ARE PREPARED RANDOM NUMBERS AND REAL TIME RNGS INTERCHANGEABLE?

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PROBLEMS OF RANDOMNESS*

ARE PREPARED RANDOM SEQUENCES AND REAL TIME RANDOM GENERATORS INTERCHANGEABLE?

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Electronic random number generators (RNGs), which generate a random target number on demand for each trial, became widely accepted in parapsychological research following their use by myself (JASPR, 1966, pp. 256-269), Schmidt (JP, 1970, pp. 219-224), and Targ and Puthoff. Numerous studies have now shown, however, that electronic RNGs are susceptible to PK effects. Thus, when an electronic RNG is used as a real time generator in any ESP experiment, the possibility exists that some unspecifiable proportion of significant results might be due to PK action rather than ESP.

One result of this ambiguity has been a call by several colleagues to use prepared random number tables, stored targets, as standard operating procedures. If prepared, stored random numbers and real time RNGs are indeed experimentally equivalent, this suggestion has great merit. The data presented here suggest, however, that they are not experimentally equivalent.

In two reported studies using a real time electronic RNG, I found a strong and statistically significant negative correlation between positive scoring on a designated real time target and +1 precognitive scoring on the upcoming but not yet determined next target. I proposed a theory of transtemporal inhibition to account for this (RIP 1977, pp. 197-250), hypothesizing that the part of the mind which uses psi is less "localized" in space and time than our ordinary brain-mediated consciousness. Simply activating this psi part of the mind per se might produce ESP-mediated information not only about the desired, real time target, but also about immediately temporally adjacent targets as well. On those trials on which ESP is activated, some non-conscious part of the mind discriminates the immediately future and real time targets, and then creates a psychological inhibition against calling the immediately future target, thus enhancing (by contrast) the chances that the real time target will be

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called correctly. Insofar as trans-temporal inhibition theory is valid, it suggests that an already prepared, stored sequence of targets is not experimentally equivalent to a real time RNG, where a new target is not determined until after a previous response. In the already prepared target case, at a time of any given response all of the targets exist and some sort of "spatial" discrimination, as well as possible temporal discrimination, may be required by the percipient. Thus different kinds of performance, in terms of hitting or missing on immediately future targets, might be expected when comparing stored random target sequences with target sequences generated by real time RNGs.

In the course of a third study on the effects of immediate feedback on ESP performance, a modification of equipment was made which allowed a test of whether percipients responded differently to stored targets than to targets generated on line. The third training study was similar in procedure to that of the two previous training studies (JASPR, 1979, pp. 151-165). The main test device used was the Apple-ADEPT ten-choice training device (A/ADEPT), a more sophisticated version of the original ten-choice trainer (TCT), which was also used. An Apple II microcomputer controlled the functioning of the display and response consoles, as well as electronically recording data. The basic task on each was to push the button beside one of the ten unlit lamps that corresponded to the current target.

While an on-line, real time electronic RNG was always used with the TCT, the A/ADEPT was modified so that, unbeknown to the experimenters or percipients, it randomly chose to use either an on-line, real time RNG or to use a sequence from a stored table of RNGs on particular runs.

As a group, the 15 percipients did not show any evidence for ESP functioning in terms of hitting on the intended, real time target. They made 609 hits when 591.3 were expected by chance, corresponding to an insignificant Z-score of +.77. One individual percipient scored significantly above chance (53 hits when 40 were expected by chance, $p \cong .03$, 2-tailed), but this is probably not significant when 15 individual significance tests were conducted. There were no suggestions of significant differences (by t-test) between the TCT and A/ADEPT devices, or between the real time RNG and stored target conditions of the A/ADEPT for real time hitting on the designated target.

The hypothesis of a scoring difference on +1 future displacement scoring between real time and stored targets was tested in two ways. First, the real time and stored target conditions on the A/ADEPT were compared by a t-test between the standard Z-scores of each percipient on +1 scoring. The mean Z-score for real time RNG targets was -.13, while for stored targets it was +.78, $t = 2.11$, $p \cong .06$, 2-tailed. Second, the RNG conditions on the TCT and A/ADEPT are essentially equivalent (both on-line, real time), so those data were combined for a more sensitive test of +1 differences with a larger data base. The mean Z-score for scoring on +1 displacements with the real time RNG changes trivially to -.06, and for the comparison, $t = 2.34$, $p < .05$, 2-tailed.

With little or no apparent ESP manifesting on the intended real time targets, the effects of trans-temporal inhibition on the hypothesized non-equivalence of real time RNG and stored target conditions might be expected to be minimal or non-existent. Nevertheless, a significant difference was found on +1 precognitive scoring, and the study suggests that stored random number targets and targets generated by real time RNG are not equivalent experimental conditions in terms of the way psi works. (See Erratum, p. 152.)

PSI SCORES WITH RANDOM AND PSEUDO-RANDOM TARGETS

Gertrude R. Schmeidler† and Randall Borchardt (City College of the City University of New York)

Donald and Martin (EJP, 1976, pp. 17-36) set forth a theory for the physics of psi, based on time-symmetric thermodynamics. Their thermodynamic equations are solved for both positive and negative values of time, thus showing future events influencing past events.

The theory makes many predictions about psi. Some are strongly supported; some untested; none disconfirmed. One untested prediction is that "results of psi tests using truly random events will be more significant than those using pseudo-random events" (p. 33). We performed an experiment to examine this.

Methodological decisions were: (a) to control individual differences in psi ability by using a within-subject design; (b) to determine order of conditions randomly; (c) to control conscious preference effects by keeping both experimenter and subject blind to the target condition (though obviously extrasensory knowledge could not be shielded); (d) because our random events generator (REG) lends itself readily only to precognition or PK and because a fully pseudo-random series permits clairvoyance, to initiate our pseudo-random sequences from random choices; (e) to analyze hits by subject preference and run order as well as by target type.

An REG designed and constructed by Edwin May (and generously donated by Charles Honorton) produced random binary sequences. The subject throws a switch; the instrument displays the outcome.

A table of random numbers provided the odd and even digits for pseudo-random sequences. Each subject drew slips of paper from concealing envelopes to designate page, column, and row for entering the table.

ERRATUM

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In the course of some checking on the nature of the random number generator circuitry of the APPLE computer, I discovered that an apparatus repair, made part way through the experiment reported under the title "Are Prepared Random Sequences and Real Time Random Generators Interchangeable?" (pp. 43-45) in this volume, and thought by me and my technical associate to be of no consequence at the time, was quite serious. The experimental comparison was of performance differences between targets drawn from a stored random number table (and thus all existing in present time) versus those generated de novo on each trial. The change resulted in a seed for determining the targets for the next 20 trials of a particular run being generated at the beginning of each run. While this is not quite the same as the targets already having been generated and stored, it is also not the same as de novo generation, as we thought they were. This confuses the design for part of the experiment: the results should be taken lightly until I can locate the date of the change and reanalyze the data. I wanted to withdraw the paper until such reanalysis, but it was already set in unchangeable page proofs.

Charles T. Tart