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A PARAPSYCHOLOGICAL INVESTIGATION OF THE *I CHING*: THE RELATIONSHIP BETWEEN PSI, INTUITION, AND TIME PERSPECTIVE[1]

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ABSTRACT: Statistical evidence was sought that an anomalous effect might be involved in the ancient Chinese system of divination known as the I Ching. The I Ching user throws 3 coins 6 times, to generate 1 of 64 possible 6-line symbols (or hexagrams) and then consults the associated divinatory reading. Initial studies by Storm and Thalbourne (1998–1999, 2001a) suggest that first-hexagram outcomes can be determined in advance of generating the hexagram to a significant degree above MCE. In the present study, it was theorized that hexagram targeting accords with a person's time perspective. Individuals who have a present time perspective (PTP) focus on immediate events and those who have a future time perspective (FTP) focus on the future. Because intuitive types are said to be future-oriented, it was hypothesized that FTP-types are more intuitive than PTP-types. It was also hypothesized that predicted hexagram outcomes are above chance, there is a relationship between pro attitude and hexagram hitting, and intuition predicts hexagram outcomes. In a sample of mostly university students ($N = 200$), FTP-types were not more intuitive than PTP-types. Hit-rates were above chance on second-hexagram hitting only (not significantly). PTP-types did hit more often on first hexagrams (29%) compared to FTP-types (20%), whereas FTP-types did hit more often on second hexagrams (36%) compared to PTP-types (31%), but the differences were not significant. Intuition scores did not predict hexagram outcomes. Other significant effects were found.

The *I Ching* is a form of divination that hails from ancient China. As a system of divination in book form (containing 64 unique readings), most scholars view the *I Ching* traditionally as a tool for guidance, though many Western users today would see it as a book of predictions (Whinchup, 1986; Wilhelm, 1989). Though the *I Ching* is many thousands of years old, documented evidence exists that it steadily grew in popularity over the centuries, especially from the seventh century BC onward, surviving political chaos and even book burnings in the third century BC because of the importance of divination in the Chinese zeitgeist. In modern times it has gained widespread use throughout the world (Whinchup, 1986).

The *I Ching* has been found to be methodical and well organised. For example, Covello (1977) showed that there was a rationally derived, systematic substructure to the *I Ching*, and he claimed: "One of the more fascinating aspects of the *I Ching* is that it can be viewed as a mathematically ordered cosmology. Its surprisingly systematic structure renders many of its

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assertions amenable to controlled investigation" (p. 115). In the modern era, the user throws three coins six times to generate 1 of 64 so-called hexagrams (six-line symbols) with its associated reading. The reading is said to provide an answer to the user's questions, to give insight into a problem, or even to furnish the user with an ostensible forecast of future outcomes based on conditions in the present. Because the *I Ching* putatively gives such information, the possibility exists that an anomalous process which would primarily reside in the user underlies the *I Ching* process. Jung (1960, 1989) argued that chance is given a free rein in the process and that an acausal principle underlies the outcome, but his claims are driven by certain assumptions made under the rubric of synchronicity theory (see Storm, 1999). It is equally valid to argue that the rules of chance can actually be subverted by intention (conscious or unconscious) so that the effects of chance are reduced. The outcome may then be less coincidental and more "veridical" in nature. That is, the predisposed participant may introduce his or her own influence into the system so that human involvement — the crucial part of the *I Ching* process — might anomalously generate a hexagram that corresponds with a reading of some utility to the user. Thus, the system may be dependent on other than normal processes (i.e., a paranormal or otherwise anomalous process).

Experimentation with the *I Ching* may help establish statistical evidence that an anomalous process might be taking place during the use of the *I Ching* that might, by implication, reflect on the alleged efficacy of this form of divination. As previously stated, this divinatory process has been described as synchronicity (Jung, 1960, 1989) — a paranormal effect involving meaningful coincidence. It has also been described as psychopractic, an overarching term that replaces the terms ESP and PK (Storm & Thalbourne, 2001), because it is difficult to determine whether the *I Ching* effect is produced through precognition (ESP) or anomalous manipulation of the coins (i.e., PK), with or without clairvoyance (ESP).

A number of researchers have investigated the *I Ching* for its possible paranormal component (e.g., Rubin & Honorton, 1971, 1972; Thalbourne, 1994; Thalbourne, Delin, Barlow, & Steen, 1992–1993), and these studies reported mixed results (for a review, see Storm & Thalbourne, 2001). Studies by Storm and Thalbourne (1998–1999, 2001a) looked for relationships between paranormal ability in the *I Ching* "setting" and two dimensions not previously tested in any *I Ching* study: (1) personality (using Raymond Cattell's 16PF questionnaire — see Cattell, Eber, & Tatsuoka, 1970), and (2) transliminality (the tendency of psychological material to cross into or out of consciousness — see Lange, Thalbourne, Houran, & Storm, 2000). Significant hexagram hit rates were found in those studies, as well as predictors of psi (specifically, the so-called "*I Ching* effect") in some of the personality measures and in the transliminality measure, but these effects have not always been replicated (Storm & Thalbourne, 2001; Thalbourne & Storm, in press).

In the *I Ching* study, there is an additional step to the usual *I Ching* method that requires the so-called Hexagram Descriptor Form (Storm & Thalbourne, 2001, Appendix A, p. 121), comprised of 64 two-adjective descriptors (i.e., word pairs) that replace the 64 hexagrams. The task of the participant is to select 16 of the 64 descriptors that correspond to his or her feelings "lately, or right now." The participant then throws three coins six times — a process that is recorded and systematically decoded to produce a hexagram. If this hexagram corresponds to one of the 16 preselected hexagram descriptor-pairs, the outcome is regarded as a "hit." If the outcome hexagram is other than one of those preselected, it is regarded as a "miss."

