DECISION AUGMENTATION IN A COMPUTER GUESSING TASK

By John Palmer[1]

ABSTRACT: Several psi and nonpsi hypotheses were tested in a computer guessing task. Participants (Ps) were 64 volunteers, 32 self-described strong believers in the paranormal and 32 self-described strong nonbelievers. Ps guessed sequences of the numbers 1–4 by calling each guess out loud and simultaneously clicking the mouse to register the response. In the 1st 2 runs, the target sequence reflected either pure repetition avoidance or pure counting, e.g., 2,3,4,1,2,3,4,1,2…. After Run 2, Ps completed psychological tests while the experimenter calculated their response bias in the preceding 2 runs. The 100 scored targets for Run 3 were random, except that every time P clicked the mouse when a computer address registered a 1 (1-state), which occurred randomly 20% of the time, they would receive a target for the next trial that matched their response bias in the preceding 2 runs, increasing the chances of a hit. As predicted from May's decision augmentation theory, in Run 3 believers clicked the mouse significantly more frequently than chance when the computer was in the 1-state, and significantly more often than nonbelievers. Both random and total hits in Run 3 were positively and significantly correlated with scores on the AT-20 test of tolerance for ambiguity.

Keywords: precognition, psychokinesis, decision augmentation, belief in the paranormal, tolerance of ambiguity

In recent years, many of the major psi testing paradigms have involved what I call *implicit psi*. These paradigms share in common that the designated psi sources are not asked to produce the hypothesized effect and may not even be aware that they are being tested for psi. Examples include research on presentiment (e.g., Bierman & Radin, 1997; Radin, 1997), the mere-exposure effect (e.g., Bem, 2003), and the global consciousness project (Nelson, 2001). The theoretical foundation for implicit psi, at least from a psychological perspective, is Stanford's (1977, 1990) psi-mediated instrumental response model, and, more recently, Carpenter's (2004, 2005) first sight model.

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[1] A longer version of this paper was presented as a poster at the 50th annual convention of the Parapsychological Association in Winchester, England, August 2–5, 2007. I am grateful to the Cogito Foundation and to the Bial Foundation for supporting this research, and to the Parapsychology Foundation for funding the prize to the highest scoring participant. Thanks also to Peter Brugger for his contributions to the design of the experiment and his assistance with the logistics, and to Enrique Wintsch for writing some of the software. The paper for the *Journal* was independently peer reviewed under the auspices of Richard Broughton.

Decision Augmentation Theory

Another model with the potential for contributing to our understanding of implicit psi is decision augmentation theory (DAT). Proposed by Edwin May and colleagues, DAT is intended primarily to explain ostensible micro-PK effects as in fact due to ESP (May, Spottiswoode, Utts, & James, 1995a; May, Utts, & Spottiswoode, 1995b). Although controversial (Dobyns & Nelson, 1998), DAT appears to account successfully for at least some of the relevant data. Most of the experiments that the theory has addressed are of the random number generator psychokinesis (RNG-PK) type. In most such experiments, a "hardware" RNG converts electronic noise into binary numbers, the distribution of which should follow the stochastic laws of chance. Most notably, the numbers of each digit generated should be exactly equal in an infinite sequence and approximately equal in finite sequences, the approximation improving as the length of the finite sequence increases.

The traditional interpretation of data from these experiments is that participants (Ps) use PK to bias the noise source such that it yields a significantly unequal distribution of the two binary numbers. DAT rejects these "force" models. It maintains instead that P intersects the target stream being produced by the RNG at the point at which a "biased" subsequence is about to appear, i.e., a sequence with an excess of one of the binary digits. Such subsequences will occasionally occur even in a true random sequence. The anomalous mechanism that P uses to detect (or predict) the point at which the target stream should be intercepted is what we call ESP, or more precisely, precognition. In DAT experiments, P decides when to intersect the target stream by pressing a button or clicking a mouse to initiate the test or run. In an important sense the button press or mouse click *is* the ESP response. DAT and the existing force models make different predictions about the relationship between the length of the sequences and the ESP scores resulting therefrom, and it is on the basis of tests of these predictions that May and colleagues claim confirmation of the theory (May et al., 1995b).

