6

IMPROVING REAL-TIME ESP BY SUPPRESSING THE FUTURE: TRANS-TEMPORAL INHIBITION

Charles T. Tart

One of the major problems that undermines efficient functional study of the nature of ESP is the unreliability, overall low level of manifestation, and prevalence of decline effects when ESP is studied in the laboratory. In the vast majority of experiments, even when ESP is present to a statistically significant degree, the vast majority of responses made by percipients are simply guesses, and only a very tiny fraction of them are ESP; also, the signal-to-noise ratio is very poor, making study of the characteristics of the signal difficult. As percipients continue to work at ESP tasks, it is very common for them to decline in performance and eventually be reduced to mere chance guessing.[2] Ten years ago, I theorized that this was due to lack of immediate feedback to percipients, so they could not learn to distinguish subtle characteristics of mental events that indicated when they were generally using ESP from mere guessing processes.[3] This theory has recently been elaborated.[4]

Two major studies have now been carried out in my laboratory, one already published[5] and the second in press,[6] which support the hypotheses that the provision of immediate feedback to percipients *with some ESP talent at the start of training* can slow down or eliminate the common decline effect (stabilize performance) and can allow *some* percipients to learn, and the degree of learning (improving performance) in the feedback situation is directly proportional to the ESP level a given percipient initially brings to the training sessions. These developments suggest that efficient functional studies may soon be possible.

In the course of exploratory post hoc analyses of the first Training Study, some remarkably strong effects produced by *precognition*, ESP cognition of immediately future events, were discovered; they were confirmed in subsequent analysis of the second Training Study data. These precognitive effects and their theoretical implications for an

information-processing mechanism used for enhancing real-time ESP, named *trans-temporal inhibition*, will be the focus of this chapter. The data on learning ESP per se are available elsewhere and will not be discussed further here except when they are relevant to the main focus.[7]

OVERVIEW OF THE EXPERIMENTAL PROCEDURE

Figure 6.1 provides an overview of the general procedure of each of the two studies. Since the learning theory predicted that percipients had to have some demonstrable ESP to begin with for feedback training to have much effect, it was necessary to start with relatively talented percipients. Since percipients who can demonstrate individually significant number-guessing-type ESP in a short period of testing were assumed to be relatively rare, a two-stage selection procedure proceeded the actual Training Study. In the first stage, teams of experimenters gave quick ESP card-guessing tests to large classes of University of California–Davis students. Students who showed individually significant ESP hitting were selected from these results.

In screening hundreds of students, a certain number were bound to

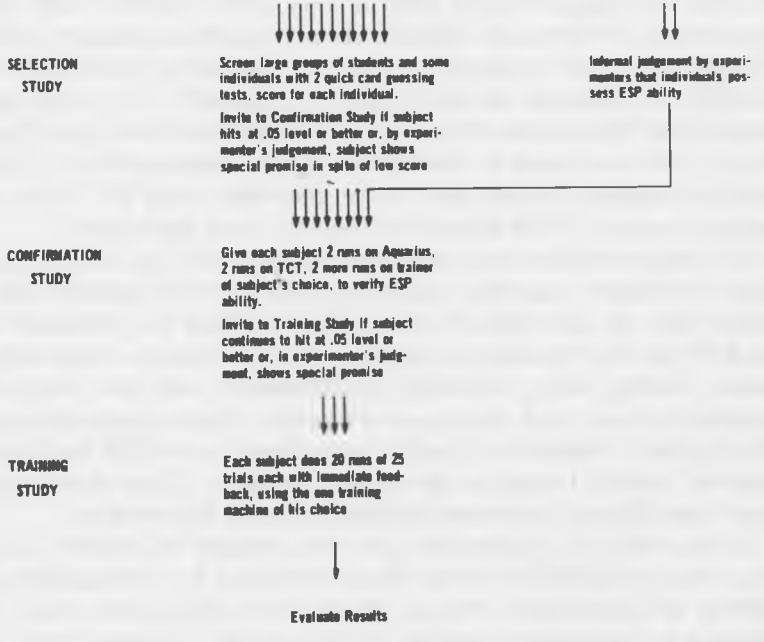

Figure 6.1 Sequential selection procedure in the two Training Studies.

score at least at the .05 level of significance by chance alone, so those selected students who accepted our invitation to participate in the second-stage Confirmation Study were given six individual test runs of 25 trials each. Two were on the ten-choice trainer (TCT) (described below), two were on the Aquarius Model 1000 ESP trainer, a four-choice machine developed by Russell Targ and David Hurt, and two more on whichever of the two machines each student preferred to do two more runs on. Since it would be highly unlikely that a student who made the criterion in the Selection Study by chance alone would also make the criterion of individual significance in the Confirmation Study ([.05] × [.05] = .0025), we assumed that almost all students who scored significantly in both studies probably had genuine ESP talent, and they were invited to participate in the Training Study.

A few students went directly into the Confirmation Study without going through the Selection Study because individual experimenters had other reasons to suspect they might have demonstrable ESP ability.

We will deal only with data from the TCT in both the Training Studies in this chapter, as individual trial data were not recorded for the Aquarius four-choice trainer in the first study. Ten student percipients completed the first Training Study, and seven new percipients completed the second Training Study. *Completed* means doing 20 runs of 25 trials each on the TCT, over several sessions, our a priori criterion. Results in this chapter deal with Training Study data.

THE TCT

The TCT consisted of a percipient's and experimenter/sender's console. The two consoles were located in separate rooms, as shown in Figure 6.2. The percipient, or receiver, was alone in the laboratory room shown in the lower lefthand corner of Figure 6.2, sitting in front of his or her console. A TV camera was focused on the console. The experimenter/sender was inside a Faraday cage constructed of thin copper sheets soldered together over an otherwise ordinarily constructed room, and this Faraday cage was inside another room, across the hall from the percipient's room. The shielding of the Faraday cage was not intact, however, due to power cables and the TV monitor and TCT interconnecting cables. The laboratory arrangements for the Aquarius four-choice trainer are also shown, although I shall not deal with data from that trainer in this chapter.

Figure 6.3 is a diagram of the arrangement of the percipients' console. It had ten unlit lamps arranged in a circle about 15 inches in diameter, with a miniature playing card glued beisde each lamp to numerically identify it. A response push button was located beside each

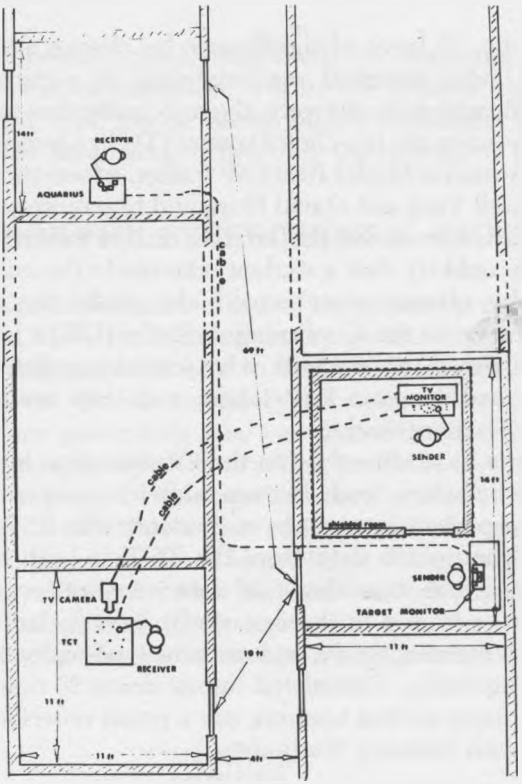

Figure 6.2 Arrangement of the experimental laboratories.

lamp. When the ready lamp in the center of the console came on, the percipient knew that the experimenter/sender had selected (in accordance with the output of a random number generator, to be described later) one of the ten lamps as a target, and was trying to telepathically "send" the identity of that target to him or her.

The percipient could respond quickly or take as much time as he or she wished to make his or her decision. When the percipient had decided on which number he or she thought the target was, he or she pushed the response button beside it; electrical circuitry immediately scored the percipient's response as a hit or miss and lighted the lamp on the percipient's console that corresponded to the *correct* target, so the percipient had *immediate* feedback on whether he or she was right or wrong. When he or she was right, a chime rang inside his or her console, and the correct light came on.

If, on a given trial, a percipient felt he or she had no idea what the target was, he or she could push the pass switch, signaling to the experimenter/sender that he or she would like a new target. A pass was not counted as a hit or miss, and no feedback on correct target identity

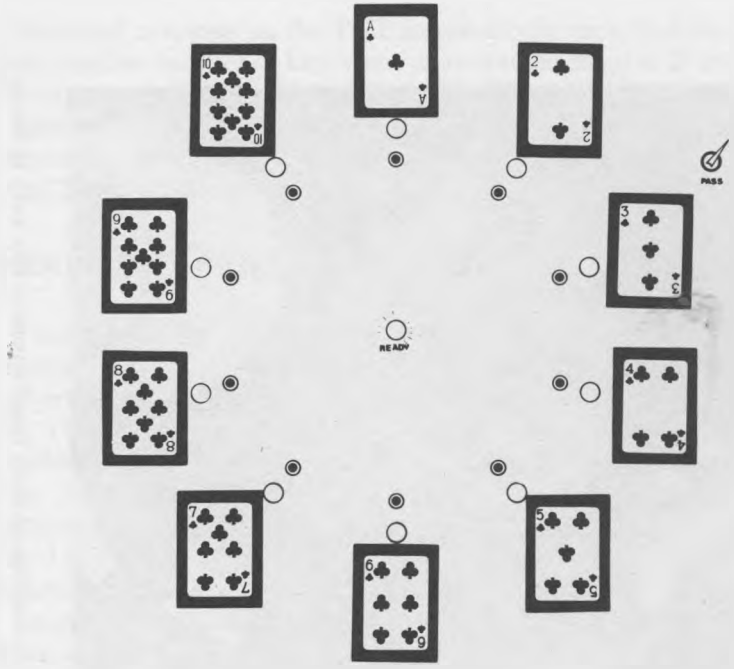

Figure 6.3 Layout of the percipient's (receiver's) ten-choice trainer console. Target number four is shown as lit, indicating it was the correct target for whatever the percipient's response was.

was given. Percipients rarely used the pass option. A circuit diagram of the TCT is available elsewhere.[8]

Figure 6.4 is a photograph of the experimenter/sender's console and the TV monitor mounted beside it. Except for operating controls, such as power switches, this console was laid out identically to the percipient's console.