As mentioned, previous studies (see Thalbourne & Storm, in press, for a review) have given tentative indications that hexagram outcomes can be determined in advance of generating the hexagram. However, second hexagrams might be targeted by participants in accordance with their time perspective (i.e., whether they are focused on the present or on the future). This orientation may determine participants' pro attitudes, or dispositions, toward hexagram outcomes. The first-hexagram reading is past-and-present focused so long as it is not "static" (i.e., not comprised of at least one so-called changing line),[2] whereas the second-hexagram reading (generated from any changing lines in the first hexagram) is future-focused, as is the static-hexagram reading, though static-hexagram readings traditionally concern past, present, *and* future (see Hazel, 1990; Wilhelm, 1989).

Hexagram Hitting

The primary paranormal task in the *I Ching* studies has been to predict or select the outcome hexagrams in advance of generating them. There are two types of hitting — first-hexagram hitting (any of 64 possible outcomes) and second-hexagram hitting, derived from the first hexagram (second hexagrams can only be one of the 63 remaining hexagrams). The binomial (exact) test is used to calculate the proportion correct (i.e., the hit rate) and the p value (a hit is designated "1" and a miss is designated "0"). Hit rates for both types of hexagram hitting in four *I Ching* studies to date are given in Table 6 in the Results section.

As can be seen from Table 6 (first four studies only), three out of four hit rates were above mean chance expectation (MCE) on first-hexagram hitting and five out of eight were above MCE for second-hexagram hitting, but only one of the eight was significant. Of those eight, the three remaining hit rates that were not above MCE were at or below chance (not significantly) — see Study 2 (22%), Study 3 (25%), and Study 4 (23%). In

[2] Changing lines are derived from coin throws of three-of-a-kind — i.e., HHH or TTT. The changing line, as the name suggests, changes a line in the first hexagram from "broken" to "unbroken" or vice versa, thus resulting in a second hexagram (any or all of the six lines in the first hexagram can be changing lines).

total, 8 independent measures of hexagram hitting out of 12 such measures (i.e., 67%) were above MCE ($p = .194$). Thus it was hypothesized for the present study that it is possible to generate above-chance hit rates on first hexagrams and second hexagrams.

It is assumed that psi hitting on first hexagrams is the result of conscious intention and is therefore most likely the consequence of a compliant pro attitude (see Hypotheses 10 and 11). In contrast, Thalbourne and Storm (in press) conjectured that second-hexagram hitting was an exclusively noncompliant effect (unintentional, unconscious, and even a form of displacement) because in previous studies the experimenters were interested only in outcomes on first-hexagram hitting, so second-hexagram hitting was not considered a genuine target and was therefore irrelevant — especially as second-hexagram generation is semidependent on the first-hexagram outcome. Also, as a safeguard against noncompliance (particularly from skeptics) and as a means of circumventing displacement, it has never been part of standard procedure to inform participants about the possibility of targeting second hexagrams. But it is possible that psi hitting on second hexagrams may *also* be indicative of a compliant pro attitude. On the one hand, for those participants who know about second hexagrams from prior use, second-hexagram hitting, insofar as it is an *I Ching* effect, would be conscious and intentional. On the other hand, participants who do not know about second hexagrams may unconsciously and unintentionally use GESP (telepathy/clairvoyance) to find out about them. Because the measures in the present study are all of the self-report type (i.e., explicit) and we do not have measures of the implicit kind, we are not in a position to test any claims about noncompliance, unconscious motives, or unintentional effects. We will merely assume that significantly above-chance hitting on first and second hexagrams are forms of psi (*I Ching* effects) underscored by some kind of pro attitude that is measurable to the degree that it is conscious (hence, Hypotheses 10 and 11).

Predicting Hexagram Outcomes

Zimbardo's Time Perspective Inventory and the Singer-Loomis (1996) Type Deployment Inventory. Historically, psi in the lab is usually a weak effect and in the *I Ching* process where there can be two outcome hexagrams, the number of outcome hexagrams that a participant can paranormally target (consciously or unconsciously) and produce in any given trial may be delimited by the nature of the psi process. This "economy" of psi possibly explains Thalbourne and Storm's (in press) result in which there was a lower than usual hit rate on first hexagrams (not significantly below MCE) and corresponding relatively higher hit rates on second hexagrams (above MCE in one case, but not significantly). The question that needs answering is: "If there has to be a choice between hexagrams, can (and do) participants prefer one over the other?" In this article, an answer to that question is sought. By tradition, the first-hexagram reading is past-and-present-focused (except for static hexagrams, which are to a minor degree past-and-present-focused but mainly future-focused), but the second hexagram reading (generated from changing lines found in the first hexagram) is purely future-focused. If PTP-types and/or "low-intuitive" types are focused on immediate events whereas FTP-types and/or "high-intuitive" types are interested in what fate has in store for them, it was proposed that inventory scores that identify these types might serve as predictors of hexagram outcomes.