DAT can be applied to ESP as well as PK data, and it is especially well suited to ESP experiments of the RNG type. One way it could work would be for P to use the DAT mechanism to enter the target stream at the time it was about to produce a "biased" subsequence that is consistent with a naturally occurring response bias of P. This would then create a bias-matching situation and thereby yield an increase in ESP hits.

In this experiment, I tested the mechanism underlying DAT by assigning Ps a hit in the first nonfeedback run whenever they made a mouse click registering their guess at the same time a hidden computer address was in a certain state, determined randomly with a 1/5th probability. Moreover, Ps were rewarded for these hits by being given on the next trial a target that matched their response bias, as determined from the preceding runs.

Belief in the Paranormal

There is ample evidence in the parapsychological literature that believers in ESP score on average more positively than nonbelievers in ESP tests (Lawrence, 1993; Palmer, 1971; Schmeidler & McConnell, 1958/1973). Most of this evidence comes from ESP tests of the forced-choice type. Since DAT is postulated to be the mechanism by which ESP operates, I would expect it to have comparable correlates, including belief. For this reason, I expected DAT to function more positively in believers in the paranormal than in nonbelievers. This is especially likely in the present experiment, because one would expect the "reward" for using DAT (the opportunity to enhance one's score on the overt ESP test) to be rewarding for believers but not nonbelievers.

Hypotheses

The formal ESP hypotheses for the experiment are as follows:

1. Ps will register their responses more often than expected by chance when the computer is in a state leading to a favorable target on the next trial.
2. Hypothesis 1 will be confirmed more strongly for believers than for nonbelievers.
3. Ps will score significantly above chance on those trials with biased targets.

Method[2]

Participants

Sixty-four volunteers were recruited from the University of Zürich community and the city of Zürich. Written informed consent was obtained at the beginning of the test session.

As an additional requirement, these recruits had to indicate either that they have a strong belief in ESP and have had previous psychic experiences, or that they have a strong disbelief in ESP and no previous psychic experiences. This variable will be referred to hereafter as "belief." This specification was included in the recruitment poster.

Midway through the experiment I became concerned that I would not be able to obtain a sufficient number of Ps before I had to leave Zürich.

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[2] As this experiment was funded primarily to test specific hypotheses regarding response biases and implicit sequence learning, the ESP tests had to be fitted into the experimental protocol without compromising the tests of these hypotheses or increasing the duration of testing. For this reason, the ESP tests are more complicated than they would have been otherwise.

I thus decided to offer a prize of 500 Swiss Francs (approximately $400) to the P who achieved the highest score in the experiment. To which runs this scoring applied was left undefined so Ps would be equally motivated for all the runs in the experiment. In fact, the prize applied only to the first three runs, as the procedure for Run 4 was not the same for all Ps. Although all Ps were eligible to win the prize, only those 38 Ps who were tested after the prize was decided upon knew about it before their test session. The winner was a nonbeliever.

Questionnaires

The Australian Sheep-Goat Scale (ASGS). The ASGS (Thalbourne & Delin, 1993) was used as a check on the status of Ps who assigned themselves to the believer and nonbeliever groups. It consists of 18 items reflecting both belief in and experiences of various types of psychic phenomena. The items were presented in a visual analogue format, with possible scores on each item ranging from 0 to 13.

The Post-Test Assessment Scale (PTAS). This rating scale was developed by Peter Brugger to assess how Ps react to the test procedure in implicit learning experiments of the type conducted by himself and his associates. The most important question asks Ps whether they came to expect that a target sequence was biased and, if yes, at what point in the testing and the nature of that bias. Ps who can correctly identify the bias are classified as "detectors." In past research of this type conducted by Brugger and associates, about 15% of the participants in the original sample have proven to be detectors. In this experiment, data from detectors were not included in the formal analyses, and they were replaced by new Ps with the same belief in ESP.

A second set of questions asks Ps to estimate how many trials were included in each run. Third, Ps are asked if they responded intuitively, adopted a logical strategy, or a combination of the two. Finally, they are asked to describe any guessing strategies they used and when they used them.

Drawing Task. This test was developed as a measure of cerebral lateralization with respect to perceptuo-motor organization (Alter, 1989; Alter, Rein, & Toro, 1989). Ps are asked to draw rapidly on separate sheets of paper six familiar objects: bicycle, walking dog, bus, facial profile, airplane, and pitcher (ewer). The score is the number of drawings in which the object is facing right minus the number in which it is facing left, divided by the total number of drawings. The scale has a range from -1 to +1. Drawings in which the object faces neither right nor left are not counted. Right-handers tend to produce drawings facing left, and left-handers tend to produce drawings facing right, but the discrimination is not absolute (Alter, 1989).

