

STUDIES OF THE *I CHING*: I. A REPLICATION

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ABSTRACT: L. Storm and M. A. Thalbourne (1998–1999) carried out an experiment ($N = 93$) with the Chinese book of divination the *I Ching* (J. Blofeld, 1968), which contains 64 hexagrams (6-line structures) and associated readings. Three coins are thrown 6 times to generate 1 of these hexagrams. Participants selected 16 of 64 hexagram–descriptor pairs, based on their emotional and/or cognitive states of mind. It was predicted that 1 of the 16 choices would come up as a “hit” ($P_{MCE} = .25$). The proportion of hits was marginally significant. Transliminality and 6 factors on R. B. Cattell’s 16 Personality Factor Questionnaire (16PF; R. B. Cattell, H. W. Eber, & M. M. Tatsuoka, 1970) correlated significantly with hitting success. Number of changing lines (given by throwing 3 heads or 3 tails) was not significantly different from chance, but number of changing lines did correlate significantly with transliminality. Number of changing lines also correlated with 5 factors on the 16PF. Finally, transliminality correlated with 5 factors on the 16PF. A replication experiment ($N = 107$) was conducted in 1999. Hexagram hitting was significant, but the transliminality–hitting correlation and the 6 hitting–16PF correlations were not significant. Also, the transliminality–changing lines correlation and the 5 changing-lines–16PF correlations were not significant. However, 4 transliminality–16PF correlations were significant. The successful parapsychological outcomes were interpreted according to the theory of psychopraxia (L. Storm & M. A. Thalbourne, 2000; M. A. Thalbourne, 1982, in press-a).

This is a report of a replication of an experiment we conducted in 1998 (Storm & Thalbourne, 1998–1999). We carried out a study with the *I Ching* (an ancient Chinese system of divination; Blofeld, 1968) to determine, among other things, whether transliminality² “might function as a connecting principle between paranormal effects and other personality variables” (Storm & Thalbourne, 1998–1999, p. 100). Participants were also required to complete the Transliminality Scale (Thalbourne, 1998) and Cattell’s 16 Personality Factor Questionnaire (Cattell, Eber, & Tatsuoka, 1970).

According to traditional usage, to consult the “oracle” of the *I Ching* one must generate a hexagram, which involves, first, posing a meaningful question to the *I Ching* (yes–no questions are excluded), followed by the

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² Transliminality is defined as “a hypothesised tendency for psychological material to cross thresholds into or out of consciousness” (Thalbourne & Houran, 2000, p. 853). A review of the literature on transliminality can be found in Thalbourne’s (in press-b) article.

repeated casting of 64 yarrow sticks to generate all six lines of the hexagram. (The modern method involves throwing three coins six times, which was the method used in both *I Ching* experiments.) We provided further details about the “coin method,” and background material concerning the origin, structure, and use of the *I Ching*, in our previous article (Storm & Thalbourne, 1998–1999, pp. 101–103).

One of the earliest experiments with the *I Ching* was conducted by Rubin and Honorton (1971, 1972). Participants were asked to generate a hexagram in response to a specific question. They were each given two readings: (a) the correct one and (b) a control reading. Both readings were rated on a scale of 1 to 10 by the participant according to how relevant or accurate he or she felt them to be (the difference between the two ratings being the dependent variable). There was no overall significant result for the whole sample, but a sheep–goat rating scale had also been administered, and participants who believed in ESP scored significantly higher than those who disbelieved.

A replication of Rubin and Honorton’s (1971, 1972) experiment was conducted by Thalbourne, Delin, Barlow, and Steen (1992–1993). Participants followed the same procedure of generating a hexagram and rating two readings (the correct one and a systematically selected control). There were three planned “parapsychologically relevant” hypotheses, and the following results were found: (a) although the mean difference score was above chance, it was not significantly so, (b) there was no significant positive correlation between scores on the Australian Sheep–Goat Scale (Thalbourne & Delin, 1993) and difference scores, and (c) those who believed in the efficacy of the *I Ching* scored significantly higher on difference scores than those who disbelieved.

Regarding finding (b), Lawrence (1994) used Rosenthal’s (1991, p. 63) Formula 4.2 for testing the significance of the difference between effect sizes to test the nonsignificant finding of Thalbourne et al. (1992–1993) against Rubin and Honorton’s (1971, 1972) significant finding. When the original mean difference scores were converted to effect size estimates, Lawrence found no significant difference between the two. He concluded that Thalbourne et al. had effectively replicated Rubin and Honorton’s result.

Thalbourne (1994) conducted another experiment using the *I Ching* but this time focused on changing lines exclusively. Using a personal (but ecologically sound) database, he first found that the number of changing lines in mid-1992 was significantly higher than mean chance expectation (1.66 changing lines, where MCE = 1.5 changing lines).

Later, in early 1994, the number of changing lines dropped to 0.70 lines, which was significantly lower than MCE. Thalbourne (1994) concluded that “familiarity” with the *I Ching* system over time reduced his “information-hunger.” Thus the *I Ching* process seemed to be influenced by an experimenter effect so that more “static” hexagrams (i.e., no

changing lines) were generated in the later period compared to the earlier period (p. 133). This “motivational hypothesis” (p. 133) may explain the earlier result.