Scales used in this study are the Singer-Loomis (1996) Type Deployment Inventory (SL-TDI), which is based on Jung's (1987) personality types (and thus includes two subscales that measure Intuiting), and Zimbardo's (Zimbardo & Boyd, 1999) Time Perspective Inventory (ZTPI), which provides categories for understanding time perspectives and their psychological ramifications. Zimbardo has found that those with a present-time perspective (PTP) — so-called "present-minded" individuals — can be hedonistic or fatalistic and tend to be focused on immediate events whereas those with a future-time perspective (FTP) live in a world of abstraction and ideals and tend to be more interested in what the future has in store for them. Thus, it was proposed that time perspective may influence hexagram outcomes because a participant's interest in the present or the future may predispose him or her to paranormally target present- or future-oriented information in the form of a much needed or desired *I Ching* reading. It was also proposed that Intuiting subscale scores on the SL-TDI are related to these time perspective types and that Intuiting scores might predict hexagram outcomes. The ZTPI has not yet been used to predict paranormal processes. It was hypothesized that PTP-types and "low-intuitive" people hit more often on first hexagrams that have changing lines than do FTP-types and "high-intuitive" people, who are hypothesized to hit more often on second hexagrams and static hexagrams (no changing lines).

The Pro Attitude Scale. The Pro Attitude Scale (PAS; Thalbourne & Storm, in press) measures participants' pro attitudes towards a given task outcome. A favourable pro attitude is said to be necessary to achieve a desired outcome (Storm & Thalbourne, 2000), and there is some evidence that PAS scores predict hexagram outcomes (Storm, 2003). Specifically, Storm (2003) found that PAS scores (Items 4 and 5 only) correlated negatively with first-hexagram scores, $r(30) = -.31$, $p = .042$, one-tailed. The reason for this somewhat counterintuitive finding has to do with Heath's (2003) observation that the attitude of those successful at psi tasks "seemed to be one of caring about what happened combined with trust that things would work out as they should" (p. 303). As was surmised by Storm (2003):

> We might expect that the more participants shift from "some interest" to thinking a hit was "very important," the

> less we might expect them to hit. It was hypothesised that, as long as participants have *some interest* in getting a hit, but they do not think that it is *very important* either, there is a negative relationship between pro attitude and the *I Ching* effect. That is, the strongest overall hitting effects are likely to be found in those who merely trust in the process, rather than care too much. (pp. 148–149)

In order to eliminate the effect of extreme scores, which represent extreme attitudes (i.e., caring too much or caring too little), Storm (2003) used only midrange scores (i.e., scores of 3, 4, and 5). Storm's (2003) finding of a significant negative relationship between the two-item PAS score and hexagram hitting thus indicates that the more participants tended to shift from "some interest" in getting a hit to thinking a hit was "important," the less they tended to hit. This finding is exactly what we would expect according to Heath's theory. The same effect is sought in the present study.

The Australian Sheep-Goat Scale. The Rasch-scaled (Lange & Thalbourne, 2002) version of the Australian Sheep-Goat Scale (ASGS; Thalbourne, 1995) replaces the two belief questions that have historically accompanied the cover sheet of the *I Ching* Hexagram Descriptor Form because it is a more accurate measure of paranormal belief. ASGS scores may predict psi success (specifically hexagram hitting) because the relationship between paranormal belief and success at psi tasks is a reasonably consistent one (see Lawrence, 1993). Depending on the results of the hypotheses (Hypotheses 8 and 9), data will be analysed (post hoc) for a sheep-goat effect.

Hypotheses

The following hypotheses were proposed:

H1. PTP-types have lower Intuiting scores than FTP-types.
H2. First-hexagram hitting is at a rate greater than MCE.
H3. For those who are first-hexagram "hitters," second-hexagram hitting is at a rate greater than MCE. For those who are first-hexagram "missers," second-hexagram hitting is at a rate greater than MCE.
H4. Present-time perspective types (i.e., PTP-types) correctly predict more first hexagrams (excluding static hexagrams) than types with a future-time perspective (i.e., FTP-types).
H5. FTP-types correctly predict more second hexagrams than PTP-types.
H6. Those with "low-Intuiting" scores correctly predict more first hexagrams (excluding static hexagrams) than those with "high-Intuiting" scores.
H7. Those with "high-Intuiting" scores correctly predict more second hexagrams than those with "low-Intuiting" scores.

H8. There is a positive relationship between paranormal belief and first-hexagram hitting.
H9. There is a positive relationship between paranormal belief and second-hexagram hitting.
H10. There is a negative relationship between pro attitude and first-hexagram hitting.
H11. There is a negative relationship between pro attitude and second-hexagram hitting.

Method

Participants

Two hundred participants from the population of University of Adelaide students volunteered to participate in the study. There were 76 males (38%) and 124 females (62%). Average age was 22 years (SD = 7 years). Based on previous findings, this many participants would be needed to ensure a reasonable chance of significant results given the smallest subgroup used (i.e., second-hexagram hitters); second hexagrams are produced by approximately 75% of participants (n = 150).

Measures

(1) Thalbourne and Storm's (in press) eight-item Pro Attitude Scale (with two items, numbers 4 and 5, specifically about pro attitude. Items use a graduated scale ranging from 1 to 7 — for example, Item 4: "I'm not at all interested in achieving my assigned goal" [score = 1] to "I'm extremely interested in achieving my assigned goal" [score = 7]; Item 5: "It's not at all important to me that I achieve my assigned goal" [score = 1] to "It's of utmost importance to me that I achieve my assigned goal" [score = 7]. The remaining six items — 1, 2, 3, 6, 7, and 8 — are about various motivations. Scale descriptive statistics reported in the Results section are based on the use of scores of 3, 4, and 5 only (extreme scores of 1, 2, 6, and 7 were excluded for reasons given in the above section, Predicting Hexagram Outcomes). Thus, the theoretical range for the two-item scale is between 3 and 10 inclusive. (2) Lange & Thalbourne's (2002) Rasch-scaled Australian Sheep-Goat Scale (ASGS; 18 items, each scoring 0, 1, or 2 points, where 0 = false, 1 = uncertain, and 2 = true; Raw range is 0 to 36; Raw M = 18). The ASGS data are then top-down purified to eliminate age and gender bias from the scale (Lange & Thalbourne, 2002), and this procedure alters the scoring range and mean. The Rasch-scaled theoretical range is 8.13 to 43.39, and the Rasch-scaled theoretical mean is 25.51; Cronbach's alpha = .92. (3) The *I Ching* Descriptor Form (see Storm & Thalbourne, 2001, p. 121). (4) The Singer-Loomis (1986) Type Deployment Inventory (TDI; Extraverted Intuiting [EN] and Introverted