LIMBEX Scale. The LIMBEX is intended to measure signs of temporal lobe dysfunction, or what is referred to more specifically as complex partial epilepsy. It was developed by Brugger, who chose those 13 items from a longer scale by Makarec and Persinger (1990) that had the highest point biserial correlations with the total score in a sample of 40 volunteers. Each item of the LIMBEX is a 6-point scale, resulting in a theoretical range of scores from 0 to 65. Although persons with complex partial seizures have been shown to score high on the original scale, some others also obtain high scores, and a high score by itself is not diagnostic of a seizure disorder.

Ambiguity Tolerance Scale (AT-20). This 20-item true-false scale is a revision of the 16-item Rydell-Rosen Ambiguity Tolerance Scale (MacDonald, 1970). MacDonald defines a high scorer on the scale as a person who seeks out ambiguity, enjoys ambiguity, and excels in the performance of ambiguous tasks. The task in this experiment clearly could be described as ambiguous. The AT-20 correlates in the .4 range with Rokeach's Dogmatism Scale, as well as with Gough and Sanford's Rigidity Scale (MacDonald, 1970).

Equipment

Testing was performed on a Compaq Deskpro EXM/P800 computer. Random target sequences were generated using Visual Basic, whereas the on-screen presentation was programmed with Java-Script.

Guessing Task

P was seated in front of the computer monitor, which continuously displayed squares containing the digits 1, 2, 3, 4, arranged in a vertical column in either increasing or decreasing numerical order (counterbalanced across Ps) from the top to the bottom of the screen. The reason for the vertical display was to eliminate the effect of left/right response biases potentially confounding P's guesses. At the beginning of the run, a box surrounding the word *start* was superimposed over the column of digits. P mouse-clicked on this box to begin the run, at which time the box disappeared. P's task was then to repeatedly guess which digit the computer would select for the ensuing trial. Ps indicated each choice by saying the digit out loud and simultaneously clicking the mouse. The experimenter (E), who was seated next to P, immediately entered Ps response on the computer keyboard. P's oral responses were tape recorded, and after the session E checked the typed responses against these oral responses to check for possible entry errors. The setup is illustrated in Figure 1.

The number of milliseconds between the appearance of the array and Ps' mouse click to indicate their guess was recorded by the computer as a measure of reaction time. The computer also recorded and stored the target sequence type (see below), the run number, the targets, and Ps' responses.

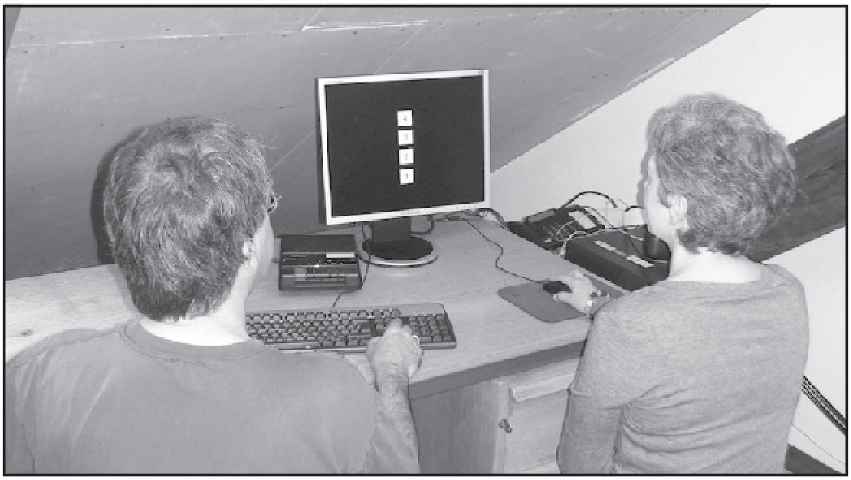

Figure 1. Layout for the testing

Target randomization employed an algorithm developed by Marsaglia and Zaman (1987) and thoroughly tested to assure passage of numerous tests of nonrandomness. The first pair of seed numbers for the formal experiment was 1 and 2,[3] and every time in the experiment that a new sequence was called for, the seeds were advanced to the next pair. This procedure provided each P with unique target sequences (no stacking effect).