In pilot work with the TCT, my students and I found that many percipients would slowly run their hand around the circle of unlit lamps, trying to get some kind of "impression" as to when they were over the correct lamp. The TCT was designed so no electrical or physical differences of any sort existed[9] so, on the null hypothesis of no ESP, this was an irrelevant procedure. Because of this, however, we had a TV camera focused on the percipient's hand movements, so the sender could tell when the percipient was "hot" or "cold," and so could intensify, diminish, or modify his or her sending effort accordingly.

The experimenter/senders found this full feedback of ongoing process to the sender to be extremely involving, and I think it is quite important, although I have not assessed its effect independently. In terms of training people to use ESP, we were actually training each experimenter/sender and percipient as a *team*, with full feedback to each.

Figure 6.4 Layout of the experimenter sender's console on the ten-choice trainer. Target is number two, and a hit has just been scored, lighting the "hit" lamp on the upper right of console. Experimenter/sender can see receiver's hand movements on the video monitor and thus send "hot" or "cold" thoughts, as well as target number.

Electrical counters on the TCT automatically recorded the number of trials and the number of hits. Runs were standardized at 25 trials. If, as rarely happened, the pass option was used, additional trials were given so the total of scored trials was 25. On other rare occasions when an experimenter accidentally ran one or two more trials than 25, all data beyond 25 trials were deleted.

RANDOM NUMBER GENERATOR

Target selection was controlled by an electronic random number generator. This was of the "electronic roulette wheel" type, with a 1-megahertz (MHz) clock cycling a zero to nine counter over and over again. The length of time the clock was connected to the counter was controlled by the experimenter/sender manually depressing a push button. Since controllable human reaction time is several orders of magnitude slower than the clock speed, which output from zero to nine is selected is a random event. The circuit of the random number generator, designed by Dana Redington, is shown in Figure 6.5

Empirical tests, using a chi-square analysis for equal incidence of individual targets and equal incidence of all 100 possible pairs of target selections, on 1,000 trial test blocks collected before and after the first Training Study, showed satisfactory randomicity. We did not test for even higher-level possible sequential effects (triplets, quadruplets, and so on), as there is no theoretical reason to expect such sequential effects with this type of random number generator.

The TCT was used to gather the data in the first Training Study. We replaced it in the second Training Study with a more sophisticated and somewhat more automated version, the Advanced Decimal Extrasensory Perception Trainer (ADEPT), designed and constructed by Dana Redington, which was similar to the TCT except for the fact that individual trial data were recorded automatically by teletypewriter and the random number generator was internal to the machine, whereas with the TCT, the individual trial data were recorded by hand and the random number generator was external to the machine.* Total trials and total hits were both recorded automatically on both machines.

PSYCHOLOGICAL FOCUS ON REAL-TIME EVENTS

In both Training Studies, neither I, nor my experimenters, nor the percipients had any interest in precognition. Our conception of the

* Construction of ADEPT was made possible through a grant from the Parapsychology Foundation.

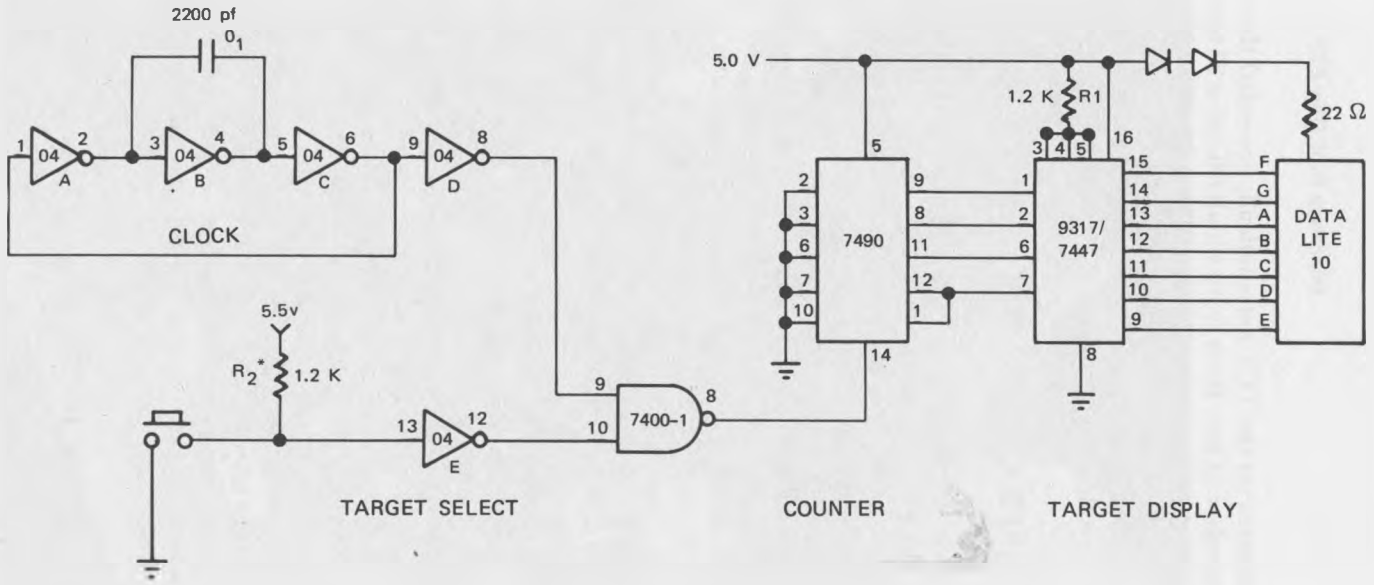

Figure 6.5 Circuit of the random number generator used to generate targets for the ten-choice trainer. Integrated circuits are Signetics types 7404, 7400, 7447, and 7490. Seven-segment display is a Litronix Data Lite 10. Note that some earlier published versions (C. Tart, *Learning to Use Extrasensory Perception* [Chicago: University of Chicago Press, 1976], and C. Tart, *The Application of Learning Theory to Extrasensory Perception* [New York: Parapsychology Foundation, 1975] of this circuit were incorrectly drawn.

experiment was that we were trying to train real-time ESP, either clairvoyance (direct perception of the state of the TCT) or telepathic (perception of the experimenter/sender's knowledge of the correct target) transmission of ESP information. This psychological focus is important to note, in light of later results.

Figure 6.6 illustrates the temporal aspects of target generation. Given that a target had already been generated and the TCT activated (ready light is lighted on the percipient's console) for trial N, a percipient would take a variable period of time, from a second or two to sometimes minutes, to decide on what he or she thought the target was. He or she would then push a response button, giving himself or herself feedback and lighting a target lamp on the experimenter/sender's console, showing what the percipient's response had been. The experimenter/sender recorded the response on his or her record sheet (the target had already been noted), turned off the TCT, and then triggered the random number generator to select the next random number. When this selection had been made, in a second or so, he or she switched on the target lamp for trial N + 1.

During the time that a percipient was trying to use ESP to determine what the current, real-time target was, the target for the next trial had not yet come into existence, nor could it be inferred from any knowledge of current events. The random number generator had not yet been activated. Any significant information about the future targets, then, would have to be due to precognition.

SCORING RESPONSES

For evaluating the presence of ESP and subsequent analysis of learning effects, we were interested in real-time hits, and all scoring was

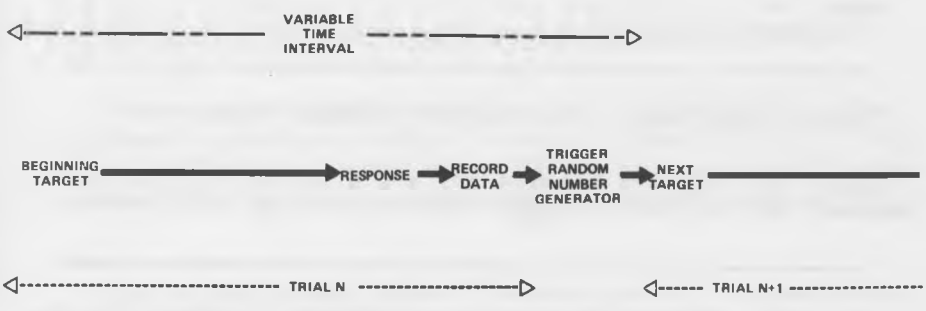

Figure 6.6 Temporal sequence of target generations.

done for such hits. The top third of Figure 6.7 shows data from an actual run from percipient P_5. The top row shows the 25 targets that were sequentially generated; the second row shows the percipient's response to each one. Real-time hits are circled. There were six of them for this particular run. This happened to be an individually significant run, as the exact one-tailed binomial probability of six or more hits in 25 trials (with a P of .1) is three in 100.

Although I knew that it was relatively routine in parapsychological experiments to check for possible precognitive effects, I personally had no real interest in them and had not gotten around to such checking until some analyses for another purpose by a colleague in the genetics department, Lila Gatlin, suggested to me that there were important precognitive effects worth looking at. The computer was reprogrammed to do temporal displacement analyses then, in the style shown in the middle and lower thirds of Figure 6.7.

To see if a response given by a percipient at time N was a hit or a miss on the target at trial N +1, the +1 temporal displacement, the response register was uniformly shifted one position forward in time. In the example shown, there were no hits with this procedure. N is reduced to 24 for such a shift, as the last response has no future target to be scored against.

To look at −1 past temporal displacement, as shown in the bottom third of the figure, the response register is shifted uniformly backward one position. In this case, there was one hit by this procedure, with N

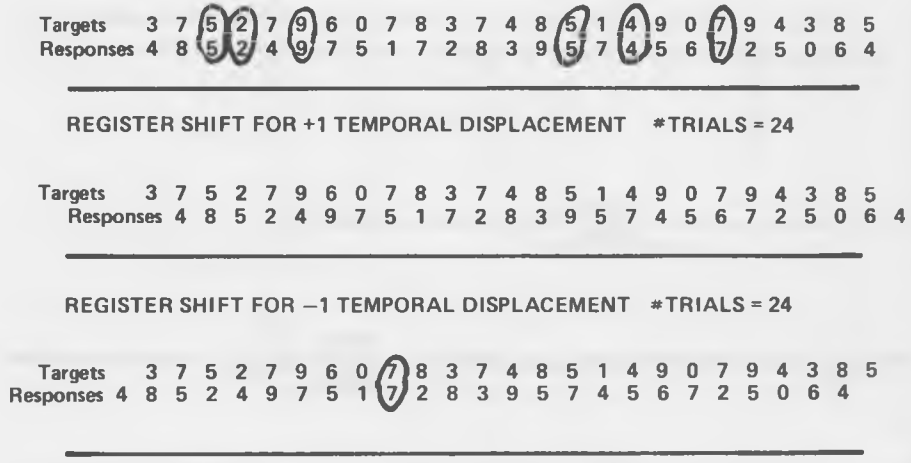

Figure 6.7 Target and response sequences for percipient (P_5), third run, illustrating scoring techniques for real-time hits, +1 precognitive hits, and −1 postcognitive hits.

again reduced to 24. A similar procedure allows looking at any temporal displacement, forward (+1 through +24) or back (−1 through −24).

