Extrasensory Perception: Research Findings

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1. Does This Stuff Really Exist?

1.1. The Early Years

Although claims of psychic phenomena have been with us since antiquity, the beginning of organized research into the nature of these phenomena is usually associated with the founding in 1882 of the Society for Psychical Research in London. The S.P.R. was the brainchild of a group of distinguished scholars who were concerned primarily with the question of survival after death, and who believed that scientific research might provide a more satisfactory resolution of this problem than had the current religious dogma (Gauld, 1968). The S.P.R., as well as its sister society established a few years later in America, devoted its energies to two principal lines of ESP research. The first was a thorough investigation of reports of "real-life" psychic experiences (e.g., telepathy, apparitional experiences, hauntings) with the purpose of demonstrating that they could not be adequately explained by "normal" causes (e.g., Gurney, Myers, and Podmore, 1886/1970; Myers, 1903/1975). The second approach involved the investigation of spiritualist mediums who claimed the ability to communicate with the dead. Although some of these mediums proved to be fraudulent, others consistently were able to provide investigators with remarkably detailed information about deceased persons, information that

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it is difficult to conceive of their having acquired by normal means. Perhaps the most outstanding of these mediums were Leonore Piper (Hodgson, 1897–1898) and Gladys Leonard (Smith, 1964). Whether the information received by these mediums originated from the "other side" or simply reflected their own ESP is still an unresolved issue in parapsychology, although most parapsychologists today recoil from the spiritualistic interpretation.

The observational approach only gradually gave way to laboratory experimentation. Although a handful of quantitatively analyzed laboratory experiments were reported in the first quarter of the 20th century in both Europe (e.g., Brugmans, 1922) and the United States (e.g., Coover, 1917; Estabrooks, 1927/1961), the dominant status that the experimental method enjoys today is largely attributable to J. B. Rhine. Although Rhine did not originate the card-guessing paradigm in parapsychology, he employed it more extensively and successfully than had previous investigators. In 1934 he published a monograph describing an extensive series of card-guessing tests with eight college students, each of whom achieved highly extrachance scores with a great degree of consistency (Rhine, 1934/1973). Unfortunately, most of this research was conducted under informal conditions that were not always well controlled, and the monograph itself reads more like a popular book than a detailed scientific report. Combined with the dominance of both methodological and metaphysical behaviorism in American psychology at this time, these facts caused the monograph to become the object of severe attacks from more orthodox segments of the scientific community. Although these attacks were not always rational, they did push Rhine to tighten experimental controls, and by 1940 he and his colleagues were able to publish a more scholarly volume, which purported to demonstrate that later card-guessing experiments effectively overcame the legitimate criticisms of other scientists (Rhine, Pratt, Stuart, Smith, and Greenwood, 1940/1966).

1.2. Evidence from Selected Subjects: The Psychic Superstars

Probably the most important and evidential of the early Rhine experiments was the so-called Pearce–Pratt distance series (Rhine *et al.*, 1940/1966; Rhine and Pratt, 1954). Hubert Pearce was a divinity student at Duke and one of the eight star subjects referred to in Rhine's 1934 monograph. For this experiment the BT clairvoyance procedure was selected, with the subject (Pearce) and the experimenter (Pratt) located in different buildings.* Duplicate records were made of both the call and target sequences,

*The meanings of abbreviations used to define forced-choice testing procedures such as BT, DT, and STM are discussed in Chapter 1, pp. 24–25.

and the scoring was checked independently by Rhine and Pratt. There were 37 sessions conducted, generally consisting of 2 runs each. Pearce's average score was 7.5 hits per run, where the expected number of hits was 5. The probability of such a scoring rate occurring by chance over this number of runs is less than 10^{-22}.

Of course, no single experiment, regardless of how significant the results or tight the controls, can be accepted without reservation as conclusive verification of any scientific hypothesis, especially one as controversial as the existence of ESP. The case for ESP rests not on any one study but on the cumulative results of literally hundreds of controlled experiments. The bulk of these experiments have used groups of unselected subjects (mostly high school and college students) who claim no outstanding psychic ability. While the pooled scores from such samples frequently provide statistically significant evidence of ESP, the results are rarely dramatic. Although equating the magnitude of an effect with its evidential value is a questionable tactic, it is the smaller number of experiments with "gifted" subjects—who produce highly significant individual scores under controlled laboratory conditions—that usually are considered as providing the strongest evidence in support of the ESP hypothesis. Generally speaking, these are the only studies that have captured what little interest scientists outside the field of parapsychology have shown in ESP research. For a historical perspective on research with outstanding ESP subjects, see Pratt (1975).

Not counting subjects tested at Rhine's laboratory prior to 1940, six subjects stand out as having demonstrated the ability to achieve high scores in forced-choice ESP tests over a protracted period of time. It is the reliability of their performance as much as, if not more than, the magnitude of their scores that causes these subjects to assume prominent positions in the annals of parapsychological research. Two of these subjects, a photographer named Basil Shackleton and a housewife named Gloria Stewart, were tested by the British parapsychologist S. G. Soal, whom we will discuss shortly. The other four I will briefly discuss now, in chronological order.

The first was a college student identified only as C. J., who was tested at the University of Colorado (Martin and Stribic, 1938a, b, 1940). This subject excelled at card-guessing tests of the conventional DT (or UT) type, in which he averaged better than 7 hits per run over 2,000 runs; but he also performed well on other card-guessing tests.

The second outstanding subject is a library information clerk in Czechoslovakia by the name of Pavel Stepanek (Pratt, 1973). Stepanek, who was discovered by the Czech parapsychologist Milan Ryzl, has been tested over a period of more than 10 years. He probably has retained his card-guessing abilities longer than any other subject in the history of

parapsychology, although his ability has seemed to decline since 1968. Stepanek has been able to succeed on only one type of test, one which involves guessing which side of a green-and-white card is facing upward inside a cardboard envelope. Although he was able to succeed at guessing the correct color early in his career, his success has always been combined with a strong tendency to base his calls on visual cues from the envelopes. The significance of his later results derived in large part from the continuation of these secondary scoring patterns when the envelopes were concealed in progressively larger containers that shielded the inner containers from Stepanek's view. We will discuss this "focusing effect" in greater detail toward the end of the chapter. Stepanek has succeeded with tests conducted by a number of investigators, including a neutral scientist not previously associated with parapsychology (Blom and Pratt, 1968).

The third subject is a professional psychic from Trinidad named Lalsingh Harribance (Altrocchi, 1971; Child and Kelly, 1973; Damgaard, 1972; Dukhan, 1971; Kanthamani, 1974; Kelly and Lenz, 1976b; Klein, 1972; Morris, 1972, 1973; Morris, Roll, Klein, and Wheeler, 1972; Roll, 1972; Roll and Klein, 1972; Stump, Roll, and Roll, 1970). Harribance has succeeded in a number of different forced-choice tests under well-controlled conditions, but his unique specialty is guessing the sex of persons in concealed photographs. He also succeeded in a free-response experiment where he was asked to give "blind readings" of 20 volunteer subjects. He was particularly accurate in identifying the physical aspects of these persons (Roll, Morris, Damgaard, Klein, and Roll, 1973).

The fourth subject is a former law student named Bill Delmore (Kanthamani and Kelly, 1974a, b; Kelly and Kanthamani, 1972; Kelly, Kanthamani, Child, and Young, 1975). Although he has been tested less extensively than the other subjects described in this section, Delmore also has succeeded on a variety of forced-choice tests. His most outstanding results have involved correctly and completely identifying concealed playing cards.

Although free-response testing methods have been employed at times throughout the history of parapsychology (e.g., Sidgwick, 1924) and are enjoying increasingly widespread use, the published literature fails to reveal any subjects who have achieved outstanding scoring levels with such methods under controlled conditions over a large number of trials. Perhaps the individual most closely approaching this ideal was the wife of novelist Upton Sinclair, who evidenced striking success over several years at duplicating hundreds of line drawings made by her husband or others in a different room (Sinclair, 1962). Unfortunately, the results could not be adequately analyzed statistically and the sender was allowed to arbitrarily select the target picture, a fatal flaw in the design of any ESP

experiment. Nevertheless, many of the correspondences were extremely striking.

A number of subjects have produced striking free-response results under better controlled conditions in short series, however. Many of these occurred during dreaming, a topic to be discussed later. Several subjects have achieved impressive results with a technique called "remote viewing," where an experimenter travels to a randomly selected location several miles from the laboratory and the subject is asked to both describe and draw his impressions of the location (Bisaha and Dunne, 1977; Puthoff and Targ, 1976; Targ and Puthoff, 1977). In a very sophisticated experiment, an Argentine psychiatrist obtained highly significant results in duplicating 90 freehand drawings under both GESP and clairvoyance conditions (Musso and Granero, 1973).

The above listing is by no means intended as a complete catalogue of all persons who have demonstrated exceptional ESP talents in either the forced-choice or free-response modes. I have simply selected those who have provided the most striking and consistent evidence of ESP in well-controlled experiments reported in detail in the scientific literature.

No discussion of star ESP subjects would be complete without mentioning the Israeli psychic Uri Geller. In a controversial experiment published in *Nature*, Geller was seated in a visually, acoustically, and electrically shielded room and asked to reproduce freehand drawings that were located in another room. The results were highly significant statistically, and many of the correspondences were quite impressive (Targ and Puthoff, 1974).

The greater-than-average controversy surrounding these results stems from the fact that there is at least a great deal of circumstantial evidence that many of Geller's ostensibly psychic stage and "cocktail party" feats are nothing more than magician's tricks (Randi, 1975). Nonetheless, critics so far have been unable to convincingly explain away Targ's drawing experiment. The editorial reviewers for *Nature* were split concerning whether the paper should be published (Investigating the Paranormal, 1974). There were general criticisms concerning the lack of methodological detail in the report but no indications as to what information the reviewers felt was lacking. The only specific criticism stated in the editorial concerned the less-than-ideal method of assuring unbiased selection of target pictures, a technically valid but trivial argument given the magnitude of the effects. Suggestions by others as to how Geller might have cheated either misrepresented the experimental conditions as outlined in Targ's report (Randi, 1975; noted by Tart, 1976b) and/or delved into such exotic speculations as that Geller had a radio receiver implanted in his tooth (Hanlon, 1974).

The controversy over whether or not Geller has genuine psychic ability has become such a media event that serious scientists interested in coming to terms with the paranormal would be best advised to look elsewhere. However, fraud in ESP experiments (on the part of subject, experimenter, or both) is an important issue that must be confronted, however unpleasant and distracting such a task may be.

1.3. Is It All a Hoax?

1.3.1. The Hume Game

In the first presidential address delivered to the Society for Psychical Research, Henry Sidgwick made the following prophetic statement: "We have done all that we can when the critic has nothing left to allege except that the investigator is in the trick" (Sidgwick, 1882, p. 12). By 1940, it appeared that the skeptics were in just such a position. It took them 15 years after that to fulfill Sidgwick's prophecy.

The logic of their attack can be traced back to David Hume, a member of the British empiricist school of philosophy, which helped to provide the philosophical foundation of American behavioristic psychology. In Hume's book, *An Enquiry Concerning Human Understanding*, originally published in 1748 (Hume 1748/1952), one finds the following quote: "No testimony is sufficient to establish a miracle, unless the testimony be of such a kind that its falsehood would be more miraculous than the fact which it endeavors to establish . . . the knavery and folly of men are such common phenomena, that I should rather believe the most extraordinary events to arise from their concurrence, than admit to so signal a violation of the laws of nature." (p. 491). In other words, it is more reasonable to believe that those who participate in ESP experiments are cheaters than to believe in the "miracle" of ESP.

One could question the relevance of Hume's quotation to parapsychology because if ESP does exist, it is not a miracle (i.e., a temporary suspension of natural law). On the contrary, it itself represents a natural law, albeit one currently not well understood by science. Such technicalities were insufficient, however, to deter a young research scientist named George Price from publishing in *Science* an article proposing that ESP research that could not be explained away on more conventional grounds could be accounted for as deliberate fraud or "mildly abnormal mental conditions" (Price, 1955, p. 360). He thus became the first highly visible player of what I will hereafter call the Hume Game.

Although no one has ever set down an official set of rules for the

Hume Game, my own observations suggest the following salient features. The object is to take any ESP experiment, preferably one that seems on the surface to provide conclusive proof of ESP, and to figure out a way the experiment could have been faked. Considerable stress seems to be laid on the elegance of the solution. The best solutions would seem to be the ones where it is necessary to assume that only the subject is a cheat, while the less ideal solutions are apparently the ones where the principal investigator must be implicated as a culprit. Solutions also seem to be more elegant the fewer persons are assumed to be involved in the conspiracy.

Price (1972) eventually decided that his earlier promotion of the Hume Game had been unfair, but by that time other players had come along to take his place. Probably the best known of these newcomers is the British psychologist C. E. M. Hansel. In 1966, he published a book entitled *ESP: A Scientific Evaluation*, in which he played the Hume Game with several of what were considered to be the most "conclusive" ESP experiments published up to that time. At the beginning of the book he defines his own rules for the game: "An experiment that has any defect such that its result may be due to a cause other than ESP cannot provide conclusive proof of ESP. In parapsychological research, the process being investigated is both hypothetical and a priori extremely unlikely. *Any possible known cause* [italics mine] of the result is far more likely to be responsible for it than the hypothetical process under consideration" (p. 17). In an earlier paper, we find an even more sweeping quote: "Any experiment that has any defect such that the result may be due to *any cause* [italics mine] other than the hypothetical cause being investigated must be rejected" (Hansel, 1960, p. 8). In other words, all a critic has to do to destroy the evidence for ESP (or any other hypothesis he or she doesn't like) is to demonstrate that for each relevant experiment there is some alternate hypothesis that does not invoke ESP or whatever other construct happens not to be fashionable in the current scientific orthodoxy. Since there are no limits to the lengths one can go in applying such "orthodox" hypotheses, the failure to do so would seem to be more a reflection on the dullness of the critic than on the rigor of the experimental design. Perhaps this is why the Hume Game is so popular with certain critics: *It is almost impossible to lose*!

One experiment that Hansel subjected to the Hume Game was the Pearce–Pratt series. It will be recalled that this was the clairvoyance experiment in which subject and experimenter were located in different buildings. Although the results seemed to provide strong support for the ESP hypotheses, Hansel proposed an alternate explanation, which assumed fraud on the part of the subject. In a nutshell, Hansel claimed that

Pearce could have left his building during the session and stationed himself in a room across the hall from Pratt's room. From there he could have stood on a chair, peeked through the transom above the door in Pratt's room, copied the target order as Pratt was recording it after the run, returned to his own room, and recorded his guesses so as to obtain the desired number of hits.

Unfortunately for Hansel, the building in which Pratt was located had since been renovated, and Hansel was unable to obtain the original blueprints. He therefore could not document his assumption that Pearce could have had a direct line of sight onto Pratt's desk. Pratt, however, was more successful in obtaining the blueprints and they discredited Hansel's theory (Stevenson, 1967).