In our original experiment with the *I Ching*³ (Storm & Thalbourne, 1998–1999), the principal goal was the generation of a “hit”: Participants were required to select 16 of the 64 hexagrams (actually, descriptor pairs for each hexagram) in accordance with the statement “Lately, or right now, I feel . . .” (see Appendix A). If 1 of the 16 hexagrams arose from the *I Ching* process, the outcome was deemed a hit ($P_{MCE} = .25$). The second goal was to generate as many changing lines as possible (formed by throwing three heads or three tails).

Hexagram hitting was suggestively significant ($P = .32$, $p = .067$), although it was later found that the hit rate, when expressed as an effect size, was significant ($\pi = .59$, $p = .048$; see Storm & Thalbourne, in press). Number of changing lines was at chance. Transliminality correlated with hitting to a significant degree ($r = .27$, $p = .010$) and with six factors on the 16PF (Storm & Thalbourne, 1998–1999, p. 109). There were other significant results—some planned, some post hoc.

In the present study we sought to replicate our (Storm & Thalbourne, 1998–1999) confirmed hypotheses and the post hoc findings. Such experimentation would add to a growing tradition of parapsychological research using the *I Ching*, as reviewed above. Also reviewed has been parapsychological research conducted with Cattell’s 16PF (see Storm & Thalbourne, 1998–1999, p. 101).

PARAPSYCHOLOGICAL HYPOTHESES

The parapsychological and psychological hypotheses posed in this study are based on our (Storm & Thalbourne, 1998–1999) significant findings, both predicted and post hoc. We proposed the following parapsychological hypotheses. (The tests we used are given in parentheses with each hypothesis).

1. Hexagram hitting, when expressed as a proportion of hits, is at a rate greater than *MCE* ($P_{MCE} = .25$; binomial test). This is the primary analysis. As a secondary analysis, hexagram hitting, when expressed as an effect size π , is at a rate greater than *MCE* ($\pi_{MCE} = .50$; Rosenthal & Rubin’s [1989, pp. 333–334] “diffuse testing procedure”). This two-part hypothesis is one-tailed, because above-chance scores were observed in the first experiment.

³ Traditionally, the *I Ching* process requires a “general question” (Hazel, 1990, p. 7) or a question “preferably of great personal relevance” (Thalbourne et al., 1992–1993, p. 13). Therefore, the use of the *I Ching* in this unorthodox study is itself somewhat unorthodox.

2. Hitting for two types of second hexagram “hitters” (first hexagram “hitters,” and first hexagram “missers”) is above chance for both subgroups (binomial test).
3. There is a positive correlation between transliminality and hexagram hitting (Pearson’s r).⁴
4. There is a positive correlation between transliminality and number of changing lines (Pearson’s r).
5. Hexagram hitting correlates positively with Factor F (Liveliness), Factor H (Social Boldness), Factor EX (Extraversion), and Factor IN (Independence) and negatively with Factor Q₂ (Self-Reliance) and Factor Q₄ (Tension) of the 16PF (Pearson’s r).
6. Number of changing lines correlates positively with Factor M (Abstractedness) and Factor Q₂ (Self-Reliance) and negatively with Factor A (Warmth), Factor C (Emotional Stability), and Factor EX (Extraversion) of the 16PF (Pearson’s r).
7. Number of changing lines correlates positively with answers to Question 2: “Do you think it is possible for at least some people to exhibit paranormal effects in this experiment, by predicting the outcome hexagram, or influencing the fall of coins so that the outcome hexagram matches 1 of their 16 choices?” (Pearson’s r).

PSYCHOLOGICAL HYPOTHESES

We proposed the following psychological hypotheses.

8. Transliminality correlates positively with answers to Question 2 (the “sheep” question) and with answers to Question 3: “Do you believe in your own abilities to exhibit paranormal effects in this experiment, by predicting the outcome hexagram, or influencing the fall of coins so that the outcome hexagram matches one of your sixteen choices?” (Pearson’s r).
9. Answers to Question 2 (“possibility”) and Question 3 (“ability”) correlate with each other (Pearson’s r).
10. Transliminality correlates positively with Factor A (Warmth) and Factor M (Abstractedness) and negatively with Factor G (Rule-Consciousness), Factor TM (Tough-Mindedness), and Factor SC (Self-Control) of the 16PF (Pearson’s r).

In this study, the only 16PF factors that were tested were those that yielded significant results in our (Storm & Thalbourne, 1998–1999) first study.

⁴ The Pearson r tests are one-tailed for all hypotheses that use this test, because they are all directional hypotheses.

METHOD

Participants

One hundred seven participants were recruited for this experiment.⁵ Thirty-one (29%) were Adelaide University psychology students from all levels (undergraduate, honors, or postgraduate), and the remaining 76 (71%) were not enrolled in any psychology course, at any level. These 76 participants were either students from other departments or were found through friends and colleagues by word –of mouth. The total sample consisted of 54% women. Ages ranged from 18 to 63 years, with a mean of 26 years ($SD = 8.9$).

Measures

Three measures were used in this experiment:

1. The *I Ching* hexagram descriptor form, which in the experiment included a question about previous use of the *I Ching* and two questions about belief in the *I Ching* process (the wording of these was given in Hypotheses 7 and 8 but is given again below). The measure also contains 64 two-word descriptors representing each of the 64 hexagrams (see Appendix A).⁶
2. The Transliminality Scale (Form B), which contains 29 items taken from various scales, 14% of which refer to paranormal phenomena (Thalbourne, 1998). The participant answers “true” or “false” to each item, and the total number of “true” answers out of 29 is his or her transliminality score.
3. Cattell’s 16PF, designed to measure and “identify the primary components of personality,” including five global factors (Russell & Karol, 1994, p. 7).