In looking at possible hits displaced forward in time, any significant deviations from chance expectation must be due to some kind of precognitive ESP, for, as discussed earlier, these targets did not yet exist and could not be predicted from any knowledge (sensory or extrasensory) of current events. In looking at temporal shifts backward, my immediate reaction was to believe these would indicate something about ordinary psychological processes in the percipient: because of the immediate feedback of results, percipients *knew* what the immediately past target had been (to the extent that they had not forgotten it). The situation may be more complex than that for past displacements, however, as we shall see later.

ESP MISSING

An interesting effect that has been reported in many dozens of published ESP experiments is what is called *ESP-missing* (or *psi-missing*), scoring that is significantly *below* chance expectation.[10] Scoring below chance expectation can indicate as much that ESP is operating as scoring above chance expectation can. If you are guessing whether the cards in an ordinary deck are red or black, for example, getting zero right is just as significant as getting all 52 right.

In terms of a model underlying the process, some *nonconscious* part of the mind must use ESP to *correctly* identify certain targets and then influence *conscious* guessing processes to make sure that these targets are *not* guessed correctly. This has been associated with motivation in a number of parapsychological studies: percipients who have an a priori disbelief in ESP and who are statistically naive, but who (like most of us) think that the worse you score on a test the less you know, have often been shown to score significantly below chance, thus thinking they have validated their belief that there is no such phenomenon as ESP.[11]

ESP MISSING IN THE FIRST TRAINING STUDY

The ten percipients who completed the first Training Study showed exceptionally significant results in terms of real-time hitting. For their total of 5,000 trials, we would expect 500 hits by chance, but 722 were observed.* The two-tailed probability of such an occurrence, using the

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*In the original publication of these ESP learning results (C. Tart, *Learning to Use Extrasensory Perception* [Chicago: University of Chicago Press, 1976]), we worked with total run scores and did not realize that the total number of trials was slightly less than 5,000.

normal approximation to the binomial, is 2×10^{-25}. This corresponded, for the group as a whole, to an average of 3.61 hits per run of 25 rather than the average of 2.50 expected by chance.

There was considerable individual variation, of course, with a few percipients apparently having their overt manifestation of ESP suppressed in terms of real-time hitting and not showing individual significance, a finding often associated with changes in psychological conditions, such as we had in going from the Confirmation to the Training Study.[12] Five of the ten percipients showed exceptionally significant individual scores. The least of these five averaged 3.90 hits per run, for a P of 4×10^{-5}, two-tailed, and the most significant averaged 6.20 hits per run, for an individual P of 4×10^{-28}, two-tailed.

In scoring for hits on the +1 future trial, there were 4,790 trials where a hit could have occurred (a few possibilities were lost when an experimenter inadvertently gave only 24 trials in a run, as well as the routine loss of one trial in each run), so 479 hits would be expected by chance. Only 318 hits occurred: this would occur by chance with a two-tailed probability of 8×10^{-15}. Thus, some part of the percipients' minds was occasionally using precognition to know what the +1 future target was and then affecting the conscious guessing of the real-time target to be sure it was *not* what the +1 target would be. All other possible future displacements (+2, +3 . . . +24) were checked but were not of such obvious significance and so will not be reported on in this chapter.

Past temporal displacements were also checked, and a rather regular pattern was found for the −1 and −2 displacements. Figure 6.8 is a bar graph of this for a percipient, P_1, whose individual pattern is typical of that of many other percipients. He made 78 real-time hits, when 50 would be expected by chance, $P = 4 \times 10^{-5}$, two-tailed. His avoidance of the immediate +1 future was also extremely significant: $P = 6 \times 10^{-4}$, two-tailed. His avoidance of the immediate −1 past was even greater, $P = 10 \times 10^{-8}$, two-tailed. This avoidance of −1 past targets being greater than the avoidance of the +1 future was the typical pattern for almost all percipients.

The past targets at the −2 displacement were also significantly avoided, but by the −3 displacement and for other greater temporal displacements, the group average was generally small, being only nonsignificant variations around chance. This suggests something in accordance with known psychological facts about people's guessing habits, namely, that percipients strongly avoid making their guess identical to what the immediately previous target has been; a similar psychological avoidance

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The current total analysis here retains the convention of 5,000 trials in order to be consistent with the original publication; as this is a conservative error, the data are slightly *more* significant than the results here calculated.

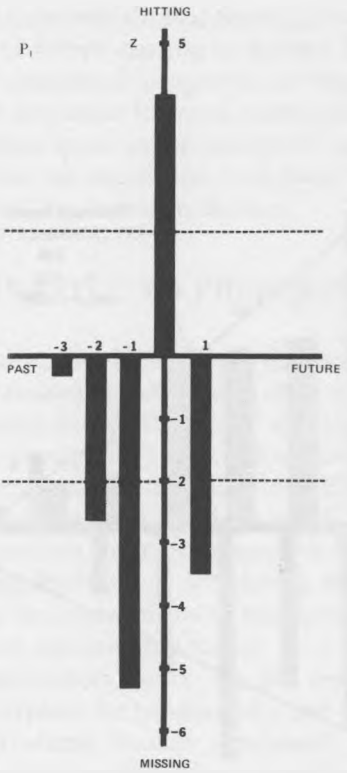

Figure 6.8 Scoring pattern over all 500 trials (20 runs) of percipient P_1 for −3, −2, −1, real-time and +1 temporal displacements. Units of vertical axis are standard normal deviates (Z-scores, σ).

holds, but is not quite so strong, by two targets back, and is pretty much inoperative by three or more targets back.

RELATIONSHIP BETWEEN REAL-TIME HITTING AND AVOIDING THE FUTURE

It turns out that this precognitive avoidance of the immediate +1 future in the first Training Study was not an isolated event but was quite strongly and negatively related to the degree of real-time hitting. Figure 6.9 shows the magnitude of the real-time hitting and the +1 missing (hitting in one case) for each individual percipient. The vertical axis is Z or σ score, with anything greater than 2σ conventionally being accepted as statistically significant. I have ordered the real-time hitting scores from the highest on the left down through the greatest degree of missing on the real-time target to the right. The rather good ordering of missing scores

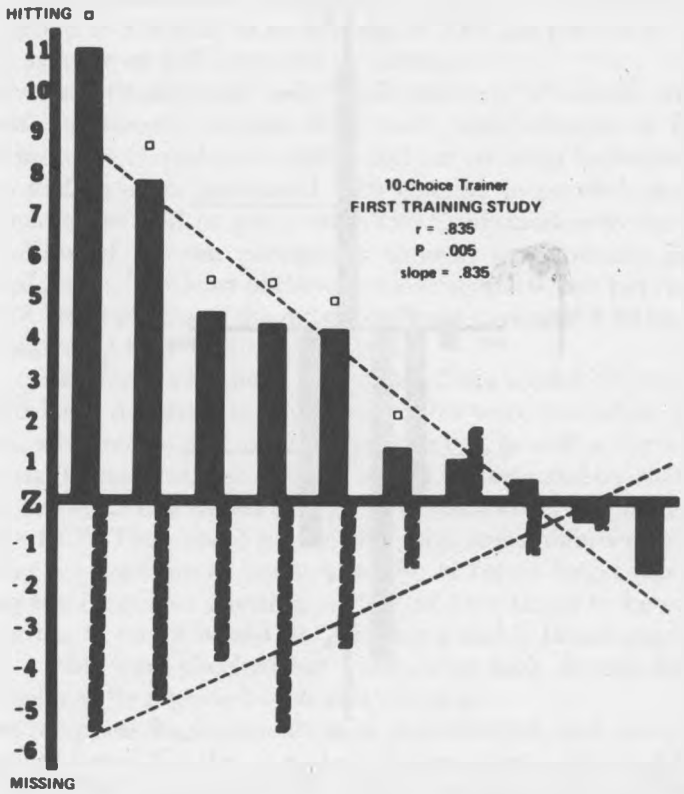

Figure 6.9 Relationship between real-time hitting and +1 future missing, first Training Study. Solid bars are scoring on real-time targets, and hatched bars are scoring on +1 future targets, paired by percipient.

on the +1 future target that then results is an indication of the strength of the relationship between these two measures. The dotted lines are fitted regression lines. As can be seen, there is an extremely strong relationship: the more a percipient tends to hit on the real-time target by ESP, the more he or she tends to avoid the +1 future target. The correlation is −.835, $P < .005$, two-tailed. A rank order correlation, which makes somewhat fewer assumptions about the characteristics of the numerical scaling, gives $r = -.89$, a slight increase.[13] We shall consider the lower graph, labeled *strategy-boundness*, later.

The small squares beside each individual percipient's data indicate when the real-time hits were significantly different from the +1 future missing by a t-test, applied over the 20 runs of each individual percipient. Six of the ten percipients show such significant differences, including one whose real-time hitting no longer showed individual significance by itself.

As a control test (to be certain that the negative relationship between real-time hitting and +1 future missing in the first Training Study did not result from peculiar numerical properties of the target and response sequences), the target sequence for each percipient was paired with the response sequence from some other percipient and the same analyses carried out. There were no significant "real-time" hits, no significant +1 missing, and no relationship between the two.

PK AS AN ALTERNATIVE TO PRECOGNITION?

Because numerous studies have shown that humans can influence the output of electronic random number generators simply by willing some outputs to come up more frequently (PK),[14] and because we could not be sure that some of our percipients might not unconsciously use PK on the random number generator rather than just using ESP to know the state of the machine or the experimenter/sender's mind, we made an a priori decision to test our random number generators for randomness *before* and *after* our Training Studies but not *during* them, when percipients might be "on line," in the sense of being concerned about, and possibly influencing, the random number generators.