A second experiment that received Hansel's attention was by Pratt and Woodruff (1939). In the more tightly controlled second series of this experiment, 32 unselected subjects were tested using an STM procedure. The overall results, although not dramatic, were highly significant. In this case, Hansel's villain was the experimenter (Woodruff) who controlled the deck of target cards. One of the control features supposedly introduced into this series was that this experimenter should not know the order of the key cards hung in a row by the subject on the opposite side of the screen, so that he could not cheat by occasionally matching a target card to the corresponding key card contrary to the subject's call. However, Hansel discovered that one could determine the location of at least some key cards by noting their order on the preceding run (which was revealed during the scoring of that run). This assumes that the subject did a poor job of rearranging the key cards between runs, thus allowing the experimenter to keep track of them. Hansel also found that for himself it was easiest to keep track of the cards that occupied the end positions on the previous run (E-cards), and he concluded that the misplacement of target cards should be concentrated on these key cards.

Hansel then went a step further and actually demonstrated that in the case of the highest scoring subject in the series, the significance indeed was attributable to an excess of hits on the E-cards. This effect also was found to a lesser but still significant degree in the combined results of the four other subjects whose overall scores were independently significant (Medhurst and Scott, 1974).

Pratt argued that parapsychological interpretations could account for this finding (Pratt and Woodruff, 1961; Pratt, 1974a), and he succeeded in providing evidence for such an explanation in a later paper (Pratt, 1977). He suggested that subjects might score best on the E-cards simply because these cards were most salient to them, as a result of their positions on the previous run. As we will see later (see section 4.1.1.) such salience effects have been found in other ESP data. He reasoned that if the

E-cards were salient to the subject, he would be more likely to remember to change their locations on the next run than he would if these E-cards were not salient. Pratt in fact found, at least with the highest scoring subject, that there were significantly more hits on the E-cards when their locations had been shifted than when they had not been shifted.

Although parapsychologists so far have had the last word in the controversies surrounding the Pearce–Pratt and Pratt–Woodruff experiments, it would be hazardous to assume that either controversy is over. But it really doesn't matter. As a last resort, all Hansel (or any other player of the Hume Game) has to do is argue that Rhine, Pratt, Pearce, and a few of the subjects in the Pratt–Woodruff experiment fabricated the data. While this argument lacks the elegance of Hansel's earlier solutions, it is preferable to the ESP solution, according to the logic of the Hume Game.

1.3.2. Toward a More Balanced Approach

The excesses of the Hume Game should not blind us to the fact that fraud can occur in any science, and that there are legitimate means of both detecting and demonstrating it. A case where the accusations or insinuations of fraud possess more credibility than in those cases discussed above is the research of the late British mathematician and parapsychologist S. G. Soal. He obtained highly significant evidence of psi over a number of years from two selected subjects, a photographer named Basil Shackleton and a housewife named Gloria Stewart, using adaptations of Rhine's forced-choice GESP techniques (Soal and Bateman, 1954). Soal's research, which seemed to be among the most tightly controlled in parapsychology up to that time, became the object of speculative attacks in the tradition of the Hume Game (Hansel, 1960, 1966; Price, 1955), attacks to which Soal vigorously replied (Soal, 1955, 1960).

However, a new element was added to the controversy when one of Soal's assistants reported that she saw Soal altering figures in the target sequences (Soal and Goldney, 1960), a fact that Hansel, curiously enough, mentioned only briefly in his lengthy attack on Soal's work. More recently Scott and Haskell (1974) found internal evidence in the data which was consistent with the assistant's allegation, while another investigator was unable to find the recorded target sequences in question in any of the sources Soal claims to have used (Medhurst, 1971). Several prominent parapsychologists were invited to defend Soal (who was at the time senile and unable to defend himself and has since died) in a debate published in the *Proceedings of the Society for Psychical Research* (Scott *et al.*, 1974), but none of them was able to refute the heart of the critics'

argument, at least in the reviewer's opinion. Nonetheless, the case against Soal cannot, at this point, be considered conclusive.

What sets the criticism of Soal's research apart from, say, that of the Pratt–Woodruff experiment was that fraud was not just assumed to have occurred on an ad hoc basis but was actually alleged by a participant. A similar allegation of fraud by an experimental assistant recently led to the exposé of W. J. Levy and the discrediting of his extensive research on psi in animals (Rhine, 1974).

It is thus undeniable that at least one professional parapsychologist whose work was considered of high scientific quality did not live up to the standards of integrity maintained by the vast majority of other scientists in the field, a human frailty not unknown in the more orthodox sciences. Because of this fact, any suspicion of experimenter fraud *based upon empirical evidence of fraud* should be vigorously pursued. Moreover, experimenters should take all reasonable precautions to eliminate the possibility of cheating by subjects (precautions, incidentally, that I have found most good psychics insist upon). On the other hand, it is both unrealistic and unfair to assume cheating just because the results of a particular experiment are distasteful or do not readily fit into the current paradigm—not because such an assumption will not on occasion be correct but because science cannot function in the climate of paranoia and "witch hunting" (of the secular variety) that such an attitude inevitably produces. *No* branch of scientific inquiry can reach its full potential if those who engage in it know that their honesty or competence will be questioned simply for advancing and defending bold ideas or "disparate" findings. Such persecution has been with us throughout the history of science, but never in modern times has it been so blatantly defended as by those critics of parapsychology who have played the Hume Game. The implications of their attacks are by no means limited to parapsychology.

A more reasonable guideline for evaluating the likelihood of fraud in parapsychology experiments has been presented by Ransom (1971):

> If you have a situation where fraud or ESP are the only explanations for an experimental result, the result is evidence for (not proof of) ESP to the degree that the evidence for an honestly conducted experiment outweighs the evidence for fraud; and it is evidence for (not proof of) fraud to the degree that the evidence for fraud outweighs the evidence for an honestly conducted experiment. (p. 294)

1.4. The "Crucial Experiment"—and Other Myths

A great deal of energy has been wasted over the years by both parapsychologists and their critics in efforts to either proclaim or debunk the

"crucial experiment" that once and for all will provide conclusive proof of ESP. By this time we all should know better. There is no such thing as a conclusive experiment in parapsychology or any other science. Beyond the lowest levels of abstraction, the results of any experiment can potentially be interpreted in more than one way, even if one assumes the competence and integrity of the experimenters.

It is likely that many scientists who do not feel that ESP has been convincingly demonstrated would change their minds if a well-controlled (although not "conclusive") ESP experiment could be replicated by any competent investigator in his or her own laboratory. However, parapsychologists must concede that no such "repeatable experiment" exists, a concession, incidentally, that must be echoed by investigators in many areas of orthodox psychology. While lack of replicability is often cited as a reason for outright rejection of the ESP hypothesis (see Ransom, 1971), it is not at all clear that such absolute repeatability should be expected, even assuming the validity of the hypothesis. It is important to recognize that the behavioral sciences, including parapsychology, are probabilistic rather than absolute sciences. This is why statistical methods must be used to evaluate most results in these disciplines. One often overlooked implication of this fact is that valid relationships that are not exceptionally strong are likely not to reach conventional levels of statistical significance in a replication attempt simply as a result of sampling variability.

A second cause of the failure of ESP experiments to replicate by conventional criteria is the fact that it is difficult, if not impossible, to precisely replicate the original methodology in all potentially crucial respects. For example, any independent replication attempt by definition involves a different experimenter, and, as we shall see later, there is evidence that different experimenters conducting the same ESP experiment frequently obtain significantly different results. The ways in which different experimenters interact with their subjects is difficult to control but likely has a profound effect on experimental outcomes in this area. We are only beginning to understand the situational variables that determine the success or failure of ESP experiments.

Even if one concedes all of the above, the fact still remains that the repeatable ESP experiment does not exist. Any scientist who chooses to cite this fact as a reason for concluding that the existence of ESP has not been proven is on firm ground, at least in terms of scientific tradition. But why all the fuss over whether ESP has been "proven"? *Proof* is a term that is appropriate in mathematics and logic but not in empirical science. Sciences that are based on probabilistic models and use probabilistic methods of analysis should restrict themselves to probabilistic conclusions. The proper question is not whether ESP has been proven but what

is the subjective probability one can reasonably attach to the validity of the ESP hypothesis?

Unfortunately, such a judgment must be largely subjective, although there are certain objective factors that should enter into it. One factor that in my opinion should *not* enter into it is the so-called a priori improbability of ESP. One often hears the argument that if ESP exists, it would violate other well-established laws of nature. This simply is not true. The ESP hypothesis deals with a set of observations totally outside of those that serve as the data base for evaluating other physical laws or theories. ESP in no way threatens the validity of currently accepted scientific laws with respect to the observations to which those laws were intended to apply. The only threat posed by parapsychology is to the *universality* of those laws, a universality that should never be assumed in the first place. When and if the "existence" of ESP is finally accepted by the majority of orthodox scientists, the preferred explanation of how you are assimilating the information on this page will have to do with patterns of light processed by your physical sense organs and brain, not with ESP.

A factor that *should* enter into the judgment is the massive evidence in support of the ESP hypothesis accumulated over the years by parapsychologists and others. First of all, while "anecdotal" reports of ESP experiences by laymen do not and should not carry the conviction of well-designed experiments, a substantial proportion of the population have reported ESP experiences that they found convincing, both in the United States (Greely, 1975; Palmer and Dennis, 1975) and elsewhere (Haraldsson, Gudmundsdottir, Ragnarsson, Loftsson, and Jonsson, 1977). Furthermore, many such cases have been carefully documented (Gurney *et al.*, 1886/1970; Stevenson, 1970). The detail of correspondence between these experiences and the target events is often greater, and the likelihood that the experiences would have occurred without the target events is often less, than is often supposed by critics.

However, the bulk of the case for ESP rests on the numerous controlled laboratory experiments carried out by trained investigators that have provided statistically significant evidence of ESP in the data. While the quality of these experiments varies, few have flaws I would consider fatal as far as the demonstration of ESP is concerned, and the best ones compare favorably with the best I have seen in the psychological literature from the standpoint of methodological rigor. Secondly, although there is far from perfect repeatability in ESP research, it would be equally erroneous to say that there is no repeatability at all, especially when one considers the results of attempts by experimenters to repeat their own results. Generally speaking, I would say that the level of repeatability is about what one would expect given a genuine but weak phenomenon

subject to the vagaries of sampling error and changes of conditions described above. Finally, and perhaps most important of all, the results of many experiments fall into consistent patterns that make psychological sense.

After reading the evidence presented in this chapter, the reader, one hopes, will be in a position to attach his or her own subjective probability to the validity of the ESP hypothesis. (The reader will be in an even better position, of course, if he or she consults the original reports.) In all likelihood, if the reader is open-minded, this probability will be greater than zero but less than one.

Once one has decided upon one's own subjective probability, the important question then becomes whether that probability is high enough to justify assuming the existence of ESP as a working hypothesis on which to base further research. I have little sympathy for the kind of logic that says that since parapsychologists have failed to "prove" the existence of ESP after close to a hundred years of research, further research is a waste of time. Progress is being made in this most difficult field of research, even though the progress is slow. Progress would be much faster if the educational and financial resources available to the other sciences were equally available to parapsychology. Just because parapsychologists lack the "repeatable experiment" now does not mean that such will always be the case. Further research well may bring to light the variables that must be exploited or controlled to produce this ultimate breakthrough. When one considers the revolutionary theoretical and practical implications of ESP if it does exist, it is clear that a sufficiently strong prima facie case has been made for its existence to justify a major research effort to achieve this objective.

Such a program, unfortunately, will need to be a long-term affair. Parapsychology is in a very primitive stage of development compared to most of the other sciences. Although there is some testing of theory-based hypotheses (e.g., Stanford, 1973; Schmidt, 1975), much of the "hypothesis testing" in parapsychology involves the cross-validation of post hoc effects found in preliminary experiments. The parapsychological literature consists primarily of one huge and rather unwieldy data base. What I will attempt to do in the remainder of this chapter is to integrate that data base and to reveal some consistent trends that emerge from it. These trends may not be strong or reliable enough to deserve the title of "scientific laws," but they may point the way toward the further development of methods for improving the reliability of ESP data and the construction and elaboration of testable theories.

More specifically, I will attempt to review in the remainder of this chapter the great majority of valid, published experiments that, more than

simply demonstrating ESP, have contributed, or attempted to contribute, some understanding of its properties and its relationship to other variables. The logic of this admittedly ambitious undertaking is predicated on the assumption that a great deal of weight should not be placed on the results of any one experiment or experimental series in this field, regardless of the apparent elegance of the methodology or the apparent impressiveness of the results. To state the point positively, reliable knowledge is most likely to derive from the convergence of the results of several experiments on a common conclusion. While I could have lightened my burden by reviewing only those experiments I consider "important," such a strategy would merely add my own prejudice to whatever biases already exist in the literature itself. Although space limitations will prevent me from reviewing the literature as critically as I would like, I can take some comfort in knowing that the fair-minded and critical reader will want to consult the original reports before drawing final conclusions, regardless of how thoroughly critical is my own treatment.

The sources I have drawn from consist primarily of the major professional journals in the field (*Journal* and *Proceedings of the American Society for Psychical Research*, *Journal of Parapsychology*, *Journal* and *Proceedings of the Society for Psychical Research*, *International Journal of Parapsychology*, *European Journal of Parapsychology*, and *Parapsychological Monographs*). The second major source will be abstracts of papers referred and approved for presentation at the Parapsychological Association conventions since 1967 but not yet published at length in the journals. The published abstracts of these papers, while not the equivalent of journal articles, are rather substantive, especially since 1971 when the series *Research in Parapsychology* was initiated. Other abstracts, most of which were published in the *Journal of Parapsychology* and reviewed by their staff if not published elsewhere, will only be cited if they involve replication attempts or reflect on the generality of findings from more fully reported experiments. In cases where my information about a paper is derived exclusively from the abstract but a more detailed report is presumably available, both will be listed in the references.*

Any published scientific literature tends to provide a somewhat biased representation of all experiments actually conducted, especially with regard to the proportion of significant findings. In the following pages, I will be interested primarily in exploring consistency with respect

*The chapter includes journal articles published before the fall of 1976. I have also cited about half the papers presented at the 1976 Parapsychological Association convention. These are now published in *Research in Parapsychology 1976*, and some have already appeared in journal form.

to the *direction* of experimental relationships across studies rather than their *significance* per se. In this former respect it is my opinion, based on some knowledge of the publication policies of my sources, that the literature is not seriously biased.

I have tried to describe the experiments reviewed in the rest of this chapter such that the reader may assume that a difference between groups or experimental conditions is nonsignificant unless it is stated as being significant or its significance is obvious from the context (e.g., significant hitting in one group and significant missing in the other). The same principle applies to the significance with respect to MCE of overall ESP means in an experiment and the means of particular groups or conditions. While I have tried to apply these criteria consistently, readers who require detailed information on particular topics are urged to consult the original reports.

2. *ESP and the Experimental Situation*

Whenever a parapsychologist wants to test subjects in an ESP experiment, he must make numerous decisions about how the experiment should be conducted. Does it matter how far away the targets are from the subject? What kind of targets should he use? Should he offer incentives for high scores? Should he employ an agent to "send" the targets? Might it help to hypnotize the subject or attempt to put him in a state of consciousness maximally conducive to receiving psi impressions? The purpose of this section is to examine what parapsychologists have learned about the effects of various experimental manipulations on ESP scores.