Intuiting [IN] subscales only). The theoretical range for both scales is between 20 and 100 inclusive. Cronbach's alpha is .73 for both EN and IN (Kirkhart & Kirkhart, 1998, p. 7, Table 1). (5) Zimbardo and Boyd's (1999) Time-Perspective Inventory. There are five ZTPI scales: (i) Past Negative (PN), (ii) Past Positive (PP), (iii) Present Hedonistic (PH), (iv) Present Fatalistic (PF), and (v) Future (F). The theoretical range for all five scales is between 1 and 5 inclusive. For the five scales, Cronbach's alpha ranges from .74 to .82, and test-retest reliability ranges from .70 to .80 (interval: 4 weeks). Only the two PTP scales and the single FTP scale were used to test three relevant hypotheses (i.e., Hypotheses 1, 4, and 5). Participants were assigned to a time perspective category (i.e., PTP or FTP) on the basis of scale scores (i.e., if F scores were greater than PH or PF scores, participants were classed as FTP-types, otherwise participants were classed as PTP-types).

Procedure

Participants first completed two of the four scales (i.e., PAS and ASGS). Participants then preselected 16 of 64 descriptor pairs that epitomize the meanings underlying the corresponding six-line symbols (i.e., hexagrams). Participants' choices are made in response to their emotional and cognitive states of mind, in accordance with the statement: "Lately, or right now, I feel . . ."

Participants then threw three coins six times to generate the six lines of the first hexagram. The coins may show three-of-a-kind on some occasions, and these throws produce changing lines, which partially generate the second hexagram (unchanging lines in the first hexagram remain the same in the second hexagram). If the first hexagram matches 1 of the 16 preselected hexagrams it is deemed a "hit" (MCE = 16/64 = 1/4 = .250), and if the second hexagram matches 1 of the 16 preselected hexagrams it is also deemed a hit. Those participants who already obtained a hit on their first hexagram have a reduced chance of getting a hit on the second hexagram (P_{MCE} = 15/63 = .238), but those participants who did not get a hit on their first hexagram have a slightly better chance of getting a hit on their second hexagram (P_{MCE} = 16/63 = .254).[3] The effect size measure for hexagram hitting is π, where $\pi = P(k-1)/[1 + P(k-2)]$, P is the proportion of hits correct, and k is the number of choices (see Rosenthal & Rubin, 1989, pp. 332–334). Bem and Honorton (1994, p. 8) point out

[3] Out of a total of 64 hexagrams, 16 are preselected by the participant. If one of the 16 is a hit, there are 15 left that could also be a hit, but only 63 chances left of getting a second hit because it is impossible for the first hexagram to be regenerated (changing lines change the first hexagram to a new hexagram). The probability of a hit is 15/63. If one of the 16 is not a hit the first time, then all 16 go back into the draw, so to speak, for a second chance. As before, the first hexagram that came up (even though not a hit) cannot be regenerated, so the whole pool of available hexagrams is still 63 but the probability of a hit is slightly improved to 16/63.

the advantage this measure has in providing a "straightforward intuitive interpretation" of the effect size, because π is the "proportion correct, transformed to a two-choice standard situation" so that while $P_{MCE} = .25$, the effect size $\pi_{MCE} = .50$ (Rosenthal & Rubin, 1989, p. 333). Note that π values calculated from second-hexagram hit-rates are estimates. Participants were not to be told whether their first hexagram was a hit.

Finally, participants completed the remaining two of the four scales (i.e., SL-TDI and ZTPI).

Precautions

The *I Ching* study requires certain precautions so that undesired effects are reduced or eliminated. The major precaution is the use of individual testing as opposed to group testing, which is deemed not conducive to psi (see Storm, 2002). Also, administration of the PAS and the ASGS was *prior to* the psi task so that the procedure and process of the I Ching task did not influence responses to the pro attitude and paranormal belief items. The lengthy SL-TDI and ZTPI measures were administered *after* the psi task to eliminate the problem of possible fatigue and boredom effects during the psi task (no hexagram feedback was given to participants prior to completion of the SL-TDI and the ZTPI as such feedback might influence responses to those inventories).

Methods of Evaluation

Raw data were analysed statistically using SPSS (*Statistical Package for the Social Sciences*) and the online *VassarStats* Exact Binomial Calculator (Lowry, 1998–2006). Statistical testing procedures included Pearson's r and the independent samples t test.

Results

Scale Scores

Pro Attitude Scale. The eight-item PAS is a test of pro attitude and general motivation toward the psi task. As well as "importance of" and "interest in" a paranormal effect (Items 4 and 5, respectively), which tests pro attitude, the eight-item scale covers various states of mind: relaxation (Item 1), tension (Item 2), general capacity to achieve goals (Item 3), confidence (Item 6), task know-how (Item 7), and focus on the task (Item 8). (Note that these six items will not be analysed in the present study, but it is planned to use that data in a followup article.) The mean two-item PAS score was 6.58 ($SD = 2.40$).

