TESTING FOR FORCED-CHOICE PRECOGNITION USING A HIDDEN TASK: TWO REPLICATIONS

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ABSTRACT: This paper describes two extended replications of Luke, Delanoy, and Sherwood's (2008) precognition effect using a covert task with contingent reward or punishment that found performance to be related to belief in luck. In Study 1, 25 participants completed the short-form Questionnaire of Beliefs About Luck (QBL) and then rated the pleasantness of sets of fractal images, which was a covert precognition task. Participants in the contingent condition subsequently completed a pleasant or unpleasant task based on performance; those in the no-contingent condition did not. Overall, participants selected more target images than *MCE*, $t(24) = 2.60$, $p = .02$, but there was no difference between the contingent and no-contingent conditions, $t(23) = .73$, $p = .47$. Performance was positively correlated with the Chance and Providence subscales of the QBL ($r = .48$, $p = .02$, and $r = .39$, $p = .05$ respectively). In Study 2, 32 participants completed Goldberg's measure of openness to experience, Holt's Creative Cognition Inventory and Luke et al.'s long-form QBL before taking the contingent version of the covert precognition task. Participants again selected more target images than *MCE*, $t(31) = 2.01$, $p = .03$. We did not replicate earlier correlations between performance and QBL subscales, nor with creativity measures, but there was a significant positive correlation with openness to experience ($r = .46$, $p = .01$).

In its naturally occurring state among unselected persons, psi may be essentially an unconscious process. Broughton (1991, p. 350) considered this possibility when he had completed his review of parapsychology and was moved to conclude: "It is entirely possible that the sort of psi ability that has traditionally attracted the attention of parapsychologists … may be aberrations, completely unlike 'normal' psi ability." If this were the case, then it would not be evident from collections of spontaneous cases, as these rely on the percipient recognising that something unusual had occurred, which clearly requires some level of conscious awareness—though this awareness may be quite rudimentary, as in Rhine's (1961) classification of intuitive cases or Hearne's (1989) notion of a vague foreboding. It might be possible for the spontaneous effects of an unconscious psi to be detected in more subtle ways (e.g., Cox, 1956), although interpretation of the behaviour patterns observed in such cases is fraught with difficulty.

But if psi were essentially unconscious, then it might be self-defeating to attempt to capture effects in the laboratory by asking participants to make conscious judgments about the identity of targets, even where other interventions are included that are intended to establish a psi-conducive frame of mind—or perhaps even render conscious what would ordinarily be unconscious—as found, for example, in dream ESP and ganzfeld protocols

(Bem & Honorton, 1994; Sherwood & Roe, 2003). Asking participants to "be psychic" to order while under the scrutiny of lab personnel is likely to increase their autonomic arousal and disrupt performance much as it can do for other forms of psychological performance (cf. Blascovich, Mendes, Salomon, & Hunter, 1999; Geen & Gange, 1977). Similarly, in parapsychological experiments elevated anxiety typically inhibits performance in both PK (see Broughton & Perlstrom, 1986, 1992; Roe, Davey, & Stevens, 2003) and ESP tasks (e.g., Palmer, Ader, & Mikova, 1981; see Schmeidler, 1988, for a brief review). There seems to be a growing acceptance among laboratory researchers that more direct or unconscious measures of psi are more appropriate and more likely to be successful, as evidenced by the popularity of paradigms that test, for example, for prestimulus response (Radin, 1997), staring detection (cf. Baker, 2005, p. 60), precognitive habituation (Bem, 2003), and unintentional PK (Roe, Holt, & Simmonds, 2003).

Perhaps the earliest systematic laboratory exploration of psi as an unconscious process is to be found in Stanford and associates' tests of his Psi Mediated Instrumental Response (PMIR) model. Stanford has described the evolution of this model in extensive detail in a series of publications (Stanford, 1974a, 1974b, 1990). However, the essential features for the current discussion are that PMIR suggests that psi operates below the level of conscious awareness; is essentially goal oriented, responding to basic needs and environment threats or opportunities; and acts by facilitating pre-existing responses (actions, memory traces, and so on). Hence the participants needn't intend to use psi, nor be aware that the task requires them to use psi—indeed it might be counter-productive for them to know this. Empirical tests of the model have confirmed predictions that it makes concerning the effects upon psi performance of (1) the hidden nature of the task (e.g., Dwyer, Stanford, & Zenhausern, 1975), and (2) the existence of a reward or punishment that is contingent upon performance (e.g., Stanford and Associates, 1976).

Recently, Luke, Delanoy, and Sherwood (2008) have sought to extend this paradigm by attempting to identify those persons who might be most likely to capitalise on the action of PMIR in their daily lives to see if they perform similarly under controlled laboratory conditions. Luke et al. hypothesised that such people might experience the positive or negative outcomes that result from PMIR but attribute them to good or bad luck, so that if participants reported that they consistently benefited from fortuitous events they might describe themselves as particularly lucky whereas if they tended to suffer from them they might describe themselves as particularly unlucky. Luke (2003) had previously identified different characterisations of luck that seemed to be relatively independent, and these were represented as different subscales of his Questionnaire of Beliefs about Luck (QBL: Luke et al., 2003). Luke et al. (2008) were interested to discover which of these might be predictive of performance at a PMIR task. They recruited 100 participants who, after completing a battery of questionnaires, were individually presented with a computer-based selection task that was described as preparatory to the psi task. This consisted of 10 trials in which they were shown sets of four fractal images and asked to record which they found most aesthetically pleasing. In fact this constituted a forced-choice precognition task, because for each trial after the participant had registered his or her preference, the computer would randomly select one image as the target. Over 10 trials, participants should select the target as their preferred image on 2.5 trials by chance alone. If participants scored more than 2.5 hits, they were subsequently given a reward (to continue the preferences task but with erotic images as stimuli), whereas if they scored fewer than 2.5 hits they were given a "punishment" that involved a dull task in which they had to monitor a sequence of randomly selected digits to identify runs of three odd numbers or three even numbers. The amount of time spent on the punishment contingent task was proportional to the number of hits, as was the degree of eroticism of the images in the reward contingent task. As predicted by PMIR, participants did select significantly more targets than would be expected by chance, one-sample $t(99) = 2.51$, $p < .01$, one-tailed, $es(r) = .245$. Performance correlated with the Luck and Providence subscales of the QBL ($r = .26$, $p < .01$, and $r = .17$, $p = .05$, respectively[1]), and with responses on a single item measuring overall perceived luckiness ($r = .26$, $p < .01$), as hypothesised by Luke et al., but not with the other subscales.