2.1. Transcending Space and Time: Beyond the Fourth Dimension

2.1.1. ESP and Distance: From Rock Concerts to Moon Rocks

If one accepts the possibility that a person can obtain information about distant events without use of the known senses, it is tempting to speculate that some transmission of physical energy is involved, even though that energy may have yet to be discovered by scientists. One probable implication of most theories of ESP that assume such transmission is that receptivity should decrease as physical distance between the subject and the target stimulus increases.

2.1.1a. Long-Distance Experiments. A large number of experiments have shown that significant ESP scores can occur when subjects and

targets are separated by long distances. Perhaps the first substantial long-distance experiment was by Carington (1940a, b), who had subjects in other countries, including the United States, attempt to duplicate freehand drawings located in his home in England. The results were highly significant, but his statistical methods were of questionable validity. A subsequent "replication" attempt gave results of comparable significance (Schmeidler and Allison, 1948), but the significance was based on one subseries where the subjects and target drawings were located in the same building.

J. B. Rhine considered the distance question in the early Duke experiments (Rhine, 1934/1973). The Pearce–Pratt experiment, described earlier, provides strong evidence that ESP can occur over moderate distances of 100 to 250 yards with the targets and percipient in separate buildings. Other experiments from the early Duke period provided significant evidence of ESP over distances ranging from hundreds to thousands of miles (Gibson, 1937; J. B. Rhine, 1937). In the latter article, Rhine reported that over 4,000 runs from published and unpublished experiments involving distances from 70 to 3,000 miles resulted in a mean ESP score that was significantly above chance.

Subsequent demonstrations of ESP occurring over long distances have primarily involved subjects who had achieved high scores in preliminary testing or reported frequent spontaneous psi experiences. Undoubtedly the most extensively tested of these was a physician named Carlo Marchesi, who recorded his responses in Yugoslavia and mailed them to Duke, where the targets had been located (McMahan and Bates, 1954; McMahan and Rhine, 1947; Rhine and Humphrey, 1942). The results for all three experiments combined were significantly positive, but the magnitude of the effect was not impressive given the large number of runs (1,352) completed. A number of shorter card-guessing experiments with selected subjects also produced significant results involving psi-hitting (Anderson, 1959a; Mangan, 1957; Nielsen, 1956a), psi-missing (Osis, 1955), psi-hitting and psi-missing (Osis and Pienaar, 1956), and replicated displacement effects (Mangan, 1955, 1957). A South African subject was repeatedly able to wake himself up at times randomly selected by a friend 900 miles away (Bleksley, 1963).

A transcontinental card-guessing experiment with a selected subject that produced chance results was reported by Osis (1956), and we do not know how many other nonsignificant results simply were never published. Distance experiments with groups of subjects have produced mixed results (e.g., Fisk and West, 1957; Green, 1965; Kahn, 1952; Michie and West, 1957; J. B. Rhine, 1962; Skibinsky, 1950). Nonetheless, the success of long-distance card-guessing experiments in the published

literature compares quite favorably in terms of significant outcomes to the success of short-distance experiments from the same literature.

The number of long-distance free-response experiments is relatively small. The only long-distance drawing experiments, outside of Carington's and Schmeidler's work discussed above, were successful endeavors by Rush and Jensen (1949) and the recent experiments in "remote viewing" (e.g., Puthoff and Targ, 1976). Probably the most exotic of the significant distance series was a dream study where the agents were the audience at a rock concert being held several miles from the percipients (Krippner, Honorton, and Ullman, 1973; see also Krippner, Honorton, Ullman, Masters, and Houston, 1971). However, a transcontinental dream experiment with a single sender submitted to "sensory bombardment" was less successful (Foulkes, Belvedere, Masters, Houston, Krippner, Honorton, and Ullman, 1972).

The most ambitious attempt to transcend the distance barrier through ESP was by astronaut Edgar Mitchell on the Apollo 14 moon flight (Mitchell, 1971). During six rest periods, Mitchell was to send random sequences of 25 ESP symbols to four persons on earth, all of whom had been preselected for psychic ability. Unfortunately, Mitchell was not always able to send at the proper time, and two of the transmissions were missed entirely. This threw off the time correspondences between sending and receiving, and it required some arbitrary decisions to be made about which guess sequences to match with which target sequences for analysis. The precise analyses decided upon are too complex to describe here. Suffice it to say that matching in terms of sequence, e.g., first guess sequence with first target sequence, produced marginally significant psi-hitting, while analyses based more upon the temporal proximity of the sequences produced significant psi-missing. These results, being of a highly post hoc nature, must be interpreted with even greater than usual caution.

2.1.1b. Comparison of Distances. Although ESP may or may not be a possible means of future communication for space voyagers, the evidence does indicate that ESP can function over long distances. However, this does not mean that ESP functions equally well at all distances. The more interesting question of whether ESP effects are attenuated with distance has yet to be addressed in this chapter.

Generally speaking, the early Duke work revealed little evidence of decline with distance (J. B. Rhine, 1937). In the Pearce–Pratt series, however, the mean ESP score was significantly lower at 250 yards than at 100 yards, but outstanding single run scores were obtained at both distances (Rhine and Pratt, 1954). Also, Gibson (1937), who gave GESP tests to three unselected subjects in the same building and at distances up

to 2,000 miles, reported substantial declines with distance in all three cases.

In the nonsignificant transoceanic experiment reported by Osis (1956), the subject, who was located in Germany, achieved very high scores on control runs he conduct by himself at home. While having subjects test themselves without supervision is not accepted procedure in parapsychological research, Osis defended the validity of these results by citing a significant negative correlation between the daily scores on the short-distance and long-distance runs. Since the subject did not know his long-distance scores when he completed the corresponding short-distance runs, the attenuation-with-distance interpretation retains some plausibility, although this reasoning implies that some psi was operating at the long distance.

In a more sophisticated experiment, Osis and Fahler (1965) manipulated distance and time (precognition vs. clairvoyance) in a 2×2 factorial design. Subjects were members of a Finnish psychical research society. Multivariate analysis of variance was used to evaluate not only direct hits but also $+1$ and -1 displacements. The result was a complicated interaction affecting primarily the -1 scores. None of the simple effects suggested a straightforward decline of scoring level with distance. Some kind of decline with distance was also reported by Turner (1965), but I was only able to find an abstract of the report.

Of the experiments discussed above, those of Gibson (1937), Osis (1956), Rhine and Pratt (1954), and Turner (1965) reveal a significant decline with distance. All involved research with selected subjects. No studies reveal comparable incline effects. However, in each experiment where a significant decline effect was found, other uncontrolled variables could have been responsible for the effect. Perhaps the most important of these factors was that subjects were aware of the target locations. This procedure allows psychological effects to be confounded with distance effects, e.g., the subject may lose confidence if he thinks the target is far away from him, and the decline effect may be attributable to this loss of confidence. Karlis Osis attempted to circumvent this problem in an elaborate series of card-guessing experiments with subjects restricted to persons who had shown evidence of ESP ability in previous testing (Osis and Turner, 1968; Osis, Turner, and Carlson, 1971). In the first experiment, senders were located in New York, Los Angeles, and Sydney, Australia, with the percipients scattered throughout the United States, but mostly in the East. Subjects did not know which target location they were aiming for on any particular run. Complex multivariate techniques again were used to evaluate the results. The only evidence of significant decline effects were on two measures of $+1$ displacement (see p. 198).

Recognizing that this post hoc finding required replication, Osis undertook two confirmatory experiments. In each of these, a sender traveled from New York to Sydney and back, with intermediate stops in Paris and New Delhi. Again, subjects were kept "blind" as to the location of the sender on any particular run. In the first replication experiment, the decline effect was replicated on one of the two +1 measures, while in the second experiment it was replicated in neither. Given the large number of potential relationships from which this one finding was selected, support for the decline-with-distance hypothesis was marginal at best in the Osis–Turner experiments.

2.1.1c. Conclusion. Generally speaking, the experimental evidence indicates that ESP can occur at great distances and does not decline with distance. These findings do not fit well with most hypotheses that physical energies mediate the transmission of extrasensory information. Indeed, the information transmission model itself may be erroneous, a point I will return to at the end of the chapter.

On the other hand, it would be unwise to form any final conclusions at this point. Despite their methodological shortcomings, some studies have shown a significant decline with distance and none have shown a significant incline. A possible reason for the failure of the Osis–Turner experiments was that all the distances were so long that there was not enough variability to allow significant distance effects to consistently occur above the noise abundant in all ESP data. Another possibility is that ESP information triggers neural receptors in an "all-or-none" fashion provided that a critical threshold level of physical energy is received, in which case we *might* not expect a decline of scores with distance, even though there is a continuous decline in the strength of the carrier energy. There are a number of conceptual problems not discussed in this section that any physical theory of extrasensory transmission would have to solve before we could take it seriously, but the best attitude at present is still an open mind.

2.1.2. Precognition: ESP of the Future

It seemed natural to Rhine that since ESP could overcome distance it could overcome time as well. Instances of such "precognition" frequently were recorded in the spontaneous case literature, and informal testing with some of his star subjects further convinced Rhine that ESP could transcend the time barrier.

2.1.2a. Evidence for Precognition. The first formal experiment to provide evidence for precognition was again the drawing experiment of Carington (1940a,b), who found that his subjects often would draw pictures

closely corresponding to targets for later sessions, targets that had not yet been chosen. Tyrrell (1936) tested a highly talented subject who had shown success in previous clairvoyance experiments with a mechanical box device. In the precognition experiment, the subject opened one of five lids immediately before Tyrrell activated a circuit that randomly selected a target and caused a light to appear in the corresponding box. After 2,255 trials, she accumulated a rate of success giving odds of several hundred thousand to one against chance.

In 1938, Rhine reported results of a series of experiments with 49 subjects, 32 of whom were grade school children (Rhine, 1938b). Variations of the basic DT and matching tests were used. In the DT tests, for example, subjects recorded their guesses on record sheets. Immediately thereafter, the experimenter shuffled a deck of ESP cards to determine the target order. Although the mean score per run was only 5.14, this result was highly significant for the total of 4,523 runs completed by the subjects.

A concern that has continued to plague precognition researchers to the present day is that the experimenter might be using some other form of psi (either ESP in the present time or psychokinesis [PK]) to determine the target order in such a way that it will significantly match the percipient's guesses. When target orders were generated by shuffling decks of cards, this became known as the "psychic shuffle." One likely mechanism of the "psychic shuffle" in precognition tests is that the experimenter uses unconscious ESP to stop shuffling at the time when the order of cards most closely corresponds to the subject's pattern of calling the symbols. The plausibility of the "psychic shuffle" as a counterexplanation of precognition results was demonstrated in an experiment where subject and experimenter both shuffled decks of cards and found the resulting sequences to be significantly related (Rhine, Smith, and Woodruff, 1938). In a later precognition experiment, Rhine (1941a) attempted to circumvent this problem by having target orders determined by mechanical shuffling of the cards. Although today this procedure would not be considered a very good way of ruling out PK, it did have the advantage of assuring a more random target sequence than likely was obtained by hand shuffling. A matching test was chosen for this experiment, so only the order of the 5 key cards had to be rigorously randomized. The subjects were 19 adults and 5 children, who completed a total of 2,108 runs. Prior testing had indicated that the children tended to score above chance and the adults below chance on precognition tests. This pattern was significantly confirmed for each group.

Unfortunately, not all precognition experiments had been this successful. Nevertheless, in the appendix to his 1941 report, Rhine sum-

marized the results of all known precognition experiments conducted at his laboratory and elsewhere up to June 1939. Despite the psi-missing in some experiments, he found the overall results were significantly above chance. Using a statistical test that treats the results of individual experimental groups in terms of their mean deviation from chance regardless of sign, the probability was 10^{-12}. For a discussion of the early precognition work, see Rhine (1945a).

Since 1940, parapsychologists have continued to use the precognition technique for ESP testing, albeit rarely in experiments as massive as those described above. Impressive results have continued to appear in these shorter experiments when testing was restricted to preselected subjects. A number of such experiments began to appear in the literature in the 1950s, specifically those referred to in the last section on distance effects. By this time, a more advanced method, which made use of random number tables, had been developed at Rhine's laboratory for generating target sequences (see Chapter 1). Significant results were obtained with this technique by several selected subjects (Anderson, 1959a; Mangan, 1955, 1957; Nielsen, 1956a; Osis, 1955).

Highly significant results with selected subjects have been obtained more recently by Helmut Schmidt using a machine that generates random target sequences through the principle of decay of a radioactive source (Schmidt, 1969b; Schmidt and Pantas, 1972; see Chapter 1 for a discussion of this apparatus). A possible alternate interpretation for some of these results is that the subjects might have been using PK to influence the target generation of the machine to coincide with their guesses, and Schmidt (1969b) presents supplementary data suggesting that this may have happened with at least one subject. Significant precognitive psi-hitting by selected subjects with one of Schmidt's machines also has been reported by Haraldsson (1970), Honorton (1971a) and by Kelly and Kanthamani (1972).

The use of the precognition technique in free-response testing has been less frequent but equally successful. In two eight-night dream experiments, the British psychic Malcolm Bessent was asked to dream about events or slides he would experience the next day. He was awakened during the night to give dream reports, but the target was never selected until the following morning. In each experiment, outside judges were able to match target and dream reports for the eight nights to a degree significantly better than chance (Krippner, Ullman, and Honorton, 1971; Krippner, Honorton, and Ullman, 1972).

Puthoff and Targ (1976) asked a professional photographer named Hella Hammid, who previously had been successful in clairvoyance tests with the "remote-viewing" technique, to try it precognitively. Only four

trials were completed, but an outside judge was able to correctly match all targets and descriptions. The correspondences were qualitatively quite impressive, somewhat more so than those obtained with the clairvoyance procedure. Successful precognitive remote viewing also was found with two female college students (Bisaha and Dunne, 1977).

As might be expected, precognition experiments with unselected subjects have been less consistent in providing significant overall deviations from chance, although many of the studies I will cite later in which significant relationships were found between ESP scores and predictor variables employed precognition procedures. In perhaps the largest precognition experiment with unselected subjects, close to 30,000 readers of *Maclean's* magazine completed a ten-trial precognition test by filling out and mailing back postcards placed in the magazine (J. B. Rhine, 1962). Separate random target orders were generated for each subject by computer. The overall mean score was significantly *below* chance.

2.12b. Precognition versus Clairvoyance. Of the several studies where precognition and clairvoyance tests have been systematically compared within subjects, only three provided significant differences, two of which favored precognition. Freeman (1962) gave seven college students alternate DT and precognition runs over several sessions. They scored significantly above chance on precognition and close to chance on DT. The difference was significant, although it is unclear how consistent the effect was across subjects. Furthermore, demand characteristics favoring precognition were introduced for other purposes, and these may have been responsible for the effect. The British psychologist Robert Thouless (1949) tested himself with DT and precognition methods in counterbalanced order over several sessions. Contrary to his initial expectation, he scored significantly above chance on one of two precognition tests and significantly below chance on a DT test. He attributed this result to the greater novelty of the precognition tests which sustained his interest longer than the DT method; he had practiced DT extensively in the past. Buzby (1963) reported significant positive scoring on clairvoyance but not precognition among a group of 33 college students, the difference being significant. Overall results for a second group, reported in more detail later (Buzby, 1967b), showed no significant difference.

