Journal of Scientific Exploration, Vol. 19, No. 1, pp. 11–29, 2005 0892-3310/05

The Effect of a Change in Pro Attitude on Paranormal Performance: A Pilot Study Using Naïve and Sophisticated Skeptics

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Abstract—A computerized symbol-identifying experiment was conducted to test Thalbourne's (2004) concept of the "pro attitude" (an attitude towards a favorable outcome in a normal or paranormal task). Participants were required to identify the correct symbols randomly presented on computer in a run of 50 trials. Skeptics were given a second run. After each run, hit-rates were presented on screen. A subgroup of randomly selected skeptics were informed that scores, if sufficiently high or low, indicate statistical evidence of psi. It was hypothesized that news of this information (the "treatment") would alter the pro attitude of some skeptics and lead them to try to score at chance, rather than risk producing scores that might indicate psi. A significant correlation between hit-rate and belief in psi after treatment (but not before treatment) was found for "converted" skeptics (i.e., "new believers" in psi). Post hoc evidence showed a significantly high hit-rate on symbol identification after conversion (but not before conversion). These results suggest a "conversion effect" in some skeptics, thus indicating a change in pro attitude. It was concluded that further research on the pro attitude is warranted since evidence of same may help identify sources of paranormal effects.

Keywords: psychopraxia—pro attitude—conversion effect—paranormal—parapsychology—psi

Introduction

The Theory of Psychopraxia and the Pro Attitude

The theory of psychopraxia has been described briefly by Thalbourne (1982), at greater length by Storm and Thalbourne (2000), and most fully in a monograph by Thalbourne (2004). The term "psychopraxia" is derived from two Greek words: *psyche*, which means "soul" or "mind" or "self", and *praxia*, from which we get our word "practice" (derived from *prattein*, meaning "to accomplish" or "bring about"). Thalbourne's (1982) theory attempts to unify both normal and paranormal psychology, and motor action and cognition, so that the conceptual distinction between (a) ESP and PK and (b) normal information-acquisition and

normal motor control might be "eliminated" (p. 63), since, for example, both sides of the dichotomy are instances of action.

The theory emphasizes four fundamental aspects of action, whether it occurs endosomatically (within the body) or exosomatically (outside the body).

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 **–S** [not **S**] if those two alternatives were to be brought to their attention . . . . Under this heading fall goals, desires, wishes, intentions, needs, preferences, and dispositions, be they conscious or unconscious. So-called 'psi missing' is thus conceived of as being the result of a pro attitude toward below-chance results. [Skeptics, for example, would be naïve in thinking that a low score, or even no hits, indicates a chance result. 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**". (Storm & Thalbourne, 2000: 280)

Thalbourne (2004) hypothesized that, in addition to the self, the so-called pro attitude plays an initiating role in bringing about psi effects, notwithstanding the presence of certain other necessary conditions (as per [4] above), which bring about the so-called sufficient condition.

One method of gaining evidence of the pro attitude is to determine whether it is mutable. Specifically, the present study investigated the possibility of influencing, or better, altering the pro attitudes of so-called sophisticated skeptics as a direct result of a pedagogical explication of the laws of chance. The present study is also an investigation into paranormal belief and experience (as measured by the Australian Sheep-Goat Scale [ASGS]) as one possible predictor of paranormal success amongst others, and as a possible "necessary" condition for psychopraxia to occur. Before proceeding to the experiment, the nature and influence of attitudes in ESP research must first be considered. It will be seen that, more generally, attitude appears often to play a role in outcomes of psi tasks.

Attitude-ESP Research

Palmer (1977: 193) noted that attitude toward ESP in the test situation has been "an extensively studied predictor of ESP test performance". Much of the early work on attitude-ESP research actually preceded personality-ESP research. As early as the 1930s, Rhine began taking notice of the types of individuals who

seemed to give the best performances on ESP and PK tasks. He found repeated evidence that the more enthusiastic, curious, and motivated participants would more reliably score above chance than did other types of participants (Rhine, 1937/1950: 65, 84–85; 1948/1954: 54, 119).

Schmeidler (1943, 1960) introduced the term "sheep" to describe a person who believes in the possibility of ESP under the given experimental conditions, and "goat" as one who rejects this possibility. That is, Schmeidler considered the possibility of a direct relationship between paranormal belief and psi performance. The sheep-goat nomenclature usually applies in the experimental situation, where participants are classified according to their answers to a question about their belief in ESP or PK, or answers to a series of psi-relevant questions that together lead to a scale score.

When Schmeidler (1943, 1960) administered an ESP task to sheep and goats, she found significant differences in scoring between the two groups—sheep tended to score significantly above *Mean Chance Expectation (MCE)* and goats tended to score significantly below *MCE*. Also, when sheep were subdivided into two subgroups ("well-adjusted" and "poorly adjusted"), only the well-adjusted sheep participants demonstrated the sheep-goat difference.

Palmer (1977) reported the general finding that the sheep-goat dichotomy is probably the most reliable predictor of ESP performance to date. Thirteen of 17 sheep-goat experiments (76%) from 1947 to 1970 "were in the predicted direction" (p. 193). He added that experiments from 1970 to 1977 consistently confirmed the sheep-goat hypothesis. For example, Schmeidler and McConnell (1973) conducted a series of experiments and again found that sheep scored significantly above *MCE* and goats scored significantly below *MCE* (with a highly significant difference between mean scores for sheep and goats). (Interested readers should see Palmer [1977: 193–195] for a review of other sheep-goat experiments. See also Lawrence's [1993] meta-analysis of the sheep-goat effect.)