As a post hoc exploratory study, we did test the individual target sequences of each percipient for randomicity and found that three of the 17 sequences (both Training Studies combined) did show statistically significant departures from randomicity, as per our hypothesis that our percipients might unconsciously use PK on the random number generators. Two of the nonrandom target sequences were for the two highest-scoring percipients in the first Training Study, P_3 and P_5. Although the magnitude of these target sequence departures from randomicity was small compared with the magnitude of the ESP effects, suggesting that these percipients occasionally used PK on the random number generator but were mostly using ESP, I did check the correlations between real-time hitting and +1 future missing to see if they would be affected if the data from these two percipients were thrown out. The differences were trivial and can be ignored: for the first Training Study, $r = -.81$ instead of $r = -.84$. Further analyses showing that small departures from randomicity are not important in this data have been described elsewhere.[15]

REPLICATION OF EFFECTS IN THE SECOND TRAINING STUDY

The second Training Study was not as successful as the first in terms of magnitude of real-time ESP shown, an unfortunate, but predicted, effect. Our second Selection Study and second Confirmation Study did

not give us individual percipients with as high scores as we had in the first Training Study. The group of percipients who entered the first Training Study had Confirmation Study scores ranging from 2.50 to 6.00 hits per run of 25 (chance is 2.50), with a mean group score of 4.78, while the corresponding range was 2.75 to 4.50 (group mean of 3.61 hits/run) for the percipients who completed the second Training Study. The difference was statistically significant ($P < .05$, two-tailed, by t-test). Ideally, we should have run more students through our Selection Study and Confirmation Study procedure and made the ESP talent level comparable to that of the first Training Study. Time, money, and manpower shortages prohibited this, so we used the percipients we had but predicted that our overall level of ESP would be smaller in the second Training Study. It was.

Seven percipients completed the second Training Study. The overall group mean (2.61) did not differ significantly from chance expectation ($P \approx .40$, 2-tailed), although two of the seven percipients showed individually significant results. One of these percipients showed individually significant real-time hitting (average of 3.20 hits/run, $P < .05$, 2-tailed); the other showed individually significant real-time missing (average of 1.85 hits/run, $P < .05$, 2-tailed), so they effectively canceled each other out.

Figure 6.10 shows the individual percipient results for real-time scoring and +1 missing or hitting. My hypothesis that we still had talented

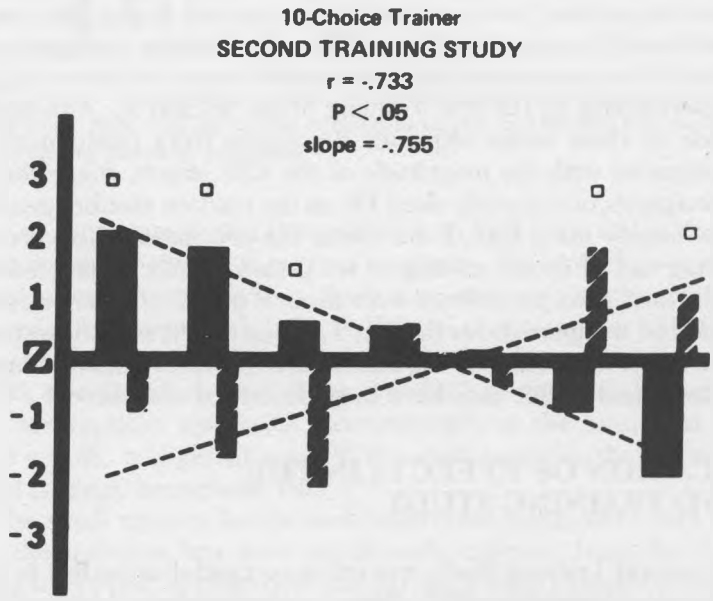

Figure 6.10 Relationship between real-time hitting and +1 future missing, second Training Study.

ESP percipients but that the increased pressure of the Training Study had probably inhibited their ESP abilities, as in the first Training Study, was confirmed. Five of the seven percipients showed individually significant differences (t-test) between their real-time scores and +1 future scores, again indicated by the small squares above their scores in Figure 6.10. The negative relationship between real-time hitting and +1 missing was again confirmed, with $r = -.733$, $P < .05$, one-tailed. The more conservative rank order correlation gives $r = -.79$, a slightly stronger effect.

As in the first Training Study, I carried out an exploratory, post hoc analysis for possible nonrandomicity in the percipients' target sequences that might represent a PK effect. One of the seven target sequences, for percipient P_{10}, showed too many sevens. Cursiously, this percipient scored almost exactly at chance expectation (51 hits versus 50 expected) for real-time hits. Conservatively deleting the data of P_{10}, however, again has a negligible effect on the correlation between real-time hitting and +1 future missing: $r = -.74$, $P < .05$, one-tailed.

In many ways, the percipients from the second Training Study amounted to a sampling of the lower end of the distribution sampled in the first Training Study, so I combined the results of the two Training Studies, to produce the diagram shown in Figure 6.11. Here, the strong relationship between real-time hitting and +1 missing stands out very clearly ($r = -.85$, $P < .001$, two-tailed). The more conservative rank order correlation is also −.85. The highly successful real-time ESP percipients strongly suppressed their calls of the immediate future, while the ones who, under the increased psychological pressure of the Training Study, tended to switch to missing in real time, an incorrect focusing of the ESP effect, showed some tendency to switch to hitting on the immediate future.

If, to be very conservative, the data of the three percipients showing nonrandom target sequences are deleted from the overall correlation, the change is negligible, with r changing from − .84 to −.82, so the data from these three percipients will be left in. More microscopic analyses, aimed at distinguishing these small possible PK effects from ESP effects, will be undertaken in the future.

Such a significant negative relationship between real-time hitting and +1 missing has not, to my knowledge, been previously reported in the experimental parapsychological literature.* This may be partly due to the

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* Although there are more than 700 published articles showing experimental evidence for the existence of ESP and investigating its mechanisms, they are not generally known to the scientific community, having appeared in specialty journals. The reader interested in getting into this literature should consult the *International Journal of Parapsychology*, the *Journal of Parapsychology*, the *Journal of the American Society for Psychical Research*, the *Journal of the Society for Psychical Research* (London), and the recent *European Journal of Parapsychology*.

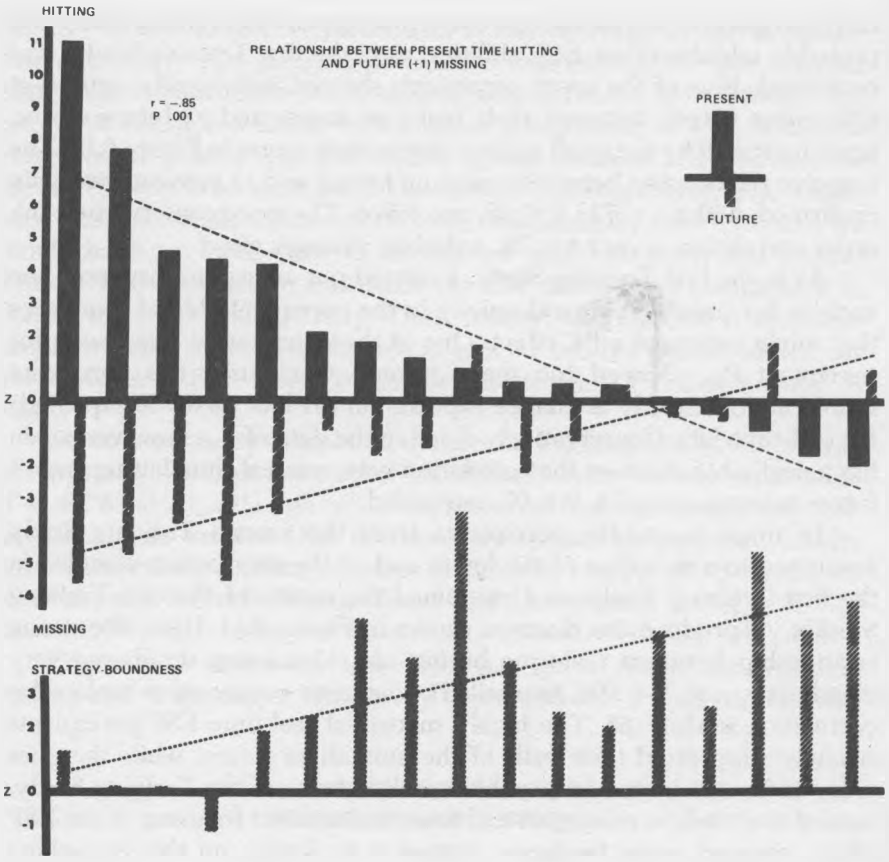

Figure 6.11 Relationship between real-time hitting, +1 future missing, and strategy boundness, combined data of both Training Studies.

fact that it has not been looked for, but I also suspect it is partially due to a procedural difference. In the present Training Studies, there was a sequential generation of targets "on line," as it were. In most parapsychological studies, until fairly recently, targets have been thoroughly shuffled decks of cards. In precognition studies with cards, the entire sequence of future targets is generated simultaneously when they are thoroughly shuffled at a future time, rather than being generated one by one after each real-time response.

I shall now present the theory I have devised to explain these results. I am deeply indebted to Enoch Callaway, a colleague at the Langley-Porter Neuropsychiatric Institute, who, after seeing a preliminary analysis of this data, suggested that it resembled a neural inhibitory surround and started the train of thought in me that led to the following theory.

THE DURATION OF THE PRESENT

If you will stop to ask yourself what is "present" to your experience, you will find that your *experienced* present, although very short, definitely seems to have a certain duration. The mathematical *abstraction* of the present being a temporal point of zero width, sandwiched between past and future, is a useful abstraction in a variety of applications but a poor representation of psychological experience. In Figure 6.12, the heavy lines model what we might call, by analogy with filters, the *passband* of the experienced present. For some small duration, centered around the now, all actions and experiences are *now*. The length of this interval is slightly variable, depending on how our attention is focused, and probably is ordinarily somewhere between one-tenth and two-tenths of a second wide. Within this experienced now, the intensity of experience (the vertical axis) is very high. At the edges of the passband, experience drops in intensity and clarity. Dynamically, we should picture this passband as moving along horizontally from past to future. Whether experience

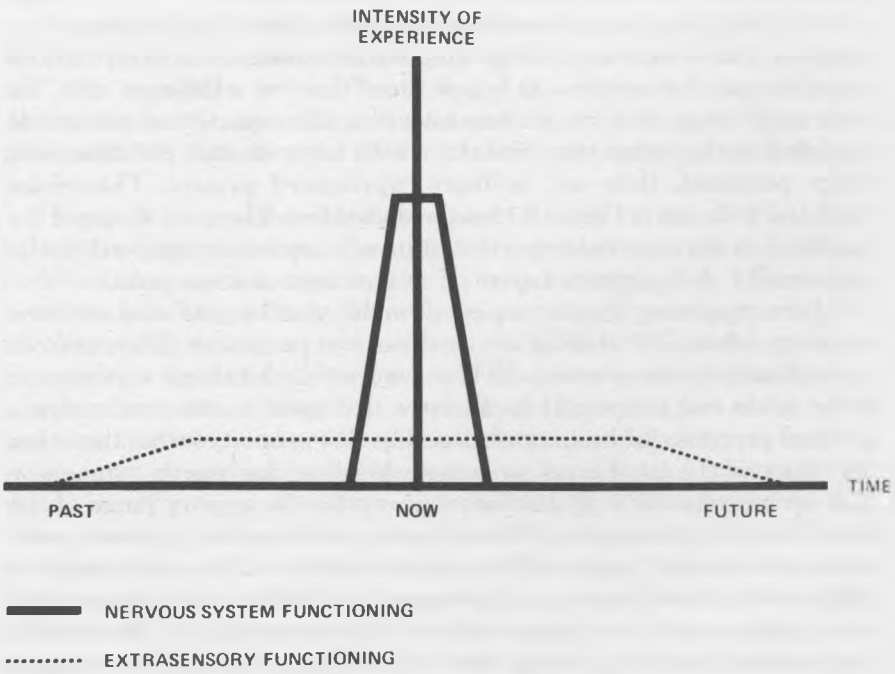

Figure 6.12 Intensity and duration characteristics of the experienced present for ordinary consciousness (heavy lines) and the extended aspect of the mind that uses ESP (dotted lines).

within this passband of the experienced now is actually continuous or consists of discrete frames, with awareness of the interframe interval suppressed, is an interesting question.