Procedure and Test Protocol

Each P completed two sets of two runs. The first run was preceded by as many practice trials as necessary to assure that P understood the procedure and that P and E were "in synch" regarding their respective mouse and keyboard entries. If two successive mouse clicks or keyboard entries occurred without an intervening input of the opposite type, the computer indicated the error by "1" (indicating successive keyboard entries) or a series (indicating successive mouse clicks) of beeps. E then said "repeat" or "next," thereby instructing P what to do to correct the error, and repeated the keyboard entry if necessary. This problem arose quite rarely in the formal testing.

Runs 1 and 2. The first two runs each consisted of 80 scored trials[4] and were administered without feedback. One of the runs drew exclusively biased targets generated by an algorithm created to mimic a kind of response

[3] The Marsaglia algorithm requires input of two seed numbers.

[4] Each run began with an unscored trial. This was necessary because some of the target and response biases were defined by the relationship between the trial in question and the immediately preceding trial.

bias often demonstrated by normal Ps, namely *repetition avoidance*. In this run the targets never repeated, but after the first target in the sequence each target appeared an equal number of times (i.e., 20). Otherwise the sequence was random. For the other run, targets were assigned by an algorithm that, after the randomly selected first target, produced the extreme form of the *counting* bias characteristic of Alzheimer's patients (Brugger, Monsch, Salmon, & Butters, 1996). For example, if the first target was 2, the sequence was 2, 3, 4, 1, 2, 3, 4, 1, 2, 3 …. The order of these two run types was counterbalanced across Ps.

Following the second run, P moved to a chair facing away from E and the computer screen and then completed, in order, the drawing task, the AT-20, and the LIMBEX scale. At the same time, E moved to the adjacent chair in front of the computer and determined P's most marked response bias in the previous two runs. The computer records from these runs were merged and the resulting file submitted to analysis using software developed by Towse and Neil (1998). The frequency of each *single* target (1, 2, 3, and 4) and the relationship of each target to its predecessor (*shifts* of 0, +1, +2, or +3 units) were recorded from the Towse output.[5] The chance probability for each of these eight alternatives is .25. The summed frequencies for the first, second, and third most frequent single and shift responses, respectively, were then computed and recorded. A table had been developed which indicated the chance likelihood for each of these frequencies and ranked them, with the least likely alternatives getting the highest ranks (see Appendix). The table provides ranks for each of 24 possible response biases, i.e., the sum of the most frequently called one, two, and three choices for singles and shifts, respectively. For example, conformance to the counting bias would yield a high rank for +1 shifts, whereas repetition avoidance would be reflected by a high rank for the sum of +1, +2, and +3 shifts, which is equivalent to a low frequency of 0 shifts, or repetitions. The bias that received the highest rank, and the value of that rank, were then recorded by E. For example, in the rating scale illustrated in the Appendix, repetition avoidance (+1, +2, +3) received a rank of 20, which is higher than the ranks given to the excess of +1 and +2 shifts (17.5), the excess of 1s and 2s (4), and the excess of 1s, 2s, and 3s, or a deficiency of 4s (4). Thus, repetition avoidance was chosen as the most likely response bias in Run 3 and therefore was used for the DAT manipulation described below.

Run 3. Following completion of their respective tasks, P and E resumed the seating arrangements in effect for the first two runs. Following a few practice trials, Run 3 (N = 100 scored trials), which tested the DAT mechanism, was initiated. From P's point of view the procedure was the same as for the first two runs, except that a 2 s delay was introduced before each trial, during which the computer screen was blank. Ps were instructed

[5] This required that +1 and –3, +2 and –2, and –1 and +3 each be summed from the Towse table.

to blank their minds during the 2 s interval and only formulate their guesses when the column of digits returned to the screen. This modification of procedure was introduced in an effort to increase the variability of reaction times by attempting to break up the rhythm Ps often got into during the first two runs. Pilot testing had indicated this modification would have the desired effect.