More recently, Storm and Thalbourne (1998–1999) conducted a parapsychological experiment using the *I Ching*, an ancient Chinese form of divination that uses six throws of three coins to generate, line-by-line, a six-line symbol called a hexagram—there are 64 possible hexagrams altogether, each of which has a corresponding reading or forecast. Storm and Thalbourne constructed their own "super-sheep" question (devised originally by Beloff & Bate, 1970), where a super-sheep is defined as "a subject who is sure that their score on a test of [ESP] will be high, by virtue of their own psychic ability" (Thalbourne, 1982: 72).

Perhaps not surprisingly, Storm and Thalbourne (1998–1999) found a significant correlation between the super-sheep question and Thalbourne's (1998) 29-item Transliminality Scale (a type of belief measure, since 14% of the 29 items refer to experience of, and belief in, paranormal phenomena. See also Thalbourne & Houran, 2003). Transliminality is defined as "a hypothesised tendency for psychological material to cross (*trans*) thresholds (*limines*) into or out of consciousness" (Thalbourne & Houran, 2000: 853). Via the Revised Transliminality Scale, which contains no paranormal items, the correlation was

still significant, $r(91) = 0.26$, $p = 0.012$ (Thalbourne & Houran, in press). Storm and Thalbourne (1998–1999) conducted a path analysis and found that the sheep-sheep question itself was a direct predictor of transliminality, which, in turn, was a direct predictor of a psi outcome measure known as hexagram hitting, and therefore a possible indicator of paranormal performance.

Storm and Thalbourne (1998–1999, 2001a, 2001b) also found, and replicated, a significant correlation between answers to a "sheep" question (belief in the possibility of a paranormal effect) and another paranormal measure, *number of "changing lines"* (a changing line is produced if the participant throws three-of-a-kind—i.e., three heads or three tails—for each throw, $P = 2/8 = 0.25$). The hexagram line so produced changes from "broken" to "unbroken", or vice versa, and as a consequence, the first hexagram changes to a different hexagram (at least one changing line is necessary to produce a second hexagram). There are six chances of throwing three-of-a-kind, hence the variable: *number of changing lines*. Storm (2002) has since established the consistency of these correlations using the pooled data of three separate *I Ching* studies. Specifically, these correlations suggest that belief in paranormal phenomena, and belief in the possibility of producing such phenomena, are involved in the *I Ching* process, thus leading to the generation of psi effects.

Having found reasonable support for the hypothesis that attitude is conducive to ESP, a more detailed consideration of the purpose of the present study is next presented.

The Nature of the Pro Attitude

Thalbourne (2004: 65) theorized that "a person may be said to have a pro attitude towards state **S** when they would consciously prefer **S** rather than **–S** [**not S**] if those two alternatives were to be brought to their attention". To show that the pro attitude is likely to exist, it is necessary to measure it directly, or, as in the present study, to manipulate the pro attitude in some way. Thalbourne argued that a change in the pro attitude might be indicated by changes in scoring in psi tasks. He also pointed out that significant negative scoring is not regarded as evidence for psi by most people, but is often regarded as "fail[ing] miserably" (p. 59). Although psi-missing is supportive of the psi hypothesis, some skeptics (i.e., naïve goats) may not see it that way. Rather, they would argue that extreme failure vindicates their belief that "chance" has again played its part in the failure to reject the Null hypothesis. Thus Thalbourne suggested that changes in scoring outcomes (or changes in the variance of those scores between multiple runs indicating shifts towards chance scoring) should occur as a result of the successful manipulation of skeptics' beliefs about low scoring and its relevance to the psi hypothesis when low scores become psi-missing. That is, "educated" skeptics should, upon re-testing, try to score as close to chance as possible, thus producing significantly lower variance of run-scores.

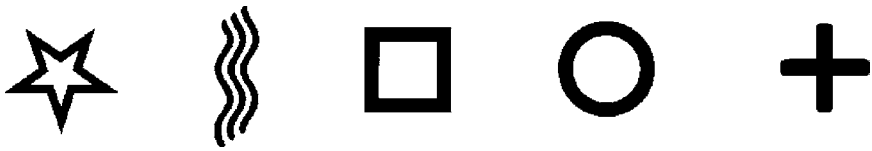

Fig. 1. The Zener-card symbols: star, waves, square, circle and cross.

There are two main types of skeptics in this study: (a) those who are *naïve* (i.e., not educated to the concept of significant scoring in its two forms, psi-hitting and especially psi-missing, and thus still presumably have a pro attitude toward low scores), and (b) those who are *sophisticated* (i.e., educated to the concept of significant negative scoring). Moreover, in the sophisticated group, there are two subtypes: *converted* and *entrenched* (note that both types are "sophisticated" in the sense that they are educated to the concept of below-chance scoring). Those who are *converted* believe that there can be statistical evidence of psi (i.e., they answer "yes" to the question: "Do you believe that a score which deviates significantly from chance might indicate the presence of ESP?"; see the *Measures* section on pg. 18). Those who are *entrenched* believe that a statistically significant result does not prove the existence of psi (i.e., they answer "no" to the same question).

The statement above, that "educated" skeptics, upon re-testing, might produce lower variance of run-scores, applies to an undifferentiated sample of converts *and* entrenched skeptics, or entrenched skeptics on their own. In the case of converts, an *increase* rather than decrease in variance might be expected upon re-testing because it is possible that some converts might still be vacillating about their belief in the psi hypothesis, which, even after the conversion, might cause them to score low, whereas other converts might try to psi-hit.