An old psychological term for this effect was the *specious present*, a term I do not like, as it shows that the mathematical abstraction was being considered more real than actual experience, implying that direct experience was specious. I shall speak of the *experienced present* and its width. By using "outside" time sources, such as a clock, we can say that the experienced present has a definite width, even though, to the mind, this small segment of time is all now.

PRECOGNITION AND THE EXPERIENCED PRESENT

There are dozens of published parapsychological studies indicating that precognition, under laboratory conditions, is a genuine phenomenon.[16] These results are usually conceptualized as the future "influencing" the present or as information flow from the future to the past. Reactions to these data are frequently mixed with "absolute" questions about free will versus determinism or causality, and discussions get phrased in such absolute terms that they lead nowhere.

An alternative way of accounting for the data of precognition is to postulate that there is some other temporal dimension of mental functioning, a temporal dimension in which time "flows at a different rate," or some such thing, with the consequence that the experienced present of the mind in that other temporal dimension has a greater duration, or a wider passband, than our ordinary experienced present. This wider passband is shown in Figure 6.12 as the dotted line. The exact shape of the passband as drawn is not important: it merely represents that, ordinarily, the intensity of experience tapers off to near zero at some point.

I am proposing that the aspect of mind which is activated on those occasions when ESP abilities are used has two properties different from our ordinary consciousness, which seems spatially localized with respect to the brain and temporally localized with respect to the time system's physical processes of brain operation. The first property is that this other dimension of the mind is not so spatially localized and can thus somehow pick up information at spatial locations outside the sensory range of the body/brain/nervous system. The second property is that the center point of the experienced present of this other dimension of the mind can be a different time than the physical time associated with the body/brain/nervous system, and the band width of that other part of the mind's experienced present is wider than the band width of our ordinary consciousness's experienced present. Thus, what is *now* in this other dimension of the mind may include portions of time that, from our ordinary point of view, are past and future, as well as present.

Since consciousness (or basic *awareness*, as I prefer to call it in my systems approach to consciousness) is ordinarily fully identified and preoccupied with body/brain/nervous system functioning, the experienced intensity of the part of mind that operates in this other temporal and spatial dimension is ordinarily quite low, usually below conscious threshold, and is shown accordingly so in Figure 6.12.[17]

When a percipient is asked to use ESP, he or she must disregard ongoing sensory input (the experimental conditions make it irrelevant) and whatever fantasies or strategies he or she has about outguessing the random number generator (since targets are equiprobable and sequentially independent) and try to "contact" or "tune in" to that aspect of mind that exists or is capable of using this broader spatial and temporal dimension. Considering the temporal aspects of it, this creates a problem. If your desire is to obtain real-time information being "sent" by the experimenter/sender in another laboratory, then simply tapping into the wider experiential present of this other dimension is not good enough: it now includes information about past and future events, as well as present events. Since your goal is *present* event information, this past and future information is noise, which may interfere with detection of the desired signal.

Given the psychological set of experimenters and percipients in our studies, namely, concentrating on getting the real-time information by ESP, this implicitly defined the temporal boundaries of that real-time information as the immediate −1 past and the immediate +1 future targets/trials. We shall consider effects of altering this psychological definition later.

Figure 6.13 models what a percipient must do to use ESP successfully, then, to get real-time information. His or her awareness is receiving irrelevant sensory information that must be disregarded. His or her memories of what past targets have been may suggest guessing strategies, but they are irrelevant, since each output of the random number generator is independent of the previous ones. He or she must occasionally tap into that dimension of mind that uses ESP, but since that part of the mind is getting information about the past and future, as well as the present, he or she must further add a *discrimination process* of some kind that will clearly identify the past and future aspects of the ESP information and then actively *suppress* such aspects in order to enhance the detectability of the real-time desired ESP information. The output of the discrimination process, then, consists of some kind of information designed to influence the percipient's conscious guessing processes to correctly guess the present *real-time* target and to inhibit guessing target identities that are the same as the immediate future and the immediate past targets, lest the past or future be confused with the present. The nonconscious ESP and discrimination processes may certainly work intermittently and

imperfectly, depending on other factors that could constitute both systematic or random noise at various stages in the total information flow system.

TRANS-TEMPORAL INHIBITION

What I am postulating, then, is an *active inhibition* of the precognitively and postcognitively gained information about immediate future and immediate past in order to enhance the detectability of ESP information about real-time events. Since this inhibition extends over time, I have named this phenomenon *trans-temporal inhibition.*

Except for the unusual features of extending over time rather than space, trans-temporal inhibition is analogous to a widely used information-processing strategy in the nervous system called *lateral inhibition.*[18] This is a general phenomenon of a highly stimulated receptor

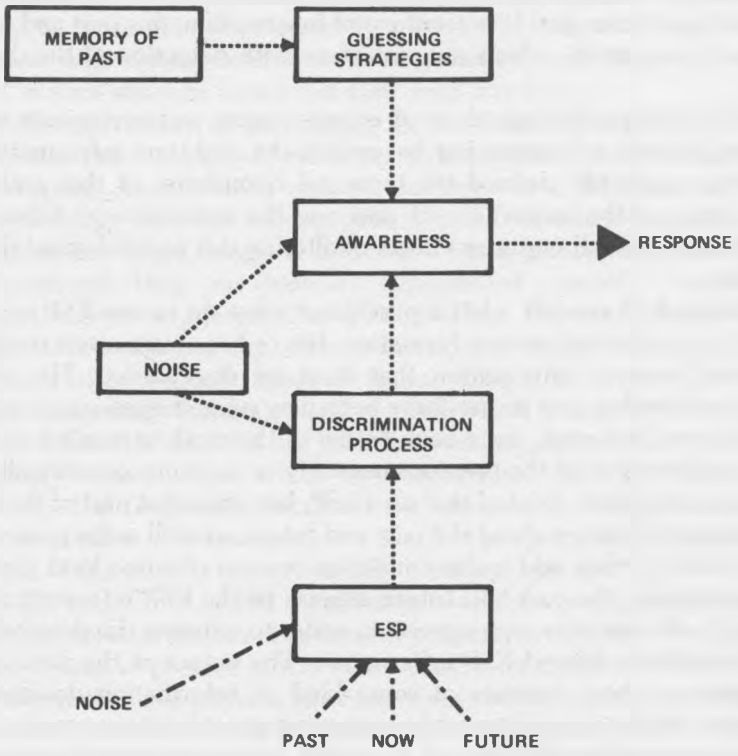

Figure 6.13 A model of psychological processes used in making a successful ESP response.

sending out inhibitory impulses to receptor endings laterally/spatially adjacent to it, thus suppressing their initially weaker output, unless they are also strongly stimulated by an appropriate stimulus. It amounts to an edge detection process—to illustrate: if you press on your skin with a sharply pointed object, not only is the touch receptor immediately under the point strongly stimulated, but because of the mechnical deformation of the skin, receptors laterally adjacent to the point are also stimulated, although less intensely. The neural impulses resulting at the first stage of detection, then, would be most intense immediately under the stimulated point, but fairly intense on each side of it, gradually tapering off, producing a neural signal pattern suggesting a blunt, rounded, stimulating object rather than a point. The most stimulated receptor under the point, however, sends out inhibitory impulses suppressing the weaker (less frequent) impulses from the laterally adjacent receptors and so recovering a pattern indicating point stimulation further on in the nervous system. The phenomenon of trans-temporal inhibition, then, suggests that a generally useful information-processing procedure is also operative for ESP.

How well does this theory fit the data?

APPLYING THE THEORY TO THE DATA

In showing the +1, real-time, and −1 score patterns of percipient P_1 earlier in Figure 6.8 (we shall ignore the −2 and −3 points from now on, as they are not related to other things), I indicated that the very significant degree of missing on the immediately past −1 target probably reflected maladaptive guessing habits on the percipient's part. The random number generator is so constructed that there are no sequential dependencies, that is, the probability of two sequential targets being a one-one is identical to that of their being a two-two, a three-three, a three-four, a one-nine, and so forth. People, however, have inaccurate conceptions of what random sequences are; they usually believe that the probability of the same target occurring twice is considerably less than that of a different target following the original one, that is, that one-one, two-two, and so on are all much less probable than one-two, one-three, two-four, and so forth. Thus, the percipients tend to avoid giving a response that is the same as the previous target, and I suggest that this accounted for the very large degree of the −1 missing. The theory of trans-temporal inhibition, however, assumes that the experienced present of this other dimension of the mind is probably symmetrical in most circumstances; this is an assumption that will be made, paralleling the general assumption that works so well in the physical sciences, namely, that all physical processes are symmetrical.[19] Given this symmetry assumption, I then postulated that the −1 missing could be partialed into two components. One of these

would be *post*cognitive ESP inhibition of the calling of the previous target, and I would further assume that this component would be approximately equal in magnitude to the inhibition of the +1 response for each percipient, treated individually. The rest of the missing on the −1 past displacement would be due to maladaptive guessing strategies, this business of tending not to repeat the immediately past target. I have named this component of the −1 missing *strategy boundness*. Figure 6.14 shows this partialing out applied to the data of percipient P_1. For this particular example, about half of the −1 missing would be assumed to be due to trans-temporal inhibition of the postcognitive response to the −1 target and half to maladaptive strategy boundness.