Apparatus

Ten sets of materials were used in the experiment: (a) an invitation to volunteers; (b) an information sheet; (c) a consent form; (d) an *I Ching* hexagram file, containing an introductory page, a how-to-score page, and the 64 hexagram readings (1 reading per page, totaling 64 pages [Wing, 1982], with the changing line readings on the back of each page [Wing,

⁵ Note that the odd number of participants (viz., $N = 107$) should not raise the suspicion that optional stopping had taken place in the experiment. We decided on purely aesthetic grounds before we began the experiment to test 107 participants with a view to combining them wherever possible with the 1998 sample ($N = 93$), thus yielding an even total of 200 participants.

⁶ Unlike the 1998 study, the 1999 hexagram descriptor form did not contain the actual hexagram symbols because these may have provided cues to participants familiar with the *I Ching*.

1979)]; (e) three coins (Australian 10-cent pieces—75% copper, 25% nickel), a coin cup (for shaking the coins), and a felt-lined box (as a receptacle for the falling coins); (f) a score record sheet for recording coin throws; (g) a “how to generate an *I Ching* hexagram” sheet which are instructions to the principal experimenter (Lance Storm) on how to convert the outcomes of the coin tosses to “yin” and “yang” lines, and whether they were so-called changing lines; (h) an “eight by eight (8×8) trigram matrix” for calculating hexagrams; (i) a debriefing sheet for “hitters”; and (j) a debriefing sheet for “missers.”

Procedure

Once ethics approval was granted from the relevant departmental ethics committee, psychology students were approached to participate in the experiment by way of a written invitation lodged in their pigeonholes in the psychology department. Nonpsychology students placed response slips in a “ballot” box placed in the university library.

At the experimental sessions, participants first read the information sheet and then signed the consent form. The information sheet outlined the general nature of the experiment, describing it in three stages. Participants were instructed to take their time and to start when they felt ready, because there was no time limit. The three stages were as follows.

Part 1: The completion of an *I Ching* hexagram descriptor form, which first gives three introductory questions.

1. Have you ever used the *I Ching* before?
2. Do you think it is possible for at least some people to exhibit paranormal effects in this experiment, by predicting the outcome hexagram or influencing the fall of coins so that the outcome hexagram matches 1 of their 16 choices?
3. Do you believe in your own abilities to exhibit paranormal effects in this experiment, by predicting the outcome hexagram or influencing the fall of coins so that the outcome hexagram matches 1 of your 16 choices?

Question 1 separates the naïve from the sophisticated participants, and Questions 2 and 3 measure the participants’ beliefs about the ostensible paranormal effects involved in the *I Ching* process.

Participants were then required to choose 16 two-word descriptors that they felt to be relevant to their feelings: “Lately, or right now, I feel . . .” These choices were not ranked. Under the watchful eye of Lance Storm and a witness,⁷ each participant then threw three coins six times, recording

⁷ The presence of a witness ensured that accurate recordings of coin throws were made. The witness also certified that no “unsuccessful” coin throws were neglected (and rethrown).

the number of heads and tails of each throw on the score record sheet, from the bottom up, according to the conventions of the *I Ching*.

Each of the six “heads-and-tails” counts was converted to its respective hexagram line, as shown on the how-to-score page of the hexagram file (see Figure 1). A second hexagram was also generated if changing lines were produced from throws of three of a kind. Hexagrams were decoded by Lance Storm, using the 8 × 8 trigram matrix: The bottom three lines and the top three lines each form trigrams, which are collated with each other with the aid of the trigram matrix to form the hexagram.

When the participant and the witness were satisfied that the hexagram(s) had been calculated correctly, they signed and dated the bottom of the score sheet. (N.B.: Lance Storm was also witness to this whole process from the coin-throwing stage to the signing stage.) A “hit” was a match of the participant’s outcome hexagram with 1 of his or her 16 selections, as marked on the hexagram descriptor form, whereas in the case of a “miss” there was no such match.

Part 2: When the *I Ching* component of the experiment was over, participants completed the Transliminality Scale (Form B; Thalbourne, 1998).