An address inside the computer randomly alternated its content between 0 and 1, such that it (or, we could say, the computer) was in the 1-state 20% of the time during the run. This outcome was programmed as follows. Thirty repetitions of the digits 2 through 6 ($N = 150$) were randomly permutated, separately for each P. Each digit represented a .2-s interval, during which the computer would be in the 0-state. Following this time span, the computer would be in the 1-state for .2 s. Thus, it would be in the 0-state anywhere from .4 to 1.2 s (the sequence of these intervals being random) before the next 1-state, and there were never two 1-states in a row. The subroutine was activated at the time P clicked the start box on the screen, and the sequence simply recycled after it was exhausted (every 2.5 min).

Each time P clicked the mouse while the computer was in the 1-state, the next target was guaranteed to conform to P's most likely response bias, as defined by the calculation (described above) of P's most extreme response bias during the first two runs. (In the example in the Appendix, this is repetition avoidance.) For example, Ps who called an excess of 4s in the first two runs would be guaranteed to receive a 4 as the target for the next trial following any trial in which they clicked the mouse while the computer was in the 1-state. Likewise, if Ps had demonstrated repetition avoidance previously, their target following a 1-state mouse click would never duplicate their immediately preceding response. The effect of this procedure was to increase Ps' chances of a hit on the manipulated trials, insofar as they maintained the response bias they demonstrated in the first two runs. The course of Run 3 is illustrated in Figure 2.

Run 4. This run consisted of 90 scored trials with trial-by-trial feedback that was subliminal for half of the participants. For half of each subgroup, the response bias was the same as in Runs 1 and 2, and for the other half it was opposite to that in Runs 1 and 2. As this run is not relevant to the DAT test (which was completed in Run 3) it will not be described further, and the results from it will not be reported in this paper.

After Run 4, P was administered the PATS and ASGS, in that order. During this period, E returned to his office, printed out the results of the four guessing runs, and entered the data on the Participant Feedback Form, which also explained the rationale of the experiment. When E returned to the testing room, and after P had completed the scales, E gave P the feedback form, which P read. E then showed P the data sheets and answered any questions P had about the experiment or his or her results. Finally, P was asked not to discuss the details of the experiment with anyone who might participate in the experiment at a later time.

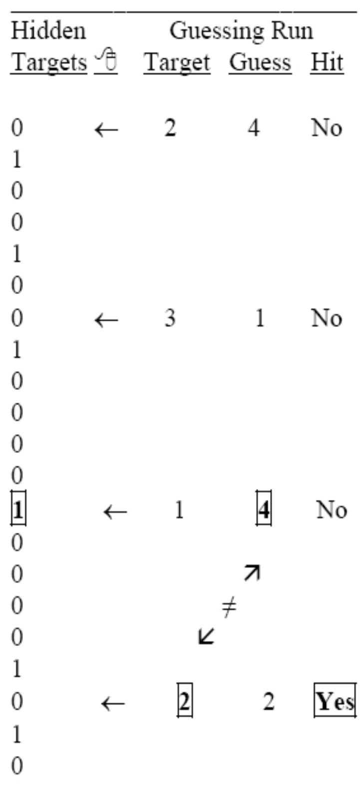

Figure 2. The DAT manipulation

Summary of Design

Five between-P variables were counterbalanced: (1) *belief* in the paranormal (believer vs. nonbeliever), (2) order of the four digits on the *screen* (ascending vs. descending), (3) target *bias* in the first two runs (repetition avoidance vs. counting), (4) bias of *targets* in the feedback run (pro-bias vs. counter-bias), and (5) *speed* of presentation of the feedback digits in the feedback run (supraliminal vs. subliminal). The four runs served as the single within-Ps variable. However, as the hypotheses were run-specific, no analysis was performed corresponding to this full design.

Results

Elimination of Flawed Data

Eight Ps were replaced during the course of the experiment. Five were replaced because of recording errors of either targets or responses in one or more runs. This came about because of errors in the sequence of oral calls and mouse clicks by P or E that could not be resolved by listening to the tapes of P's calls. There were five other cases involving Run 1 or 2 in which such errors involved the final five or fewer trials in the run. In these cases, the suspect trials were eliminated from the calculations of the run scores. One P was replaced because she had been defined as a nonbeliever but scored above the midpoint on the ASGS, i.e., in the believing direction. One believer was replaced because in Runs 3 and 4 she called the same number many times in succession, creating extreme response bias scores. Finally, one believer was replaced because she correctly detected during Run 4 that the targets were related to her own responses. This caused her to obtain an extremely high number of hits on this run.