In terms of skeptics in general, we need to consider the following experimental scenario: In a forced-choice experiment, an unselected participant (who is a skeptic) is asked, in the first run, to identify only the "star" symbols in an array of face-down Zener cards (for the five Zener card symbols, see Figure 1). In a second run (i.e., a second array), the same participant is asked to identify (say) "crosses". If the skeptic psi-misses in both runs, a change in pro attitude would have been demonstrated, but this design merely tests one side of the sheep-goat effect—that is, we expect skeptics to psi-miss.

Thus the main problem in the experimental scenario just described is that the change in pro attitude was merely a change in targeting. In fact, what has not been tested is the degree of entrenchment (or mutability, for that matter) of an overarching, "core-value" (or *primary*) pro attitude in the skeptic toward disproving the psi hypothesis. The question is, "Can the skeptic's primary pro attitude be changed?" This is the pro attitude of interest in the present study, and it is a pro attitude of the skeptic that is irreconcilable with the psi hypothesis

(i.e., psi-hitting), but one that might be changed in order to bring about psi-hitting, or at least chance scoring.

The Skeptics experiment, then, offers the experimenter the opportunity to attempt a treatment of the underlying predisposition of the skeptical participant (i.e., to score low—see Thalbourne, 2004: 60–63). This pro attitude is here defined as *primary* in nature. Distinct from the primary pro attitude is the *secondary* pro attitude, which can be changed by instruction (as in the scenario given on pg. 15). An untreated (and therefore unchanging) primary pro attitude is underscored by a core value, which would effect (i.e., bring about) the same paranormal performance every time. The primary pro attitude is therefore *permanent* (or at least *enduring*). Although the secondary pro attitude can be changed (i.e., it is *ephemeral*), the skeptic is never fazed by this change, because the effect of the primary pro attitude is carried across from run to run, or experiment to experiment, thus resulting in no challenge to, or cognitive dissonance in, the skeptic.

The Skeptics Experiment

Description of the Experiment

Skeptics are those persons who reject the possibility that paranormal phenomena such as ESP or PK can occur. In the theory of psychopraxia, this "rejection" is the foundation of a *primary* pro attitude toward failing at a psi task. Generally, skeptics are not likely to be easily dissuaded from their a priori beliefs, and it is likely that they will adopt the appropriate pro attitude that they think will vindicate their belief that low scores are evidence of the absence of ESP (see Thalbourne, 2004: 60–63). This skeptical pro attitude, however, may change as a result of statistical explication.

The manipulation of the pro attitude could not simply be an influence that shifts the participant's focus (say) from run to run (a relatively superficial objective), but instead shifts the philosophical mental-set of the participant. The former can be achieved with a simple instruction from the experimenter and would not create any cognitive dissonance in the participant, but the latter requires something akin to creating a dilemma that challenges the participant's worldview, as it were. For example, in meeting such a challenge, a skeptic might have to accept the concept of psi-missing *and* do something about it, such as psi-miss less often in order to score at chance, but not too much in case psi-hitting is effected!

The purpose of this experiment is to examine performances of *naïve* and *sophisticated* skeptics on a computer-run forced-choice symbol-identifying task over the course of one or two runs (50 trials each). Appropriate hypotheses are made about *converted* and *entrenched* skeptics (see *Hypotheses* section on pg. 17). Note that it is expected that the Null hypotheses (Hypotheses 5 to 8) will *not*

be rejected for entrenched skeptics (i.e., deviations in scores and variances between runs will be at chance).

Participants were instructed to guess which of five different Zener-card symbols, presented in random sequence on a computer screen, was the target symbol (see Figure 1) pseudo-randomly pre-selected by the computer before each trial. There were 50 trials in the first run, and possibly 50 trials in a second run if the computer typed them as a skeptic according to their scores on the 18-item ASGS (Thalbourne, 1995), which would need to be less than 17 (the empirically derived median score.)

At the conclusion of each run, participants would receive feedback from the computer (given as a score out of 50). If participants were skeptics, and so were to proceed to the second run, the computer would then do one of two things, the course of action being chosen at random: (a) tell them to continue directly to the second run, or (b) give them additional information about the statistical interpretation of their scores and then tell them to continue to the second run.

Hypotheses

The following parapsychological hypotheses were proposed. The tests used are given in parentheses with each hypothesis:

1. The mean symbol hitting score for to-be-converted skeptics is below chance in the first run ($MCE = 10$ correct symbols; single-sample t test, one-tailed).
2. The mean symbol hitting score for converted skeptics is above chance in the second run (single-sample t test, one-tailed).
3. The mean symbol hitting score for converted skeptics is higher in the second run compared with their first run performance (Wilcoxon test, one-tailed).
4. The variance around the theoretical mean[i] of symbol hitting for converted skeptics is higher in the second run than in the first run, where this variance $= (10 - \text{hits})^2$ (Wilcoxon test, one-tailed).
5. The mean symbol hitting score for entrenched skeptics is at chance in the first run ($MCE = 10$ correct symbols; single-sample t test, one-tailed).
6. The mean symbol hitting score for entrenched skeptics is at chance in the second run (single-sample t test, one-tailed).
7. The mean symbol hitting scores for entrenched skeptics is not different between first and second runs (Wilcoxon test, one-tailed).
8. The variance around the theoretical mean of symbol hitting for entrenched skeptics is not different between first and second runs (Wilcoxon test, one-tailed).
9. There is a positive relationship between ASGS scores and symbol hitting for believers (first-run data; Pearson r test, one-tailed).
10. There is a positive relationship between ASGS scores and symbol hitting for converted skeptics (second-run data; Pearson r test, one-tailed).