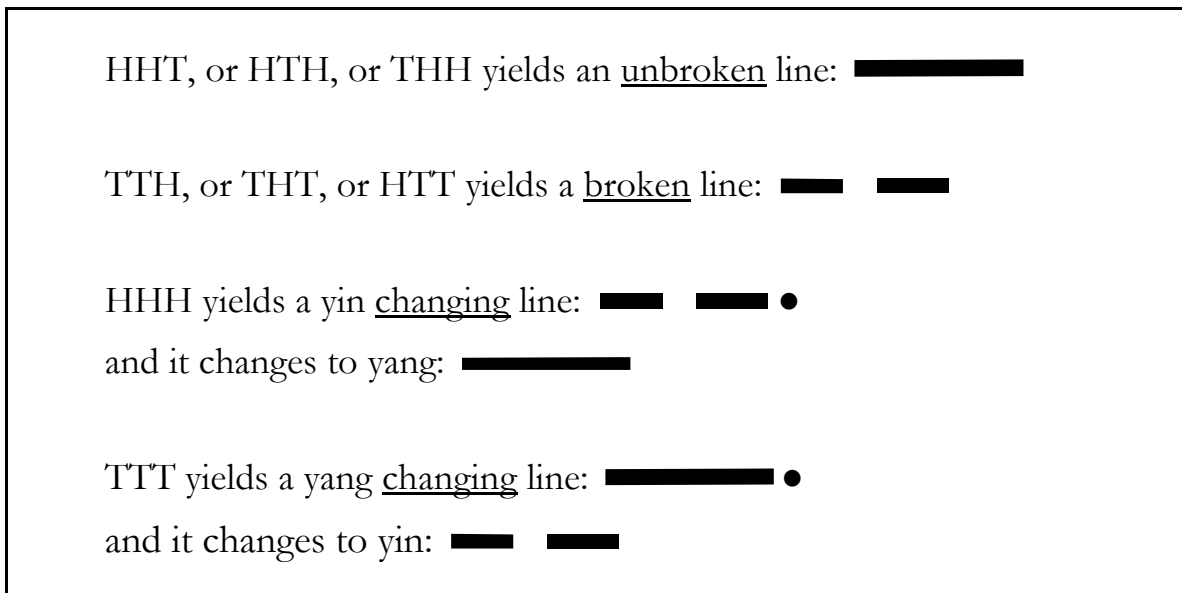


Figure 1. Coins are thrown three at a time, yielding eight possible outcomes. A throw can yield an unchanging line (HHT, HTH, etc.) or, with three of a kind, a changing line (HHH or TTT: Changing lines generate a second hexagram). Each of six lines in total is produced this same way, one line on top of another from the bottom up, thus forming a hexagram. H = heads; T = tails.

Part 3: The 16PF component (Russell & Karol, 1994) was the third and last stage of the experiment. Participants completed this component, and their tasks were thus finished.

During the three stages no feedback was given to participants as to whether they had been successful at the paranormal task (i.e., whether they had generated a hexagram that matched 1 of the 16 chosen on the descriptor form). Neither were participants given performance feedback

or results on the Transliminality Scale or the 16PF. These precautions were taken to eliminate the rival hypothesis that some (or all) of the significant personality correlates with hitting were caused by artifactual responses to 16PF questions as a result of knowledge of success or failure at the paranormal task (e.g., a participant's mood may shift from habitual introversion to temporary extraversion if he or she gets a hit, or he or she might suddenly feel that there is some truth to the paranormal hypothesis after all). The same rival hypothesis would apply to significant correlates of transliminality with hitting and changing lines. (We duly note as well that lack of performance feedback on the psi task might also produce disgruntlement effects on the personality measures.)

Alternatively, a referee argued that normal feedback may be redundant given the possibility that anomalous knowledge of a hit or miss could still have a biasing effect on responses to the test items. Another referee argued that it was conceivable that the choices made on the hexagram descriptor form could affect item responses. We see no way of avoiding all of these potential problems; we merely raise them. As we stated in our previous article (Storm & Thalbourne, 1998–1999, p. 108), there are methodological problems regardless of order of administration of materials and psi task, and we chose to avoid just some of the more pertinent problems, for example, the possible motivational obstacle participants might face when spending 1 hr, on average, on personality testing before the psi task.

Some time after testing, once scores were calculated on both the Transliminality Scale and the 16PF, debriefing sheets (stating “you got a hit” or “you did not get a hit,” transliminality scores, and instructions on how to interpret the 16PF results) were issued to all participants. Included with each debriefing sheet was a copy of the participant's consent form and copies of hexagram readings and changing line readings (if any). Participants were thanked for their participation in the experiment.

RESULTS

Use of, and Attitude toward, the I Ching

Of the total sample of 107 participants, only 16 (15%) had used the *I Ching* prior to the experiment. (Note that none of these previous users had gained that experience as a participant in our [Storm & Thalbourne, 1998–1999] initial run of the *I Ching* experiment. We refer the reader to Appendix B for procedures and results of tests for [a] evidence of cheating on behalf of experienced *I Ching* users and [b] evidence of head–tail bias in the three coins that were used during the hexagram generation procedure.)

Eighty participants (a staggering 75% of the sample) believed that it was “possible” for other people in the sample to achieve a hexagram

outcome matching 1 of the 16 designated on the descriptor form (i.e., to get a hit) by paranormal means, but only 30 participants (28%) believed in their “own [paranormal] abilities” to get a hit.

Parapsychological Hypotheses

Hypothesis 1: Hexagram-Hitting is at a Rate Greater Than MCE When Expressed as a Proportion of Hits ($P_{MCE} = .25$) and as an Effect Size $<$ ($<_{MCE} = .50$). The observed proportion of hits was .35 (a 35% hit rate). The binomial test was significant ($p = .015$). Hypothesis 1 was therefore supported. This proportion translates as an effect size $<$ of .62. A direct significance test of $<$ can also be calculated, because the sample is large ($N = 107$). We used Rosenthal and Rubin’s (1989, p. 334) Formula (4) to calculate a ζ score of 2.51 ($p = .006$, one-tailed). Thus, the effect size $<$ of .62 was significantly higher than the MCE effect size of .50. As far as effect size is concerned, Hypothesis 1 was again supported. The corresponding findings from Storm and Thalbourne (1998–1999, pp. 108–109) and Storm and Thalbourne (in press) were thus replicated.