Given these promising results with an unselected sample and using a straightforward off-the-shelf protocol, we were encouraged to see if these effects could be replicated. We planned to recruit participants for these replication studies among the general public and felt that it would be difficult to secure ethical clearance for the use of erotic stimuli and so planned to replace this reward task with an alternative that involved rating the relative humorousness of sets of cartoons (taken from Gary Larsen *Far Side* publications—see Figure 1).

We were also aware that as Luke et al.'s study did not include a condition with no contingent task we could not be sure that above-chance performance was due to the subsequent reward or penalty and so planned to explore this aspect formally here.

Finally, Luke (2007) had conducted further psychometric analysis of the QBL that condensed the original 41-item scale to 21 items, and the current study gave the opportunity to see whether this streamlining had any effect on observed relationships with performance on the precognition task. Based on previous findings, we predicted the following (note that although these predictions are directional, significance thresholds were conservatively kept as two-tailed):

- Participants will select more fractal image targets in the hidden precognition task than mean chance expectation.

[1] We should note that, in subsequently revising their paper, Luke et al. reverted to two-tailed tests and introduced a Bonferroni correction that reduced the Providence-performance relationship to nonsignificance ($p = .09$); however, at the time of the current study this effect was interpreted as significant and so we sought to replicate it here.

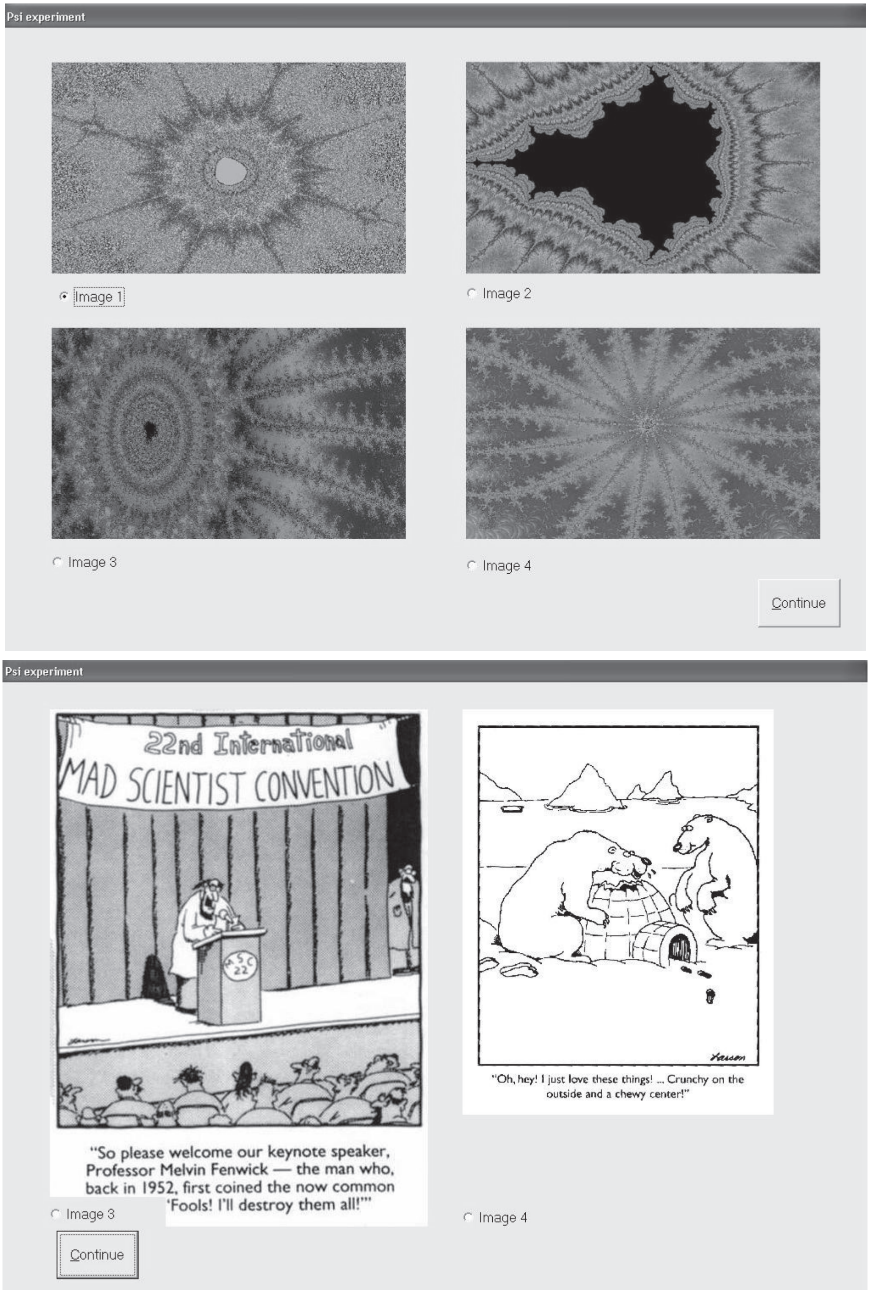

Figure 1. Screen shots illustrating the fractal image preference task and the reward task in which participants rate the relative humorousness of cartoons

- The number of hits in the hidden precognition task will be greater for the contingent condition than for the no-contingent condition.
- The number of hits in the hidden precognition task will be positively correlated with scores on the Luck and Providence subscales of the QBL.