A number of other experiments have shown no significant within-subject differences between the two methods nor any consistent directional trends (Beloff and Bate, 1970; Dean, 1972; Fahler, 1957; Freeman, 1969a; McMahan and Rhine, 1947; Nash and Nash, 1968; Osis and Fahler, 1965; Zenhausern, Stanford, and Esposito, 1977). However, only the Beloff, Osis, and Zenhausern experiments controlled the order of clairvoyance and precognition trials within sessions. Zenhausern *et al.*

(1977) did find a significant interaction between type of test and sex, with females scoring significantly higher on clairvoyance than on precognition. Comparisons using between-subjects designs simply have not been reported in the literature.

2.1.2c. Comparison of Time Intervals. Just as it was meaningful to ask whether ESP scores decline with distance, it is meaningful to ask if scores on precognition tests decline as the time interval between the actual test and target selection increases. Hutchinson (1940) reported significantly lower scores on runs checked 10 days after the test than on runs checked 1 day after the test. Scoring on the 1-day runs was significantly positive. However, the 10-day runs were usually the last runs subjects completed in the session, so the results might reflect nothing more than a within-session decline effect. Also, subjects knew in advance which runs would be checked at which time, introducing possible demand characteristics. In an earlier series where 1-day and 10-day intervals were compared and some effort was made at counterbalancing the design, no significant difference was found, and the means in both conditions were close to chance. Turner (1965) found no significant differences among precognition scores checked 1, 2, or 3 weeks after the test.

The only other studies where time intervals have been compared in any systematic way were correspondence experiments with individual subjects. Osis (1955) found no significant difference between scores on runs checked within 1 week of testing and those checked 1 month after testing. How many days he waited was decided arbitrarily for each run. Overall scores in this experiment were significantly below chance. A subject tested by Anderson (1959a) actually scored better on runs checked 1 year later than on those checked only 5 days later. The difference was not quite significant, but significant psi-hitting was restricted to the 1-year runs. In neither of these studies were subjects informed at the time of testing which runs would be scored when.

2.1.2d. Conclusion. Research with selected subjects provides a strong case in support of the conclusion that ESP under certain circumstances can provide information about events that do not yet exist at the time of the response. The philosophical implications of precognition are obviously rather mind-boggling, but a discussion of these is beyond the already ubiquitous scope of this chapter. The evidence for precognition is particularly impressive methodologically, because by definition there is no way that the subject can be guided by sensory cues, since the target sequence does not exist at the time he makes his responses. The possibility that all precognition data can be explained by other forms of psi such as PK has not been completely ruled out, but it is rather strained in those experiments where target orders were derived from random number ta-

bles and entry points were determined in a complex manner. Precognition procedures have been no less successful than clairvoyance procedures in group experiments with nongifted subjects. There is no evidence that precognition scores decline as the time interval between testing and target generation increases, but more research on this topic with high-scoring subjects is needed. Other data relevant to the precognition issue are discussed in section 6.1.1.

2.2. Forced-Choice Target Material: Variety Is the Spice of Psi

2.2.1. Type of Target: It's All a Matter of Preference

Parapsychologists have revealed no lack of creativity in selecting types of target material for forced-choice ESP experiments. Not surprisingly, a number of experimenters have systematically compared scores on two types of targets using within-subject designs. Although subjects frequently score quite differently on these target types, the nature of these trends by no means has been clear or consistent, at least on the surface.

2.2.1a. Physical Dimensions. Size of the target stimulus is a case in point. Pratt and Woodruff (1939) found that subjects scored significantly above chance on an STM test when the ESP symbols were made very small, but close to chance when the symbols were of normal size. However, this effect could not be replicated significantly in a second experiment. In both experiments, subjects knew which type of symbol was being used on some runs but not others, and this variable had no significant effect on the results. In another matching experiment L. E. Rhine (1937) found that grade school children scored equally well on various sizes of symbols. To complete the cycle, the French biologist Chauvin (1961) found that in a clairvoyance guessing game where targets were the numbers 1 and 2, he and four children from his family scored significantly below chance when the numbers were very small and near chance when they were of normal size. Subjects did not know the size of symbol on particular trials, although they knew symbol size was a variable in the design.

Pratt and Woodruff were able to explain the findings from their first experiment as a tendency for subjects to score significantly only on targets they had not responded to in previous testing. Many of Pratt's subjects in his first series had prior experience with normal-sized ESP symbols, while Rhine's subjects apparently had not. Chauvin and his children had been tested before with numerical stimuli, but the microscopic stimuli were probably new to them. This pattern of results suggests

that, at least as far as stimulus size is concerned, novelty has the effect of increasing the magnitude of ESP scoring, but the direction of the effect depends upon other factors. However, in an experiment designed to systematically manipulate subjects' familiarity with type of target (symbol or position of symbol in a row of five spaces), novelty was found to have no effect (Hallett, 1952).

Other variations of target type where the emphasis has been on the physical attributes of the targets as opposed to their meaning or impact for the subjects have produced mixed results which so far have contributed little to our understanding of the ESP process. MacFarland and George (1937) found that significant psi-hitting among 13 college students was not adversely affected when the ESP symbols were distorted in shape. In a series of classroom GESP experiments in which grade school children also achieved significant positive scoring overall, Van Busschbach (1956) initially found higher scoring when the targets were colors or symbols as opposed to words, but this effect vanished when the order of run types was counterbalanced. Differences in target type (generally words vs. symbols) entered into complex interactions in classroom ESP tests of grade school and high school students conducted by Freeman (1963, 1965, 1966b, 1967, 1968, 1969b, 1970a, b, 1972b), but no significant main effects were reported.

In an experiment involving numerical stimuli, Nash and Nash (1959) reported nonsignificant scoring when the targets were addition problems that subjects had to solve (e.g., the target is "1 + 2" and the correct response is "3"), while significant psi-missing occurred when the targets were the numbers themselves (e.g., "3"). The difference is significant by a C.R. analysis computed by the reviewer. Subjects were unaware that addition problems were included in the target sequence. A possible explanation of the less significant scoring on the addition problems is that subjects were picking up on the actual numbers rather than their sum, but no direct evidence of this is reported. Translation also may have been a factor in an experiment reported by Krippner (1966). Children who were asked to respond by circling the appropriate word on a clairvoyance test scored significantly above chance when the targets were words but nonsignificantly when the targets were pictures representing the words.

2.2.1b. Psychological Dimensions. There are some indications from the literature that subjects may be more sensitive to the personal meaning of target stimuli than to their physical form. Perhaps the most compelling single illustration of this point is an experiment with a single subject in which targets consisting of descriptions or pictures of people were compared with blank cards onto which images of these people had been hallucinated by a hypnotized person. Untreated blank cards served as con-

trol targets. Significant positive scoring occurred on the treated blank cards and on the three experimental types of stimuli combined. Unfortunately, no comparisons with the control stimuli were possible (Lucas and Roll, 1973).

Meaningful stimuli do not always produce psi-hitting, however. Skibinsky (1950) found in three GESP distance series that overall significant psi-missing occurred on runs where the targets were names of the subjects' family members as compared to slightly above-chance scoring with normal ESP symbols. The difference was significant in the three series pooled. Unfortunately, subjects probably filled out the name run first in all sessions, introducing a confounding order effect. Van de Castle (1953) found that a single subject scored very significantly above chance on conventional types of targets (e.g., ESP symbols and numbers) but slightly below chance on drawings that she made herself and that were meaningful to her. Nash and Nash (1968) found that male college students scored significantly above chance on word targets that they selected by group vote as representing "favorite things" and significantly below chance on number targets selected by the experimeter. Freeman (1961), however, found no mean difference among college students between scores on ESP symbols and target objects they selected themselves as having emotional significance for them. (We will return to this study later.) Other experiments in which target material of an emotional nature was used without the subject's knowledge have revealed appropriate effects on ESP scoring. These experiments will be discussed in section 5.1.2.

Rao conducted a series of experiments in which subjects were asked to select five symbols to which they had a "favorable emotional attachment." Scoring on these symbols was then compared to scoring on conventional ESP symbols in the same session. In the first experiment, six female subjects selected on the basis of high scores in preliminary testing scored above chance on "choice" symbols and below chance on ESP symbols, the difference being significant (Rao, 1962). However, in a second experiment using the STM technique, five unselected subjects produced a significant reversal of this effect (Rao, 1963a).* Unlike the earlier experiment, subjects did not know which type of target they were guessing on any given trial. Two further STM experiments failed to produce any overall difference, but post hoc analyses revealed a reversal of the trend between the first and second runs of the session in each case (Rao, 1963c). The reversal was significant in the second experiment and approached significance in the first.

*Here and elsewhere in the chapter, "significant reversal" means that the second effect was independently significant, not necessarily that it differed significantly from the first effect.

Another series of experiments that has continued this pattern of inconsistent within-subject differences involved comparisons of targets composed of English words and words in a foreign language (Hindi or Telugu) unknown to the subjects. Kanthamani (1965b) found that subjects scored above chance on English words and below chance on Hindi words. The difference was significant in two of three experiments and approached two-tailed significance in the third. However, subjects scored significantly higher on Hindi than on English words when she attempted to adopt a different method of presenting targets to the subjects (Kanthamani, 1965a).

Rao (1964b), on the other hand, found in an STM test that his male subjects scored significantly higher on Telugu than on English words in each of two experiments, while females reversed the trend. The effect was strongest when the target and key cards were in the same language. An earlier experiment produced mixed results (Rao, 1963b). Seventy-five high-school students completed two standard clairvoyance runs, one with each type of target. The initial analysis produced results generally in line with those of his later experiments described above. However, Rao noted that while his subjects had always completed the Telugu run first (a procedure that he recognized had confounded target type and order), he had always selected targets for the English run first. When he went back and compared the Telugu responses with the English targets, and vice versa, the results confirmed Kanthamani's finding (i.e., overall higher scores on English words) to a significant degree. Another experiment, however, produced a nonsignificant trend in the opposite direction from the previously found pattern (Rao, 1965a). Finally, Sailaja (1965) reported in abstract form an experiment with five subjects of unspecified sex who scored significantly higher on Telugu than on English targets, but an additional subject later failed to confirm the effect.

Two other experiments involving major procedural variations produced no differences in scoring on English and Telugu words. In one of these, the subjects were Indian students who knew both languages (Sailaja and Rao, 1973). In the other, ordinary ESP symbols were compared to ESP symbols incorporated into artistic drawings of African masks. Subjects scored significantly higher on the mask targets, suggesting that targets which are aesthetically pleasing to subjects may facilitate psi-hitting (Rao, 1964a). Ten of the subjects in this experiment were given a language ESP test in addition to the symbol test. Scores on the two tests were negatively correlated to a very high degree across subjects. It is unclear whether the order of the tests was counterbalanced. Freeman (1961), in a study mentioned earlier, found a similar significant negative correlation, in this case between scores on ESP symbols and on emotionally toned objects.

2.2.1c. The "Preferential Effect." These last two findings illustrate, perhaps more clearly than any we have discussed so far, the tendency for subjects to score differentially on two types of target material when they are combined in a single experiment. In these two experiments, subjects were not consistent with respect to which target type was associated with psi-hitting, in contrast to those experiments where one target type produced a significantly higher mean score than the other. In both cases, the customary finding is for psi-hitting to occur on one target type and a comparable degree of psi-missing on the other, a phenomenon that Rao (1965a) called the "differential effect." He earlier had labeled this the "preferential effect," assuming that the psi-hitting occurred on whichever target type the subject preferred. However, the fact that subjects sometimes scored higher on ESP symbols than their "choice" symbols (e.g., Rao, 1963a) caused him to introduce the more neutral term. It should be mentioned that only in Rao's first experiment (Rao, 1962) was the subject aware what type of card he was aiming for on a particular trial, so only in this experiment would we expect the psychological consequences of preference to vary as a function of target type. In this experiment, subjects scored significantly higher on the supposedly preferred target type. Also, in most of the studies where emotional and "choice" targets were compared, there was no check to see if subjects actually *preferred* the "choice" targets.

Sanders (1962) tested the preferential hypothesis directly by alternating runs in which subjects responded by calling out their guesses with runs in which they wrote down their guesses. There was no main effect for type of response, but in each of two series the subjects scored significantly higher with the method they preferred. Schmeidler (1946b) had subjects alternately guess symbol and color of ESP cards in a clairvoyance test. She found that subjects scored significantly better on calls representing the particular symbols or colors they claimed to prefer. In a later experiment, the target pool consisted of pictures that varied on four attributes, and subjects were asked to guess on each trial which attributes were present in the target (Schmeidler and Lewis, 1969). On the first four trials, subjects had to guess all four attributes, while on the second four they were told two of them and were asked to guess the other two. Afterward, they were asked which procedure they preferred. Subjects scored significantly higher on the preferred procedure than on the nonpreferred procedure, the scores on the latter actually falling significantly below chance. An interesting secondary finding was that subjects scored significantly higher on the nonpreferred targets when the results were analyzed for +1 displacements. Schmeidler suggested that "impatient"

subjects may have been looking ahead while engaged in the nonpreferred task, causing them to direct their psi-hitting tendencies toward the next trial in the sequence. Finally, Hebda, Velissaris, and Velissaris (1974) reported that subjects scored significantly higher with a deck composed of cards of a type (e.g., ESP cards, animal cards) they preferred than with a type they did not prefer.

2.2.1d. Conclusion. Evidence is beginning to accumulate which supports the perfectly reasonable proposition that when subjects are allowed to choose which of two methods of response they prefer in an ESP experiment, they will score better on the one they prefer. Although this "preferential hypothesis" has been validated primarily with respect to response type rather than target type, it offers our best hope to date of integrating a very messy and inconsistent body of data concerning the effect of target type on ESP scoring in forced-choice experiments. So far, the applicability of the preferential hypothesis has only been demonstrated in situations where subjects each completed two types of tasks. The hypothesis that sensitivity to subject preferences can help guarantee overall psi-hitting in single-task experiments, although plausible, remains a question for further research.

2.2.2. Multiple Aspect Targets: Getting the Whole Picture

Several experiments in the parapsychological literature have involved targets that differ simultaneously on two or more attributes. An example of such target material is a deck of ordinary playing cards, which differ in terms of suit and number. The most interesting question raised by the use of multiple-aspect targets is whether subjects tend to score more total or exact hits than would be predicted from their scoring rates on the component elements. In other words, do subjects respond to such targets as wholes or as a series of independent parts?

Foster (1952) reviewed five early ESP experiments that achieved overall significantly positive scoring. In four of these series, subjects scored significantly higher on exact hits than would be expected on the basis of their scores on the separate attributes. (This number of expected exact hits, based on scores for separate attributes, hereafter will be called the "adjusted expectancy.") Unfortunately, these experiments were conducted in the early 20th century when controls against sensory cues were not as adequate as they are today, and one of the four experiments showing the effect was by S. G. Soal (see Sec. 1.3.2).

