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AN ORIENTATION-BASED MODEL FOR PSYCHOKINESIS

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Abstract

A model for conceptualising psychokinesis is outlined, based on a two-way interaction between the target system and the participant's physiology, via the environment. The model predicts that an orientation period, wherein the participant can associate internal/subjective experiences to the feedback display of the target system, will improve psychokinetic performance. An experiment, currently in progress, designed to test the model is detailed. The psychokinetic performance of [illegible] randomly assigned participants is compared for those who experience an orientation period with those who do not. The amount of feedback given is also varied, one display providing real-time information, the other providing cumulative information about past performance. A novel element was introduced whereby participants were asked to create a preset pattern out of the random data, rather than just attempting a deviation from the control baseline.

Introduction

Problems with psychokinesis

Traditionally, as extrasensory perception (ESP) was thought to be analogous to the 'normal' senses, so psychokinesis (PK) was the 'paranormal' equivalent of motor control, implying the 'action of mind on matter' (Schmeidler, 1990). This dichotomy leads to a problem long recognised by PK researchers: how does the PK agent know what they are manipulating in the target system ? If there is to be directed action, some sort of feedback seems necessary, but what constitutes feedback? Furthermore, why is it that PK seems independent of the task complexity (e.g. Schmidt, 1984; Kennedy, 1978) ? How can feedback at the end of an influence session be as successful as ongoing feedback (e.g. Berger, 1986) ? And, perhaps more importantly, how can PK work when participants are unaware of the existence of a task (e.g. Stanford et al, 1975) ?

The two main approaches that address this problem are the 'process-oriented' theories and the 'goal-oriented' theories. Rhine advocated the former approach (see Kennedy, 1978), proposing that PK requires ESP to operate, information about the target-system being continually monitored extrasensorially; this has been termed 'cybernetic' PK. The latter approach developed from suggestions by Price (see Kennedy, 1978) that a better conceptual model for PK was that of 'ideomotor action', such as is seen in the everyday operation of the human body. When walking, we do not continually monitor the workings of our leg muscles; instead, we have in mind the desired goal, and the body, seemingly automatically, carries out the necessary procedure. Below are brief descriptions of some of the theories, using both approaches, which attempt to model PK.

Psi Mediated Instrumental Response (PMIR)

Stanford (1974) proposed a general model wherein an organism uses psi, as well as sensory means, to scan its environment for information related to its needs. This is often, but need not necessarily be, an unconscious process. In this model, cybernetic PK is viewed as being an instrumental response. The author lists the following important features:

(i) PK and ESP are separate processes: although telepathy can be seen as involving both extrasensory scanning for information about another organism and mental/behavioural influence of that organism by PK.
(ii) Psi events happen in relation to the needs of the organism, and depend on the closeness in time of the relevant object/event.
(iii) Psi can occur without the need for conscious perception of the need-relevant circumstance: this tends to imply that psi may operate independently of task complexity.
(iv) Feedback is not necessary: ESP provides relevant information.
(v) The use of psi is governed by a variety of factors, both situational and psychological.

Teleological Model (TM)

Schmidt (1975) originally proposed a teleological model that postulated psi as representing a modification of the probabilities for different world histories. Its most important features were:

(i) Unity of psi: PK and ESP are all aspects of one common psi principle.
(ii) Psi is independent of space and time: when and where in the world history psi occurs is irrelevant.
(iii) Psi is independent of task complexity: the psi agent aims for the desired end-point.
(iv) Feedback is vital: the psi agent can have an effect only if it is coupled to its environment in such a way that it may receive a stimulus.
(v) The divergence problem: future psi agents can also have an effect on the present world history.

Quantum Mechanical Theory of Psi (QMTP)

Walker (1974) identified consciousness with quantum-mechanical hidden variables. He pointed out that any physical system, including the brain, develops probabilistically into a number of potential states. Which of these states becomes the physical reality depends upon an 'observation' being made; that is, it depends upon the specification of the values of the hidden variables (consciousness). As the brain is linked via sensory input to the external world (which includes any other observers), and as there must be consistency between observers as to the state of that external world, this specification can effect a change in both. Important features of this theory include:

(i) Unity of psi: PK, ESP and precognition are all aspects of observer state-selection.
(ii) Psi is independent of space and time: hidden variables are required to be non-local.
(iii) Psi is independent of task complexity.
(iv) Feedback is vital.
(v) The divergence problem: although future psi agents can also have an effect, they can only increase the variance of experimental results rather than change what has already been observed.