My conception of the optimal way to try to use ESP is that all "rational" processes are irrelevant. A guessing strategy that involves keeping track of what the past targets have been and then trying to outguess the random number generator is not only a waste of time (because of the sequential independence of the random number genera-

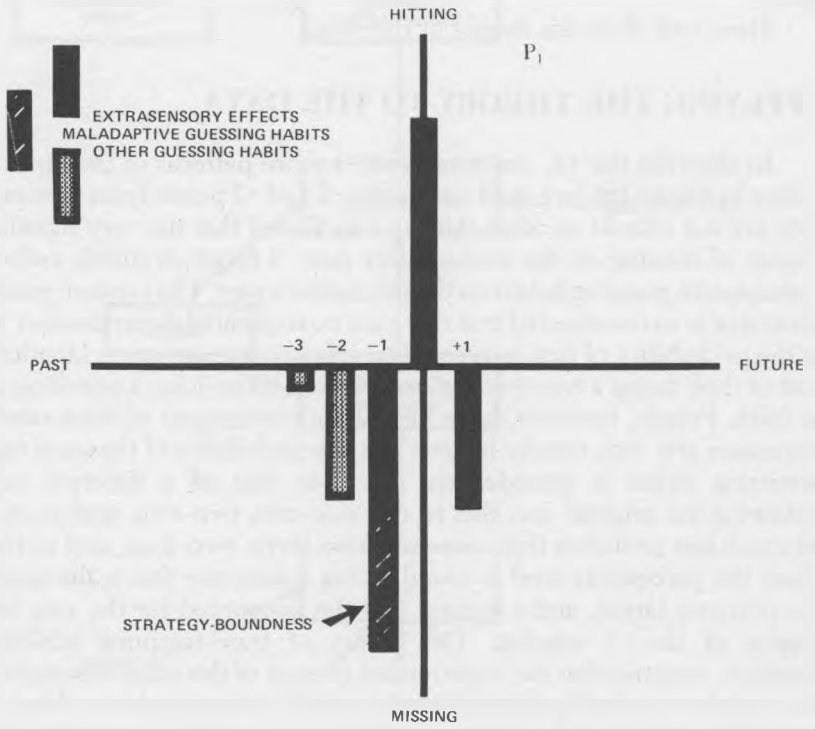

Figure 6.14 Partialing out the strategy boundness measure from the total missing on the −1 temporal displacement.

tor) but it also distracts a percipient from turning his or her awareness toward more relevant mental processes, toward what we might call metaphorically "listening to the still small voice within" that might occasionally give a useful hint about target identity.

STRATEGY BOUNDNESS AND SUCCESS IN USING ESP

On theoretical grounds, then, we would expect that the more strategy boundness a percipient showed, the less real-time ESP he or she would show. Since trans-temporal inhibition of the future (and by assumption, of the past) target response is adaptive for enhancing real-time ESP, we would also expect that with more strategy boundness, there would be less missing on the +1 future target. The data bear this out quite convincingly.

Because the signs for the straight arithmetical computations of missing, strategy boundness, and so forth require a good deal of attention to follow in terms of their relationships, I have taken the value of strategy boundness, which is inherently negative (missing), and made it positive in order to make the results clearer.

In originally computing the correlations between real-time hitting, +1 future missing, and −1 past missing for percipients in the combined two Training Studies, I found that +1 future missing was significantly correlated with real-time hitting ($r = -.85$, $P < .001$), but the magnitude of −1 past missing did not correlate significantly with either the magnitude of real-time hitting ($r = -.24$, nonsignificant) or with the magnitude of the +1 future missing ($r = +.14$, nonsignificant). After factoring out strategy boundness, as discussed above, it turns out that strategy boundness is significantly correlated with the other two measures. Strategy boundness correlates $r = -.64$, $P < .01$ with present time hitting, and $r = +.83$, $P < .001$, with +1 future missing. Referring back to Figures 6.9 and 6.11, where the degree of individual strategy boundness was plotted for the percipients in the lower part of the graphs, the strength of this relationship is very clear. The more a percipient was caught up in maladaptive strategy boundness, the less likely he or she was to show real-time hitting and the less likely to show trans-temporal inhibition—missing of the +1 future target. Strategy boundness can be conceived of as a failure to direct awareness to that part of the mind which is not so localized in space and time and which thus exercises ESP; instead, awareness is involved with ordinary aspects of the mind, which cannot use ESP.

Applying the symmetry assumption to trans-temporal inhibition theory, then, takes some random data (The absolute magnitude of the −1 past deviations) and partials it into meaningful data. There is, however, a difficulty. When performing these calculations, I was concerned that there might be an artifactual element in this sort of partialing of the −1 deviations that would automatically create a high correlation for numeri-

cal reasons alone, whether any correlation existed in reality or not. I checked my procedure with four mathematicians, all of whom assured me that there was no artifact problem. The possibility still nagged at me, however, so I asked a colleague, Eugene Dronek, to do a computer simulation of the process for me; unfortunately, I discovered that you get very high correlations artifactually the majority of the time. Thus, the data presented above cannot prove the concept of strategy boundness, but since the concept makes so much intuitive sense, I present this material nevertheless as a stimulus to thought. How could we assess strategy boundness in a valid way?

A FURTHER TEST OF THE THEORY

As I mentioned earlier, both percipients and experimenters in the two Training Studies were focused on the ordinary present—on the task of picking up real-time information. This implicitly defined the immediate boundaries of the now as the +1 and −1 future and past target events. Since my data only occasionally suggest significant ESP missing on the +2 target (and, by the same sort of operations described above, on the −2 target), this suggests that while the experienced present of this other dimension of the mind was wider than the ordinary experienced present, it was not too much wider. Other studies of precognition, however, have often dealt with events that are much further ahead in the future—minutes, hours, days, and sometimes months.[20] Insofar as the trans-temporal inhibition theory is correct, I would predict that if the focus of attention is successfully placed on some *future* event, there ought to be ESP hitting on that event but inhibition of responses to events temporally surrounding that future event. Using our filter analogy, with the experienced present of the dimension of the mind that uses ESP corresponding to the band width of that filter, it should be possible, by means of psychological processes, to shift the center point and/or the band width of the filter and see a corresponding shift of trans-temporal inhibition. I have been able to carry out one test of this prediction to date.

Ingo Swann is a well-known New York artist who possesses a variety of ESP abilities that he has demonstrated under rigorous laboratory conditions in other investigators' laboratories, including SRI and the City College of New York.[21] Swann was present at a small meeting of parapsychological researchers, in October 1976, when I presented the above data and the basic theory about trans-temporal inhibition, although I did not say much about the prediction of the possibility of shifting the center point of the experienced now of this other aspect of mind or its predicted consequences. Swann was very intrigued by my data and made a number of useful comments on it, including his own observation that what he and the SRI researchers R. Targ and H. Puthoff called *analytical*

overlay seemed to correspond to my concept of strategy boundness—any kind of "rational" but actually irrelevant activities that diverted one from relevant aspects of the ESP task. He wanted to try my ADEPT training device, and a few days later, he was able to briefly visit my laboratory.

I looked forward to his visit with considerable interest, for he would be the first percipient who, because he had heard about trans-temporal inhibition, would be psychologically set to have some concern with the immediate (+1) future target, as well as the real-time target. I predicted (to myself, not to Swann) he would probably show hitting on the +1 future target but missing on the +2 future target. This is what happened.

Swann did five runs on ADEPT in the course of a little over an hour, for a total of 129 trials (in one run, he inadvertently did 29 trials instead of the usual 25). He made 21 real-time hits in the five runs, where only 12.9 would be expected by chance, $P = 9 \times 10^{-3}$, one-tailed. In terms of +1 future scoring, he made 19 hits, when only 12.4 were expected by chance, P = .03, one-tailed. His +1 precognition scores' significance is probably underrepresented by this conventional evaluation, because he tended to have bursts of hitting twice in a row on +1 precognition; a separate evaluation of the probability of the number of doublet precognition hits he showed gives odds of 10^{-6}.

On +2 precognition hits, he scored only seven hits when 11.9 would be expected by chance, P = .07, one-tailed. This is not quite independently significant for below chance scoring by itself, but as predicted, a t-test shows the *difference* between the scoring rate on the +1 and +2 hits is statistically significant ($t = 2.59$, 4 df, $P < .05$, one-tailed).*

I later asked Swann if he was deliberately trying to guess the immediate future target, as well as the real-time target, and he replied that he had not been deliberately trying to do this—*consciously*, he was concentrating on the real-time target. This suggests that the passband of the "wider dimension filter" can be altered without there being full conscious awareness of it.

Figure 6.15 shows Swann's performance on −1, real-time, +1, and +2 temporal displacements. It is also interesting to note the magnitude of his −1 displacement score: it is only slightly larger than the +2 missing displacement, indicating a very low degree of strategy boundness. This is precisely what we would expect for someone with high ESP abilities. Incidentally, we should not overlook the fact that it is a quite amazing performance for Swann to have walked in "cold" off the street, as it were, and immediately have shown statistically significant ESP in a new test situation.

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* Five pairs of data points is a low N for a t-test and pushes the underlying assumption, but I used it to be consistent with earlier analyses.

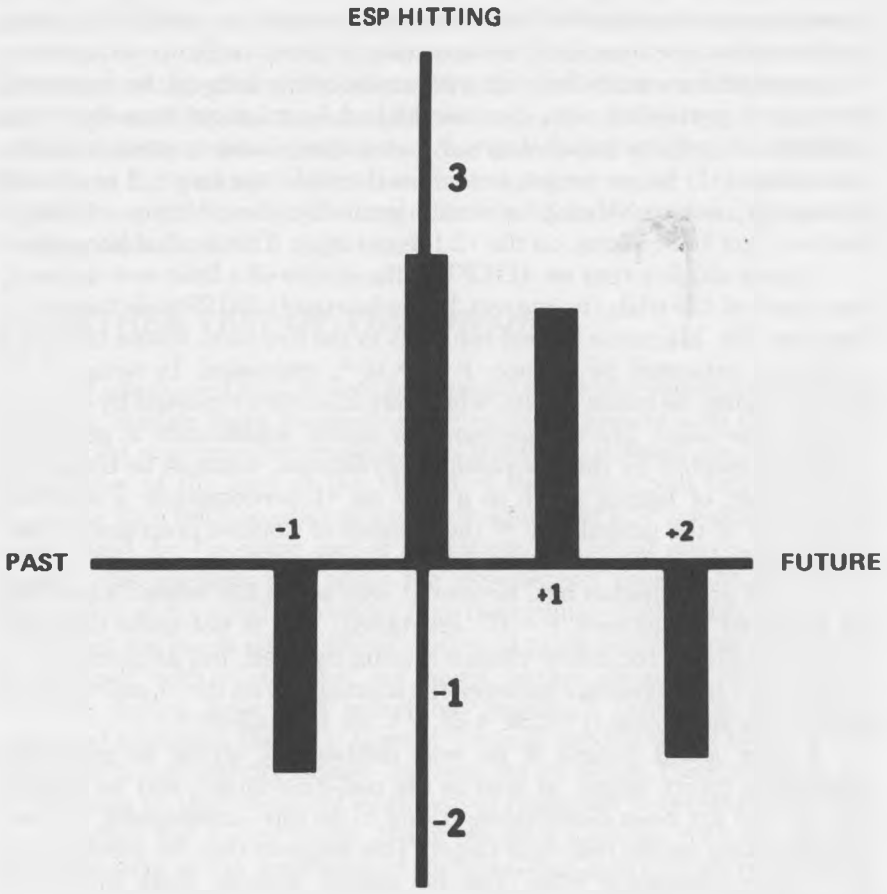

Figure 6.15 Widened temporal passband for Ingo Swann.