Hypothesis 2: Hitting for Two Types of Second Hexagram “Hitters” (First Hexagram “Hitters” and First Hexagram “Missers”) is Above Chance for Both Subgroups. Seventy-nine participants generated changing lines and therefore had a second chance of achieving a hit, because changing lines change the first hexagram into one of the 63 remaining hexagrams. Participants ($n_1 = 27$) who threw changing lines, and got a hit on their first hexagram, have 15 chances out of 63 of getting a hit on their second hexagram ($P_{MCE} = .238$). The proportion of second hexagram hits for group n_1 was only .22, which equates to a 22% hit rate ($p = .513$). Thus (as expected), the null hypothesis failed to be rejected. (The reasons for these expectations are given in the DISCUSSION section.)

Participants ($n_2 = 52$) who also threw changing lines, but did not get a hit on their first hexagram, have 16 chances out of 63 of getting a hit on the second hexagram ($P_{MCE} = .254$). The proportion of second hexagram hits for group n_2 was only .29, which equates to a 29% hit rate ($p = .340$). Again (as expected), the null hypothesis failed to be rejected.

Hypothesis 3: There is a Positive Correlation Between Transliminality and Hexagram Hitting. We (Storm & Thalbourne, 1998–1999, p. 108) originally found a positive and significant relation between these two variables, $r(91) = .27$, $p = .010$. In the 1999 study the correlation was positive, but it was not significant, $r(105) = .01$, $p = .479$. Hypothesis 3 was not supported.

Hypothesis 4: There is a Positive Correlation Between Transliminality and Number of Changing Lines. We (Storm & Thalbourne, 1998–1999, p. 110) originally found a positive relation between these two variables, $r(91) =$

.19, $p = .062$. This result, however, was not replicated in the 1999 study: An even weaker, negative, and nonsignificant correlation was found, $r(105) = .004$, $p = .486$. Hypothesis 4 was not supported.

Hypothesis 5: Hexagram Hitting Correlates Positively With Factor F (Liveliness), Factor H (Social Boldness), Factor EX (Extraversion), and Factor IN (Independence) and Negatively With Factor Q₂ (Self-Reliance) and Factor Q₄ (Tension) of the 16PF. There were no significant correlations between hitting and any of the six factors on the 16PF. Thus, Hypothesis 5 was neither generally nor specifically supported. Our previous findings (Storm & Thalbourne, 1998–1999, p. 110), therefore, were not replicated.

Hypothesis 6: Number of Changing Lines Correlates Positively With Factor M (Abstractedness) and Factor Q₂ (Self-Reliance) and Negatively With Factor A (Warmth), Factor C (Emotional Stability), and Factor EX (Extraversion) of the 16PF. Number of changing lines did not correlate significantly with any of the five hypothesized 16PF factors. Thus, Hypothesis 6 was not supported. Therefore, our previous findings (Storm & Thalbourne, 1998–1999, p. 111) did not replicate.

Hypothesis 7: Number of Changing Lines Correlates Positively With Answers to Question 2 (“Possibility”). A suggestively significant correlation was found, $r(105) = .16$, $p = .052$. This result compares favorably with our (Storm & Thalbourne, 1998–1999, p. 111) statistically significant result, $r(91) = .21$, $p = .047$. Thus, participants who believed in the possibility that paranormal phenomena might be involved in the *I Ching* process tended to generate significantly more changing lines than those who did not believe.

Psychological Hypotheses

Hypothesis 8: Transliminality Correlates Positively With Answers to Question 2 (the “Sheep” Question) and With Answers to Question 3 (the “Super-Sheep” Question). Transliminality did correlate positively with Question 2, $r(105) = .41$, $p < .001$. Our (Storm & Thalbourne, 1998–1999, pp. 110–111) post hoc finding was thus replicated: Highly transliminal participants tended to believe in the possibility that a paranormal process might take place during the *I Ching* process.

Transliminality also correlated positively with Question 3, $r(105) = .35$, $p < .001$. Again, our (Storm & Thalbourne, 1998–1999, pp. 110–111) post hoc finding was replicated. Highly transliminal participants tended to believe that their own paranormal abilities might contribute to, or be responsible for, success in the paranormal component of the *I Ching* process.

Hypothesis 9: Answers to Question 2 (the Sheep Question) and Question 3 (the Super-Sheep Question) Correlate Positively With Each Other. Answers to

Question 2 and Question 3 correlated significantly and positively with each other, $r(105) = .32, p < .001$. Hypothesis 9 was therefore supported, and our (Storm & Thalbourne, 1998–1999, pp. 114–115) post hoc finding was replicated. Participants who believed in their own psi ability believed it was possible for other participants in the sample to have psi ability.

Hypothesis 10: Transliminality Scores Correlates Positively With Factor A (Warmth) and Factor M (Abstractedness) and Negatively With Factor G (Rule-Consciousness), Factor TM (Tough-Mindedness), and Factor SC (Self-Control) of the 16PF. Table 1 shows the results for these correlations. Transliminality did not correlate significantly or positively with Factor A but did correlate significantly and positively with Factor M, suggesting that highly transliminal participants tended to be idea-oriented. Transliminality also correlated significantly and negatively with Factor G, Factor TM, and Factor SC. Highly transliminal participants, therefore, tended not to be rule-conscious (Factor G) or tough-minded (Factor TM) and tended to be lacking in self-control (Factor SC).