Method

Participants

A total of 131 participants volunteered for this experiment. Thirty-two participants (24%) were Adelaide University First-Year students, while the majority (76%) were volunteers from the general public, most of whom attended the Adelaide University's two Open Days (October 13, 2000, and August 19, 2001). Fifty-two participants (40%) were men. The mean age was 26 years ($SD = 12.85$).

Measures

Three measures were used in the experiment:

1. The forced-choice version of the ASGS (Thalbourne, 1995).
2. The single-item question: "Before you started the 2nd run of 50 trials, did you understand that if your 1st run score was *way below* or *way above* chance, it might reach statistical significance?" The concept of significance was explained to sophisticated skeptics as follows:
   "If your score was *way below* chance such that it might reach statistical significance, it would indicate the presence of a form of ESP in which the correct target was *avoided* more often than chance would allow. However, if your score was *way above* chance such that it might reach statistical significance, it would indicate the presence of a form of ESP in which the correct target was *sought* more often than chance would allow. If only chance was operating and there was no ESP, your score would be expected to be much closer to chance."
   The question required a "yes" or "no" answer.
3. The single-item question: "Do you believe that a score which deviates significantly from chance might indicate the presence of ESP?" The question required a "yes" or "no" answer.

Apparatus

Four items were used in the experiment: (a) information sheet; (b) instruction sheet describing the experiment; (c) desktop computer; and (d) computer program, including the one (or two) runs of 50 Zener symbol-guessing trials, and specifically worded instructions addressed to the participant throughout the symbol-guessing component of the experiment.

Procedure

Once ethics approval was granted from the departmental ethics subcommittee, the experiment was advertised in the foyer of the Department of Psychology.

Apart from being open to the general public at the two Adelaide University Open Days, the experiment was also open to First-Year psychology students for credit toward their overall grade in the psychology course, but non-psychology students also participated. No aspects of statistical significance had been taught to these students at this stage (only rudimentary descriptive statistics is taught at this level, whereas significance testing is introduced at Second-Year). Participants who required information about the experiment were issued leaflets explaining the running of the experiment.

Most participants logged-on to a computer in the Computer Suite (Department of Psychology), but some were able to access the experiment on computers outside the suite. Starting from the Department of Psychology's *Home Page* via *Netscape Navigator* they followed the meta-links to "ESP Experiment" (i.e., the Skeptics experiment).

The experiment opened with a consent form. To start the actual experiment, participants clicked on the bar at the bottom of the consent form screen, which implied that they gave their consent to participate (this screen could not be bypassed). There were two stages to the experiment:

Stage 1—Questionnaire: A survey of belief in the paranormal, using the ASGS.

Stage 2—The Paranormal Task: One (or two) runs of the symbol-guessing tasks (50 trials/run). Participants were required to guess the computer's pre-selected Zener symbol (1 of 5; see Figure 1). Selections were made by clicking the "radio" button under the symbol thought to be the computer's pseudo-randomly pre-selected symbol. Order of the symbols was presented in random sequence to help avoid symbol preference, though it could not avoid position preference (note that the program was written so as to list position preferences for later analysis of possible bias). Total scores correct followed each run.

As the experiment was designed to test the pro attitudes of skeptics only, skeptics were given two runs in the experiment, whereas believers received only one run. Skeptics could not be selected until their ASGS scores were known, so believers were present in the experiment merely by chance, and any further testing of them would be extraneous to the aims of the experiment.

Results

Preliminary Analyses

There were a total of 131 participants in the sample. As determined by the computer program, participants whose total score on the ASGS was below the median (determined from previous data[ii] to be less than 17 of a possible 36) were classified as skeptics, while those whose score was equal to or above 17 were classified as believers. There were 87 believers (66%; $M_{\mathrm{ASGS}} = 24.84$, $SD = 4.94$)

TABLE 1
Frequency of Responses by Sophisticated Skeptics to the Two Questions ($n = 20$)

Question	Yes	No	Total
Before you started the second run of 50 trials, did you understand that if your first run score was *way below* or *way above* chance, it might reach statistical significance?	19	1	20
Do you believe that a score, which deviates significantly from chance, might indicate the presence of ESP?	10	5	15[a]

[a] Five participants did not respond.

and 44 skeptics (34%; $M_{ASGS} = 9.18$, $SD = 4.98$). An independent-samples t test showed the difference in ASGS scores between the two groups to be significant, $t(129) = 17.10$ $p < 0.001$, two-sided, $\omega^2 = 0.69$.

Of the 44 skeptics, 24 were naïve and 20 were sophisticated.[iii] Sophisticated skeptics were asked two questions (see the *Measures* section on pg. 18, [2] and [3]).

Table 1 shows the frequency of responses to these questions. As Table 1 also shows, the majority of sophisticated skeptics had no problem understanding the principle of "significance", but the total pool of sophisticated skeptics split into two basic types when questioned on belief in ESP: (a) converted skeptics ($n = 10$),[iv] and (b) entrenched skeptics ($n = 5$), as has been described above.

The ASGS. In this sample, the ASGS had a high reliability coefficient: Cronbach's alpha = 0.91. Theoretically, minimum and maximum scores on the ASGS are 0 and 36, and the observed range was almost the same (viz., 0 and 35; $N = 131$). The mean ASGS score was 19.58 ($SD = 8.91$), which is probably significantly above the mean score in the survey ($N = 301$) used by Basterfield and Thalbourne (2002): $M_{ASGS} = 15.21$ ($SD = 7.68$). The distribution of ASGS scores is shown in Figure 2.