After completion of testing it was found that for one nonbeliever in the control condition of Run 4, the protocol for defining the target bias for this run was grossly violated, such that the targets reflected the P's response bias in Runs 1 and 2 positively rather than negatively. There was not sufficient time to replace this P, so her Run 4 guessing data were eliminated from the analyses.

Tests of Hypotheses

Hypothesis 1 was tested by examining how frequently Ps clicked the mouse when the computer was in the "1-state" in Run 3—20% of the time by chance. The mean percentage of such clicks was 20.80 (SD = 3.34), $t(63) = 1.94$, $p = .057$.[6] As this result does not quite reach significance, Hypothesis 1 is suggestively supported. However, the percentage for believers was significantly high (M = 21.7; SD = 3.23), $t(31) = 3.06$, p = .006, and significantly higher than the nonsignificant percentage for nonbelievers (M = 19.85; SD = 3.21), $t(62) = 2.36$, $p = .022$. Thus Hypothesis 2 was strongly supported.

On trials in which Ps received targets consistent with their response biases in the preceding runs—trials in which the computer was in the 1-state for the preceding trial—the percentage of hits was quite high (30.92; SD = 11.18) and strongly significant, $t(63) = 4.23$, $p = .0001$. Thus, Hypothesis 3 was strongly supported. The observed mean was compared to the mean chance expectation of .25 that would apply under null conditions, that is, no matching target and response biases; thus, this result is not an ESP effect. It nonetheless confirms that 1-state trials produced the intended positive reinforcement. However, this advantage was not enough to produce significant positive scoring in the entire Run 3 for either believers (M = 26.06; SD = 4.56), $t(31) = 1.32$, or nonbelievers (M = 25.84; SD = 3.07), $t(31) = 1.55$. However, due to greater power, the mean for the whole sample just missed significance (M = 25.97; SD = 3.86), $t(63) = 1.97$, $p = .053$.

[6] All p values in this report are two-tailed.

Exploratory Analyses

The only predictor variables from the questionnaires to correlate significantly with the ESP scores in Run 3 are listed below. They should not be taken too seriously unless or until they are replicated.

Ambiguity tolerance. There was a significant positive correlation between scores on the AT-20 Scale and the proportion of hits in Run 3, both for all trials, $r(61) = .320$, $p = .010$, and for the random trials, $r(61) = .266$, $p = .035$. This means that the greater the tolerance for ambiguity, the higher the proportion of hits. The means on the ambiguity scale were quite similar for believers ($M = 11.09$; $SD = 3.16$) and nonbelievers ($M = 10.82$; $SD = 3.18$), $t(61) = 0.34$.

Post-test Rating Scale. Not surprisingly, believers estimated a higher proportion of hits for Run 3 than did nonbelievers (M = .343 vs .250), $t(45.6) = 2.32$, $p = .025$, but the variance was also significantly higher for believers ($F = 6.38$, $p = .014$, by Levene's test). Estimated success in Run 3 correlated negatively with success in the random trials of this run to a significant degree among all Ps, r_s ($N = 61$) = -.346, $p = .006$. The average number of trials Ps estimated for Run 3, which consisted of 101 trials, was 62.3. This marked underestimate occurred despite the fact that the written instructions mentioned that the number of trials per run would vary between 80 and 120.

Discussion

DAT predicts that in RNG "PK" experiments positive scoring is achieved by P intersecting a random stream of binary digits at a time that captures a scored subsequence tending to match the designated target. I operationalized this principle in the present experiment by allowing Ps to create targets matching their response biases, as estimated by the response biases they demonstrated in previous runs. Ps could create these targets by making their mouse-click responses at an opportune time, namely at a time in which the computer was randomly in the 1-state. Doing so would allow them to improve their score, and I thus predicted that Ps would generate more 1-state trials than predicted by chance. This hypothesis was suggestively confirmed with $p < .10$. As believers are more likely than nonbelievers to be motivated to attain a high score, it is not surprising that, as hypothesized, a significant excess of 1-state trials was achieved only by believers. The fact that trials determined by the manipulation yielded a high percentage of hits (30.92%) demonstrated that the manipulation had the intended effect, although it was not strong enough to yield overall significant positive scoring in Run 3 for either believers or nonbelievers. The bottom line is that these results confirm the DAT mechanism and show that it applies to ESP as well as PK test paradigms.