TABLE 1
CORRELATIONS BETWEEN TRANSLIMINALITY AND 16PF FACTORS

Factor	<i>r</i>	<i>p</i>
M (Abstractedness)	.23	.008
G (Rule-Consciousness)	-.24	.006
TM (Tough-Mindedness)	-.17	.042
SC (Self-Control)	-.15	.062

Note. $N = 107$; p values are one-tailed. 16PF = 16 Personality Factor Questionnaire.

As can be seen in Table 1, this last correlation of transliminality with Factor SC just missed significance. Nevertheless, it can be regarded as “tell[ing] about the same story” (Rosenthal & Rubin, 1979, p. 1165) as our (Storm & Thalbourne, 1998–1999, p. 111) statistically significant result, $r(91) = -.29, p = .005$, because, as Rosenthal and Rubin (1979) claimed, “both results are in the same direction and the studies are of similar size” (p. 1165).

Given the failure of the transliminality–Factor A correlation to replicate, it might be claimed that Hypothesis 10 has been only partially confirmed, and therefore that our (Storm & Thalbourne, 1998–1999, pp. 110–111) findings were only partially replicated. However, we (p. 115) had already acknowledged that multiple analyses could produce chance results. The failed transliminality–Factor A correlation may be such a case, and recent research supports this conclusion: Lange, Thalbourne, Houran, and Storm (2000) performed a top–down purification

procedure on the Transliminality Scale. This procedure identifies and removes any “differential item functioning” (i.e., item bias). They rejected 12 of 29 questions that were biased toward sex and age. When we ran a Pearson’s test again on our previous (1998–1999) sample ($N = 93$) using the Revised Transliminality Scale, Factor A dropped out. It is highly likely that the transliminality/Factor A correlate of the 1998 sample was the one correlation that could be expected by chance alone. (See Storm & Thalbourne [1998–1999, p. 115]; we calculated that there would be an expected 1.1 significant correlations by chance alone given that the null hypothesis is true.)

DISCUSSION

In this discussion we focus on two major questions. The first of these is: Is there any evidence for the operation of the paranormal in this replication experiment? The answer to this question appears to be in the affirmative. The paranormal task was to select, out of 64 hexagram possibilities, 16 descriptor pairs, 1 of which the participant thought would come up when three coins were thrown six times for an outcome hexagram. This hexagram came up on 35% of occasions, as opposed to 25% by chance ($p = .015$). By contrast, hitting on second hexagrams, which was not a set goal for participants, came up at a rate consistent with mean chance expectation.

Although a number of parapsychological hypotheses were tested, making it more likely that a significant outcome might be obtained by chance, the 28% rate of successful analyses on tests for these parapsychological hypotheses substantially exceeds the 5% “success” rate expected by chance (note that we regard the two confirmed predictions in Hypothesis 2 as successes). It must also be said that the overall hitting rate in the 1999 study replicated and indeed exceeded that obtained in the original 1998 study. We may tentatively conclude that a paranormal phenomenon had been demonstrated (although not buttressed by the significant correlations with transliminality or factors from the 16PF that characterized the 1998 study.) These outcomes suggest that the *I Ching* process (as operationalized by us) was underscored by a paranormal process that served the hitting goal of the successful participants (recall that the tests in Appendix B support this conclusion).

The second major question we raise in this discussion concerns the nature of the paranormal effect. If a paranormal process had been demonstrated, then an adherent of the traditional ESP–PK dichotomy might then ask: Is this paranormal effect a case of precognition (in which the successful participant, as it were, looks forward to the outcome of the coin throws and their subsequent decoding) or, instead, is it a case of “blind” psychokinesis, in which the goal of the participant paranormally influences the coins to fall in such a way as to match 1 of the 16

designated descriptor pairs? It is even possible that both processes occurred simultaneously. It seems that there is no way to decide among these three alternatives, not only in the present case, but also in other experiments.

We believe that a new theoretical perspective should be adopted to deal with the ESP–PK dichotomy, a dichotomy that can be unworkable in practice. That perspective is called the *theory of psychopraxia*, from the Greek *psyche*, meaning soul or self, and *prattein*, to accomplish. This theory has been described briefly by Thalbourne (1982), at greater length by Storm and Thalbourne (2000), and most fully in a monograph by Thalbourne (in press-a). The theory emphasizes four fundamental aspects of the task at hand, whether it occurs endosomatically (within the body) or exosomatically (outside the body). We repeat here those four aspects slightly edited).

1. The self, not defined further than that it is inclusive of the “I”—the common denominator of all experience and the co-agent of all action (this description allows for additional agency of the unconscious component of the self).
2. The “pro attitude”: “A person may be said to have a pro attitude towards state **S** when they would prefer **S** rather than $-\mathbf{S}$ [not **S**] if those two alternatives were to be brought to their attention” (Thalbourne, in press-a). Under this heading fall goals, desires, wishes, intentions, needs, preferences, and dispositions, be they conscious or unconscious. Psi missing is also postulated to be the result of a pro attitude, perhaps unconscious, toward obtaining low scores. It is postulated that there is a hierarchy of pro attitudes, and the most potent one wins out. The self is said to “adopt” a pro attitude.
3. The goal-state **S** that is to be brought about, whether in the so-called “mental” sphere or in the “physical” sphere, is irrelevant.
4. The set of intervening necessary conditions mediating between the self and its pro attitude and the goal-state **S**.