The distribution shows a number of deviations above the normal distribution curve in scores ranging from 20 to 33 and some deviations above the curve in scores ranging from 0 to 8. There is also a deviation below the curve in scores ranging from 9 to 18. These deviations may be attributable to the nature of the experiment and the ethical demands on the experimenter. On the one hand, the experiment was designed specifically for skeptics and may have attracted a larger number of low ASGS scorers than might be expected. On the other hand, and rather ironically, the experimenter could not turn away from the experiment believers interested in the paranormal. Hence the experiment may have attracted a larger than usual number of high scorers on the ASGS. These two facts may help explain the deficit of "in-between" scorers whom Lawrence (1993: 76) referred to as "conflicts" or "undecideds".

The skewness of the distribution was –0.380 ($SE = 0.21$). A test of the skewness[v] showed that it was non-significant.

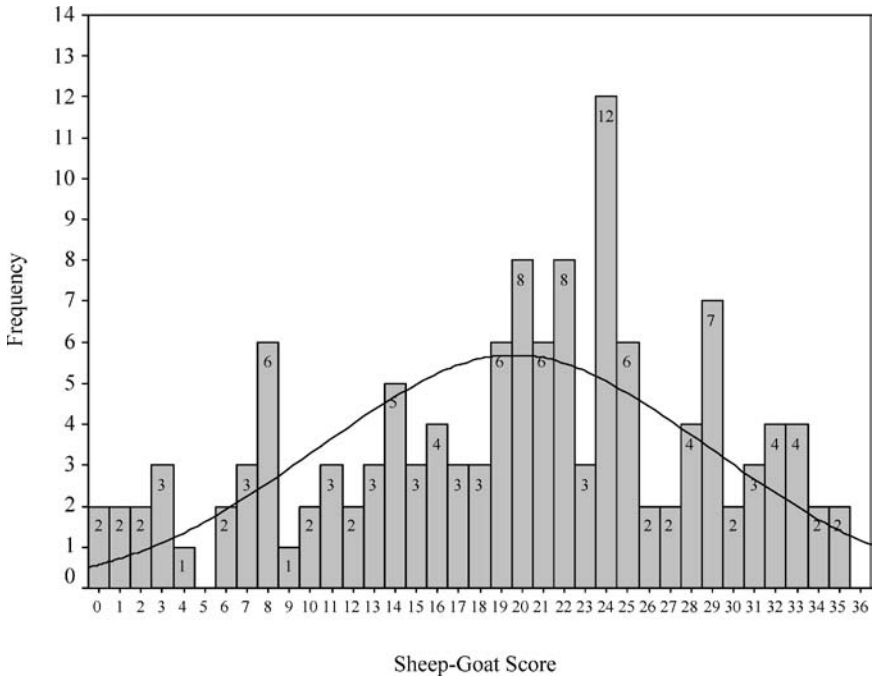

Fig. 2. Distribution of sheep-goat scores ($N = 131$; first-run data only).

Planned Analyses

Hypothesis 1: The mean symbol hitting score for to-be-converted skeptics is below chance in the first run (MCE = 10 correct symbols). The mean score for converted skeptics ($n = 8$) was *not* below chance, $M = 10.13$ ($SD = 2.42$). The hypothesis was not supported.

Hypothesis 2: The mean symbol hitting score for converted skeptics is above chance in the second run. The mean score *was* above chance, $M = 11.13$ ($SD = 3.52$), but non-significantly, $t(4) = 0.90$, $p = 0.198$, one-tailed. The hypothesis was not supported, although the hit-rate was in the right direction.

Hypothesis 3: The mean symbol hitting score for converted skeptics is higher in the second-run compared with their first-run performance. Although the mean score *was* higher in the second run compared with the first run for converted skeptics, the difference between the two mean scores was non-significant, $z = –0.07$, $p = 0.472$, one-tailed. The hypothesis was not supported.

Hypothesis 4: The variance around the theoretical mean of symbol hitting for converted skeptics is higher in the second run than in the first run, where this variance = (10 − hits)^2. Based on statements made in the *Introduction*, there may be some vacillation and/or attempts to psi-hit amongst some converts, resulting in a higher variance in the second run compared with the variance in the first run. In

the first run, the mean variance was 5.13 ($SD = 8.58$), and in the second run the mean variance *was* higher at 12.13 ($SD = 17.03$). However, the difference was non-significant, $z = -1.06$, $p = 0.146$, one-tailed. The hypothesis was not supported.

Hypothesis 5: The mean symbol hitting score for entrenched skeptics is at chance in the first run (MCE = 10 correct symbols). The mean score for entrenched skeptics ($n = 5$) was below chance, $M = 9.80$ ($SD = 1.79$), but non-significantly and may be considered a chance effect, $t(4) = -0.25$, $p = 0.408$, one-tailed. The results are consistent with the expectation that this Null hypothesis would not be rejected (see *Description of the Experiment* section on pg. 16).

Hypothesis 6: The mean symbol hitting score for entrenched skeptics is at chance in the second run. The mean score was above chance, $M = 10.60$ ($SD = 2.30$), but non-significantly and may be considered a chance effect, $t(4) = 0.58$, $p = 0.591$, one-tailed. As expected, this Null hypothesis was not rejected.

Hypothesis 7: The mean symbol hitting score for entrenched skeptics is not different between first and second runs. Given that entrenched skeptics were not likely to change their pro attitudes, it was expected that the difference between the two mean scores would not be significant, $z = -0.73$, $p = 0.232$, one-tailed. As expected, this Null hypothesis was not rejected.