In a DAT experiment of the PK type, the DAT effect is generally created by a keyboard button press or mouse click that intercepts a rapidly moving bit stream of 0s and 1s in the computer. It thereby selects a long sequence of subsequent numbers that, if DAT is operating, will have an excess of, say, 1s. In the present experiment, there was also a rapidly moving sequence of 0s and 1s that, unlike in the PK example, P intercepts on each trial, using a mouse click. Thus, P selects an individual target rather than a sequence of targets. This is actually a more challenging task than P confronts in the PK case. In the latter, it is likely that any of several adjacent sequences could be selected that have the necessary bias. This means that P could press the button at any one of several adjacent moments and still achieve the desired result. That leeway is not provided by the design of the present experiment. Offsetting this disadvantage is the fact that the number stream moved more slowly in the present experiment than in a typical PK experiment.

These results represent the strong sense of what I call implicit psi; that is, psi occurred without awareness by Ps that psi was being tested. Although Ps probably realized that ESP was tested in Run 3, they were not informed that the timing of their mouse clicks had any influence on their results.

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Abstracts in Other Languages

Spanish

AUMENTO DE DECISIONES EN UNA TAREA DE COMPUTADORA DE ADIVINAR

RESUMEN: Varias hipotesis psi y no-psi fueron puestas a prueba en una tarea de adivinación de computadora. Los participantes (Ps) fueron 64 voluntarios, 32 que se describieron como creyentes fuertes en lo paranormal y 32 como no creyentes. Los Ps adivinaron secuencias de los números 1-4 a voz alta y al mismo tiempo aprentaron el ratón para registrar la respuesta. En la primeras dos secuencias los objetivos reflejaron evitación de repetición o contar, tal como 2,3,4,1,2,3,4,1,2…. Después de la secuencia 2 los Ps contestaron pruebas psicológicas mientras el experimentador calculaba sus tendencias de respuestas en las dos secuencias anteriores. Los objetivos registrados para la tercera secuencia fueron aleatorios, excepto que cada vez que que el P activaba el ratón cuando la computadora registraba un 1 (1-estado), el cual occurría al azar el 20% del tiempo, ellos recibían un objetivo para la próxima prueba que correspondía a su tendencia de respuesta en las dos secuencias anteriores, aumentando la posibilidad de un acierto. De acuerdo a la predicción de la teoría de May de aumento de decisiones, en la tercera secuencia los creyentes activaron el ratón significativamente más frecuentemente de lo esperado al azar cuando la computadora estaba en el 1-estado, y significativamente más frecuentemente que los que no tenían creencias paranormales. Los aciertos aleatorios y totales obtivieron una correlación positiva y significativa con las puntuaciones de la prueba AT-20 de tolerancia de ambiguedad.

French

AUGMENTATION DE LA DECISION DANS UNE TACHE INFORMATISEE DE DIVINATION

RESUME: Plusieurs hypothèses psi et non-psi furent testées dans une tâche informatisée de divination. Les participants (Ps) étaient 64 volontaires, 32 se décrivant comme croyant fortement au paranormal et 32 se décrivant comme des incroyants invétérés. Les Ps devinaient des séquences des nombres 1 à 4 en disant chaque divination à haute voix et en cliquant simultanément sur la souris pour enregistrer la réponse. Dans les deux premières séries d’essais, la séquence cible

correspondait à un pur évitement de la répétition ou à un pur comptage, c'est-à-dire : 2,3,4,1,2,3,4,1,2… Après la deuxième série, les Ps complétaient des tests psychologiques tandis que l'expérimentateur calculait leur biais de réponse dans les deux séries précédentes. Les 100 nombres cibles dans la troisième série étaient aléatoires, sauf que chaque fois qu'un participant cliquait sur la souris quand l'ordinateur demandait la réponse 1 (état-1), ce qui arrivait aléatoirement 20 % du temps, il recevait pour l'essai suivant une cible qui correspondait à son biais de réponse dans les deux séries précédentes, augmentant ainsi ses chances de succès. Comme le prédit la théorie de l'augmentation de la décision de May, durant la troisième série d'essais, les croyants ont cliqué sur la souris significativement plus fréquemment que le hasard lorsque l'ordinateur était dans un état-1, et significativement plus que les incroyants. A la fois les succès aléatoires et totaux dans la troisième série étaient positivement et significativement corrélés avec les scores au test AT-20 de la tolérance à l'ambiguïté.

