to trial. Selections and reaction times were logged, but no feedback was given at this stage.

At the end of the experimental phase, participants were informed that on half of the trials the card reverse (which in fact served as a mask) had been accompanied by a subliminal presentation of the target card to prime their selection. They were asked if they had been aware of the primes, and two participants who admitted clearly seeing the primed shapes were dropped from further analysis. Since it was necessary to establish the subjective threshold of awareness of remaining participants, they were asked to complete a further forty trials. This time participants were asked to indicate, by pressing the appropriate key, whether a subliminal prime was 'present' or 'absent' regardless of whether they were able to identify the subliminally presented card. They were further informed that there would be primes on roughly half of the trials (for technical reasons it was exactly half of the trials). The selected card and order of presentation was, as in the card-guessing phase, randomly determined by the computer.

Participants were then asked to complete the required questionnaire, and were given further debriefing which included their scores from both parts of the experiment.

3 Results

The correlational results reported are from Pearson two-tailed analyses. Scores on the Transliminality Scale ranged from 0 to 26 with a mean of 10.86, and a standard deviation of 5.94. No relationship was found between transliminality scores and either age or reaction times.

3.1 Card-guessing task

A significant positive correlation was obtained between transliminality scores and the number of correct responses on the primed trials ($r = 0.240$, $p = 0.016$). No relationship was found between transliminality and the number of correct responses on the unprimed trials ($r = 0.151$, $p = 0.133$).

3.2 Presence-or-absence detection task

A significant positive correlation was found between transliminality scores and the correct identification of presence trials ($r = 0.260$, $p = 0.009$) but no relationship was shown between transliminality scores and the correct identification of absence trials ($r = -0.070$, $p = 0.491$). This result suggested that higher levels of transliminality are associated with greater stimulus sensitivity, but, alternatively, the result might indicate that the high transliminals had adopted a more lenient response criterion. To eliminate this possibility, the data from the presence-or-absence trials were subjected to a signal-detection analysis, the results of which were correlated with transliminality scores. A positive relationship ($r = 0.253$, $p = 0.011$) was found between transliminality scores and d' values (mean = 1.22, SD = 1.07), the measure of stimulus sensitivity. However, no relationship was found between transliminality and beta values (mean = 1.02, SD = 0.67) or the cut-off points for reporting a signal present ($r = -0.038$, $p = 0.711$). This analysis indicated that the superior detection performance of the high transliminals could be explained in terms of greater stimulus sensitivity rather than as a response bias.

4 Discussion

The results of the experiment were supportive of the concept of transliminality, and the prediction that higher levels of transliminality would afford greater access to unconscious or preconscious material. The results of the presence-or-absence detection task, including those of the signal-detection analysis, provided evidence that the superior performance associated with higher levels of transliminality reflected greater sensitivity to visual stimuli rather than a more lenient response criterion. With respect to the card-guessing task, there was support for the prediction that high transliminals would benefit more than low transliminals when subliminal clues were provided to prime the correct choice of card.

Most participants showed surprise (and amusement) when they were informed that they had been subliminally shown the answers on half of the trials in the card-guessing task. Only a couple of participants (whose data were dropped) reported that they had been clearly able to see the primed shapes, while a few reported some awareness of 'something being there'.

No relationship was found between transliminality scores and age. This is in line with other research which has demonstrated that transliminality does not decrease with age as originally indicated by early findings (Thalbourne 1998).

Attempts were made to minimise known response biases, or population stereotypes, which are known to operate in ESP experiments. Typically when people are shown an array of cards they will tend to avoid choosing the end positions. For this reason the array was randomly ordered on each trial when people were asked to make their selection. In addition, the use of an open-deck design inevitably meant variation in the number of times each card was selected as the target, with some individuals seeing more of some Zener symbols than others. As people are known to favour certain cards (especially the star) we had to check that participants were not achieving higher scores simply because they had received a greater number of presentations of the more popular cards. This was not found to be the case, as no relationship was found between the number of presentations and the number of correct guesses when the results obtained with each Zener card were examined individually.

What conclusions can be drawn from this experiment regarding the nature of transliminality, and what implications do the results have for a better understanding of the relationship between subliminal perception and possible psi perception?

When discussing subliminal perception it is important to distinguish between the objective threshold (the minimum stimulus intensity necessary to be detected by the senses) and the individual's subjective threshold of conscious awareness of the stimulus (Cheesman and Merikle 1984). The objective threshold is lower than the subjective threshold and may be demonstrated by priming effects. The presence-or-absence detection task produced evidence that high transliminality is associated with a lower subjective threshold, while the card-guessing task provided some evidence that highly transliminal individuals may also have a lower objective threshold since the effects of priming were evident. Both results support the revised definition of transliminality, which encompasses additional thresholds. Further evidence is now needed from other subliminal paradigms (something we are currently addressing), and perhaps from physiological measures.

A number of researchers have looked at the similarities between subliminal perception and claims of psi perception (for a review, see Roney-Dougal 1986). Both are possibly examples of the way in which thought and behaviour can be influenced by incoming stimuli outside of conscious awareness. In fact, it is possible to think of the two as a continuum. Once the signal falls below the level of conscious awareness it becomes subliminal, and once outside the range of the physical senses it becomes extrasensory or psychic (Roney-Dougal 1986, page 414). It may well be that there is individual variation at the point where this change occurs and that this reflects measures of transliminality.

The nature of the relationship between transliminality, subliminal perception, and ostensible psi perception is a subject in need of further clarification, but we hope this experiment has opened the door for future research.

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