STUDY 1

Method

Participants

An opportunity sample of 16 female and 9 male participants was recruited. Participants were members of the public attending a 2-day exhibition on superstition at the Northampton Museum and Art Gallery entitled "Unlucky for Some" and who volunteered to take part in the experiment. Participants were told they would be offered feedback on their performance in "the luck experiment" if they took part.

Materials

PMIR Visual Basic program. A software program in Visual Basic (v.6) was written specifically for this experiment by the first author. The program consists of a fully automated, nonintentional precognition task with a randomised contingent/no-contingent outcome task. The program has a pool of fractal images as the decoy and target images for the forced-choice psi task (example images are shown in Figure 1). No images were repeated in any run. The entire 40 images for this program were selected previously via a standardisation procedure from a pool of 72 such images, which had themselves been created randomly (using the freeware fractal generator program Fractalus v4.02). Images had been presented to five independent judges via a presentation program written in Visual Basic and standardised using a similar rating process to that used in the creation of the International Affective Picture System (IAPS: Lang & Greenwald, 1993). Images had then been grouped together into the 10 best pools of four images based upon the homogeneity of their individual scores on scales of pleasantness and arousal (Luke, 2007).

Short-form Questionnaire of Beliefs About Luck. A 20-item questionnaire, scored on a seven-point Likert scale from strongly disagree to strongly agree, to assess belief in four polar concepts of luck: Luck ("luck" is primarily controllable but also internal, stable, and nonrandom), Chance ("luck" is random, unpredictable, unstable, and inert), Providence ("luck" is reliably managed by external higher beings or forces), and Fortune ("luck" is meant as a metaphor for life success rather than as a literal event). Each subscale has five items. The single item concerning perceived luckiness originally included by Luke (2007) was omitted here because of concerns as to its psychometric robustness in comparison to the rest of the measure (Luke, 2007).

Procedure

Participants who visited the museum exhibition were asked if they would like to take part in a study of psychic ability and beliefs about luck. After participants were recruited, the experimenter took them individually to the test room, briefed them about the study, and explained that the experiment involved a precognition task, although the nonintentional nature of the task was not divulged. They were informed that their data would be recorded anonymously but that they could withdraw from the study at any time by citing their unique participant identification number. Participants then signed a consent form and completed the questionnaire. Participants were given detailed task instructions via the computer, and they were then left in the room alone until they had completed the PMIR computer task.

The initial screen of the PMIR-task computer program asked participants to relax and to follow the instructions, and explained that they would be informed when they needed to try to use any psychic (psi) ability. Further instructions described how to indicate which one of the four presented images they most preferred for each of a series of 10 "preparatory" trials. Images were fractal patterns displayed in a random arrangement from a unique pool of four images for each of the 10 trials.

Unknown to participants, the 10 "preparatory" fractal trials were actually a nonintentional precognitive psi task. In each trial, once the participant had made his or her target selection, the computer then randomly selected one of the four fractal images as the (*post factum*) precognition target. Thus, randomised selection of the target occurred each time an image preference was selected. This randomisation and that of the image position arrangement was achieved using the RND function in the Visual Basic program, which is seeded by the timer. No feedback was given to the participant on target success.

The program also randomly assigned the participant to either a contingent or no-contingent condition, with those in no-contingent condition ending the experiment at this point and those in the contingent condition performing either a pleasant or unpleasant task depending upon their performance on the 10 PMIR trials. In the contingent condition, participants who correctly identified fewer than 2.5 of the precognition targets (i.e., who scored below *MCE*) were directed towards an unpleasant vigilance task, whereas those who correctly identified more than 2.5 targets were directed towards a pleasant cartoon-preference task.

The unpleasant vigilance task presented a set of instructions describing the task and requesting participants to observe the following display of numbers, and to press the left mouse key (or the return key) for every complete run of three consecutive odd numbers (e.g., "3," "7," "5,"), or three consecutive even numbers (e.g., "4," "2," "4"). Once the task began, a series of singular random numbers ranging from 1–9 were presented in the centre of the screen; each digit was replaced every 500 ms. Duration of the unpleasant task was dependent on degree of success at the precognition task: Those who correctly identified none of the precognition targets completed this unpleasant task for 4 min, those who identified only one correct target for 3 min, and those scoring two hits did this task for 2 min. None were informed of how long the unpleasant task would take, nor did they receive any feedback on their performance. No record of the participant's performance on this dummy task was made.

Participants who performed the pleasant, cartoon-preference task were first notified that the task would now change but that they should continue to select the image they preferred. However, like the unpleasant task, this task was not a psi task and the cartoon images presented were predetermined, not random. Participants' previous nonintentional precognition task performance determined how long the cartoon-preference task continued, such that the task lasted 30 s if they obtained three direct hits and increased by 30 s for every additional direct hit.