Quantum Collapse Model (QCM)

Using the framework of quantum theory, Schmidt (1981, 1984) went on to develop a model where PK was linked to the 'collapse' of the wavefunction into a specific state during observation of the target system. It's important features were:-

(i) PK is dominant: ESP and precognition occur as a result of the PK agent 'choosing' the outcome to agree with their prediction.

(ii) There is limited space-time independence: although the PK effect can occur irrespective of the space-time separation between the agent and the target, only the first successful PK attempt can be effective
(iii) Feedback is vital.
(iv) PK is independent of task complexity.
(v) There is no divergence problem: once complete collapse has occurred, no further PK effects can be achieved,

Decision Augmentation Theory (DAT)

This theory, which developed out of the Intuitive Data Sorting theory (e.g. Utts, May and Frivold, 1987), posits that humans may have the ability to make decisions, based on information gained 'precognitively', that allows them to take advantage of natural fluctuations in the target system. Some important features are:

(i) There is no causal PK: PK becomes an aspect of precognition.
(ii) Psi is time independent (to some extent): although there is some debate as to whether it is the future which is 'seen', or just the probabilities associated with a specific outcome.
(iii) 'PK' z-scores will remain constant over all run lengths.

The Model of Pragmatic Information (MPI)

This model (Lucadou, 1987; Lucadou, 1991) utilises a system-theoretic approach to psi, utilising the concepts of pragmatic (i.e. meaningful) information and organisational closure. Some important features are:

(i) There is no causal influence: PK is 'only' a non-local correlation between psychological and physical variables
(ii) Psi would be expected only when a mental system is undergoing a change in complexity.
(iii) Feedback is vital: its role is to strengthen the organisational closure.

The above descriptions are intended only to provide some idea as to the approach of each. To fully appreciate them, the reader is encouraged to refer to the referenced sources. Of the six mentioned, only the PMIR and the MPI take psychological variables into account, although the latter makes few predictions as to which variables are important, putting the emphasis on the import of the information the agent receives about the system. The QMTP is linked to Walker's calculations of the rate of information transmission in the human brain, but it is hard to relate this rate to specific psychological states. Although the DAT, the QCM or the TM may offer a true physical theory to explain psi phenomena, they do not take into account the psychology of the psi agent. If a full explanation of psi is to be accomplished, this must be included - possibly a combination of PMIR and one of the physical theories would achieve this. It is also difficult to see how these theories account for hidden- or unknown-target protocols (e.g. Stanford, 1975) , or why a process-oriented strategy is seemingly superior to a goal-oriented one when there is no overt feedback (e.g. Levi, 1979). With this aim in mind, I would like to propose another way of looking at PK.

'Orientation' to target system

Most PK experiments involve the participant sitting down in front of an entirely unfamiliar system and being expected to psychokinetically 'influence' it in a desired manner on demand. The participant not only has to utilise PK to affect the target system but must also work out how to 'focus' on that system in some meaningful way. The goal-oriented approach further assumes that the participant needs to concentrate only on the chosen feedback, be it a computer display, coloured lights or whatever, and attempt to modify its appearance; all the information the participant needs is contained within this feedback, which may be many steps distant from the physical source used to produce it.

However, consider the following scenario: assume the PK target system interacts with its environment in some way, this environmental change then acting to modify the physiological and/or psychological state of the participant (see figure 1). This interaction could possibly occur through recognised processes (e.g. electromagnetic or mechanical effects) or through more exotic ones (e.g. non-local correlations, QM scalar waves, etc.) - the actual mechanism is not important at this stage (although the following section will speculate as to a possible mechanism). As a particularly unsubtle example, suppose that the decay of a radioactive particle in an RNG modifies the environment in such a way that it then promotes the tunnelling of an electron across a particular synaptic cleft in the participant's brain (or that common environmental conditions promote both the decay and the electron tunnelling), resulting in a state of happiness for the participant as they are watching a red light come on. The participant, if they are monitoring their internal state as well as attending to external stimuli, may then notice a correlation between 'happy' and 'red light'. This is what I have termed the *orientation* process. When trying to influence the same RNG, the participant attempts to bring about a similar state of happiness as was experienced earlier .The assumption is made that, by recreating this 'happy' state, the associated physical processes in the participant's brain will to some extent approximate those which occurred in the original 'happy' state. These processes could then modify the environment to a condition similar to that which originally promoted the 'happy' mental state, which should then promote the decay of a radioactive particle in the RNG.