Psychopraxia is thus the self bringing about goals in the mind–body complex or in the wider world. “Mind and matter may, in the final analysis, be ontologically different substances (as the Dualists believe), but the more important fact is that from the point of view of the active agent, mind and matter are manipulated in fundamentally the same way” (Thalbourne, in press-a).

In psychopraxia theory it is the case, based on philosophical and terminological grounds, that the paranormal process is seen as unitary in nature, thus rendering the ESP–PK dichotomy redundant. Paranormal achievements are the result of a single process whereby the self with its pro attitude, provided that the relevant necessary conditions are

assembled, initiates the outcome. The theory of psychopraxia sidesteps the ESP–PK debate, deeming it fruitless and counterproductive, and emphasizes the fact that, as for example in the present case, the goal was paranormally achieved (although not achieved in the case of every participant). Psychopractic theory posits that a single, pro-attitude-serving process is at work in such cases. We should emphasize that hits on second hexagrams were not produced to a significant extent, in keeping with the fact that they were not the goal.

We may legitimately ask whose pro attitude is being served: that of the participants or that of Lance Storm (or other interested parties, such as Michael A. Thalbourne, or other parapsychologists). We acknowledge that both of us score highly on the Transliminality Scale and measures of belief in the paranormal, and both transliminality and paranormal belief seem to be conditions conducive to exosomatic psychopraxia. However, at least one theory of which we know (viz., Jung's, 1960, theory of synchronicity) suggests that the participant here may have the dominating pro attitude, because the physical outcome is meaningfully related to the mental (cognitive–emotional) state of that participant. Recall that each participant's choices of possible outcome hexagrams were limited to how he or she felt "lately, or right now," which could be "an all-pervading mood, feeling, emotion, image, or thought which has dominated [his or her] awareness for some weeks, or only today, or only in the last few moments" (from the front page of the *I Ching* hexagram descriptor form). (See Storm's [1999] article, in which he drew similarities between the paranormal and synchronicity.)

It must be conceded that although psychopraxia may be a more parsimonious description of the events involved in the present experiment, the study considered as a single research project throws little or no light on the necessary mediating conditions that must theoretically be involved. Specifically, knowledge of the level of transliminality and of the 16PF factors was of little use in predicting hitting or number of changing lines, and if any of these conditions are necessary then they are certainly only so statistically speaking. However, our conclusion may be changed as a result of a post hoc analysis and a meta-analysis of the 1998 and 1999 studies. Both of these analyses are presented in Part 2 of this article.

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APPENDIX A
I CHING HEXAGRAM DESCRIPTOR FORM

Lately, or right now I feel:

<input type="checkbox"/> Creative, Motivated	<input type="checkbox"/> Adaptable, Helpful	<input type="checkbox"/> Retroactive, Concerned	<input type="checkbox"/> Changeable, Transformed
<input type="checkbox"/> Receptive, Accepting	<input type="checkbox"/> Negligent, Habituated	<input type="checkbox"/> Empowered, Tested	<input type="checkbox"/> Spiritual, Fulfilled
<input type="checkbox"/> Troubled, Disorganised	<input type="checkbox"/> Rejuvenated, Generous	<input type="checkbox"/> Progressed, Open	<input type="checkbox"/> Shocked, Aware
<input type="checkbox"/> Inexperienced, Uneducated	<input type="checkbox"/> Contemplative, Cautious	<input type="checkbox"/> Censored, Compromised	<input type="checkbox"/> Meditative, Peaceful
<input type="checkbox"/> Expectant, Apprehensive	<input type="checkbox"/> Hindered, Provoked	<input type="checkbox"/> Loyal, Dedicated	<input type="checkbox"/> Developed, Awakened
<input type="checkbox"/> Conflicted, Tense	<input type="checkbox"/> Gracious, Idealistic	<input type="checkbox"/> Opposed, Contradicted	<input type="checkbox"/> Subordinate, Disadvantaged
<input type="checkbox"/> United, Organised	<input type="checkbox"/> Crest -fallen, Disabled	<input type="checkbox"/> Obstructed, Threatened	<input type="checkbox"/> Abundant, Accomplished
<input type="checkbox"/> Sociable, Cooperative	<input type="checkbox"/> Renewed, Optimistic	<input type="checkbox"/> Liberated, Delivered	<input type="checkbox"/> Mobile, Seeking
<input type="checkbox"/> Restrained, Disappointed	<input type="checkbox"/> Innocent, Truthful	<input type="checkbox"/> Reduced, Impoverished	<input type="checkbox"/> Gentle, Influential
<input type="checkbox"/> Behavior-oriented, Self-aware	<input type="checkbox"/> Strong, Vital	<input type="checkbox"/> Advantaged, Beneficent	<input type="checkbox"/> Joyous, Generous
<input type="checkbox"/> Prosperous, Fruitful	<input type="checkbox"/> Nurturant, Re -appraising	<input type="checkbox"/> Resolute, Intentional	<input type="checkbox"/> Fragmented, Ego-aware
<input type="checkbox"/> Stagnant, Unassisted	<input type="checkbox"/> Stressed, Challenged	<input type="checkbox"/> Tempted, Seduced	<input type="checkbox"/> Limited, Thrifty
<input type="checkbox"/> Unselfish, Caring	<input type="checkbox"/> Endangered, Unlucky	<input type="checkbox"/> Community-oriented	<input type="checkbox"/> Insightful, Unbiased
<input type="checkbox"/> Supreme, Successful	<input type="checkbox"/> Obligated, Dependent	<input type="checkbox"/> Advanced, Fortunate	<input type="checkbox"/> Conscientious, Conservative
<input type="checkbox"/> Modest, Inhibited	<input type="checkbox"/> Attractive, Liked	<input type="checkbox"/> Oppressed, Exhausted	<input type="checkbox"/> Balanced, Prospective
<input type="checkbox"/> Enthusiastic, Harmonious	<input type="checkbox"/> Steadfast, Matured	<input type="checkbox"/> Wise, Hospitable	<input type="checkbox"/> Hopeful, Reserved