Australian Sheep-Goat Scale (ASGS). The Mean ASGS (Rasch-scaled version) score was 24.99 ($SD = 5.89$; min. = 8.13; max. = 43.39). Note that these sample minimum and maximum scores are the same as the theoretical minimum and maximum scores, respectively.

Singer-Loomis Type Deployment Inventory (SL-TDI). The Mean Intuiting scores were: Extraverted Intuiting, $M = 62.12$ ($SD = 8.14$; min. = 44; max. = 87; Cronbach's alpha = .60); Introverted Intuiting, $M = 64.69$ ($SD = 8.87$; min. = 34; max. = 90; Cronbach's alpha = .69). These alpha values are considerably lower than those reported by Kirkhart and Kirkhart (1998). On average, the sample was introverted — the difference between EN and IN scores was significant, paired-samples $t(199) = -4.48$, $p < .001$ (two-tailed). Median-split scores were calculated (EN = 62; IN = 65), and the sample was subsequently divided into low-Intuiting extraverts (scores < 62) and high-Intuiting extraverts (scores < 62), and low-Intuiting introverts (scores < 65) and high-Intuiting introverts (scores ≥ 65) scorers.

Zimbardo and Boyd Time Perspective Inventory (ZTPI). The mean PH score was 3.60 ($SD = 0.52$; min. = 1.93; max. = 5.00; Cronbach's alpha = .79); the mean PF score was 2.68 ($SD = 0.58$; min. = 1.22; max. = 4.22; Cronbach's alpha = .66); the mean F score was 3.33 ($SD = .56$; min. = 1.46; max. = 4.92; Cronbach's alpha = .76). (Though the PN and PP scales are not used, the Cronbach's alphas for PN and PP were .76 and .74, respectively.) There were 128 PTP-types, and 72 FTP-types.

Planned Analyses

Hypothesis 1. On the Extraverted Intuiting measure, the mean score for PTP-types, M = 63.54 ($SD = 8.24$), was not lower than the mean score for FTP-types, M = 59.60 ($SD = 7.36$). On the Introverted Intuiting measure, the mean score for PTP-types, M = 65.60 ($SD = 8.55$), was not lower than the mean score for FTP-types, M = 63.25 ($SD = 9.30$).

Hypothesis 2. First-hexagram hitting was not greater than chance (where $P_{MCE} = .25$), $P = .24$ (48 hits out of 200), exact $p = .654$. The effect size π is used to measure the strength of the effect for all hexagram outcomes. When expressed as an effect size π, first-hexagram hitting was not above MCE either, $\pi = .49$. where $\pi_{MCE} = .50$.

Hypothesis 3. (1) For first-hexagram hitters, second-hexagram hitting was greater than chance (where $P_{MCE} = .238$), but the hit rate was not significant, $P = .33$ (13 hits out of 40), exact $p = .135$, effect size $\pi = .60$, where $\pi_{MCE} = .50$. (2) For first-hexagram missers, second-hexagram hitting was also greater than chance (where $P_{MCE} = .254$), but the hit rate was not significant, $P = .30$ (34 hits out of 113), exact $p = .150$, effect size $\pi = .56$, where $\pi_{MCE} = .50$.

Hypothesis 4. Table 1 shows that PTP-types (29%) successfully predicted more first hexagrams (excluding static hexagrams) than FTP-types (20%), but the difference was not significant, $t(151) = 1.20$, $p = .116$, one-tailed.

TABLE 1
FIRST-HEXAGRAM HIT RATES: PRESENT-TIME PERSPECTIVE (PTP) VERSUS FUTURE-TIME PERSPECTIVE (FTP)

Time perspective type	*N*	Hits	*P**	Exact *p*	π**
PTP (excluding static hexagrams)	99	29	.29	.191	.55
PTP (including static hexagrams)	128	32	.25	.534	.50
FTP (excluding static hexagrams)	54	11	.20	.826	.43
FTP (including static hexagrams)	72	16	.22	.748	.46

* $P_{MCE} = .25$; ** $\pi_{MCE} = .50$

Hypothesis 5. Table 2 shows that FTP-types (first-hexagram hitters only) did correctly predict more second hexagrams (hit rate: 36%) than PTP-types, whether the PTP-types were first-hexagram *hitters* (31%) or *missers* (30%). The difference on second-hexagram hitting between FTP-types (first-hexagram hitters) and PTP-types (first-hexagram hitters) was not significant, $t(38) = -0.31$, $p = .378$, one-tailed, and the difference on second-hexagram hitting between FTP-types (first-hexagram hitters) and PTP-types (first-hexagram missers) was also not significant, $t(79) = -0.42$, $p = .338$, one-tailed.

Hypothesis 6. Table 3 shows that low-Intuiting extraverts did *not* correctly predict more first hexagrams (excludes static hexagrams) than high-Intuiting extraverts. As the hypothesis is one-tailed, the difference was not tested.

TABLE 2
SECOND-HEXAGRAM HIT RATES: PRESENT-TIME PERSPECTIVE VERSUS FUTURE-TIME PERSPECTIVE

Time perspective type	*N*	Hits	*P**	Exact *p*	π**
PTP (excluding static hexagrams)	99	29	.29	.191	.55
PTP (including static hexagrams)	128	32	.25	.534	.50
FTP (excluding static hexagrams)	54	11	.20	.826	.43
FTP (including static hexagrams)	72	16	.22	.748	.46

* $P_{MCE} = .238$; ** $P_{MCE} = .254$; † Values of π are approximate and based on $\pi_{MCE} =$ 50.