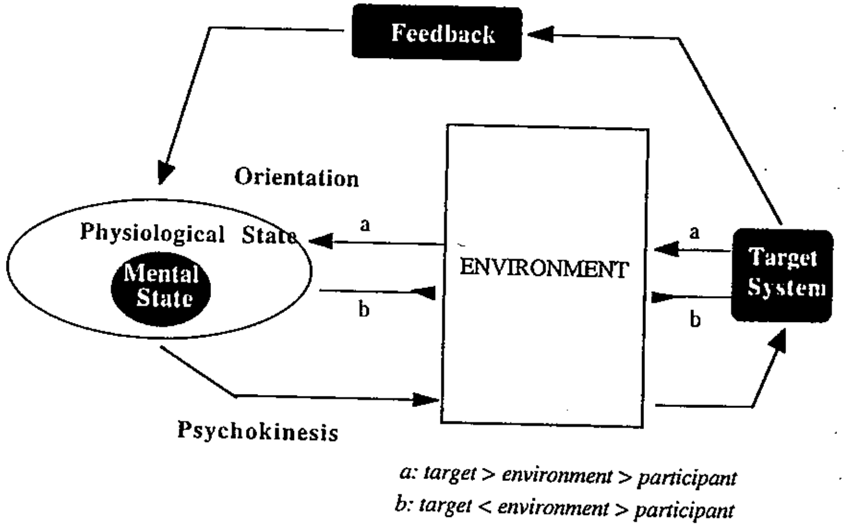

Figure 1: a schematic diagram of the model

This process is similar to the way in which biofeedback seems to work. Explicit feedback of physiological processes appears to allow some degree of voluntary control over those processes. The participant has to correlate their subjective state with the feedback display, discovering which of the many internal signals were linked to the relevant physiological process. They could then promote this internal state, which should result in a corresponding change in their physiology. It is interesting to note that there are several other interesting parallels between biofeedback and PK research. As with PK research, biofeedback effects are usually small but statistically significant (Tursky, 1980), the process of change can be goal-oriented (Schwartz, 1974) or process oriented (Tursky, 1980), and 'missing' is a common occurrence (Wegner, 1994).

In the proposed model it is this coupling of feedback to internal states that allows the PK agent to differentiate between useless information and information linked to the target system. Even in biofeedback studies, the capacity for the human brain to discriminate relevant information from noise has been found to be remarkable (Schwartz, 1974).

The model may also suggest a reason for the sender-friend being superior to a sender-stranger in ganzfeld ESP studies: if the friend is equated with the PK target, their behaviour, facial expressions, etc. become the feedback that is to be coupled with the receiver's internal states. Such coupling would be less likely to occur in the short time that the participant interacts with a sender-stranger than in the longer period of time they have interacted with the sender-friend.

Speculations as to the mechanism

In a recent book, Ervin Lazlo (1993) expounded his ideas concerning the 'quantum vacuum', a background energy field present throughout space, and how it may interact with mental processes. Although the mechanisms he describes are speculative, there is a lot of interest in the quantum vacuum itself. It is known that this energy-field is responsible for a number of phenomena in physics, such as the Lamb shift - a small shift in spectra due to a perturbation of atomic electrons by electromagnetic 'vacuum' energy. If then, as some authors have speculated (e.g. Walker, 1974), the brain's normal operation involves quantum level processes, the vacuum energy may also perturb those processes. As the vacuum is itself modified by quantum particles (e.g. Puthoff, 1990), a two-way interaction may conceivably occur. However, whether or not this mechanism is applicable, the orientation model may still be tested experimentally.

Predictions of the model

Orientation period: PK will be more successful if a specific time is allowed for the agent to correlate their internal states with the target system's operation.

The role of feedback: it should be noted that what the PK agent considers to be feedback need not necessarily be the experimenter-planned feedback! Although some form of feedback is necessary for orientation to occur, this could be minimal. This means that, in a covert task, the PK agent may still be able to exert an influence as s/he may still be able to notice a pattern of 'internal state linked to a particular outcome/event', even if the 'outcome' is merely the praise of the experimenter. Even in the absence of any overt feedback, the environmental modification from the RNG alone might still be noticeable enough, albeit on a very subtle level, for some influence of the target system to be achieved. An effect that may be seen in such a case would be that the direction of the PK influence would match the direction of any slight bias in the RNG during the orientation period. For example, if the RNG had a very slight (albeit nonsignificant) excess of ones during the orientation period, the agent may detect this bias and respond to it as the strongest stimulus. The overall PK effect would then be to introduce an excess of ones. However, although PK could still occur in the absence of feedback, it is predicted that PK influence will be greater the more the feedback is explicitly related to the target system.