Results

We hypothesised that participants would select more fractal image targets in the hidden precognition task than mean chance expectation. Hit rates are summarised in Table 1 and show that, as predicted, the overall mean hit rate for this sample, at 3.4, is significantly higher than *MCE* of 2.5.

Table 1
Mean Hit Rates (and Standard Deviations) for Precognition Task Performance Scores, With One-Sample T-Test Comparisons Against Chance Expectation

	Mean hit rate	*SD*	one-sample *t*	*p* (two-tailed)	*Es(r)*
Overall performance (*N* = 25)	3.40	1.73	2.60	.02	0.47
Contingent condition (*N* = 13)	3.15	1.91	1.24	.24	0.34
No-contingent condition (*N* = 12)	3.67	1.56	2.60	.03	0.62

Our second prediction was that the number of hits in the hidden precognition task would be significantly greater for the contingent condition than for the no-contingent condition. We can see that, in fact, better performance was achieved in the no-contingent condition, contrary to prediction, although the difference between conditions is not significant, $t(23) = .73$, $p = .47$. We should note, however, that only scoring in the no-contingent condition deviates significantly from chance, as illustrated in Table 1.

Finally, we predicted that the number of hits in the hidden precognition task would be positively correlated with scores on the Luck and Providence subscales of the QBL. Pearson correlations are given in Table 2 and show that the positive association with Providence was observed here but the correlation with Luck, although positive, is not significant. However, there was also a significant positive association with Chance that had not been predicted.

Table 2
Pearson Correlations (With Two-Tailed Significance Levels) Between Precognition Task Performance and QBL Subscale Scores

	QBL subscales			
	Luck	Chance	Providence	Fortune
Psi score	.14 (.51)	.48 (.02)	.39 (.05)	.15 (.48)

Scores on the QBL subscales are likely to intercorrelate such that zero-order correlations may not be a good indication of the variance in performance scores that is *uniquely* explained by each factor.[2] Indeed, the QBL factors are not orthogonal (Luke et al., 2003) and correlations here range between .04 and .67. When partial correlations are conducted to control for shared variance with other factors, all four relationships reduce to nonsignificance (for Luck, $pr = -.11$, $p = .64$; for Chance, $pr = .39$, $p = .07$; for Providence, $pr = .26$, $p = .25$; and for Fortune, $pr = .07$, $p = .74$).

Discussion and Rationale for Study 2

Despite the relatively modest sample size recruited here, this study was able to replicate Luke et al.'s (2008) finding that participants could score significantly better than chance at a hidden precognition task. Although the result is consistent with the prediction derived from PMIR that psi might operate below the level of conscious awareness and act by facilitating pre-existing responses (in this case simply indicating aesthetic preferences) rather than by generating novel ones, the claim that this process is essentially goal-oriented was not supported as performance in the no-contingent condition was actually superior to that in the contingent

[2] We are grateful to an anonymous referee for drawing this to our attention.

condition, although these outcomes did not differ significantly. The effect size reported here for the no-contingent condition (along with that for overall performance) is actually larger than that reported by Luke et al. and so only serves to question the importance of providing a reward or punishment for performance. It is difficult to be certain, of course, that those in the no-contingent condition did not receive any tangible reward: Perhaps subsequently being informed by the experimenter that one has done well may provide a sufficient reward to motivate performance—certainly much other parapsychological research depends upon that being the case—or indeed leaving the experiment without having to perform either the pleasant or unpleasant contingent task may have been a better incentive than either! Given this difficulty in ensuring a true no-contingent condition, we therefore decided to omit this condition from a second replication attempt and instead to concentrate on ensuring that the reward and punishment contingencies were sufficiently distinct to be effective. To this end, it seemed essential that we include a validation check to document how enjoyable those different outcomes were perceived to be.

There was some support here for speculations that those who tend to believe in a particular type of luck (presumably based on prior experience) may be more predisposed to capitalise on PMIR and that this extends to fortuitous events that occur in the laboratory. Here we confirmed our prediction that scores on the Providence subscale would be positively correlated with performance at a hidden precognition task, and although we were unable to replicate the relationship Luke et al. found with Luck, we did find a significant positive relationship with Chance that had not been reported previously. These unexpected findings seem to contradict Luke et al.'s suggestion that it is those who tend to perceive luck to be a controllable element (as measured by the Luck subscale) who tend to perform well on hidden precognition tasks—in this study, those tending to believe that luck is random and inert (as measured by the Chance subscale) actually performed better. Possibly this result may stem from the different populations used in the separate studies, with those used in this study scoring relatively higher on the Chance subscale ($M = 4.9$) and relatively lower on the Luck subscale ($M = 4.4$) compared to the scores in the original Luke et al. study (where Chance $M = 4.1$; Luck $M = 5.0$), perhaps indicating that the magnitude of belief is related to psi performance, such that the degree of conviction in a belief and not the belief itself is the determining factor. When shared variance among the luck factors was controlled for using partial correlations, the significant relationships observed above reduced to nonsignificance. This may be unsurprising where all the factors show small- to medium-sized positive relationships with performance as well as varying degrees of association with one another, but it could suggest that they share an underlying factor that itself is related to psi-task success.

We were interested to conduct a further replication that might allow us to evaluate the robustness of the psi effect observed here and to clarify its relationship with the luck variables investigated previously (in particular to see if we could confirm our unexpected finding with respect to Chance and our unexpected failure to replicate Luke et al.'s finding with respect to Luck). But we also wished to extend this replication by considering other variables that might be expected to covary with performance on a covert psi task. To this end we were guided by Stanford's (1990) claim that certain attributes may make a person more or less likely to exhibit PMIR, particularly when they affect the person's sensitivity to the psi stimulus and likelihood to act upon such a stimulus, and we sought to identify indicators of both of these.