German

ENTSCHEIDUNGSZUWACHS BEI EINER COMPUTER-RATEAUFGABE

ZUSAMMENFASSUNG: Mehrere Psi- und Nicht-Psi-Hypothesen wurden in einer Computer-Rateaufgabe getestet. Teilnehmer (Tn) waren 64 Freiwillige, 32 beschrieben sich als starke Psi-Gläubige und 32 als starke Ungläubige. Tn hatten die Abfolge der Zahlen 1–4 zu erraten, indem sie jede Zahl laut aussprachen und gleichzeitig mit einem Mausklick die Antwort registrieren mußten. Bei den ersten 2 Durchgängen (runs) bestand die Abfolge der Ziele (targets) entweder aus einer reinen Wiederholungsvermeidung oder aus einem reinen Abzählen, z. B. 2,3,4,1,2,3,4,1,2…. Nach dem 2. Run füllten die Tn psychologische Tests aus, während der Experimentator ihren Reaktionsbias in den beiden vorhergehenden Runs auswertete. Die 100 registrierten Ziele für Run 3 waren zufällig, ausgenommen dann, daß jedesmal, wenn der T die Maus anklickte, wenn eine Computeradresse eine 1 (1-Zustand) registrierte, was zufällig in 20% der Zeit passierte, er ein Target für den nächsten Versuch bekam, das mit seinem Reaktionsbias in den beiden vorangegangen Runs übereinstimmte, wodurch die Wahrscheinlichkeit für ein Treffer erhöht wurde. Wie May's Theorie des Entscheidungszuwachses (decision augmentation theory) vorhersagt, klickten die Gläubigen bei Run 3 die Maus signifikant häufiger an als der Zufall, wenn sich der Computer im 1-Zustand befand, und signifikant häufiger als die Ungläubigen. Sowohl die zufälligen wie die Gesamttreffer in Run 3 waren positiv and signifikant mit den Ergebnissen im AT-20 Test für Toleranzambiguität korreliert.

APPENDIX

Ranks for Response Sums

ANY 1		ANY 2		ANY 3	
42	1	82	1	122	1
43	2	83	2	123	2
45	3	85	3	123	3
46	4	86	4	126	4
48	5	88	5	128	5
50	6	90	6	130	6
51	7	91	7	131	7
53	8	93	8	133	8
54	9	94	9	134	9
56	10	96	10	136	10
58	11	98	11	138	11
59	12	99	12	139	12
61	13	101	13	141	13
62	14	102	14	142	14
64	15	104	15	144	15
66	16	106	16	146	16
67	17	107	17	147	17
69	18	109	18	149	18
70	19	110	19	150	19
72	20	112	20	152	20
74	21	114	21	154	21
75	22	115	22	155	22
77	23	117	23	157	23
78	24	118	24	158	24
80	25	120	25	160	25
82	26	122	26		
83	27	123	27		
85	28	125	28		
86	29	126	29		
88	30	128	30		
90	31	130	31		
91	32	131	32		
93	33	133	33		
94	34	134	34		
96	35	136	35		
98	36	138	36		
99	37	139	37		
101	38	141	38		
102	39	142	39		
104	40	144	40		
106	41	146	41		
107	42	147	42		
109	43	149	43		
110	44	150	44		
112	45	152	45		
114	46	154	46		
115	47	155	47		

RESPONSE BIAS RATING SCALE: RUNS 1 + 2 (SAMPLE)

Name: ________________________________ Date: __________________
SN: ________

Single:

Bias	Tot	Rnk
1	46	1
2	40	2.5
3	40	2.5
4	34	4

Shift (sum):

0	8	4
1	50	2
2	58	1
3	44	3

Shift (1):

Bias	Tot
-3	26
-2	30
-1	22
0	8
+1	24
+2	28
+3	22

Single	Sum	Rnk	Numbers		
Highest 2:	86	4	1	2	
Highest 3:	126	4	1	2	3

Shift	Sum	Rnk	Numbers		
Highest 2:	108	17.5	+1	+2	
Highest 3:	152	20	+1	+2	+3

Choice: (~~Single~~/Shift) +1 +2 +3 Rank: 20