Environmental noise: if the model is correct, it could be possible for the PK agent to experience interference from the environment. External sources could either further modify the environment, or could cause an effect on the physiology of the PK agent, disrupting the orientation process.

Independence of task complexity: the PK agent has 'only' to match some aspect of their internal state with a some sort of feedback. The processes which have occurred to produce either of these two factors are irrelevant.

PK can occur without conscious effort: as a PK effect is a by-product of normal mental functioning, occasional random effects or effects related ...

PK will be related to the ability of the agent to monitor their internal states: it seems likely that this would be reflected by various psychological measures such as absorption, fantasy proneness and imagery (e.g. see Irwin, 1979)

PK ability will be related to the agent's ability to perceive the correlations between internal and external stimuli: if the orientation model is as similar to the biofeedback process as it appears, this leads to the idea that those who are good at biofeedback would also be good at PK. Psychological scales such as ambiguity tolerance and field dependency may also relate to this ability.

PK will be intimately related to the psychology of the agent: PK is considered to be a result of normal physiological processes. Specifically, any factors which disrupt internal/external monitoring (e.g. anxiety) will also reduce PK.

Procedure

Participants

All participants were self-selected volunteers recruited from posters placed around the University environs. All were randomly assigned by a computer-based pseudo-random algorithm to either the orientation or the non-orientation condition, such that both conditions had equal members.

It was decided before the study started to use 60 participants. This number was based on the reported effect size in the PK meta-analysis (Radin and Nelson, 1989) of 0.0003. For an effect of this magnitude, to reach a z-score of 1.645 (significance at the p=0.05 level), 7,516,736.11 bits need to be collected. This reduces to 52.2 sets of 144,000 bits. Rounding up to the most convenient value gives the chosen number of participants. Please note this is to 'ensure' an *overall* PK effect i.e. 144,000 bits were collected in each condition.

Equipment used

Random binary digits were generated using an serial interface RNG (available from Dick Bierman) based on two Zener diodes. The RNG was subjected to a number of randomness tests, both parametric and non-parametric, before use. Tests showed good random operation over a variety of run -lengths. The only exception was that a significant excess of runs (as detected by the non-parametric one-sample runs test) was occasionally generated only when samples of 50 bytes or less were taken. As the current study had a minimum sample size of 3600 bytes, the randomness of the device was sufficient.

The RNG was connected to an IBM compatible 286 computer with an EGA colour display. The feedback display used was generated on screen by a program written by the author in C++ and compiled to executable code. Once the program had been initiated, it could be interrupted only by knowing the combination of key presses and security code. If this was attempted unsuccessfully, an alarm was sounded and program operation suspended. There was no other way to interfere with its operation short of resetting the computer, which would then require the entering of a password before it started a new session.

Feedback Display

This consisted of a 24 cell by 24 cell matrix displayed on the computer screen. Figure 2 shows a schematic diagram of the screen appearance. The currently blank 'Influence matrix' - the area in which the RNG output will appear - is on the left; the Target pattern - a fixed, preset pattern - is on the right. The information bar presented prompts for initiating key presses, selected mode, and so on. The screen was predominantly a light grey colour with dark grey text.