The biggest hindrance to (unconsciously) detecting the psi stimulus may be the neurological system's natural tendency to filter out information that seems inconsequential to the explicit task in hand, a tendency that is evident in the phenomenon of latent inhibition (LI: see Lubow, 1989). Individuals who have relatively high levels of LI find it difficult to learn association rules involving stimuli that are initially irrelevant, presumably because such stimuli have been filtered out at lower levels of processing (cf. Holt, Simmonds-Moore, & Moore, 2008). It seems plausible, then, that individuals who score high on LI might also tend to be less sensitive to peripheral or weak psi signals. LI is not straightforward to measure experimentally but has been found to covary with other factors that can be gauged using pencil and paper measures: For example, it has been reported that creative people tend to score lower on LI than less creative people (Carson, Higgins, & Peterson, 2003; Peterson, Smith, & Carson, 2002), as do those who present as open to experience on the NEO Five Factor Inventory (Carson & Peterson, 2000; Carson, Peterson, & Smith, 2002; Peterson et al., 2002). In this study we propose to treat these variables as indicators of proneness to LI and expect that higher scores on them, reflecting *lower* levels of LI, will be associated with better performance at a PMIR task.

A hindrance to a person's propensity to act upon an unconscious psi stimulus is behavioural or cognitive rigidity. For example, a person who is subtly aware of an imminent accident, such as a train crash, may be less likely to take evasive action based on any vague sense of foreboding if his or her plans are relatively fixed (i.e., the person has already booked a seat, has arranged to be picked up at the station or has an important meeting to attend) than if they are relatively flexible. A laboratory corollary of this may be the stability-lability dimension, where persons at the stable pole are characterised as relatively fixed in their thinking styles and persons at the labile pole are relatively fluid and changeable; scores on this dimension have recently been associated with performance at a PK task (Holt & Roe, 2006; Roe & Holt, 2006). We therefore expected that more labile persons would be more able to act on any unconscious psi signal and so would perform better on a PMIR task. The lability metric used in these previous studies is rather too large to use here, but a core feature was creativity, so we decided to consider one of its constituents, the Creative Cognition Inventory (an unpublished measure by Holt) in this study.

Hence in this study we make the following predictions:

- Participants will select more fractal image targets in the hidden precognition task than mean chance expectation.
- The number of hits in the hidden precognition task will be positively correlated with scores on the Luck, Chance, and Providence subscales of the QBL.
- The number of hits in the hidden precognition task will be positively correlated with scores on the openness to experience scale.
- The number of hits in the hidden precognition task will be positively correlated with scores on the linear and nonlinear subscales of the Creative Cognition Inventory.

STUDY 2

Method

Participants

An opportunity sample of 32 psychology students from the University of Northampton was used. No demographic information was collected.

Materials

A software program written in Visual Basic (v.6), used previously in Study 1 to run the nonintentional precognitive task, was adapted here to include only the contingent condition. The original long form of Luke et al.'s (2003) Questionnaire of Beliefs About Luck was used here but was supplemented by measures of creativity, the Creative Cognition Inventory (CCI: Holt, 2002), and Goldberg's (1999) measure of openness to experience.[3]

Procedure

Participants were approached and asked if they would like to take part in a study of extrasensory perception and personality. If they agreed to

[3] This measure is derived from the international personality item pool (IPIP: Goldberg et al., 2006), which was chosen for use here because it is a public domain measure that was intended to represent the domain constructs of the NEO personality inventory (Buchanan, Johnson, & Goldberg, 2005). Correlations between the IPIP and NEO scales for the six facets of the openness to experience dimension range from .70-.80 (Goldberg, 1999), suggesting that these instruments measure the same personality dimension.

participate, they were then taken individually to the test room, more fully briefed about what was involved, and informed that all of their data would be kept confidential and that they could withdraw from the study at any time without explanation if they so chose. Participants who were willing to continue signed a consent form and then completed the questionnaire measures.

Participants were then seated in front of a PC that provided on-screen instructions on how to complete the computer-based tasks. The experimenter remained outside the test room during the experiment so as to be available should participants experience any problems. The first task was presented as an activity that was intended to gauge their preferences, during which they would be shown 10 sets of four fractal images and had to register which was their preferred by selecting the appropriate option (see Figure 1). For each trial, once the participant had selected one of the four images, the computer then randomly selected one of the images to be the target. Based on their performance in selecting target images across 10 trials, participants went on to perform a second task: For scores below the *MCE* of 2.5 they were directed to an unpleasant vigilance task; for scores above the *MCE* of 2.5 they were directed towards a pleasant cartoon preference task.

For the unpleasant task, participants were presented with a sequence of randomly generated digits in the range 1–9 that changed every 500 ms and were required to monitor these and respond when this sequence involved three successive odd numbers or three successive even numbers. For the pleasant task, participants were presented with sets of Gary Larson cartoons and were required to identify which of the cartoons they found most humorous.

Although participants may have believed that the secondary task would be a test of their ESP, neither the pleasant nor the unpleasant task constituted a psi test, and participants' responses were not processed or analysed. Rather, engagement in the task constituted the participant's "reward" or "punishment" for performance on the hidden precognition task, and degree of success determined the duration for which the contingent task continued: Those scoring no direct hits completed the punishment task for 4 min, one direct hit for 3 min, and two direct hits for 2 min; those scoring three direct hits completed the reward task for 30 s, four direct hits for 60 s, and so on, up to a maximum of 240 s.