Hypothesis 8: The variance around the theoretical mean of symbol hitting for entrenched skeptics is not different between first and second runs. In the first run, the variance was 2.60 ($SD = 3.98$), but in the second run the variance was higher at 4.60 ($SD = 4.28$). The difference was marginally significant, $z = -1.60$, $p = 0.055$, one-tailed. Contrary to expectation, the Null hypothesis was not supported.

Hypothesis 9: There is a positive relationship between ASGS scores and symbol hitting for believers. There was a negative and extremely weak correlation between ASGS scores and symbol hitting for believers, $r(85) = -0.03$, $p = 0.405$, one-tailed. The directional hypothesis was not supported. The uncharacteristic negative correlation for believers may be a chance result.

Hypothesis 10: There is a positive relationship between ASGS scores and symbol hitting for converted skeptics (second run only). The correlation between ASGS scores and symbol hitting for converted skeptics was positive, moderate in strength, and significant, $r(6) = 0.63$, $r = 0.049$, one-tailed. Note that, for "converted" skeptics in the first run (not actually converted at that time), the correlation was extremely weak and non-significant, $r(6) = 0.09$, $p = 0.416$. The hypothesis was supported. "High"-ASGS converted skeptics tend to score higher than "low"-ASGS converted skeptics, thus yielding a correlation usually expected of believers and skeptics combined.

Post Hoc Analyses

Effect size (ES)—believers and skeptics. The Skeptics experiment is a typical forced-choice experiment, of which the *ESs* are generally low compared with

TABLE 2
Trials, Hit-Rates, Trial-Based *Z* Scores, and Effect Size (*ES*) Scores for Various Groups and Subgroups

Groups/Subgroups	Total Trials	Total Hits	Mean Hit-Rate	*z* score	*ES*[a]
1. Believers ($n = 87$; 50 trials)	4350	889	10.22	0.70	0.011
2. Naïve skeptics ($n = 24$; first and second runs: 100 trials)	2400	488	20.33	0.40	0.008
3. Converted skeptics ($n = 8$; first run: 50 trials)	400	81	10.13	0.06	0.003
4. Converted skeptics ($n = 8$; second run: 50 trials)	400	89	11.13	1.06	0.053
5. Converted skeptics ($n = 8$; first and second runs: 100 trials)	800	170	21.25	0.83	0.029
6. Entrenched skeptics ($n = 5$; first run: 50 trials)	250	49	9.80	−0.08	−0.005
7. Entrenched skeptics ($n = 5$; second run: 50 trials)	250	53	10.60	0.39	0.025
8. Entrenched skeptics ($n = 5$; first and second runs: 100 trials)	500	102	20.40	0.17	0.008

[a] The estimate of *ES* z/n is used here, where *z* scores are "exact".

other domains (the *ES* for the forced-choice domain is 0.012—see Honorton & Ferrari, 1989). Given the small sample size, and that the sample of believers and skeptics did not distribute normally (see Figure 2), it was not expected that the proportion of symbols correctly identified by the whole sample ($N = 131$) would vary significantly from chance ($MCE = 0.20$). Therefore, hit-rates for various groups and subgroups were calculated.

Table 2 gives the hit-rates, trial-based *z* scores, and *ES*s for four groups (i.e., believers, naïve skeptics, converted skeptics, and entrenched skeptics) and subgroups thereof. As can also be seen from Table 2, the *ES* for converted skeptics improved from the first to the second run. Although in the right direction, this trend is suggestive only of a change in pro attitude since the improvement in scoring was non-significant. Note, however, that the *ES* for entrenched skeptics also improved (from a negative to a positive *ES*), which was *not* expected, but this change was non-significant (see Hypothesis 7).

*Replication of ES*s. While Table 2 shows that *ES*s are extremely low, they may not vary significantly from the significant mean *ES* norm of 0.012 for the forced-choice domain. Using the single-sample *t* test, two performance comparisons were made between the eight *ES* values listed in Table 2 and (a) the mean *ES* of 0.015 for the nine groups/subgroups as the test statistic and (b) the mean *ES* norm of 0.012 for the forced-choice domain as the test statistic (again, see Honorton & Ferrari, 1989). The *t* values in both cases were non-significant, (a) $t(7) = 0.23$, $p = 0.825$, two-tailed; (b) $t(7) = 0.69$, $p = 0.512$, two-tailed. Thus the eight *ES* values comprise a homogeneous data set comparable in performance with that of the forced-choice domain.

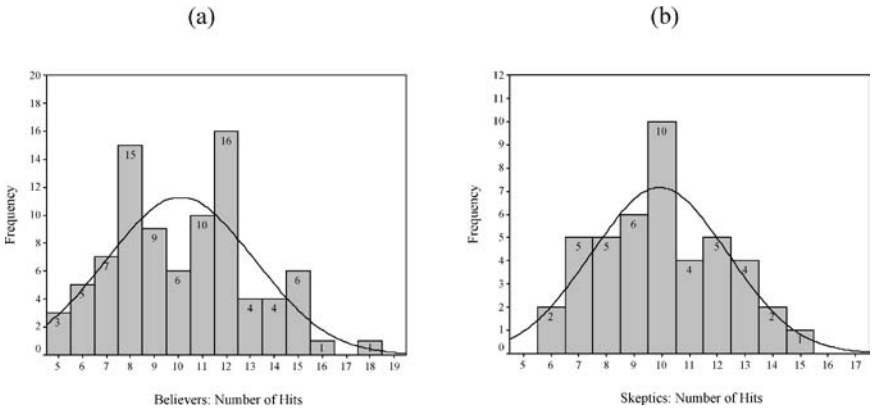

Fig. 3. (a) For believers ($n = 87$), scoring deviated marginally significantly from a normal distribution, which included a prominent deficit in scores at $MCE = 10$. (b) For skeptics ($n = 44$), scoring followed a normal distribution, though scoring at *MCE* was very high.