If data for static hexagrams are included in the counts, low-Intuiting extraverts correctly predicted *more* first hexagrams (26%) than high-Intuiting extraverts (23%), but this result runs counter to the theory proposed about static hexagrams (see Table 3).

Table 3 shows that low-Intuiting introverts did correctly predict more first hexagrams (31%; excluding static hexagrams) than high-Intuiting introverts (22%; excluding static hexagrams), but the difference was not significant, $t(198) = -0.93$, $p = .177$, one-tailed.

TABLE 3
FIRST-HEXAGRAM HIT RATES: "LOW-INTUITING" VERSUS "HIGH-INTUITING"

Personality type	n	Hits	P*	π**
Low-intuiting extraverts (excluding static hexagrams)	73	20	.21	.44
Low-intuiting extraverts (including static hexagrams)	99	25	.26	.51
High-intuiting extraverts (excluding static hexagrams)	80	20	.25	.50
High-intuiting extraverts (including static hexagrams)	101	23	.23	.47
Low-intuiting introverts (excluding static hexagrams)	72	22	.31	.57
Low-intuiting introverts (including static hexagrams)	96	26	.27	53
High-intuiting introverts (excluding static hexagrams)	81	18	.22	.46
High-intuiting introverts (including static hexagrams)	104	22	.21	.44

* $P_{MCE} = .25$; ** $\pi_{MCE} = .50$

Again, if data for static hexagrams are included in the counts, low-Intuiting introverts correctly predicted more first hexagrams (27%) than high-Intuiting introverts (21%), but this result also runs counter to the static hexagram theory.

Hypothesis 7. Table 4 shows that high-Intuiting extraverts did *not* correctly predict more second hexagrams than low-Intuiting extraverts. The table also shows that high-Intuiting introverts did *not* correctly predict more second hexagrams than low-Intuiting introverts.

TABLE 4
SECOND-HEXAGRAM HIT RATES: "LOW-INTUITING" VERSUS "HIGH-INTUITING"

Personality type	n	Hits	P*	$\pi^{\dagger}$
Low-intuiting extraverts	73	26	.36	.63
High-intuiting extraverts	80	21	.26	.51
Low-intuiting introverts	72	23	.32	.58
High-intuiting introverts	81	24	.30	.56

† Values of π are approximate and based on $\pi_{MCE} = .50$.

Hypothesis 8. The relationship between paranormal belief (ASGS scores) and first-hexagram hitting was positive, though very weak and not significant, $r(198) = .10$, $p = .090$, one-tailed.

Hypothesis 9. A positive relationship was found between paranormal belief (ASGS scores) and second-hexagram hitting, but it was weak and not significant, $r(151) = .08$, $p = .163$, one-tailed.

Hypothesis 10. A very weak negative relationship was found between pro attitude (PAS scores on the two-item PAS scale) and first-hexagram hitting, but it was not significant, $r(130) = -0.02$, $p = .416$, one-tailed. The hypothesis was not supported.

Hypothesis 11. The relationship between pro attitude and second-hexagram hitting was weak and negative, and it *was* significant, $r(100) = -.20$, $p = .021$, one-tailed. The hypothesis was supported. Second-hexagram hitting tended to occur among those with *low* scores on pro attitude (i.e., hitting tended to occur if there was "some interest" but no great "investment" in the outcome).

Only one participant who had used the *I Ching* previously scored a second-hexagram hit, so that the hit rate for second-hexagram hitting was an effect produced almost entirely by nonusers (i.e., those unfamiliar with the *I Ching*).

Post Hoc Analyses

Static hexagrams. It should be pointed out that the tested differences in hit rates on first-hexagram hitting between PTP-types and FTP-types (see test results for Hypothesis 4) did not include static hexagrams, but hitting on static hexagrams should be taken as some form of paranormal outcome resulting from time perspective. It is argued that static hexagrams should be included in the count for second hexagrams on the assumption that static-hexagram readings are mainly future-oriented, as if serving a proxy function similar to second-hexagram readings. Thus, hit rates for future-oriented hexagrams are given in Table 5, which is a modified version of Table 2 but which includes static hexagrams. Note that the p values for the various hit rates are not given in the table as these would be meaningless because the various test statistics (P_{MCE}) for each kind of hitting are incommensurable.

Table 5 shows that when static hexagrams were included in the counts, the hit rate on future-oriented hexagrams is 32% for FTP-types and 26% for PTP-types. These outcomes are in the expected directions, but the difference between the two hit rates is not significant, $t(198) = 0.60$, $p = .548$, one-tailed.

Median-split analyses on ASGS scores. Given the near-significant outcome of the test of Hypothesis 8 (on first-hexagram hitting) and given that the sheep-goat variable is a consistent predictor of psi hitting, a median-split analysis was conducted to determine first-hexagram hit rates for sheep and goats under the assumption that sheep scored more hits than goats. The median score for the ASGS was 25.51. "Low-scorers" or goats (n = 95) scored below 25.51 (Mean = 20.55, SD = 4.36), and "high-scorers" or sheep (n = 105) scored at or above 25.51 (Mean = 29.00, SD = 3.85). Sheep (30 hits; 29%) did score more hits than goats (18 hits; 19%), and the two hit rates were significantly different, $t(198) = 1.60$, $p = .05$, one-tailed.