Although it is a post hoc speculation, it is of interest to raise the question as to whether the "passbands" of some of the earlier percipients' trans-temporal inhibition processes were shifted in a manner analogous to Swann's. In the first Training Study, percipient P_{14} had Z-scores of −6.69 for −1 temporal missing, +1.04 for real-time hits, +1.83 for +1 future hits, and −2.64 for +2 future missing, and the drop from +1 hitting to +2 missing is significant ($t = 3.40$ with 19 df, $P < .005$, one-tailed).* In the second

* In comparing scores between real time, +1 temporal displacement, or +2 temporal displacement, we deal with a shortened run length in each case (25, 24, 23), meaning that the expected number of hits by chance would be slightly lower (2.5, 2.4, 2.3), so in doing the t-tests, this was compensated for by testing against the null hypotheses that [real-time hits] = [(+1 hits) + (.1)] and [(+1 hits) + (.1)] = [(+2 hits) + (.2)].

Training Study, percipient P_1 had Z-scores of −5.48 for −1 temporal missing, −.89 missing on real-time targets, +1.83 hitting on +1 future displacements, and −.78 on +2 missing. The difference between +1 hitting and +2 missing is significant ($t = 2.00$ with 19 df, $P < .05$, one-tailed). The difference between +1 and +2 scoring for a third percipient from the second Training Study, P_8, who showed a tendency toward hitting ($Z = +1.06$) on the +1 future target, is not at all significant (for +2, $Z = +.62$).

Persistence of Inhibition

Recall now that the theory of trans-temporal inhibition says that if the psi receptor and appropriate discrimination processes are working on trial N, not only does this positively influence you to call a digit that corresponds to the actual identity of the target at that time but it also inhibits or prejudices you against calling the digit that is the identity of the target on trial N +1 in the immediate future. Now, human psychological processes generally have some degree of "inertia," that is, our immediate past is constantly having some influence on the present. Living totally in the moment is a valued ideal for many, but it is distinguished in reality by its rarity. It follows then that after making a call on trial N, on trial N +1, a problem exists: the percipient is likely to still be carrying some inhibitory bias against calling the digit that corresponds to the identity of the target on trial N +1. Thus, the operation of trans-temporal inhibition is likely to produce a kind of "stuttering" of ESP, a break in its continuity. If you hit by using ESP, you are more likely to miss on the next trial than if you had not hit, an effect we might call *psi stuttering*. In terms of the data available for analysis, we should expect to see fewer hit doublets (two hits in a row) than would be expected if every trial were independent of the previous one.

The appropriate test for this is to use the observed proportion of real-time hits to recalculate the probability of a hit: then, the probability of a real-time hit followed by a real-time hit is simply the square of this empirically obtained proportion, given the assumption that real-time hits are temporally independent of one another. Calculating this, I found that in the first Training Study, there was a deficiency of real-time hits following real-time hits—only 86 when about 106 would be expected. This has a Z-score of −2.07, $P = .02$, one-tailed. More importantly, the degree of *lack* of real-time hit doublets is strongly and positively correlated with the degree of real-time hitting: $r = +.71$, $P < .025$, one-tailed, that is, the more a percipient showed real-time hitting, the more this hitting tended to be broken up and not occur sequentially, as we would expect from the trans-temporal inhibition theory.

This same relationship was found in the data of the second Training Study ($r = +.40$), but while it is in the right direction, the correlation does

not reach significance with the smaller number of percipients and a much more restricted range of ESP. Such a lowering of the range of ESP would automatically lower the estimate of the true population correlation coefficient. If the data from the two Training Studies are combined, $r = +.60$ between real-time hits and lack of real-time hit doublets, with an associated $P < .01$, one-tailed.

We would also expect that the degree of *lack* of real-time hit doublets would correlate with our direct measure of trans-temporal inhibition, the degree of *missing* on the +1 precognitive target. It does, although not quite so outstandingly. In the first Training Study, $r = +.48$, which does not quite reach the .05 level of significance; in the second Training Study, $r = +.47$, also below the level of statistical significance. When the two Training Studies are combined to produce a larger sample size, $r = +.47$, with an associated probability of $P < .05$, one-tailed.

Thus, this persistence of inhibition aspect of the theory of trans-temporal inhibition has received good support.

The Generalized Trans-Temporal Inhibition Test

Given the existence of trans-temporal inhibition, I now believe that a more sensitive test for the presence of ESP in the data of percipients (run under conditions comparable to those of the present studies—where targets are generated one by one) is to look at the *contrast*, the difference between hitting on the target on which ESP is focused and missing on the immediately adjacent (in our case, +1 precognition) targets. If we could always assume that our instructions to a percipient to focus on the real-time target were completely effective, the particular measures to contrast would always be real-time hits versus +1 precognitive hits (and/or −1 postcognitive hits in nonfeedback studies). As Swann's data demonstrated, however, the focus of ESP hitting and the consequent inhibition may be shifted to other than the real-time and +1 targets. After all, when you tell a percipient to use ESP, he or she does not really know just what to do, so he or she tries various mental strategies, and it would not be surprising if he or she occasionally "jiggled" the "temporal focus controls," as well as occasionally managing to activate the "ESP on" control. Indeed, I had suspected such shifts had occurred for at least one of the percipients of the first Training Study and at least one of those of the second Training Study, but for a long while, I had not seen how to objectively test this rather than doing a purely post hoc analysis. I have now devised a more general test for the presence of ESP, assuming trans-temporal inhibition functions, which allows for the fact that a percipient might semiconsistently focus somewhat off from the real-time target and/or have a somewhat wider passband than just the designated target. The test works as follows.

If psi is operating and trans-temporal inhibition is present to some degree but the focus of a percipient's ESP is not necessarily on the real-time target, we will assume that it is nevertheless more likely to be focused *close* to the real-time target than distantly from it. Consider the plot of scoring for all possible temporal displacements shown for a typical significant percipient, P_1, in Figure 6.16. Here, we can see the typical high scoring on real-time hits, the significant missing on +1 future hits, and the significant avoidance of the −1 and −2 immediately past targets discussed earlier. Since the past displacement registers contain a lot of psychological avoidance of past targets due to people's gross underestimation of the probability of the same target coming up twice in a row, effects there are contaminated by this psychological factor rather than being due to ESP. In general, however, you can see that once you get away from the significant scoring clustered right around real time, you have a random assortment of positive and negative hit scores that are statistically insignificant. Only one distant deviation score on the precognition side reaches the .05 level of significance, for example, which is of no significance given that 24 tests were done on precognitive deviations here. To formally test the focusing of real-time hitting and trans-temporal inhibition around the real-time origin, I took as a contrast measure the first four temporal registers, the real-time, +1, +2, and +3 precognitive scoring registers. Within these four registers, I created a contrast score for each percipient by taking the absolute magnitude of the difference between the highest Z- (usually a hitting) score and the lowest (usually a missing) Z-score. For most percipients, this meant the difference between real-time hits and +1 misses, but for a few, this was the +1 precognitive hits minus the −2 precognitive misses, and so forth. As a control for each percipient, I randomly selected (using my Texas Instrument SR-SIA calculator's random number program) four other precognitive registers from the remaining +4 to +24 precognitive registers of that percipient and computed a control contrast score between the highest and lowest of these four registers. If ESP and trans-temporal inhibition effects are concentrated on or near real time, the desired focus of attention, then the control contrast scores we compute from the registers further away from real time should, in general, be less. The results support this prediction.

In the first Training Study, the mean contrast score, in Z-score units, was 6.90 around the real-time focus, while the control contrast score had a mean of only 1.96. This difference is highly significant: $t = 3.13$, $P < .01$, one-tailed. The significance comes from both the high scores per se being above chance expectation ($t = 2.80$, $P < .025$, one-tailed), and the low scores per se being below chance expectation ($t = 3.09$, $P < .01$, one-tailed). In the second Training Study, the contrast scores are again significant, with a mean contrast score of 2.76 in real-time and adjacent registers, compared with a mean contrast score of 1.76 in the control

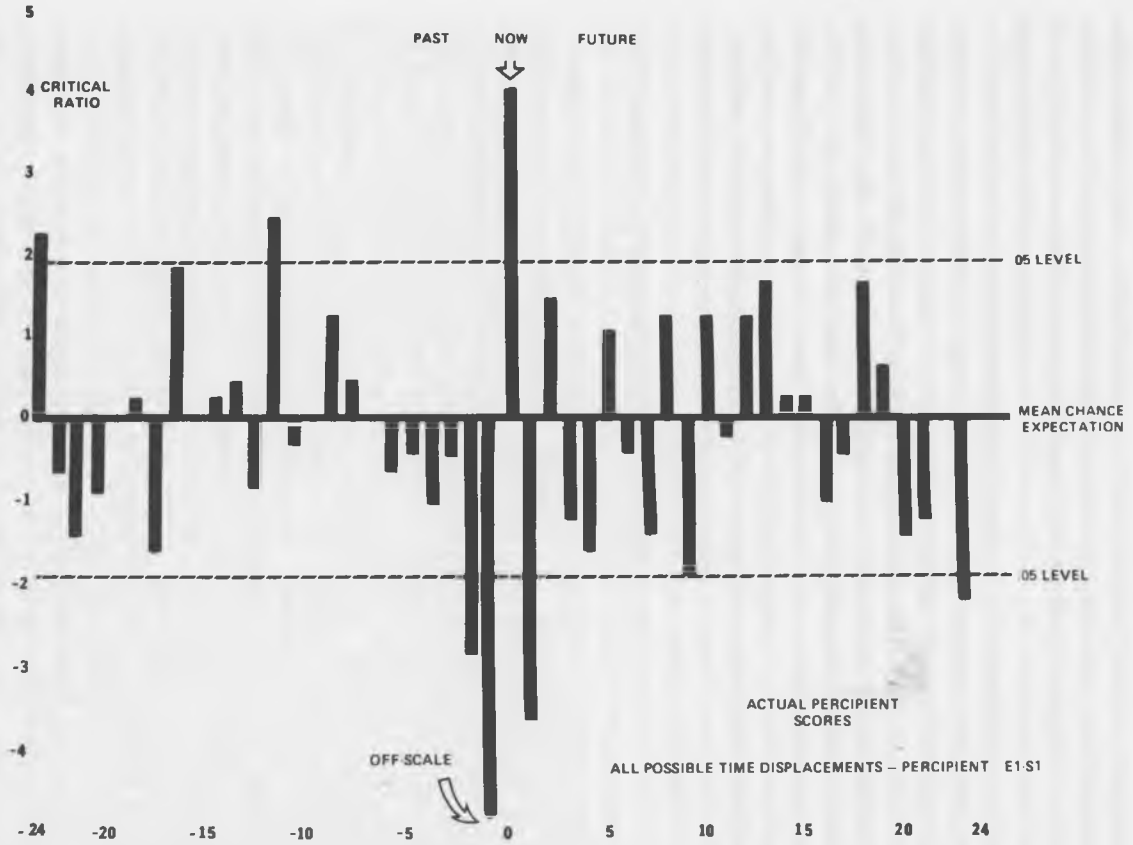

Figure 6.16 Mean of all possible temporal displacements within a run for Percipient P_1.

registers: $t = 3.37$, $P < .01$, one-tailed. The significance here is contributed primarily by the high scores in the experimental versus control registers.