The sheep-goat effect. As was indicated in the literature review (see *Attitude-ESP Research* section above), a differential effect can often be found in paranormal experiments, where sheep tend to psi-hit and goats tend to psi-miss. Using first-run data only, the Pearson test showed a positive but non-significant relationship between ASGS scores and hit-rates, $r(129) = 0.05$, $p = 0.281$, one-tailed. However, when believers ($n_1 = 87$) and skeptics ($n_2 = 44$) were looked at separately by using the one-sample Kolmogorov-Smirnov test on the normality of the distributions of hits for these two groups, there was a marginally significant deviation from a normal distribution of hits for believers, $z = 1.17$, $p = 0.065$, one-tailed, but for skeptics there was no significant deviation from a normal distribution, $z = 0.91$, $p = 0.194$, one-tailed. Figure 3 illustrates these effects quite dramatically.

In Figure 3a, there is a marginally significant trend for believers to deviate in their scoring behavior mainly *away* from a normal distribution *in the direction of* psi-hitting, but there is also an uncharacteristic deviation *toward* psi-missing—hence, a bimodal effect, which may mean there were two types of believer, perhaps those confident in their psi-ability and those lacking confidence in their psi-ability. Further testing may determine whether this assumption has validity, but no measure was made in this experiment to ascertain this typological difference (however, see Storm, 2001).

Two believers were psi-hitters with significant scores of 16 and 18, respectively ($p < 0.05$), but note also (a) the above-average number of psi scores of 15 by six participants, which contributed to the significant trend, and (b) the deviation away from scoring exactly at *MCE*. Slightly more than half (52%) of believers scored above *MCE*.

In Figure 3b, there is no significant trend in scoring for skeptics—only a preponderance of scoring exactly at *MCE* (a kind of reversal of effect when

compared with Figure 3a). Slightly more than half (53%) of skeptics scored below *MCE*. But it must be conceded that if the sheep-goat effect has manifested in these data, it comes only as faintly suggestive trends in the expected directions.

"*High*" *ASGS scoring as a necessary condition.* For converted skeptics, there was a positive relationship between ASGS scores and symbol hitting (see Hypothesis 10). A median-split analysis was performed on ASGS scores to determine whether relatively "high" ASGS scoring might be a necessary condition, which completes the ensemble of conditions sufficient for successful paranormal symbol-identification. The median score on the ASGS for converts is 10.50. Note that "high" scores in the case of converts (>10.50) are still below the median score for the whole sample (i.e., 17) because converts were initially typed as skeptics, after all. High-scoring converts, therefore, would more accurately be described as "undecideds" or "conflicts", or "indecisives", to use Lawrence's (1993: 76) terminology. Theoretically, though, a positive relationship between ASGS score and psi success (i.e., the sheep-goat effect) should still hold true. And, of course, we do not know what the post–second-run mean ASGS scores are for converts because they were not re-tested.

There are only eight converted skeptics—four were "high" ASGS scorers (>10.50) and four were "low" ASGS scorers (<10.50). High scorers produced a significant hit-rate (second run) of $P_{\text{obs.}} = 0.30$ ($p = 0.047$; where $P_{MCE} = 0.20$), whereas low-scorers' hit-rate was non-significant, $P_{\text{obs.}} = 0.20$ ($p = 0.465$). Results show that "high" scoring (relatively speaking) on the ASGS was necessary and sufficient for eliciting psi-hitting. It is of interest to note that *before* these same four "high" ASGS-scoring participants were converted (first run), their mean hit-rate was at chance, $P_{\text{obs.}} = 0.20$ ($p = 0.465$). It appears that new belief can bring about a conversion effect that is measurable. This finding, albeit post hoc, supports the major postulate of the present study that the *primary* pro attitude can be changed.

Discussion

In Storm and Thalbourne's (2001a) *I Ching* experiment, evidence was found that *implied* the existence of a pro attitude on the part of sufficient numbers of participants toward a specific outcome. However, a thorough investigation into the concept of the pro attitude would also require that alternative evidence be found that would *confirm* rather than simply *imply* the existence of the pro attitude—for example, by confirming its mutability. The so-called Skeptics experiment was therefore conducted in the present study in order to test the hypothesized mutability of the pro attitude.

The experiment was primarily aimed at skeptics, since common sense would dictate that their pro attitudes could be regarded as *at least* gravitating toward some form of target-avoidance based on doubt, or even denial, of the psi hypothesis. Given such an orientation, it was deemed possible that skeptics'

primary pro attitudes could be changed if sufficient cause was given, and that these changes would be indicated by changes in (a) scores across runs and (b) variances of scores across runs. Thus the present study differed from conventional forms of testing for changes in targeting, as these merely focus on change in *secondary* pro attitudes.

It must be stated that this experiment was only a pilot study. Computer program failure, and the inability to acquire sufficient numbers of skeptics, put the experimenters at a disadvantage. Consequently, not a lot can be said about the performances of converts and entrenched skeptics. For converts, scoring was higher in the second run compared with the first run as expected, although the result was non-significant (Hypothesis 3). There was only a suggestive indication that converts were pulling away toward higher scores (Hypothesis 4).