In a more recent series of experiments, the gifted subject Bill Delmore consistently scored a highly significant excess of exact hits com-

pared to the adjusted expectancy on playing cards using both standard clairvoyance and psychic shuffle methods (Kanthamani and Kelly, 1974a, b, 1975). Another subject tested with double-aspect targets (form and color, each with $p = 1/5$) also scored significantly above chance on exact hits but, unlike Delmore, her exact hit total was not quite significant when I compared it to the adjusted expectancy (Mangan, 1957). There was *possibly* evidence of excess exact hits in dual-aspect group experiments by Lancaster (1959) and Warcollier (1962), but the reports I have seen are only brief abstracts. In an experiment with unselected subjects involving triple-aspect targets, Schmeidler and Lewis (1968) found a significantly high number of exact hits, while scoring on the separate attributes was close to chance. This effect was not found in a later experiment with four-aspect targets, however (Schmeidler and Lewis, 1969).

Although the above results provide indirect evidence for holistic "perception" of ESP targets, other explanations cannot be ruled out. When Delmore guessed the cards using ordinary clairvoyance methods, he did not make unitary responses. On the contrary, he tended to guess the number first and then the suit (Kanthamani and Kelly, 1974a). His pattern was to guess the number correctly to a highly significant degree but only to get the suit right if the number had been right. Schmeidler's subjects were required by the nature of the task to guess the attributes successively rather than holistically. Her subjects were given immediate feedback after guessing each attribute, leading her to suggest that the excess of direct hits may have resulted from heightened motivation or positive affect at the time of later guesses if guesses on previous attributes had been successful.

One negative study with respect to exact hits as compared to attribute hits was reported by Hallett (1952), who used double-aspect targets consisting of the identity of ESP symbols and their locations on rows of five spaces. Scoring was positive on position and negative on symbol, the difference reaching significance in each of two experiments. The number of exact hits was close to chance.

2.2.2a. Conclusion. The general pattern among those few studies where multiple-aspect targets were used and appropriate analyses reported is for subjects to score at least as high or higher on the total target than on any of its primary attributes. Such results suggest either that such targets are perceived holistically (even if the overt responses are fragmentary) or that a correct guess on one attribute somehow facilitates correct guesses on other attributes. It may be that both processes occur in different cases, and other factors such as psychological set may also play a role. These issues, of course, must be resolved by future research.

2.3. Test-taking Strategies: In Search of the Magic Formula

Subjects are usually left to their own devices when it comes to the best strategy for successful card guessing. There have been a few experiments, but only a few, where experimenters have attempted to manipulate the manner in which the subject guesses the targets on a particular type of test. Most of these have involved the subject's rate of guessing.

2.3.1. Rate of Responding: The Tortoise and the Hare

Stuart attempted to establish subjects' preferred tempos by having them tap a pencil in three-quarter time. Then a series of trials were administered in which each subject had to make his calls correspond to the beat of a metronome. The metronome was set at different tempos, sometimes at the subjects' preferred tempo and other times either above or below it. In each of three exploratory series involving both BT and STM procedures, subjects scored significantly above chance at the preferred tempo and near chance at the other tempos. In each series, the difference was significant (Stuart, 1938). However, results of a more systematic confirmatory experiment, although in the predicted direction, were not significant (Stuart and Smith, 1942). Hebda *et al.* (1974) and Nash and Nash (1958) also found no significant correlation between ESP scores and rate of responding with unselected subjects.

Other experiments suggest that slower calling rates may facilitate psi-hitting. Van de Castle (1953) had a subject call each five-trial segment of the run at a different tempo, the order being varied across runs. The intertrial intervals ranged from 30 seconds to 90 seconds or more. Overall scoring was significantly positive, but there was a significant linear decline in scores as response rate increased. Osis and Pienaar (1956) reported the results of GESP tests with two subjects, each tested with two response rates in counterbalanced order. The trials (including intertrial intervals) lasted either 5 seconds or 20 seconds. There was significant psi-hitting at the slow rate and significant psi-missing at the fast rate. Among a group of ten subjects preselected for high ESP ability by screening tests, Tart (1976a) found that those who apparently worked most slowly on a confirmatory GESP test with trial-by-trial feedback obtained the highest scores. The particular agent-experimenter used with the high-scoring subjects in this experiment may be a confounding factor, however. Finally, Stuart (1947) found that students who felt "rushed and inhibited" in a classroom free-response drawing experiment scored significantly above chance on the target for the *next* trial, and significantly higher on this target than did the other subjects in the class. The *overall* results for

the class as a whole were below chance on direct targets, but it is not reported how much this was contributed by the subjects who felt rushed. However, Heyman and Schmeidler (1967) found that subjects described as "dynamic–hasty" on a test of one's orientation to time (see Sec. 3.2.3d) scored significantly above chance on +1 displacement when asked to respond *slowly* (one call every ten seconds).

2.3.1a. Conclusion. There is suggestive evidence that slower response rates facilitate psi-hitting in forced-choice ESP tests. But since this evidence comes exclusively from a handful of selected subjects, its generality is quite questionable. Stuart's drawing experiment suggests the hypothesis that lower scores resulting from rushed responses may be a by-product of +1 displacement, although Heyman's results suggest that individual differences must be considered as well.

2.3.2. Being Spontaneous: Impulsivity Pays Off

A strong impression shared by many experienced parapsychologists is that an attitude of spontaneity during an ESP test is conducive to good scoring. Subjects often are instructed to adopt such an orientation toward the ESP test. Is the value of such spontaneity merely a myth energized by the disdain many parapsychologists feel toward the excesses of rationalism, or is there some evidence for it? Fortunately, we have some data that we can turn to for at least a tentative answer.

2.3.2a. Affectability. Stuart (1941) reanalyzed several thousand runs from previous clairvoyance and precognition experiments in which subjects had been asked to predict their scores on a run-by-run basis. He found that when subjects' predictions for the first ten runs of the session were influenced by their scores on the immediately previous run, their scores in the remainder of the session tended to be lower than if their predictions had been more independent. Although such "affectability" in predicting ESP scores does not necessarily reflect a lack of spontaneity in actually making ESP responses, it is symptomatic of a rationalistic cognitive style that ordinarily would not favor spontaneity.

2.3.2b. Spontaneous Card Calling. Ross, Murphy, and Schmeidler (1952) found that children rated as "spontaneous" on the basis of free-play behavior scored suggestively higher on an ESP card test than did less spontaneous subjects. However, the first experiment designed specifically to test the spontaneity hypothesis was by Scherer (1948). In two experiments using two different homemade ESP testing machines, Scherer asked subjects to make one guess at a time and to make such responses only when they had a strong "hunch" that the response would be accurate. Various control conditions were introduced, the most com-

parable of which had the same subjects make one trial at a time in a "deliberate" manner. On one machine, there was a highly significant difference between results in the experimental condition and the various control conditions, with significant psi-hitting in the former. Results with the second machine were in the predicted direction but not significant.

In exploratory self-testing, Cadoret (1952) consistently found that the first trial with a new technique tended to yield a higher scoring rate than other trials. This kind of result fits in nicely with the spontaneity hypothesis not only because of the novelty element (e.g., Pratt and Woodruff, 1939) but also because the first responses in a calling sequence are the ones least influenced by the development of sequential calling patterns.

The effect of such calling patterns was examined more systematically by Stanford (1966a), who had a group of college students complete two precognition runs. In one run "closed decks" (always five of each symbol) were used, and subjects were urged to call each symbol an equal number of times. In the second run, "open decks" were used, and subjects were urged to make their calls more spontaneously. Mean deviation scores for the two runs did not differ significantly, but run-score variance was significantly higher for the open deck run. Similar results were subsequently found in three other experiments (Stanford, 1966a, 1968), two of which were conducted by experimenters other than Stanford. In one of these experiments, no calling set was given. Another experiment by Stanford providing indirect support for the spontaneity hypothesis is discussed in Sec. 3.3.1b. For an overall review, see Stanford (1975).

Morris and Cohen (1971) gave subjects four DT runs with an "open set." They found that those subjects whose responses showed the most "randomness," as defined by a relatively large number of doubles in the call sequence, scored significantly below chance while the low-doubles group scored significantly above chance.

Schouten (1975) attempted to eliminate calling patterns more directly by training subjects to produce more random sequences. The specific objective of the training was to help subjects avoid response strategies altogether and to make their responses more "free." However, the training was not successful in boosting ESP scores. Among those subjects who met Schouten's criterion for unbiased responding, there was no significant difference between their scores in the first (nonrandom) session and their scores in the session where their calls had been most random, although the latter scores approached significant psi-missing. Unfortunately, no analyses comparable to Stanford's analysis of run-score variance were reported in either the Morris or Schouten experiments.

2.3.2c. Imagery versus Impulse. In two DT clairvoyance experiments, subjects were instructed on some runs to imagine the targets

visually and on other runs to "guess the first thing that comes to mind." In neither case did one method or the other prove superior, nor was there any significant interaction with imagery ability as measured by the Betts QMI, despite independent evidence of psi in the data. (Honorton, Tierney, and Torres, 1974; Schechter, Solfvin, and McCallum, 1975).

2.3.2d. Conclusion. The highly consistent results reported by Stanford suggest that a set for spontaneous calling, whether it is imposed by the experimenter or occurs naturally, facilitates both psi-hitting and psi-missing (i.e., high variance) as opposed to chance scoring. The single-trial results of Cadoret and Scherer, although involving psi-hitting only, can readily be interpreted within this framework, while the results of Morris and Cohen are more equivocal. If one assumes that absence of measurable calling biases reflects such spontaneity, it should be a relatively simple matter to verify the generality of Stanford's results by reanalyzing previously collected data. Although there apparently was no analysis for run-score variance, Schouten's experiment suggests that attempts to enforce spontaneity by extensively training subjects to call randomly is unlikely to be a fruitful solution. A possible reason for the failure of this approach is that subjects become so concerned about not responding in a biased manner that genuine spontaneity is sacrificed, despite the experimenter's intention.

Generally speaking, attempting to visualize the targets does not seem to be more effective than more intuitive guessing strategies, even for "good" imagers.

2.4. External Conditions: Manipulating Motivation

2.4.1. Environmental Conditions: Pollution in the Laboratory

It is natural to expect better performance on any mental task if the surroundings are pleasant and free from distraction. Although most parapsychologists consider the test environment to be important, only rarely has it been the object of systematic experimental manipulation.

The first such manipulation I was able to find in the literature was by Bevan (1947a), who had college students complete card-guessing runs with the room either normally light or darkened. Subjects scored above chance in the light and below chance in the dark, the difference being significant. In GESP experiments with cats, positive ESP scores were significantly reduced by introducing unpleasant conditions such as excess light or darkness, increasing the speed of an electric fan aimed at the cats, rubbing the cats' fur the wrong way, or holding them back from food (Osis, 1952; Osis and Foster, 1953).

Less noxious environmental changes seem to have little effect, however. Gibson and Stuart (1942) reviewed seven card-guessing series and found no consistent relationship between ESP scores and average barometric pressure for the day of the test in a nearby city. Barometric pressure also had no discernible effect on ESP scores of the Yugoslav subject Marchesi (McMahan and Rhine, 1947). Eilbert and Schmeidler (1950) and Reed (1959) found that playing different kinds of background music had no significant effect on ESP scores, in experiments where there was other evidence of ESP in the data. Palmer, Bogart, Jones, and Tart (1977) discovered that redecorating a barren-looking laboratory room failed to reverse a psi-missing trend in a free-response ganzfeld experiment.

Pratt (1961) noted that the great majority of high-scoring ESP subjects reported upon in the *Journal of Parapsychology* up to that time did exceptionally well when tested in their own homes, often better than when tested in the laboratory. This observation was significantly confirmed in a more systematic fashion in an experiment with unselected children as subjects (Drucker, Drewes, and Rubin, 1977). However, Eilbert and Schmeidler (1950) found that college students scored significantly higher when tested at the college than when asked to come to the *experimenter's* home to be tested.

Finally, Woodruff (1943) introduced ESP tests into an experiment designed primarily to test the effect of low temperatures and oxygen deprivation on a motor task. College students completed five DT runs before and five after each of eight sessions involving various combinations of stress factors. Stress was not present during the tests themselves, however. A significant decrease in scoring following the session, as compared to before the session, was obtained; but it was entirely attributable to the control condition where the only effective variable apparently was boredom.

2.4.1a. Conclusion. There are a few studies that suggest that adverse environmental conditions lead to decrements in ESP scoring, provided that they are sufficiently extreme. The possibility that ESP scores may be improved by testing subjects in their own homes should be explored further, when the requirements of the experimental design permit.

*2.4.2. Incentives: Here Comes the Bribe**

It is almost a religion among many parapsychologists that high ESP scores depend upon the subject being strongly motivated to achieve such scores (e.g., Smith and Gibson, 1941). Incredibly, there are only a few

*This subheading was stolen from Dr. Lawrence Casler.

experiments in the literature where motivational variables have been directly manipulated. They can be broken down into those involving tangible incentives, such as money, and intangible incentives, such as knowledge of results.

2.4.2a. Tangible Incentives. In a precognition experiment with adult and child subjects, Rhine (1941a) offered rewards ranging from candy bars to $100 for high scores on some runs. There was no significant difference between overall scores on these runs and other runs in the experiment, although rewards seemed to lead to somewhat improved scores among the child subjects. Woodruff and Murphy (1943) assigned one group of subjects to a condition where they received 5¢ for each hit obtained in a second set of clairvoyance runs above what they achieved in the first set. Control subjects were offered no rewards. There was an increase in scoring rate from the first to second set of runs in the experimental group, but it was not significant, nor apparently was it significantly different from the change in the control group. Woodruff and George (1937) introduced a manipulation of financial incentive (this time, theater tickets) with two high-scoring subjects, but the results were highly ambiguous. Sprinthall and Lubetkin (1965) offered half of the subjects they tested $100 if they could get a score of 20 or higher on one BT run. Both the experimental and the control groups scored close to chance. Palmer and Miller (1972) found that a significant relationship between ESP scores and an attitude scale was significantly reduced when a $10 reward was offered for the highest score.

2.4.2b. Feedback as Incentive. Participating in an ESP test can have its own intrinsic rewards, provided the subject can learn how well he or she scored. However, as any college student who has to wait weeks and weeks for an exam grade will tell you, a long delay in receiving such feedback can be more frustrating than receiving no feedback at all.

Rhine (1938a) reported the results of close to 5,000 clairvoyance runs completed by 175 subjects in eight experiments by various investigators. Results were positive to a highly significant degree when subjects received immediate feedback of their scores after each run. Less extreme but still significant psi-missing occurred when feedback was delayed several days. The latter were experiments where decks of cards were mailed to subjects who made their guesses and then mailed the cards and record sheets back to Duke for scoring. Sometimes these latter subjects never received their actual scores. Cases where the scores were checked at the end of a session but not after each run produced chance results. Comparable effects were found when an even larger number of precognition runs were broken down in this way (Rhine, 1941a). Although these results could be attributable to any one of a number of procedural differences,

Rhine felt that negativism (possibly unconscious) resulting from the delay in feedback was the most likely interpretation.

A somewhat better test of this hypothesis is provided by the experiment of Woodruff and Murphy (1943). Experimental subjects, who received feedback of their scores after each of four runs and knew beforehand that this would be the case, scored significantly higher than the control subjects, who received no feedback. Although feedback was somewhat confounded with monetary incentive in this experiment, the internal analyses suggest that the feedback was the most powerful factor.