Once their allocated time had expired, participants were asked by the experimenter to describe the purpose of the two tasks so as to ensure that no participants suspected that the first task required them to use ESP, and also to rate how pleasant they found their second task on a 10-point scale where 1 = not at all pleasant and 10 = extremely pleasant, so as to ensure that the intended manipulation of pleasantness of the contingent task had been successful.

Because of the element of deception involved in a covert psi task such as this, particular care was taken to fully debrief participants in a manner that explained the necessity of the misdirection in order to investigate the unconscious or unintentional use of ESP. Participants were allowed as much time as they needed to discuss and ask questions about the study design and its aims and were reminded of their right to withdraw their data anonymously at some future point should they so wish; no participant exercised this right.

Results

To test the effectiveness of the manipulation of the enjoyability of the two contingent conditions, we asked participants to rate the secondary task they were given using a 10-point scale ranging from 1 (not at all pleasant) to 10 (extremely pleasant). Participants allocated to the pleasant task gave an average rating of 7.00 ($SD = 1.12$) whereas participants allocated to the unpleasant task gave an average rating of 2.42 ($SD = 0.90$), and this difference is significant, $t(30) = 11.98$, $p <.01$, suggesting that this manipulation was successful. Degree of enjoyment was related to duration of the contingent task for both the reward and punishment outcomes, $r\,(19) = .57$, $p = .01$ and $r(11) = -.61$, $p = .03$, respectively.

Hypothesis 1 predicted that participants would select significantly more target images in the incidental psi task than would be expected by chance. Mean chance expectation is for 2.5 hits in 10 trials; actual hit rates are illustrated in Figure 2. The actual mean hit rate was 2.90 ($SD = 1.15$), which, although only somewhat higher than *MCE*, is significant, one-sample $t(31) = 2.01$, $p =.05$, $r = .34$.

Our second prediction was that the number of hits in the hidden precognition task would be positively correlated with scores on the Luck, Chance, and Providence subscales of the QBL. We can see from the Pearson correlations reproduced in Table 3 that none of the correlations comes close to significance, so this study fails to replicate earlier findings. When partial correlations are conducted, Luck and Chance show increased positive associations ($pr = .26$, $p = .17$ and $pr = .27$, $p = .16$, respectively) whereas Providence and Fortune show increased negative associations ($pr = -.11$, $p = .56$ and $pr = -.22$, $p = .24$, respectively), but all remain nonsignificant.

We thirdly predicted that the number of hits in the hidden precognition task would be positively correlated with scores on the openness to experience scale, and in this study this gives rise to the strongest association, with an effect size of .46 that is significant.

Finally, we speculated that the number of hits in the hidden precognition task would be positively correlated with scores on the linear and nonlinear subscales of the Creative Cognition Inventory. These are given in Table 3 and, although in the predicted direction, give only small effect sizes that are not significant.

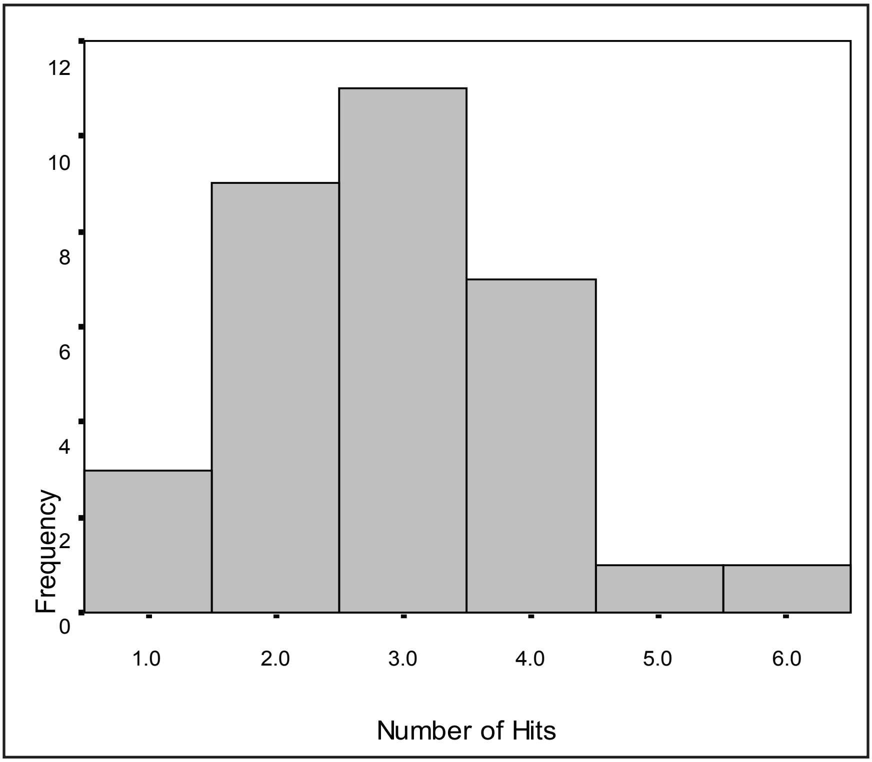

Figure 2. Histogram illustrating distribution of hits on the covert precognition task

TABLE 3

PEARSON CORRELATIONS (WITH TWO-TAILED SIGNIFICANCE LEVELS) BETWEEN PRECOGNITION TASK PERFORMANCE AND SCORES ON QBL SUBSCALES, OPENNESS TO EXPERIENCE, AND CREATIVE COGNITION SUBSCALES

	QBL subscales					Creative Cognition subscales	
	Luck	Chance	Providence	Fortune	Openness to experience	Linear	Non-Linear
Psi score	.12	.20	-.03	-.13	.46	.25	.20
	(.50)	(.27)	(.86)	(.48)	(.01)	(.17)	(.27)

Discussion

Both studies described in this paper were able to replicate the precognition effect first reported by Luke et al. (2008) and give encouragement to the suggestion that this relatively simple paradigm might provide a straightforward means of eliciting ESP effects with a setup that requires no more than a personal computer. The sample sizes in both of these replications have been relatively small so that capturing significance here suggests that we are dealing with quite a robust effect that merits more extensive study. We would like to encourage others to consider adopting this approach when pursuing their own research interests, and would be happy to provide a copy of the program and some support with setting up.