We have an interesting result then. The overall data of the second Training Study were not independently significant for real-time hitting ($Z = +.85$) by conventional scoring, because the data of a strong ESP misser balanced out the data of a strong ESP hitter. This study was statistically significant, however, when evaluated by contrast scores. The real-time ESP misser who wiped out the significance on overall real-time hits was a percipient who may very well have been inadvertently focused on the +1 future target: the difference between +1 hits and +2 misses is independently significant by a post hoc t-test for him. I hope then that this contrast measure may serve to find evidence of ESP in many experiments that were initially considered failures in terms of overall hitting. Insofar as trans-spatial inhibition is real, similar relationships between hitting and missing contrasts should be looked for in existing data: studies using playing cards in the DT mode (cards remain in pack, percipient calls "Down Through"), for example, call for the strong sort of spatial discrimination that might call for trans-spatial inhibition.

CONCLUSIONS

The major mystery about various kinds of ESP is how the information gets from the target to the percipient; once the percipient has "received" or "sensed" the information on some nonconscious level, it generally seems to be processed in psychologically familiar ways.[22] Trans-temporal inhibition is a general information-processing procedure that is psychologically and neurologically familiar: the puzzle is in the precognitive (and postulated postcognitive) acquisition of the information about immediate future (and immediate past) targets.

Further data on these effects would be very desirable. Although emphasis of teaching improved ESP skills in our two studies made the provision of immediate feedback necessary, one clear line of research to follow, once percipients have been brought up to high levels of performance, is elimination of the feedback, so the postulated postcognitive inhibition component can be assessed independently of effects of maladaptive guessing habits. Further work on deliberately shifting the focus of attention, as with Swann, is also needed. If the trans-temporal inhibition effect is validated, it ought to be possible to combine it with an information theory approach to optimize ESP performance. Would long-time intervals between trials, for example, make real-time ESP more successful by reducing interference from future and past targets? Is comparing the contrast between real-time hitting and +1 future missing a better measure of a percipient's *potential* ESP capacity than hitting per se?

I plan considerable more analysis of the microstructure of the already collected data and will, if funds become available, carry out further research along the lines suggested above. I hope others will investigate this fascinating new effect.

SUMMARY

During exploratory retrospective analyses of the data of a highly successful experiment on teaching real-time ESP ability through the provision of immediate feedback of results, extremely strong, below chance *missing* of the immediately future target was found—a precognitive ESP effect. This avoidance of the future was highly correlated with the magnitude of the real-time ESP used: the more real-time ESP hitting, the more the immediate future was avoided. These results are consistent with a theory of another dimension of the mind, the duration of whose *experienced present* includes times that, to ordinary consciousness, are past and future. Tapping into this other mental dimension is not useful for using real-time ESP per se, for past and future information constitute noise. *Trans-temporal inhibition*, a type of edge detection process extending over time, enhances detection of the desired real-time ESP information by actively suppressing the ESP-derived information about the immediate past and future (postcognition and precognition). An initial experimental test of one of the implications of the theory, shifting of the areas of inhibition by change of psychological focus, further supports the theory. A relatively universal information-sharpening technique thus seems to be employed in using ESP.

NOTES

1. R. Rao, *Experimental Parapsychology* (Springfield, Ill.: Charles C. Thomas, 1966) is an excellent survey of experimental work in parapsychology, although a little dated. The recent *Handbook of Parapsychology*, ed. B. Wolman, L. Dale, G. Schmeidler, and M. Ullman (New York: Van Nostrand Rheinhold, 1978), is the authoritative review work now. R. White, ed., *Surveys in Parapsychology: Reviews of the Literature, with Updated Bibliographies* (Metuchen, N.J.: Scarecrow Press, 1976) updates the Rao book.

2. J. G. Pratt, "The Meaning of Performance Curves in ESP and PK Test Data," *Journal of Parapsychology* 13 (1949): 9–22; and J. B. Rhine, *The Reach of the Mind* (New York: Sloane, 1947), pp. 189–90.

3. C. Tart, "Card Guessing Tests: Learning Paradigm or Extinction Paradigm?" *Journal of the American Society for Psychical Research* 60 (1966): 46–55.

4. C. Tart, "Conscious Control of Psi through Immediate Feedback Training: Some Considerations of Internal Processes," *Journal of the American Society for Psychical Research* 71 (1977): 375–408.

5. C. Tart, *Learning to Use Extrasensory Perception* (Chicago: University of Chicago

Press, 1976). The research reported in this book was generously supported by the Parapsychology Foundation, with administrative assistance from the Institute for the Study of Human Knowledge.

6. This second study by myself, John Palmer, Dana Redington, Henry Bennett, and my students was supported by a generous grant from the est Foundation. C. Tart, J. Palmer, and D. Redington, "Effects of Immediate Feedback on ESP Performance: a Second Study," *Journal of the American Society for Psychical Research* (in press).

7. Tart, *Learning to Use Extrasensory Perception*, op. cit., and work in press by Tart et al., op. cit.

8. Tart, *Learning to Use Extrasensory Perception*, op. cit.

9. Ibid.

10. Rao, op. cit., and White, ed., op. cit.

11. G. Schmeidler, and R. McConnell, *ESP and Personality Patterns* (New Haven, Conn.: Yale University Press, 1958); and J. Palmer, "Scoring in ESP Tests as a Function of Belief in ESP, pt. 1. The Sheep-goat Effect," *Journal of the American Society for Psychical Research* 65 (1971): 373–408. See also J. Palmer, "Scoring in ESP Tests as a Function of Belief in ESP, pt. 2, Beyond the Sheep-goat Effect," *Journal of the American Society for Psychical Research* 66 (1972): 1–26.

12. Rao, op. cit.

13. S. Siegel, *Nonparametric Statistics for the Behavioral Sciences* (New York: McGraw-Hill, 1956).

14. E. André, "Confirmation of PK Action on Electronic Equipment," *Journal of Parapsychology* 36 (1972): 283–93; W. Braud et al., "Psychokinetic Influence on Random Number Generators during the Evocation of 'Analytic' versus 'Nonanalytic' Modes of Information Processing," in *Research in Parapsychology 1975*, ed. J. Morris, W. Roll, and R. Morris (Metuchen, N.J.: Scarecrow Press, 1976), pp. 85–88; C. Honorton and W. Barksdale, "PK Performance with Waking Suggestions for Muscle Tension versus Relaxation", *Journal of the American Society for Psychical Research* 66 (1972): 208–14; F. Matas and L. Pantas, "A PK Experiment Comparing Meditating versus Nonmeditating Subjects," "*Proceedings of the Parapsychological Association*, No. 8 (1971): 12–13; B. Millar and R. Broughton, "A Preliminary PK Experiment with a Novel Computer-Linked High Speed Random Number Generator," in Morris, Roll, and Morris, eds., pp. 83–84; H. Schmidt, "A PK Test with Electronic Equipment," *Journal of Parapsychology* 34 (1970): 175–81; H. Schmidt, "PK Tests with a High-Speed Random Number Generator," *Journal of Parapsychology* 37 (1973) 105–18; H. Schmidt, "Observations of Subconscious PK Effects with and without Time Displacement," in *Research in Parapsychology*, ed. J. Morris, W. Roll, and R. Morris (Metuchen, N.J.: Scarecrow Press, 1975), pp. 116–21; H. Schmidt, "PK Experiment with Repeated Time Displaced Feedback," in Morris, Roll, and Morris, eds., op. cit., pp. 107–9; H. Schmidt and L. Pantas, "Psi Tests with Internally Different Machines," *Journal of Parapsychology* 36 (1972): 222–32; R. Stanford and C. Fox, "An Effect of Release of Effort in a Psychokinetic Task," in Morris, Roll, and Morris, eds., op. cit., pp. 61-63; and R. Stanford et al., "Psychokinesis as Psi-Mediated Instrumental Response," *Journal of the American Society for Psychical Research* 69 (1975): 127–34.

15. C. Tart, "Space, Time, and Mind" (Presidential Address, Parapsychological Association, 1977), in *Research in Parapsychology 1977*, ed. W. Roll (Metuchen, N.J.: Scarecrow Press, 1978), pp. 197–250; C. Tart, "Randomicity, Predictability, and Mathematical Inference Strategies in ESP Feedback Training Situations," *Journal of the American Society for Psychical Research* (in press); and C. Tart and E. Dronek, "Trying to Profit from Non-Randomicity in ESP Target Sequences: Initial Explorations with the Probabilistic Predictor Program," submitted for publication.

16. Rao, op. cit.; Wolman et al., eds., op. cit.; and White, ed., op. cit.

17. C. Tart, *States of Consciousness* (New York: Dutton, 1975).

18. G. von Békésy, *Sensory Inhibition* (Princeton, N.J.: Princeton University Press, 1967).

19. Tart, *States of Consciousness*, op. cit.

20. Rao, op. cit.; Wolman et al., eds., op. cit.; and White, ed., op. cit.

21. R. Targ and H. Puthoff, *Mind-Reach: Scientists Look at Psychic Ability* (New York: Delacorte, 1977; and G. Schmeidler, "PK Effects upon Continuously Recorded Temperature," *Journal of the American Society for Psychical Research* 67 (1973): 325–40.

22. C. Tart, *Psi: Scientific Studies of the Psychic* (New York: Dutton, 1977).