2.4.2c. Feedback as Direct Cause. Schmidt (1975) has theorized that feedback actually may exert a direct causal influence, backward in time, on ESP scores. If he is right, feedback should be psi-facilatory, but not because of its incentive value.

An experiment relevant to this issue was conducted by Schmeidler (1964a, b), who gave her subjects feedback on only one of three runs. She found no significant differences between the mean scores on feedback and nonfeedback runs in each of two series. This finding is not directly relevant to the incentive hypothesis, because subjects did not know in advance on which runs they would receive feedback. However, a mean difference would seem to be a logical prediction from Schmidt's theory. Although Schmidt (1975) argued that feedback to the experimenter may have washed out any effect of differential feedback to subjects, Schmeidler's study still stands as evidence against the applicability of Schmidt's theory to the results of Rhine and of Woodruff discussed above.

A more recent study by Broughton (1977b), however, provided at least a modicum of support for Schmidt's theory. Subjects each completed two runs on an electronic device similar to Schmidt's machine. After these runs were completed, the computer generated a random "hypothesis" as to which run score should be higher. Half of the subjects received feedback of their correct scores, while the other half received pseudoscores generated randomly by the computer. The main finding of the study was a significant confirmation of the computer's "hypotheses," but only with respect to those scores actually reported to the subject, whether they were his own scores or not. (All subjects thought the scores they received were their own.) However, no significant results were obtained in a strict replication attempt of this experiment. Obviously, more research will be needed before a pattern emerges that will allow us to assess the validity of Schmidt's theory as it applies to ESP.

2.4.2d. Conclusion. Tangible incentives such as monetary rewards for high scores do not seem to facilitate ESP, but there is some evidence that providing subjects with immediate feedback of their scores may be more successful. This latter effect can be explained most readily in terms

of the incentive value of such feedback, although a physical theory of psi has been proposed which assumes that feedback can have a direct causal influence on ESP scores. Other types of nontangible incentives (e.g., approval of the experimenter) simply have not been investigated experimentally.

2.5. Social Psychological Factors: The Interpersonal Side of ESP

2.5.1. The Telepathic Agent: Vital Cog or Excess Baggage?

To the early psychical researchers, the most prominent form of ESP was telepathy, or direct communication between two minds (Myers, 1903/1975). This imbalance evaporated when Rhine (1934/1973) stressed that his subjects could obtain impressive ESP scores when no one was trying to "send" them the targets, or even when no one knew what the target order was at the time. Although a few successful experiments had been reported in which agents concentrated on target symbols that had not yet been recorded (Rhine, 1934/1973; Soal and Bateman, 1954), there was always the possibility that information about the target orders written down after the session could be acquired by precognitive clairvoyance. These factors caused Rhine (1945b, 1946) to conclude that telepathy as such had not been adequately demonstrated.

2.5.1a. The Status of "Pure" Telepathy. An associate of Rhine devised an ingenious procedure to get around the clairvoyance interpretation (McMahan, 1946). She prepared decks of cards containing numerical stimuli and then memorized an unwritten code translating the numbers to ESP symbols. She communicated the code orally to another staff member who was responsible for verifying the scoring of results. During the experiment, McMahan picked up the cards one by one and "sent" the appropriate symbol. There was no way the subject could demonstrate ESP unless he could "break" the code telepathically. The code itself was never recorded.

McMahan conducted five separate series with this procedure, all of which used unselected subjects and none of which gave significant positive results. Nevertheless, some indirect evidence of telepathy was obtained in the final series, for which subjects were divided into two groups based upon personality measures and scores on a previous clairvoyance test. The two groups differed significantly on the telepathy test in a direction that confirmed previous findings with the more conventional GESP procedure. Birge (1948) also failed to obtain significant psi-hitting on real-

time targets with McMahan's procedure in three separate series, but a post hoc analysis revealed significant psi-hitting on +1 targets.

A similar mental coding technique was adapted by Soal to his standard testing paradigm, the percipient being Gloria Stewart. Three sessions with this procedure yielded highly significant positive scoring. Unfortunately, the controversial status of Soal's research makes it unwise to put much weight on these findings.

2.5.1b. GESP versus Clairvoyance: Subjects Not "Blind." Whatever the status of "pure telepathy," the widespread use of GESP procedures in psi experiments is ample evidence that many experimenters believe the presence of an agent may improve the chances of a successful outcome. Although many significant results have been obtained using the GESP method, the effect of having an agent can only be assessed adequately in those experiments where GESP and clairvoyance (or precognition) procedures are directly compared. Experiments in which the percipients were not informed or were misinformed about whether an agent was sending the targets on a particular run are most valuable as tests of the agent's actual effect on the results. In experiments where percipients were not "blind" in this respect, it is unclear whether significant differences should be attributed to a telepathic component in the psi interaction or to psychological factors associated with the percipient. For example, the percipient might be more relaxed, more confident, or more highly motivated if he thinks someone is sending to him, even if no agent actually exists.

Let us first consider experiments where the percipient was *not* "blind." Among "gifted" subjects, both Shackleton and Stewart (Soal and Bateman, 1954) and the distinguished trance medium Eileen Garrett (Birge and Rhine, 1942) scored significantly better in card tests when a GESP procedure as opposed to a clairvoyance procedure was used.

Group experiments in which GESP and clairvoyance runs were given to the same subjects in the same session have failed to produce significant differences, although in some cases significant relationships were found between pooled ESP scores and other variables (Adcock and Quartermain, 1959; Beloff, 1969; Bevan, 1947a,b; Casper, 1951, 1952; Rivers, 1950; West, 1950). Two experiments using between-groups designs also failed to reveal any significant differences between the two types of test (Altom and Braud, 1976; Casler, 1962). Palmer, Tart, and Redington (1976), however, found that in a screening experiment involving over 1,800 college students tested in a classroom setting, scoring was significantly higher on a GESP run than on a BT run within subjects, the GESP mean being significantly above chance. Agents were partly visible

to subjects in this experiment; thus sensory cues were not completely ruled out. Barring such an interpretation, these results suggest that an agent may contribute to higher scoring but that large samples are needed to demonstrate the effect.

2.5.1c. GESP versus Clairvoyance: Subjects "Blind." In smaller studies, however, significant results actually have occurred more frequently when the subject was "blind" regarding the agent. The "gifted" subject Lalsingh Harribance scored significantly above chance on GESP but close to chance on clairvoyance when the two types of run were alternated (Klein, 1972). Harribance was under the impression that all runs were GESP (Morris, personal communication), the procedure which he preferred (Klein, 1972). However, it should be noted that on other occasions Harribance achieved comparably high scores on clairvoyance tests when this procedure was used exclusively (e.g., Roll and Klein, 1972). MacFarland (1938) found significantly higher scoring among five male college students on GESP than on DT runs, the subjects apparently believing that DT was used throughout. Unfortunately, the GESP runs always were given first, introducing the possibility that the difference reflects nothing more than a decline effect (see Sec. 4.2.1.). This experiment also became the object of a methodological controversy (Kennedy, 1939; Stuart, 1940). Bierman and Camstra (1973) found higher scoring on GESP than on clairvoyance trials in each of two classroom experiments involving 88 and 1,402 high school students, respectively. However, the significance levels of the differences were unclear from the report, as was the method of ordering the two types of trials. Subjects apparently thought all trials were GESP.

Kreitler and Kreitler (1972, 1973) reported a series of four GESP experiments in which, unbeknownst to the percipient, an agent attempted to influence his or her performance on a relatively unstructured psychological test. In the first of these experiments the percipient's task was to identify letters of the alphabet projected subliminally. The Kreitlers found that the subjects were significantly more successful on those trials where an agent in another room was attempting to transmit the correct letter than on control trials. A successful replication of this finding was reported by Lubke and Rohr (1975).

In the last of these experiments, which also involved subliminal perception, the Kreitlers varied whether the ESP stimulus supported or contradicted the subliminal stimulus and also whether the agent was actually attempting to transmit the ESP stimulus or simply thinking about it. Both the subliminal and ESP stimuli were components of classical illusions (e.g., the Muller–Lyer illusion), and the percipient's task was to report which of two identical supraliminal lines or circles (the basic stimuli of the

illusions) seemed longer or larger. A significant post hoc effect was found, indicating that the ESP stimulus was most effective when it contradicted the subliminal stimulus and was being "transmitted" by the agent. Although the order of the latter variable was not counterbalanced (cf. Child, 1977), the Kreitlers' finding would not seem to correspond to a traditional decline effect.

In the two other experiments, no significant main effect was found using autokinetic perception as the psychological test, but at least a partial confirmation of the effect was found using the Thematic Apperception Test (Kreitler and Kreitler, 1972; Child, 1977).

In a free-response ganzfeld experiment, Raburn and Manning (1977) manipulated both the actual presence of an agent and the subject's information about same in a 2 × 2 factorial design. Both main effects were significant, indicating that the highest scores occurred when an agent was present and the subject was aware that his ESP was being tested. These results seem to suggest that both the presence of an agent and the subjects' awareness of this fact contribute to positive scoring. However, the latter conclusion would be more compelling were control subjects given a clairvoyance set rather than a set that ESP was not involved in the experiment at all.

Not all experiments with "blind" subjects have provided results favoring GESP, however. In an experiment with college students that may not have been adequately controlled against sensory cues, Coover (1917) obtained significant positive scoring when GESP and clairvoyance scores were pooled, but no significant difference between them (Rhine, 1934/1973). Better controlled runs with psychics as subjects produced chance results. Whether or not the agent was to look at the card during the trial was determined randomly on a trial-by-trial basis, and the agent looked at the card immediately after the trial even on clairvoyance trials. In two of her "pure telepathy" experiments, McMahan (1946) conducted a BT clairvoyance test simultaneously with the telepathy test by picking up cards from the two decks at the same time. The same subjects participated in both experiments. In the first experiment, they were told that only telepathy was being tested while in the second they were told it was only clairvoyance. The overall results revealed significant positive scoring on clairvoyance and slightly below chance scoring on telepathy, but the difference was not significant. Note, however, that this design differs appreciably from that of other experiments we have reviewed so far in this section. In three experiments with college students, Schmeidler (1961) divided her subjects into agent–percipient pairs and gave each pair two GESP and two clairvoyance runs. Percipients apparently thought all runs were GESP. There were no overall significant differences as a function of

run type, but there were significant internal effects that we will examine shortly. An Argentine psychiatrist scored significantly above chance to about equal degrees with both methods in a free-response experiment. He was led to believe that only a GESP procedure was used. Randall (1974) found no significant GESP–clairvoyance differences in six classroom ESP tests with high school students.

Finally, several ESP experiments with animals have provided data relevant to the topic of GESP in "blind" subjects. In an experiment described in more detail later, Schouten (1972) trained mice to press one of two levers for water reward. Which lever was to be rewarded in each trial was determined by a random number generator. On some trials, another mouse (the "agent") was present in a cage where a discriminable cue stimulus appeared. The "agent" also received water rewards, but only on those trials in which the "percipient" pressed the correct lever. Schouten found no significant difference in mean scores on the GESP and clairvoyance trials, but he did find a significant negative correlation between the individual percipients' scores on the two types of trials, a result reminiscent of Rao's (1965a) "differential effect" (see Sec. 2.2.1c). Follow-up experiments failed to provide significant results, however (Schouten, 1976b). Using a shock-avoidance paradigm, Extra (1972) found in each of two experiments a marginally significant tendency for rats to receive fewer shocks when the experimenter heard a warning stimulus (inaudible to the rat) than when he did not.

2.5.1d. Effect of Different Agents. One possible explanation of the inconsistent results from experiments comparing clairvoyance and GESP is that they depend upon who happens to be selected as the agent. In the large-sample classroom experiment of Palmer *et al.* (1976), for example, there was a significant interaction between type of test and which agent/experimenter team did the testing. The significantly higher scoring on the GESP run was found to be almost entirely attributable to subjects tested by one of the five teams. These subjects scored significantly above chance on GESP and significantly below chance on clairvoyance. Tart (1976a) found that one of the agent/experimenters in his ESP training experiment obtained highly significant scores with most of his subjects, a performance generally not matched by the other agents.

Schmeidler (1961) attempted to predict the GESP scoring trends of her agent–percipient pairs on the basis of their responses on a group Rorschach test. In two of the three experiments, predicted low scorers obtained significant below-chance scores on GESP, in contrast to significantly higher but chance scores obtained on the clairvoyance runs. No significant results were obtained with the predicted high scorers.

Several classroom ESP experiments have examined the question of

whether students would score higher when the agent was their teacher or someone they both knew well and liked. Anderson and White (1958a) had two teachers "send" conflicting target sequences simultaneously to a class of high school students. Students got the highest scores on target sequences sent by teachers they had independently ranked as "preferred." White and Angstadt (1963b) obtained comparable results in an experiment where the competing agents were a student nominated by his classmates and his counterpart from another class, but this result could not be significantly replicated (White and Angstadt, 1963a). Louwerens (1960) found that Dutch nursery school children obtained very high scores when their teachers served as agents, but nonsignificant results when the experimenter assumed this role. Unfortunately, the design was such that the session with the experimenter always followed the session with the teacher, so the decline may simply have been due to repeated testing. Van Busschbach (1955) also found significant psi-hitting among grade school children with their teacher as agent, but results were almost as good when the agent was a stranger. Wiesinger (1973) found the teacher's attitude toward parapsychology and the "test atmosphere" to be predictive of ESP scoring, but not the attitudes of teachers and pupils toward each other. Better results overall were obtained when children were the agents rather than the teacher.

Another common procedure is to compose agent–percipient pairs of persons who are closely acquainted with each other or who are fond of each other. Several such studies have employed control groups. In two of these, closely acquainted pairs scored significantly above chance while unacquainted pairs scored significantly below chance (Stuart, 1946a; Rice and Townsend, 1962). Unfortunately, Stuart's study, a free-response drawing experiment, can be criticized because conclusions were based on the results of "non-blind" judging procedures, and the Rice study allowed agents easy opportunities to cheat, were they so inclined. In the third study, agent–percipient pairs were composed of college students who either liked or disliked each other as determined by a peer rating procedure (Casper, 1952). On GESP runs, the incompatible pairs scored significantly *higher* than the compatible pairs. This effect reversed slightly on clairvoyance control runs. In a fourth study, spouses scored significantly above chance and (it would appear) significantly higher than strangers (Beer, 1971). Subjects were aware of the agent's identity in all these experiments. Moss, on the other hand, reports that agent–percipient rapport has consistently failed to be a factor in a series of free-response experiments (e.g., Moss, 1969). In experiments that lacked control groups, null results have been found in GESP experiments where the agent–percipient pairs consisted of "sweethearts" (Beloff, 1969),

spouses (Brinkman and Van Hilten, 1972), and persons defined as having "sympathetic relationships" (Van't Hoff, 1972). Finally, Casler (1971) failed in an attempt to improve GESP scoring by creating rapport between agent and percipient through appropriate hypnotic suggestions given to one or the other.