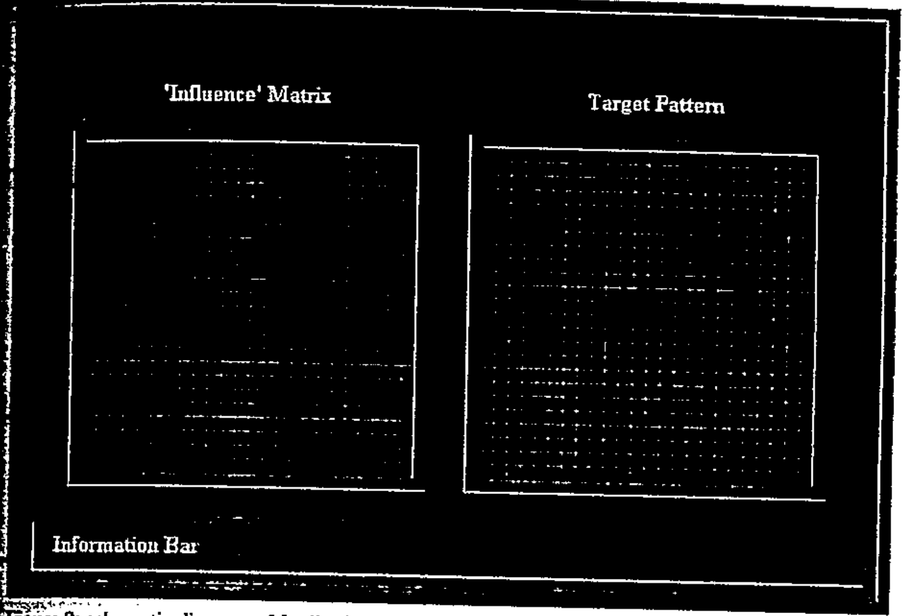

Figure 2: schematic diagram of feedback display.

Binary events were used sequentially to determine the appearance of each cell. In binary mode, a '0' was displayed as a dark blue square, a '1' as a white square. The first bit generated determined the appearance of the cell in row 1, column 1, the next bit the appearance of cell (1,2), and so on up to cell (24,24). This provided real-time feedback, but would give feedback over time only if there were a large and consistent PK effect.. In cumulative mode, the cell colour depended on the length of runs - the more consecutive 0s, the darker blue the square; the more consecutive 1s, the brighter yellow. Purely binary variation (i.e. 101010) was displayed as a neutral grey colour. This mode thus gave the participant some indication of how much influence they were having over time, and led to a more dynamic display. The decision as to which display the participant would see first was randomly assigned, again with the condition that both cumulative-binary and binary-cumulative ordered groups contained equal numbers of participants. As the cumulative display gave some indication of success over time, it was predicted that this display would result in a higher degree of PK influence.

For both modes, the preset target pattern was displayed next to the feedback grid, participants being asked to attempt to recreate this pattern on the feedback grid by influencing the RNG output. This allows the possibility that, even if the number of 1s and 0s conforms to the expected chance values, a PK influence could still be seen by the participant through the appearance of the pattern (i.e. the distribution of the binary numbers), rather than having to wait for a battery of statistical analyses. Such an approach also makes use of the well known human capability of seeing patterns in randomness, whether they are actually there or not. This may serve to boost the participant's confidence. The preset pattern appeared either white on black or black on white, this being pseudo-randomly determined before each run.

Hypotheses

Feedback:

H1a: PK scores will be greater for the cumulative than for the binary display.
H1b: Pattern correspondence will be greater for the cumulative than for the binary display.

Orientation:

H2a: PK scores will be greater for the orientation than for the non-orientation group.
H2b: Pattern correspondence will be greater for the orientation than for the non-orientation group.

The existence of a significant PK effect should be apparent from the calculated z-scores used in the above comparisons, and will be reported. Any deviation from the control baseline, or any pattern correspondence, in the orientation periods will also be looked for. However, the purpose of the study is to test some aspects of the proposed model, rather than to attempt to add yet more 'proof' to the already large PK database.

Experimental conditions

Orientation vs. Non-orientation: during the 'orientation' session, members of the orientation group experienced the true random number generator (TRNG) in operation. Members of the non-orientation group experienced the pseudo-random (computer algorithm) number generation, only experiencing the TRNG during the PK attempt sessions. Both groups had 30 participants who had been randomly assigned.

Binary vs. Cumulative Feedback Display: each participant will experience an orientation period and an PK influence period with both of the displays. Half of the participants will experience the binary and half the cumulative display first.

Method

Before the participant's arrival, a 10-run control session of the RNG was initiated with an inbuilt delay to allow the experimenter time to leave the room. Participants were then met at the Psychology department entrance and escorted to the room where the experiment was to take place. When ready, participants were seated in a comfortable chair in front of the feedback display. The procedure for the coming session was detailed and they were encouraged to ask questions about any aspect that was unclear. They then listened to a short minute progressive relaxation tape to reduce muscular tension. By promoting this inward-attentive state, such as is used in Ganzfeld ESP studies, any noise due to somatic processes may be reduced. It was hoped that this would allow any modifications or constraints within the participant's body that may correlate with the feedback to be noted as they watched the display. By asking for a self-report on any subjective impressions - mental images, feelings or sensations - any such correlations may be discovered, even if they are registered only on an unconscious level. No attempt was made to assess how confident they were about the coming task, nor their general belief in the paranormal. Such questions, it was felt, might induce anxiety, either by implying difficulty or by emphasising the 'paranormal' nature of the task.