TABLE 5

HIT RATES FOR SECOND HEXAGRAMS + STATIC HEXAGRAMS: PTP-TYPES VERSUS FTP-TYPES

Time perspective	N	Hits	P	$\pi^{\dagger}$
PTP — 1st-hexagram-hitters	29	9	.31	.57
PTP — 1st-hexagram-missers	70	21	.30	.56
PTP — static hexagrams	29	3	.10	.25
Subtotal	128	33	.26	.51
FTP — 1st-hexagram-hitters	11	4	.36	.63
FTP — 1st-hexagram-missers	43	13	.30	.56
FTP — static hexagrams	18	6	.33	.60
Subtotal	72	23	.32	.58
Total	200*	56	.28	.54

Note: All static hexagrams + all second hexagrams = total number of participants in the sample (N = 200) because number of second hexagrams = number of first hexagrams with changing lines. † Values of π are approximate and based on π_{MCE} = .50.

Decline effects. Declines in *I Ching* effects were suspected toward the end of testing the sample. Initially, on the one hand, student volunteers came from a variety of disciplines and year-levels — they completed volunteer slips, deposited them in a "ballot box" in the university library, and were subsequently contacted to arrange a time and date for attendance. On the other hand, the School of Psychology offers credit to first-year psychology students (a 5% contribution to their overall grade) for participation in any experiments conducted by researchers within the school. Although motivation seemed adequate at first,[4] perhaps on account of the fact that the sample was primarily comprised of ballot-box participants (i.e., genuine volunteers), the experimenter suspected that the motives of the first-year psychology students — especially toward the end of the academic year — were dubious to say the least. Many of these students were probably stressed because they had assignments due or upcoming exams. Nevertheless, they also wanted the 5% credit so they did not stay away.

By the end of the year, it was suspected that an *I Ching* decline effect (first-hexagram hitting only) might have resulted from a decline in

[4] See Stanford (1977) for a review on motivation in parapsychology.

motivation — the obtaining of credit by "late-comer" first-year psychology students seemed to supersede any desire or interest in producing a paranormal effect. Not having cause to anticipate decline effects at the start of the study, the experimenter participated in the school's credit program, which involved testing students who made on-line bookings with the experimenter. Students had booked many weeks in advance in most cases, so their requests to participate could not be denied. Due to a shortfall in numbers toward the very end of testing, more ballot-box participants were sought, but these more desirable types later proved to be too few in number to make a difference in experimental outcomes. A comparison between the two types of participants was not possible because online bookings were tabulated in advance in weekly online diaries, which have long since been deleted by the School of Psychology (the School does not keep these records after they have fulfilled their purpose). There was therefore no possibility, at a later date, of distinguishing ballot-box students from "online" students.

To test for the two-fold possibility of (1) a decline in *I Ching* effects, and (2) a decline in motivation, the sample was first divided into four groups of 50 participants each. The hit rates on first hexagrams for the four groups were 30%, 24%, 22%, and 20%, respectively, indicating a decline, though the group difference was not significant when the data were tested using a linear trend ANOVA, $F(1, 196) = 1.39$, $p = .120$, one-tailed. Nevertheless, this ostensibly "chance-like" decline confirms the experimenter's suspicions. Though the group effect was not significant, it would have been sufficient in itself to bring about a nonsignificant hit rate on first-hexagram hitting.[5]

The general attitude of first-year psychology participants toward the paranormal task (i.e., their motivation) was assumed to be psi-inhibitive. It was conjectured post hoc that the full eight-item PAS might be used to test general motivation as pro attitude also indicates motivation (e.g., Item 6, "I am not confident that I will achieve my assigned goal" [score = 1] to "I am confident that I will achieve my assigned goal" [score = 7]; Item 8, "I am not thoroughly focussed on the task at hand" [score = 1] to "I am thoroughly focussed on the task at hand" [score = 7]). There was a decline in mean motivation scores (43.02, 42.42, 41.82, and 41.76) across the four groups, but again the group difference was not significant when the data were tested using a linear trend ANOVA, $F(1, 196) = 1.45$, $p = .115$, one-tailed.

Cumulative record. To bring the *I Ching* cumulative record up to date, it is noted that first-hexagram hitting across the five *I Ching* studies ($N = 643$; 171 hits) is above chance, $P = .27$ (exact $p = .187$, one-tailed; $\pi = .53$). Second-hexagram hitting for first-hexagram hitters ($n = 138$; 40 hits) is also above chance, $P = .29$ (exact $p = .094$, one-tailed; $\pi = .55$), as is second-hexagram hitting for first-hexagram missers ($n = 371$; 100 hits), P

[5] Note that modeling a first-hexagram hit rate on a theoretical P value of 30% (the hit rate for the first of the four groups, $N = 50$) yields $p = .06$ ($N = 200$), which approaches significance.

TABLE 6
HEXAGRAM HIT RATES FOR THE FIVE STUDIES ($N = 643$)

Study	1st Hexagrams				2nd Hexagrams (1st hexagram hitters)				2nd Hexagrams (1st hexagram missers)			
	N	Hits	% [a]	p	n	Hits	% [b]	p	n	Hits	% [c]	p
1. Storm & Thalbourne (1998–99)	93	30	32	.070	27	9	33	.173	52	15	29	.333
2. Storm & Thalbourne (2001)	107	37	35	.017	27	6	22	.649	52	15	29	.333
3. Storm (2002)	43	11	26	.523	7	2	29	.525	28	7	25	.383
4. Thalbourne & Storm (in press)	200	45	23	.815	37	10	27	.383	126	29	23	.761
5. The present study	200	48	24	.654	40	13	33	.135	113	34	30	.150
Totals	643	171	27	.187	138	40	29	.094	371	100	27	.263

Note: p values are exact [a] $P_{MCE} = .250$; [b] $P_{MCE} = .238$; [c] $P_{MCE} = .254$

= .27 (exact p = .263, one-tailed; π = .53). See Table 6 for other results. The cumulative record also shows that 10 independent measures of hexagram hitting out of 15 (67%) were above chance (p = .151).