2.5.1e. Conclusion. There is as yet no convincing experimental evidence of direct "mind-to-mind" communication, i.e., telepathy, that adequately controls for clairvoyance or precognition. Nonetheless, indirect support for the telepathy hypothesis comes from several experiments in which significant differences betweeen GESP and clairvoyance scores were found when percipients were "blind" to the type of test. However, these results have not been entirely consistent and some of the positive experiments have weaknesses in design or reporting of results. Other evidence indicates that some of this inconsistency may be attributable to the fact that different agents often affect percipients' scores in different ways. Attempts to demonstrate that persons well known or well liked by percipients make the most successful agents have produced conflicting results, although the general trend is confirmatory.

Finally, the question of whether telepathy, assuming its existence, is primarily attributable to the agent, the percipient, or some interaction between them has yet to be directly addressed experimentally.

2.5.2. The Experimenter Effect: Psychology or Psi?

In the last section we saw that the agent can have an effect on scoring in ESP tests. In this section we will examine evidence that demonstrates that a person need not be involved in actually "sending" the targets to have such an effect. The person we will be focusing upon predominantly, but not exclusively, is the experimenter. We will consider not only whether or not he or she can influence experimental outcomes but also whether the vehicle of such influence is the method of interacting with subjects, or whether the experimenter's own psi (or potential for activating the subject's psi in the absence of sensory contact) may somehow be a contributing factor.

A number of experiments have been reported in which two experimenters conducting the same experiment with the same or similar subjects have obtained significantly different results. Although not an experimenter effect in the strict sense of the term, a finding of Sharp and Clark (1937) indicated that testing sessions conducted with a skeptical observer present produced significantly below-chance scoring, whereas subjects scored above chance when the observer was sympathetic to ESP. Subjects apparently did not know of the observers' beliefs, but one

subject complained that the skeptical observer distracted her. In an experiment where five subjects responded to two competing target sequences handled by two different experimenters, they scored very significantly above chance on one set of sequences and close to chance on the other. The effect occurred with both GESP and DT clairvoyance procedures (MacFarland, 1938). Osis and Dean (1964) reported the results of clairvoyance tests given to eight audiences following 40-minute lectures on ESP. Partway through the experiment, Osis became ill and Dean had to take over the role of lecturer-experimenter. Despite the fact that Dean gave essentially the same lecture and conducted the experiment in the same way as Osis, the groups tested by Osis scored significantly higher than those tested by Dean, the difference being most pronounced among those subjects who indicated the strongest belief in ESP. Although we have no assurance that the groups tested by the two experimenters were truly comparable, the experimenter effect remains the most likely interpretation. Still another experimenter difference was found in classroom testing of British schoolboys by Beloff and Bate (1970).

2.5.2a. Experimenter Psychology. The most obvious interpretation of such experimenter differences is that different experimenters sometimes create different moods, sets, motivational levels, or psychological "atmospheres," which in turn determine whether ESP will occur and, if so, whether it will manifest as psi-hitting or psi-missing. The first experiment to test this hypothesis directly was by Pratt and Price (1938). Margaret Price, who had a history of being a highly successful experimenter (e.g., Price, 1938; Bates and Newton, 1951), treated some subjects in a friendly, encouraging manner and others in an abrupt, discouraging manner. She found that in both instances her subjects scored around chance. However, scores markedly increased to their usual high level when she returned to her more natural way of relating to subjects. Her natural approach encouraged spontaneity during the test, a factor that seems to facilitate psi (see Sec. 2.3.2b).

A more systematic attempt to test the above hypothesis was reported by Honorton, Ramsey, and Cabibbo (1975). Subjects were randomly assigned to one of two groups. One group was tested by an experimenter instructed to be friendly and supportive, while the other group was tested by an experimenter given the opposite set. Each subject completed 200 trials on a Schmidt machine. Each of two experimenters tested subjects in each group. As predicted, there was significant psi-hitting in the group tested by a "friendly" experimenter and significant psi-missing in the group tested by an "unfriendly" experimenter.

Parker (1975a) found that agent–percipient pairs scored significantly higher in a GESP card-guessing experiment when tested by one of three

experimenters who believed in ESP than when tested by one of three experimenters who did not. Both sets of experimenters had been given lectures prior to the experiment that supported their biases. Taddonio (1976) chose to manipulate experimenters' expectancies regarding whether the type of ESP test to be employed should produce psi-hitting or psi-missing. Each experimenter tested a separate group of subjects. The results significantly confirmed the experimenters' expectations in both a preliminary experiment and a replication attempt. Other data pertinent to the effect of the beliefs projected by experimenters are discussed in Sec. 3.6.1c.

2.5.2b. Teacher–Pupil Attitudes. In the above experiments, the behavior of the experimenters was systematically manipulated. However, it is obvious that different experimenters can create different psychological effects on subjects simply by "being themselves," and such effects can still influence ESP scoring.

Margaret Anderson and Rhea White reasoned that such an effect should be especially pronounced when pupils are tested by their own teachers, with whom they have had close contact for prolonged periods. In the previous section, evidence was cited that some teachers make particularly good agents in GESP tests, but Anderson and White thought they might also make good experimenters in clairvoyance tests, provided teacher–pupil rapport was high. More specifically, they predicted that ESP scores should be most positive when teachers and pupils felt most positive toward each other and most negative when the mutual feeling was negative. In a series of well-designed experiments, they prepared a separate target sequence of ESP symbols for each pupil in the class and sealed them in opaque envelopes. Blank record sheets were pasted on top of the envelopes for the pupils to record their responses. In addition, the pupils were asked to fill out anonymous rating scales evaluating their teachers. The teacher, in turn, was asked to respond yes or no for each student to the question "If you could form your ideal group for this class, would you include this student?" The teacher then administered the ESP test to his or her class and returned all the materials to Anderson for scoring.

In the first experimental series, the pooled results from seven high school classes confirmed the hypothesis to a highly significant degree (Anderson and White, 1956). A strict replication attempt with a sample consisting of seven new classes was equally successful (Anderson and White, 1957), as was a replication attempt by Deguisne (1959). In each case, student attitudes contributed more strongly to the effect than did teacher attitudes. In an extension of the paradigm, pupils were tested twice, once at the beginning of the school term and once at the end. It was found that scores on the two occasions changed in the same direction as

student attitudes toward their teachers (Anderson and White, 1958b). In general, the pattern has been for overall scores to be near chance in the Anderson–White experiments: psi-missing when attitudes are negative canceling out psi-hitting when attitudes are positive.

Unfortunately, a number of experiments with high school students failed to confirm these earlier results (Anderson and White, 1958c; White and Angstadt, 1961, 1965). Rilling, Pettijohn, and Adams (1961) confirmed the hypothesis with respect to pupil attitudes but found a significant reversal with respect to teacher attitudes. Nonetheless, a pooling of the successful and unsuccessful experiments revealed a highly significant confirmation of the original Anderson–White hypothesis, i.e., significant psi-hitting when attitudes were mutually positive and significant psi-missing when they were mutually negative. The relationship was even stronger when student evaluations alone were considered (White and Angstadt, 1965).

Despite one early success (Anderson, 1957), the Anderson–White hypothesis has not been supported with grade school students (Anderson and White, 1958c; Eisenbud, Hassel, Keely, and Sawrey, 1960; Goldstone, 1959; Hall, 1958; Rilling, Adams, and Pettijohn, 1962). Two experiments in which college students were tested by their professors also failed to produce positive results (Anderson and White, 1958c; Rilling *et al.*, 1962), although Rilling reported a perfect positive relationship between his four class means and the estimated attitude of the professors toward the reality of psychic phenomena. Nash (1960b) obtained a significant confirmation of the hypothesis among college students by having classmates take turns testing each other. The attitudes of college students toward the experimenter were associated in more complex ways with ESP scores in other research by this author (Nash, 1964).

In summary, the first Anderson–White experiment has probably spawned more replication attempts than any other experiment in parapsychology. With high school students, the rate of replicability has been high by parapsychological standards, especially with respect to pupil attitudes toward their teachers. It is not clear why the effect does not hold up for grade school and college students. Perhaps passing through the stage of "adolescent rebellion" causes interpersonal relationships between students and teachers to be more dynamic for high school students than for the other groups. If so, the import of these findings might be that relatively powerful feelings may be necessary if attitudes toward the experimenter are to influence ESP scoring.

2.5.2c. Sex of Experimenter. One set of powerful feelings that most of us share concerns sex. Stanford and Associates (1976) attempted to capitalize on this drive in an experiment where the scores obtained by

male subjects on a disguised ESP test determined whether they later would get to examine erotic photographs. The authors hypothesized that the female experimenters would be sexually arousing to their male subjects, thereby giving the erotic pictures more incentive value than they possessed for subjects tested by male experimenters, thus leading to higher ESP scores. Subjects tested by female experimenters in fact scored significantly above chance and significantly higher than those tested by male experimenters.

In a more conventional experiment, Woodruff and Dale (1950) took turns testing each of 50 female subjects in different sessions, 20 DT runs per session. Following each session, subject and experimenter both filled out rating scales describing how they felt about each other, the experiment, and their general mood and sense of well-being. In the case of the male experimenter, the surprising result was a significant tendency for higher scores to occur when the two participants felt neutral about each other than when rapport was exceptionally good. No such trend appeared with the female experimenter. A possible interpretation of this post hoc and admittedly tenuous finding is that when subject and experimenter are of the opposite sex, rapport that is too good diverts attention from the ESP test and leads to poorer performance. This interpretation would not be relevant to Stanford's experiment, because the ESP aspect of the test did not require conscious attention (see Sec. 5.1. for a discussion of Stanford's methodology).

2.5.2d. Experimenter Psi. Up to this point, we have been dealing with cases where the subject and experimenter interacted with each other directly. Under such circumstances, it is most reasonable to assume that experimenter effects are mediated by the psychological ramifications of the overt subject–experimenter interaction. However, other data suggest that persons involved with the experiment but not interacting with the subject can also influence scoring in some way.

In a classic but sketchily reported experiment by West and Fisk (1953), 20 subjects were asked to guess the orders of 32 packs of "clock cards" with 12 cards per pack. Half of the packs were prepared by Fisk, who had generally obtained positive results as an experimenter (e.g., Fisk, 1951a, b; Fisk and Mitchell, 1953; Michie and West, 1957). The other half were prepared by West, who obtained chance results with equal consistency (e.g., West, 1950, 1952; Michie and West, 1957). The order in which subjects guessed the packs was systematically varied in a Latin Square design, and the subjects were unaware of the manipulation of experimenters. Despite the fact that the experiment was conducted by correspondence and the experimenter had no direct contact with the sub-

jects, there was highly significant positive scoring on the packs prepared by Fisk and only chance scoring on those prepared by West.

A similar type of effect serendipitously intruded into an experiment by Price (1973b), who discovered that his subjects selectively achieved high scores on certain targets prepared by an experimental assistant who happened to be in a very negative mood at the time. Although post hoc, this finding suggests that experimenters may need to pay attention to such subtle mood factors in the execution of their experiments. Complex experimenter mood effects also have been reported in the work of Osis (Osis and Carlson, 1972; Osis *et al.*, 1971), but capitalization on chance seems a likely explanation for most of these findings.

In a series of experiments intentionally aimed at detecting experimenter psi effects, Feather and Brier (1968) obtained evidence that subjects may be sensitive to who will score the record sheets of an experiment even before that person is designated. In each of three experiments, subjects completed four precognition runs. They were told that the experimenter would score only two of the four runs himself, and that they were to predict which two. Afterwards, the runs to be scored by the experimenter were determined randomly. With respect to these latter runs only, subjects scored significantly higher on those they accurately predicted the experimenter would score than on the other runs. Such an effect did not occur on the runs scored by the other checker. The effect was independently significant in the first two experiments pooled and in the third experiment. Sensitivity to the scorer also might explain the results of the West and Fisk experiment, since each experimenter also checked the results of the packs he prepared.

Only one experiment so far has attempted to discriminate between the psychological and psi interpretations of the experimenter effect (Parker, 1977). Several parapsychologists were cornered at a recent convention and asked to fill out two personality scales, one of which was a disguised ESP test. Independent judges then divided the subjects into two approximately equal groups on the basis of how frequently they reported significant evidence of psi in their experiments. The two groups did not differ significantly on any of the personality traits thought to distinguish successful and unsuccessful experimenters, but the successful experimenters were the only ones to provide significant evidence of psi on the covert ESP test. Thus Parker's results favor the psi interpretation of the experimenter effect.

2.5.2e. Conclusion. To keep things in perspective, it should be pointed out that having more than one experimenter test one's subjects does not automatically guarantee a significant experimenter effect (e.g.,

Broughton and Millar, 1975; Craig, 1975; Musso, 1965; Parker, Millar, and Beloff, 1977; Price and Pegram, 1937; Sailaja and Rao, 1973), although there was some evidence of experimenter effects in the Broughton, the Craig, and the Sailaja experiments. On the other hand, it seems clear that under certain circumstances experimenters can unwittingly make or break their own experiments. There is evidence that how experimenters treat their subjects, their beliefs about ESP and about the outcome of their experiments, how much they are liked by their subjects, and even their sex can influence the results of ESP experiments. Such factors also may explain why some telepathic agents are more successful than others in GESP experiments; in reality, the distinction between agent and experimenter may not be a very important one.

Somewhat harder to swallow is the growing evidence that persons outside the immediate experimental context and whose functions are unknown to the subjects at the time of the test can influence the results. One thing that makes such results so unpalatable is the difficulty in specifying the mechanism involved in producing such effects. One possibility is ESP and/or PK on the part of the experimenter. For example, Fisk might have unwittingly used ESP to decipher the calling biases of his subjects and then used ESP or PK to generate technically random target orders to match these biases. Psi has been known to be capable of such complex feats (e.g., Morris, 1968). A second possibility involves unconscious ESP on the part of the subject. For example, Alan Price's subjects might have unconsciously "picked up" on the distress of the experimental assistant, thus making the targets prepared by her more salient to them. As pointed out by Eisenbud (1963), it is naive to think subjects can use ESP to identify targets and not also use it to identify other aspects of the experimental situation. Note that this interpretation does not assume active psi on the part of the experimenter. At this point, however, both interpretations remain speculative.

A second unpalatable feature of psi-based experimenter effects is that they create monumental complexities for the experimenter who wishes to design a tightly controlled ESP experiment or to replicate such an experiment. Indeed, experimenter effects may be responsible for much of the lack of independent replicability in ESP research. The Heisenberg Uncertainty Principle has invaded parapsychology, as it has all the behavioral sciences. The observer can no longer be considered apart from the observed.

For the reader who wants to delve further into this topic, a number of recent review articles are available (Kennedy and Taddonio, 1976; Thouless, 1976; White, 1976a, b).

2.6. Altered States of Consciousness: Tuning In by Turning On

The idea that ESP abilities can be enhanced by entering a so-called altered state of consciousness (ASC) dates back at least to the Indian sage Patanjali (2nd century B.C.), and it was a dominant concept of 19th-century parapsychology. Although the era of the great trance mediums has largely passed, contemporary parapsychologists have shown a renewed interest in techniques that help one to withdraw attention from the external world. The most extensively studied of such techniques has been hypnosis.