Participants were not aware that they were participating in a psi task at the time when they were making their selections, and yet they were able to perform significantly better than chance expectation in identifying targets that were randomly selected after they had registered their choice. This is consistent with the suggestion that psi may be an essentially unconscious process (Broughton, 1991), an assumption that seems to underpin a number of recently adopted methodological approaches in parapsychology (e.g., Bem, 2003; Radin, 1997).

Interestingly, there are analogous cases in mainstream psychology in which performance at a task utilises nonconscious processes and may in fact be compromised by conscious attention, and these could shed some light on the action of psi. Dijksterhuis (2004), for example, has argued that better decision-making may follow deliberation without conscious attention rather than persistent conscious thought—under some circumstances. Dijksterhuis, Bos, Nordgren, and van Baaren (2006) found that where the choices to be made were relatively simple, involving few attributes (e.g., choosing between different shampoos) then conscious deliberation tends to lead to better decision-making; however, where the choice is complex (e.g., choosing between different cars, each described by 12 attributes), then better performance was achieved via deliberation without conscious attention. Dijksterhuis et al. (2006) explain this counter-intuitive finding by noting that conscious attention has a low capacity, which allows only a limited amount of information to be taken into account simultaneously. They also propose that conscious thought involves top-down processing that can allow bias to enter the process and so lead to suboptimal weighting of the relative importance of the elements of information that are maintained. In contrast, unconscious thought is characterised as having virtually unlimited capacity so that it is able to integrate much greater amounts of information into an evaluative summary judgment (Dijksterhuis, 2004: see also Betsch, Plessner, Schwieren, & Gütig, 2001). Information is also hypothesised to be processed in a "bottom-up" fashion that gives rise to more naturalistic, unbiased weightings (Dijksterhuis & van Olden, 2006).

We might suppose that incorporating information acquired by extrasensory perception into an organism's decision-making process follows a similar pathway—it could be argued that psi tasks such as those used in this study represent a form of decision-making in which participants must make a summative judgment that takes into account multiple sources of (possibly contradictory) information. It would therefore seem likely that where psi tasks utilise conscious attention then its limited capacity would place greater emphasis on the filtering and inhibition mechanisms that have been supposed to exclude psi-mediated material (cf. Honorton, 1977). Tasks that utilise unconscious attention might therefore be more psi conducive because their greater bandwith does not require such filtering. These speculations are open to empirical test; mainstream research suggests that the advantage for unconscious processing increases as the information load increases, and this could be investigated in future replications of this precognition effect using a covert task.

The method is quite inexpensive in terms of researcher time per datum collected and may provide a useful vehicle for further considering other process aspects of performance such as personality and situational factors. Of the factors considered thus far, it seems clear that the Fortune subscale of the QBL is not related to performance, but each of the other subscales has received at least some empirical support across the three studies conducted thus far and would seem to warrant further attention. The strongest predictor of performance at the psi task was openness to experience. This was included as a correlate of LI (after Carson & Peterson, 2000; Carson, Peterson, & Smith, 2002) that might stand as a marker of a person's tendency to filter out irrelevant information. Further work needs to be done to explore this notion, possibly incorporating other instruments such as measures of transliminality (Thalbourne, 2000) or boundary thinness (Hartman, 1991), or incorporating an experimental measure of LI (e.g., Holt, Simmonds-Moore, & Moore, 2008). The measures used to explore creativity were included as an indicator of behavioural or conceptual lability, but these gave only small positive correlations and were not significant. Perhaps the more comprehensive measure used previously (Holt & Roe, 2006; Roe & Holt, 2006) should be utilised before this suggestion is rejected altogether.

It is not clear to what extent this approach offers support for the PMIR model. A more extensive and thorough test of the effects of providing a contingent outcome is needed than that offered in Study 1 here. It may have been more informative, for example, to retain the reward and punishment conditions but have some participants arbitrarily assigned to them independently of their performance on the psi task. More generally, the salience of a contingent condition needs to be verified so that any supposed reward can be demonstrated to be more rewarding than just finishing the experiment without performing any further task. Clearly some tangible rewards and penalties are tied to the participant's beliefs and motivations concerning the task and psi generally, and we would advocate a multivariate approach to mapping the interactions between factors. Finally, this design makes the assumption that to be successful the psi task should be covert, but this assumption has not been tested and may be unwarranted. It would be worthwhile to directly assess the role of (non)intentionality by comparing intentional and nonintentional conditions.