APPENDIX B

PARTICIPANT CHEATING AND COIN BIAS

Two major issues of concern were raised by the journal editor regarding the hexagram generation process: (a) participants cheating by throwing coins appropriately to match designated hexagrams and (b) coin bias. If cheating were possible (and we think it vanishingly unlikely), then it can occur only in the 16 persons who were non-naïve, that is, who had prior experience of the *I Ching*. Supposing that the aim on a given occasion was to match the hexagram “Advantaged, Beneficent” (Hexagram No. 46). As can be seen in Appendix A, there is no hexagram symbol provided to cue the participant. Nevertheless, supposing the participant knew what the hexagram symbol was, namely, (from bottom up) one broken line, followed by two unbroken lines, followed by three broken lines, and was able to cast the coins appropriately, he or she would have to cast in the first instance either three heads or one head and two tails. A similar two-possibility outcome occurs all the way through the five remaining lines. If there is a single error in the six castings, then a completely different hexagram is constructed.

Assuming at least some participants could do this successfully, then one might expect an overall significant sum of hits for the non-naïve group, small though that group is. We have discovered that the hit rate for this group is in fact nonsignificant ($n = 16$, $P = .31$, $p = .370$), whereas the hit rate for the naïve group (whose members were completely ignorant as to how to score the coins) is significant, and higher ($n = 91$, $P = .35$, $p = .017$)! We argue that these results, although not absolutely cogent, are nevertheless inconsistent with the hypothesis of widespread cheating.

As regards the issue of coin bias, it is important to understand that *theoretically* biased coins should not have an effect on yin-line and yang-line outcomes, although testing for biases should proceed anyway (see below). To explain this safeguard of the *I Ching* process, yang lines are generated from coin throws of two heads (H) with one tail (T; i.e., HHT, HTH, or THH). These outcomes come up a total of 37.5% of the time if the coins used are not biased (i.e., $12.5\% \times 3 = 37.5\%$). Yang lines are also generated with coin throws of three tails (i.e., TTT). Note that TTT comes up by chance only 12.5% of the time.

The above situation is reversed if TTH, THT, or HTT are thrown, because these throws generate *yin* lines. For unbiased coins, these three outcomes would also come up 37.5% of the time. Yin lines are also generated with coin throws of three heads (i.e., HHH), which come up by chance only 12.5% of the time. Thus, for all eight possible outcomes the probability outcomes are as follows: 3T (yang) = 12.5%; 2T, 1H (yin) = 37.5%; 1T, 2H (yang) = 37.5%; and 3H (yin) = 12.5%.

But, if, say, the biases in the three coins are toward tails 51% of the time, then the outcomes are as follows: 3T (yang) = 13.27%; 2T, 1H (yin) = 38.23%; 1T, 2H (yang) = 36.73%; and 3H (yin) = 11.77%.

So, even in biased coins, yang lines can be generated 50% of the time (i.e., $13.27 + 36.73 = 50\%$), whereas yin lines can also be generated 50% of the time (i.e., $38.23\% + 11.77\% = 50\%$). The following tests were, nevertheless, conducted to ascertain the validity of the coin throws.

There are six throws of three coins involved in producing a hexagram. Using Friedman's analysis of variance test for all participants' six throws, each throw of which is independent of the other throws, we found no significant differences among the six throws, and this was true for naïve participants, $\chi^2(5, N = 91) = 6.44, p = .265$; non-naïve participants, $\chi^2(5, N = 16) = 1.87, p = .866$; and the total sample, $\chi^2(6, N = 107) = 5.44, p = .365$. Furthermore, using the single-sample t test ($N = 107$) for all six throws combined, we found that the mean number of tails was not significantly above the mean expected by chance ($MCE = 9.00$), $M_{\text{tails}} = 9.32$ ($SD = 2.28$), $t(106) = 1.44, p = .152$, two-tailed.

Given that coin bias can still affect the triple-head (HHH) and triple-tail (TTT) outcomes, which would then have knock-on effects on second hexagram generation, we performed a paired-samples t test to see if there was a significant difference between the number of TTT and HHH outcomes. We split the database into two groups—the “three-tail throwers” and the “three-head throwers”—but there was no significant difference (DIFF.) in their scoring ($M_{\text{HHH}} = .81, M_{\text{TTT}} = 1.11, M_{\text{DIFF.}} = -.30$), $t(78) = -1.85, p = .069$. There was no significant evidence of coin bias.

All testing suggests that the 107 hexagrams generated by six throws of three coins for each participant were not discernably governed biases in any, or all three, of the coins. On balance, we think the hypotheses of cheating and coin bias are unfounded.