For entrenched skeptics, even though scoring also improved from the first to the second run (Hypothesis 7), the non-significant result suggests that sufficient numbers of entrenched skeptics' pro attitudes may have stayed the same. However, the near significant result in Hypothesis 8 indicates that scores for skeptics were improving (as long as we also accept the possibility that some number of entrenched skeptics may have remained fixed in their scoring pattern—hence the increased variance). This result was not expected, but it suggests that there may have been some degree of vacillation on the part of some entrenched skeptics. It is possible that a few "high-scoring" skeptics were close to becoming believers and may not have even belonged in the subsample of skeptics. It may be necessary in future experiments of this kind to introduce more rigorous methods of selecting entrenched skeptics (such as tighter measures on change in belief).

In both cases (converts and skeptics), replication is needed before strong conclusions can be made about the mutability and the fixity of the pro attitude across runs and across time.

Regarding the ASGS as a possible predictor of paranormal performance, there was only one significant correlation of two relevant tests in Hypotheses 9 and 10. This significant correlation was not for believers (see Hypothesis 9), as might be expected, but was for converted skeptics (see Hypothesis 10). On the one hand, it is possible that believers did so poorly because their anticipation and self-expectation of a high-scoring performance disrupted their focus. Unfortunately they were not given a second run to redeem themselves. On the other hand, converted skeptics may have been spurred on by their newfound belief and had a second chance to prove themselves. Thus they showed the greatest improvement in scores, reaching the highest *ES* of all groups or subgroups (see Table 2). Although this result is only suggestive, converts with (relatively) "high" scores on the ASGS *did* shift from chance scoring before treatment ($P_{\text{obs.}} = 0.20$, $p = 0.465$; where $P_{MCE} = 0.20$) to psi-hitting after treatment ($P_{\text{obs.}} = 0.30$, $p = 0.047$).

This effect may have been the result of a "positive conversion effect" and is thus suggestive evidence that pro attitudes can change. A positive conversion effect (in the case of a participant changing from skeptic to believer) is here defined as a process by which a person becomes convinced that an anomalous process can

take place during a paranormal task when he or she at first did not believe such an outcome was possible. Naturally, "proof" of the effect is accompanied by improvement in psi performance after a treatment that is meant to bring about a change in belief from skepticism of psi to belief in psi. It is hypothesized that the positive conversion effect is concomitant with a burst of newfound enthusiasm and increased motivation that may be temporary or sustained. The conversion effect, at least in this particular form, has not been reported in the literature because the attempt to alter the performances of skeptics in the way outlined in the present study is apparently original to Thalbourne (2004: 60–63).

Storm (2001) has conjectured that the conversion effect might take reverse form (believer to skeptic) as (say) the process by which a person is convinced that an anomalous process cannot, or will not, take place during a paranormal task when, in fact, he or she might have previously thought it would. A reverse-conversion is still a conversion even though some might regard the word to mean a one-way conversion to some kind of belief, not conversion to disbelief. The negative conversion effect might be the result of discouragement and decreased motivation, leading to deterioration in psi performance. Positive and negative conversion effects are forms of pro attitudinal change.

As a consequence of the converts' psi-hitting, we also have evidence that relatively high scoring by converted skeptics on the ASGS was a necessary condition that contributed to an ensemble of conditions that constituted a sufficient condition for eliciting paranormal effects in this experiment. This claim is made because low-scoring converts elicited a mean score exactly at chance, as did both types of converts prior to conversion (see "*High*" *ASGS scoring as a necessary condition* section on pg. 25).

In conclusion, identifying pro attitudes may be useful in locating the source of paranormal effects, especially since there is much debate over experimenter effects in parapsychological research (for a discussion of the experimenter effect, see Kennedy & Taddonio, 1976). There is even speculation that experimenters may have more influence on psi outcomes than do the participants (Broughton, 1979; White, 1977). On that basis alone, the present study appears to have found reasonable evidence that adopting a psychopractic approach may be an innovative and advantageous step for future investigators to take in their parapsychological research.

Notes

[i] Variance is here calculated as the squared deviation from *MCE*, where $MCE = 10$. Note that other investigators have also used variance around the theoretical mean as an indicator of paranormal performance (for examples, see Rogers, 1966; Rogers & Carpenter, 1966; and Stanford, 1966).

[ii] The median score of 17 was calculated from data used in an unpublished study by M. A. Thalbourne called "Transliminality and the Oxford-Liverpool Inventory of Feelings and Experiences," which used the ASGS ($N = 55$).

[iii] Seven sophisticated skeptics never actually received a second run of 50 trials. It is therefore appropriate to include the data from these seven skeptics with the data from the 24 naïve participants, bringing the total of naïve skeptics to 31. For the purposes of the *ES* analyses in the *Post Hoc Analyses* section, the total of sophisticated skeptics is taken as 13 (not 20).

[iv] Due to computer error, two converted skeptics did not get the chance to do the second run; therefore, for the purposes of analyses in the *Hypotheses* section, there are only eight converted skeptics in total.

[v] If the skew value divided by its standard error is less than 1.96, the skew is non-significant.

Acknowledgments

This article was adapted from a chapter in the first author's Ph.D. thesis. Lance Storm thanks his Ph.D. thesis examiners, John Palmer and John Beloff, for their helpful comments. Research reported in this article was made possible by a grant from the Bial Foundation, Portugal. The authors thank Bob Willson for computer program design, assistance and statistical advice.

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