Discussion

Hexagram Hitting

It is clear from the planned analyses that the majority of the hypothesized effects, though in the right direction, were not statistically significant. It was hypothesized (post hoc) that decline effects may explain some of the nonsignificant results, if not all, but there was no statistical evidence in the two linear trend ANOVAs. Should an experimenter be the type who not only keeps an eye on his/her data but also on participants, and there *is* a suspicion of decline effects in motivation and/or paranormal effects, the only way of avoiding these effects is to withhold from testing participants (usually students) during demanding periods of the academic year. Unfortunately, any other form of selection management (e.g., turning away participants on the basis of the experimenter's perception/assumption of poor attitudes) may be unethical, offensive to students, and impractical for the experimenter. Nevertheless, it was hypothesized that appropriate motivation (and positive attitude in general) may be a key factor conducive to *I Ching* effects, so these issues are key.

In the present study, *I Ching* effects were generally too weak overall, or the subsamples were too small, for the tests to produce significant results, but it may still be too early to state with certainty how strong the effects actually are in the population, as the sample included a significant number of introverted students (not renowned for producing psi in the lab) who may also have had ulterior motives. Ertel (2005) refers to the need for experimenters to "unravel motives" (p. 153) of students, and such unravelling will be another key issue of parapsychological research in the future. Until safeguards are implemented to ensure that students enter into an experiment with appropriate motives, consequent declines in psi effects may always be present. Notwithstanding lack of knowledge about the strength of the *I Ching* effects, it is certain (all things being equal), that even if the individual effects remain as weak as they currently appear to be, they will eventually reach significance anyway (given a sufficiently large N in the cumulative record), assuming they are real effects (i.e., not the consistent effect of Type I error).

Time Perspective

Regarding the other findings (see test results for Hypotheses 4 and 5), there is no statistical evidence that PTP-types prefer *I Ching* readings that are to be read in the context of the present time, nor that FTP-types prefer readings that are to be read in the context of how things will turn out. An important observation to be made here is that the hit rate for PTP-types *declined* when static hexagrams were included, whereas the hit rate for FTP-types actually *increased* when static hexagrams were included (see Table 1). Recall that static-hexagram readings are to be read in the context of the future, so that static hexagrams should be preferred by FTP-types and avoided by PTP-types. Overall, this four-fold finding is in keeping with the experimenter's expectations.

Intuition

No claims can be made for intuition as a predictor of hexagram outcomes either (see test results for Hypotheses 6 and 7). In spite of these discouraging outcomes, an unexpected trend emerged in the data — hit rates on first hexagrams for high-Intuiting types (extraverts *and* introverts) *decreased* when static hexagrams were included (the opposite effect of which was found for FTP-types), whereas hit rates *increased* for low-Intuiting types (extraverts only) when static hexagrams were included (the opposite effect of which was found for PTP-types; see Table 3). Therefore, the hypothesized directional effects failed to be confirmed in three out of four analyses, but these results are not unexpected given the outcomes of Hypothesis 1, which now seem unsurprising since high-Intuiting types tend to be PTP-types rather than FTP-types (as hypothesised), or put another way, low-Intuiting types tend to be FTP-types (see results for Hypothesis 1). We might therefore have expected (1) hit rates for high-Intuiting types to mirror those of PTP-types, and (2) hit rates for low-Intuiting types to mirror those of FTP-types (though only for low-Intuiting extraverts). However, these hypotheses contradict Jung's theoretical premise about intuition, and they may well be false, unless significant test results indicate otherwise. It may well be that Singer and Loomis's (1996) measures of Intuiting are unreliable — Kirkhart and Kirkhart (1998) report high alphas for both EN and IN (.73 for both), but the present study did not (EN = .60; IN = .69). Thus, for the moment, there is no statistical precedent to suggest that Jung's theory is wrong.

Belief in Psi and Pro Attitude

Scores on the Rasch-scaled ASGS did not predict hexagram hitting (either kind; see the test results for Hypotheses 8 and 9), which may be unusual given that sheep-goat scales have a long tradition of sorting out sheep from goats as far as their psi capacity is concerned. The relationships were very weak, but at least there was the suggestion of a relationship of ASGS scores with first-hexagram hitting. In fact, the post hoc finding was more encouraging — a significant sheep-goat effect was found. Sheep scored a high 29% hit-rate on first-hexagrams whereas goats recorded a very low 19%.

Conclusion

Though the cumulative record does not indicate statistically significant trends in hexagram outcomes yet, a replication study is planned for 2007 with the aim of rectifying that situation. Suffice it to say, the significant sheep-goat effect does suggest that *I Ching* usage does involve some kind of paranormal process. There was also no statistical evidence that hexagram outcomes depend on one's time-perspective typology as measured on Zimbardo's Time Perspective Inventory. Finally, scores on the pro attitude scale have successfully predicted hexagram outcomes in two independent studies thus far. As Heath (2003) has already proposed, the possibility of an inverse (i.e., negative) relationship between the degree of importance of getting a psi effect and the subsequent psi outcome may be just another one of those counterintuitive challenges to our long-held beliefs about psi that parapsychologists can resolve only at some future time.

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