The experimenter started the no-feedback period (5 runs) having instructed the participant to report any subjective impressions or experiences. All of the participant's description of their internal-subjective state was recorded on audio-tape as well as being noted on paper by the experimenter. During this period, the matrix and target pattern appeared on screen, but no information about the RNG was displayed. Next, either the binary or cumulative feedback period was started (5 runs), the participant having been instructed to passively watch the display, again reporting any subjective impressions. At the end of this first feedback-orientation period, any reported impressions were discussed, especially if the participant had

if there were any correspondences between their impression and the display. If there were no correspondences, the experimenter attempted to discover what the dominant or most striking impressions were. If there were also none of these, the participant was encouraged to induce the same non-eventful state. In other words, no matter what the participant experienced, this was presented as being a positive result. When ready, the first influence session was started (5 runs), the participant instructed to recreate any internal states that s/he thought were related to the desired output. The orientation and influence periods were then repeated using the alternative display.

After the session had finished, data was archived and encrypted on floppy disk. The participant was debriefed as to the ideas behind the experiment and escorted out of the building. Meanwhile, another control run was performed. It should be noted that at no time could the experimenter see the screen while the display was active, and that he concentrated as much as possible on the participant's mentation rather than on his own internal state. By taking these precautions, it is hoped that any experimenter effect was minimised.

Treatment of results

Data generated

One run consisted of 50 matrix updates (i.e. 24 x 24 x 50 bits. = 28,800 bits) and took approximately 1 minute. A control period consisted of 10 consecutive runs. Thus:-

Before /	288,000 bits /	
After session control period	288,000 bits	
No feedback condition	144,000 bits	
Binary feedback orientation /	144,000 bits /	
PK attempt	144,000 bits	
Cumulative feedback orientation /	144,000 bits /	
PK attempt	144,000 bits	
	SUB-TOTAL	576,000 bits control
		288,000 bits attempted PK
		432,000 bits orientation
	TOTAL	1,296,000 bits.

Analysis of PK scores

Z-scores and effect sizes for deviation from control baseline will be calculated for each period.

Analysis of pattern correspondence

The z-score for each cell, with respect to the desired direction
Binary display: WHITE=50='score high'; BLUE=0='score low'
Cumulative display: YELLOW=50='score high'; BLUE=0='score low')
will be calculated and combined to give a z-score for the entire matrix, for each period.

Test of hypotheses

H1 & H2: a 1-tailed t-test will be used to look for differences between conditions.

All binomial probabilities used in the statistical analysis will use control period data to calculate exact probabilities. Although the RNG was extensively tested, and although the control run performed before each session is tested for any deviation from expected chance values, it was decided to that this technique would ensure that any non-random-bias in the RNG, however slight, would be compensated for. As the author is presenting a model which postulates an interaction between the RNG and its environment, it seemed sensible to allow for the possibility of varying environmental conditions altering the output.

Discussion

Problems

Regardless of the results, there are still problems associated with the suggested model. A PK effect seen in pseudo-random numbers, such as those produced by a computer algorithm, can not easily be explained. Any 'environmental modification' during the PRNG operation would essentially be indistinguishable from that of normal computer operation, hence its use in the non-orientation condition. There is also the inherent difficulty in altering the essentially preset sequence of numbers generated by an algorithm. Pre-recorded and true-random seeded algorithms also have a similar problem. In the latter case any influence would have to be on the part of the experimenter at the time of seed generation. For such situations, DAT would seem to be the most economical model.

As an interesting speculation, it might be wondered whether the balancing effect proposed by Pallikari-Viras (1993) and even the decline effect may turn out to be biological rather than physical effects, akin to overstimulation-adaptation effects seen in colour vision. As the desired state is stimulated and maintained, adaptation occurs. A greater degree of stimulation is required - an increase which doesn't normally occur in PK experiments. After the task is over, stimulus to the adapted cells is reduced, causing a complementary effect: an afterimage in vision, a balancing effect in PK ?

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