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Abstracts in Other Languages

Spanish

EXAMINANDO PRECOGNICIÓN DE RESPUESTA LIMITADA USANDO UNA TAREA ENCUBIERTA: DOS REPLICACIONES

RESUMEN: Este artículo describe dos replicaciones de el efecto de precognición usando una tarea oculta con refuerzo contingente o un castigo informado por Luke, Delanoy, y Sherwood's (2008), quienes encontraron una relación con la creencia en la suerte. En el primer estudio 25 participantes contestaron el Cuestionario de Creencias sobre Suerte (CCS, Questionnaire of Beliefs About Luck) y asignaron puntuaciones sobre cuán agradables eran un grupo fragmentos de imágenes, lo cual era una prueba de precognición encubierta. Los/as participantes en la condición contingente llevaron a cabo una tarea agradable o desagradable basada en su desempeño en el experimento; las personas en la condición no-contingente no lo hicieron. En general, los/as participantes seleccionaron más imágenes de los objetivos sobre lo esperado al azar, $t(24) = 2.60$, p = .02, pero no hubo diferencia entre las condiciones contingentes y las no-contingentes, $t(23) = .73$, $p = .47$. El desempeño estuvo correlacionado positivamente con las subescalas de Azar y Providencia del CCS ($r = .48$, p = .02, y $r = .39$, $p = .05$, respectivamente). En el segundo estudio 32 participantes contestaron la medida de Goldberg de apertura a la experiencia (openness to experience), el Inventario de Cognición Creativa (Creative Cognition Inventory) de Holt, y la versión larga del CCS de Luke et al. antes de tomar la versión contingente de la prueba de precognición encubierta. Los/as participantes seleccionaron nuevamente más imágenes relacionadas a los objetivos que lo esperado al azar, $t(31) = 2.01$, $p = .03$. No replicamos las correlaciones entre desempeño prcognitivo y las subescalas del CCS, o las medidas de creatividad, pero hubo una correlación positiva y significativa con apertura a la experiencia ($r = .46$, $p = .01$).

German

EIN PRÄKOGNITIONSTEST MIT BEGRENZTER WAHL
UNTER VERWENDUNG EINER VERBORGENEN AUFGABE:
ZWEI REPLIKATIONEN

ZUSAMMENFASSUNG: Dieser Artikel beschreibt zwei erweiterte Replikationen des von Luke, Delanoy und Sherwood (2008) erhaltenen Präkognitionseffektes unter Verwendung einer verborgenen Aufgabe mit kontingenter Belohung oder Bestrafung, wobei die Trefferleistung vom Glauben an Glück abhängig war. In Studie 1 füllten 25 Teilnehmer die Kurzform des Fragebogens Glaube an Glück [Questionnaire of Beliefs About Luck (QBL)] aus und schätzten dann ein, wie angenehm sie Gruppen von Fraktalbildern empfanden; darin bestand die verborgene Präkognitionsaufgabe. Die Teilnehmer unter der Kontingenzbedingung absolvierten anschliessend – je nach erzielter Trefferleistung - eine angenehme oder eine unangenehme Aufgabe, diejenigen Teilnehmer unter der Nicht-Kontingenzbedingung dagegen nicht. Insgesamt wählten die Teilnehmer mehr Zielbilder aus als unter der mittleren Zufallserwartung MCE, $t(24) = 2.60$, $p = .02$, allerdings zeigte sich kein Unterschied zwischen der kontingenten und der nicht-kontingenten Bedingung, $t(23) = .73$, $p = .47$. Die Trefferleistung korrelierte positiv mit den Subskalen ‚Zufall' und ‚Vorsehung' des QBL ($r = .48$, $p = .02$, and $r = .39$, $p = .05$ entsprechend). In Studie 2 füllten 32 Teilnehmer Goldberg's measure of openness to experience [Fragebogen zur Erfassung der Offenheit für Erfahrungen], Holt's Creative Cognition Inventory [Inventar für Kreative Kognition] und Luke et al.'s QBL in der Langform. Wiederum wählten die Teilnehmer mehr Zielbilder aus als unter der mittleren Zufallserwartung MCE, $t(31) = 2.01$, $p = .03$. Frühere Korrelationen zwischen Trefferleistung und Subskalen des QBL noch mit Kreativitätsmassen liessen sich nicht replizieren, aber es zeigte sich eine signifikant positive Korrelation mit Offenheit für Erfahrung ($r = .46$, $p = .01$).

French

EXPERIMENTATION POUR LA COGNITION ANTICIPEE FORCE
EN UTILISANT UNE TACHE CACHE : DEUX REPRODUCTIONS

SOMMAIRE : Ce papier explique deux reproductions prolongees par Luke, Delanoy, et Sherwood en 2008. Il s'agit de l'effet sur la cognition anticipée en utilisant une tache cachée avec une récompense ou une punition qui a démontre que la performance est associée avec la croyance en la chance. Dans Etude 1, 25 participants ont complète un court questionnaire concernant les Croyances en La Chance (QBL). Ensuite ils ont classe l'agrément des images fractales qui était

une tache cachée de connaissance anticipée. Les participants dans une situation conditionnelle ont complète une tache agréable ou désagréable basée sur leur performance , mais pas ceux qui était dans une situation non conditionnelle. Au total, les participants ont sélectionne plus d'images cible que MCE, $f(24) = 2.60$, $p = .02$, mais il n'y avait pas de différence entre les situations conditionnelles et non conditionnelles, $f(23) = .73$, $p = 47$. Leur performance était positivement en relation avec les échelles de La Chance et La Providence du QBL ($r = .48$, $p =.02$, et $r = .39$, $p = .05$ respectivement). Dans l'étude 2, 32 participants ont complète les mesures d'ouverture vers l'expérience de Goldberg, I'inventaire de la Cognition Créative de Holt et al.'s forme longue du OBL de LUKE avant de prendre la version conditionnelle de la tache cachée sur la cognition anticipée. Les participants ont encore sélectionne plus d'images cible que MCE, $f(32) = 2.01$, $p = .03$. Nous n'avions pas reproduit auparavant les corrélations entre la performance et les échelles QBL ni avec les mesures de la créativité, mais il y avait une corrélation positive signifiante avec l'ouverture vers l'expérience ($r = .46$, $p = .01$).