2.6.1. Hypnosis: The Power of Suggestion

The association between hypnotism and psychic phenomena has been proclaimed since the early days of Mesmerism. A number of dramatic examples are reported in the literature of the 18th and 19th centuries, but none of these demonstrations meet modern standards of experimental control (see Dingwall, 1967). The most impressive of these early experiments were those of Gilbert and Janet, who repeatedly succeeded in causing a peasant woman named Leonie to enter hypnosis from a distance of half a mile. More recently, hypnosis at a distance has been demonstrated by a series of experiments in the Soviet Union (Vasiliev, 1962). While these experiments seem to be better controlled than the early French work, fully detailed reports are not available.

2.6.1a. Forced-Choice Experiments. Rhine attempted to use hypnosis in some of the early Duke research but eventually abandoned the technique as unfruitful (Rhine *et al.*, 1940/1966). However, in the 1950s and 1960s a number of experimental reports appeared in the literature which painted a much more optimistic picture. The bulk of these findings were contributed by three experimenters: Jarl Fahler, Lawrence Casler, and Charles Honorton.

Fahler's results were by far the most impressive statistically (Fahler, 1957; Fahler and Cadoret, 1958; Fahler and Osis, 1966). He used standard card-guessing techniques, generally testing the same subjects under both hypnosis and "waking" control conditions, a procedure that unfortunately increases the likelihood of demand characteristics confounding the interpretation of results. It is unclear from the reports whether suggestions of success on the ESP test accompanied the hypnotic inductions. Fahler generally obtained highly significant psi-hitting in the hypnosis conditions and mostly chance results in the control conditions, although in one experiment (Fahler and Osis, 1966) the hitting was restricted to those trials

on which the subject expressed confidence that his or her guess was correct (see Sec. 4.1.3).

Casler (1962, 1964, 1967, 1971) also used standard card-guessing methodology, but his experimental designs were somewhat cleaner than those of Fahler. He used college students exclusively as subjects, and each subject was tested under both hypnosis and "waking" conditions. Moderately significant differences favoring hypnosis were reported in four of the five published experiments, although a sixth unpublished experiment briefly mentioned by Casler (1964) failed to achieve significance. In the other nonsignificant experiment, the hypnotic suggestions were oriented toward enhancing agent–percipient rapport rather than ESP scoring per se (Casler, 1971). No suggestions at all regarding the ESP test were given in two other experiments, one of which was successful (Casler, 1964). The fact that subjects predicted higher scores for the hypnosis runs than for the control runs in this experiment indicates that suggestions of success may have been present implicitly. One of the interesting and so far unresolved issues in the hypnosis–ESP area is whether hypnosis facilitates ESP because it induces an ASC, because it creates an expectation or attitude change, or both.

Honorton used hypnosis in an effort to enhance both psi-hitting and psi-missing in subjects preselected for these directional scoring tendencies on the basis of responses on the Stuart Interest Inventory (see Sec. 3.2.4). Standard DT card-guessing techniques were employed throughout, and scores on hypnosis and control runs again were compared within subjects. In the experiments where hypnosis was accompanied by suggestions of success (Honorton, 1964, 1966), hypnosis produced significant psi-missing in the predicted missers but was unsuccessful for the predicted hitters. Matters were further complicated by the failure of the attitude scale to properly predict scoring direction in the control runs. In the third study (Honorton, 1969a), where "waking" suggestions were used without hypnosis, the results were of marginal significance, suggestions having the most pronounced effect this time on the predicted hitters. In the fourth study (Honorton, 1969a), where the suggestions of success were indirect and impersonal, they had no discernible effect on ESP scores.

In summary, hypnotic suggestions of success seemed more effective (at least in producing the predicted effect) in Honorton's experiments than personal "waking" suggestions, which in turn seemed more effective than impersonal "waking" suggestions or no suggestions at all. Likewise, subjects' confidence of success, as inferred from their predictions of scores before each run, declined monotonically across these experimental conditions. This pattern indirectly suggests that hypnosis influenced ESP scor-

ing primarily because of its effect on subjects' expectancies. On the other hand, Van de Castle and Davis (1962) reported somewhat better results with hypnosis when suggestions of success were not included (see also Honorton and Krippner, 1969).

Forced-choice ESP–hypnosis experiments by other experimenters have produced mixed results. The first formal experiment of this type was reported by Grela (1945). He found significant psi-hitting among college students when hypnosis was combined with suggestions of success, but the scores were not significantly higher than those in various control conditions. Rao (1964a) reported a significant difference between the hypnosis and "waking" runs of a single subject, but the difference was contributed largely by psi-missing on the waking runs. In an earlier experiment, the same informal hypnotic induction failed to produce overall significant scoring, but there was no control group (Rao, 1963c). McBain, Fox, Kimura, Nakanishi, and Tirado (1970) incorporated hypnosis in a very carefully conceived GESP experiment in which overall significant psi-hitting was obtained, but again there was no control group. Essentially chance results have been report by Nash and Durkin (1959), Edmunds and Jolliffe, (1965), and Stephenson, (1965).

2.6.1b. Free-Response Experiments—the Hypnotic "Dream." Hypnosis most frequently has been applied to free-response ESP experiments in the guise of the hypnotic "dream." Following a standard hypnotic induction, the subject is given the suggestion to have a dream that will include the content of a randomly selected picture being concentrated upon by an agent. Honorton has reported significant psi-hitting with this procedure among female subjects selected for high susceptibility to hypnosis (Honorton and Stump, 1969; Honorton, 1972b). The latter study incorporated various control conditions involving no hypnosis and/or low-susceptible subjects, all of which produced chance results. Furthermore, ESP scores in the hypnosis groups were significantly and positively related to two measures of subjects' reported change in their states of consciousness during the session. Parker and Beloff (1970) reported two attempted replications of Honorton's work, one of which was successful. Significant psi-hitting was achieved in only the first of two sessions completed by each subject in this experiment, but since Honorton's subjects completed just one session these results are comparable to his.

Glick and Kogen (1972) reported significant psi-hitting among one of two apparently nongifted subjects in another hypnotic dream study similar in design to Honorton's, but Krippner (1968) achieved marginally significant results only in a "waking" control group. Keeling (1972) added the dimension of hypnotizing both members of agent–percipient pairs before each group of trials. The pooled results of ratings submitted by three

groups of judges (undergraduate psychology students, clinical psychology graduate students, and students in an adult education course on the occult) yielded significant overall psi-hitting. Only the ratings of the graduate students were independently significant.

Hypnosis of the percipient entered into one final free-response experiment (Moss, Paulson, Chang, and Levitt, 1970). Agents were asked to "send" the contents of emotionally arousing pictorial slides to percipients located in another room. Hypnotized subjects scored significantly above chance while control subjects scored at chance. However, the interpretation of this effect is obscured because subjects were allowed to assign themselves to conditions, and the method of statistical analysis was not specified in the report.

2.6.1c. Hypnotic Training of ESP. A technique for training ESP through hypnosis has been developed by Ryzl (1962). He claims that about 500 persons have been trained using this method, representing a success rate of approximately 10%. However, only one of his trainees, Pavel Stepanek, has gone on to show consistent success as an ESP subject (cf. Pratt, 1973), although it is conceivable that others may have had the ability to do so. It is unclear how much the hypnotic training contributed to the ability of even this subject. Independent attempts to apply Ryzl's technique have not been successful (Beloff and Mandleberg, 1966; Stephenson, 1965), although Honorton and Krippner (1969) question whether the technique was properly applied in these projects.

2.6.1d. Conclusion. Attempts to improve ESP scoring levels on a short-term basis through hypnosis have produced generally consistent results from a number of different laboratories. To illustrate this point, Van de Castle (1969) pooled the results of all forced-choice experiments reported up to that time in which scoring under hypnosis and control conditions were directly compared. He found that the mean score over 1,776 hypnosis runs was 5.51 ($p < 10^{-20}$), while the mean of 1,381 control runs was only 5.03. The record for free-response experiments is equally impressive, although most of the successful studies with this procedure lacked "waking" controls. Clearly, the hypnosis–ESP relationship is one of the more consistent in the parapsychological literature. See Honorton and Krippner (1969) and Van de Castle (1969) for excellent reviews of experimental studies.

It is likely that hypnosis is psi-conducive both because hypnotic suggestions increase one's confidence in one's ESP ability and because the induction procedure produces an altered state of consciousness that either encourages relaxation and withdrawal of attention from the external world or reduces the operation of rational, "left-hemisphere" mental processes that are thought to be inhibiting to psi. Evidence for the "confi-

dence" interpretation comes from those studies in which mean ESP scoring levels were evaluated in relation to subjects' predictions of their run scores following various combinations of hypnosis and suggestions of success. Evidence for the "ASC" interpretation comes primarily from the free-response experiment of Honorton (1972b), who found a positive relationship between ESP scores and verbal state reports among hypnotized subjects. Considerable indirect evidence comes from a growing number of experiments where other consciousness-altering techniques besides hypnosis have been used to boost ESP. We turn to these studies next.

2.6.2. Hypnagogiclike States: ESP in the Twilight Zone

Hypnagogic is a term used by sleep psychologists to refer to the intermediate period between sleep and wakefulness.* From a phenomenological perspective, it can be broadly characterized as consisting of deep physical relaxation, heightened imagery (especially visual imagery), withdrawal of attention from the external world. and a tendency toward "primary process" mental organization. Many parapsychologists suspect that the hypnagogic state, or at least one or more of its associated characteristics, may be particularly well suited for psychic functioning. Much of the recent work on ESP in altered states was inspired by an article by Rhea White (1964) in which she analyzed the techniques used by various sensitives to enhance psychic receptivity. White found that these techniques contained many common elements, among which were relaxation and stilling of the mind preparatory to the emergence of psi-related visual imagery. In the early 1970s, many parapsychologists began to apply such techniques to their experimental subjects and note their effect on ESP scores, especially in free-response tests. Several specific techniques have been tried, and we will examine each separately.

2.6.2a. Progressive Relaxation. An exercise that has been known for a number of years to induce deep muscular relaxation is the progressive relaxation technique of Jacobson (1938/1974). The technique essentially consists of having the subject alternatively tense and relax specific muscle groups and note the contrast between the tension and relaxation. William Braud combined the Jacobson technique with suggestions for mental quietude as a means of inducing a so-called "psi-conducive syndrome" (Braud, 1975b).

*The term *hypnopompic* is sometimes used to refer to the transition state upon awakening, but for the sake of simplicity, the term *hypnagogic* will be used to refer to the transitions both into and from sleep.

Braud and his colleagues have consistently obtained significant overall psi-hitting in experiments where this induction technique immediately precedes a standard free-response GESP test (Altom and Braud, 1976; L. W. Braud, 1977; Braud and Braud, 1974; Braud and Braud, 1973; Braud and Thorsrud, 1976). A control group was employed in only one of these experiments, in which a group receiving straight relaxation suggestions was compared to a group receiving straight tension suggestions (Braud and Braud, 1974). As predicted, there was significant psi-hitting in the relaxation group and chance scoring in the tension group. The difference was significant. Differences in relaxation between the two groups were verified by both verbal reports and EMG measures, and the groups reported very similar expectancies of success prior to the induction procedure. (Both techniques had been presented as psi-conducive.) In a preliminary experiment where all subjects received the standard progressive relaxation procedure, the psi-hitters were shown to be significantly more relaxed than the psi-missers.

A successful independent confirmation of Braud's results was reported by Stanford and Mayer (1974) using a clairvoyance procedure. However, the experiment did not include a control group, and there was no significant relationship between ESP scores and verbal reports of relaxation during the session. Nonetheless, subjects as a group manifested significant psi-hitting. In contrast, significant results were not obtained in a progressive relaxation experiment by Miller and York (1976).

There is only one experiment in which progressive relaxation was used in conjunction with forced-choice testing (Sandford and Keil, 1975). In this experiment, a single subject scored significantly above chance on control runs but right at chance in runs preceded by progressive relaxation. The only other chance outcome I am aware of in a free-response experiment using progressive relaxation exclusively to induce an ASC was in the control condition of an experiment by Charlesworth (1975), to be discussed later (Sec. 2.6.2e), where an abbreviated progressive relaxation induction was utilized.

2.6.2b. Perceptual Deprivation. Honorton has recently become the leading advocate of perceptual deprivation techniques to facilitate psychic receptivity (Honorton, 1974b). He argues that in normal waking consciousness the organism is bombarded by external and internally generated sensory stimuli of a patterned or meaningful nature that compete with and drown out low-level ESP stimuli and hinder their detection. Perceptual deprivation techniques have the effect of reducing this "noise," while at the same time causing the mind to compensate for this dearth of patterned stimulation by creating hypnagogic-like imagery (see

West, 1962). This imagery may serve as a vehicle for the transmission of ESP impressions from the unconscious.

Inspired by a non-psi experiment of Bertini, Lewis, and Witkin (1969), Honorton chose the "ganzfeld" technique to create the appropriate state of consciousness. The purpose of this technique, described more fully in Chapter 1, is to eliminate *patterned* external stimulation. The subject remains in the ganzfeld anywhere from 15 to 45 minutes (Honorton recommends the longer intervals), during or after which he or she gives mentation reports that are later matched to target pictures using standard free-response judging procedures.

The first published ganzfeld experiment was by Honorton and Harper (1974), who found significant psi-hitting among 30 unselected subjects. Because of the simplicity of the technique and the qualitative impressiveness of some of the hits, a plethora of ganzfeld experiments soon began to flood the literature. Some were successful in producing overall significant psi-hitting under comparable conditions to those of Honorton (L. W. Braud, 1977; Braud, Wood, and Braud, 1975; Dunne, Warnock, and Bisaha, 1977; Raburn and Manning, 1977; Smith, Tremmel, and Honorton, 1976; Terry and Honorton, 1976; Terry, Tremmel, Kelly, Harper, and Barker, 1976; York, 1977), while others were not (Braud, 1976; Braud and Wood, 1977; Habel, 1976; Palmer and Aued, 1975; Palmer *et al.*, 1977; Palmer and Lieberman, 1975; Parker, 1975b; Parker *et al.*, 1977; Rogo, Smith, and Terry, 1976; Stanford and Neylon, 1975; Terry, 1976a). Of the successful ganzfeld experiments, only two employed nonganzfeld control groups (Braud *et al.*, 1975; Terry *et al.*, 1976). Results in the control conditions were nonsignificant in both of these experiments, but only in the Braud experiment were scores in the ganzfeld and control conditions significantly different.

Some of the "unsuccessful" experiments nonetheless yielded significant internal effects that provide some support for the underlying theoretical rationale of the ganzfeld. Parker (1975b), in an experiment where the overall results were below chance, found a significant negative relationship between ESP scores and a self-report scale measuring alterations of consciousness during the session. In other words, a relatively pronounced alteration in consciousness was associated with significant ESP scoring, but in the negative direction, i.e., persons reporting pronounced ASCs manifested psi-missing. Likewise, Palmer *et al.*, (1977) found significant psi-missing among subjects who reported relatively pronounced ASCs in the ganzfeld, based upon their responses to rating scale items answered immediately after the session. The correlation between ESP scores and the ASC scale was significant. In still another experiment with below-

chance scoring overall, Stanford and Neylon (1975) reported a significant negative correlation between ESP scores and changes in body awareness, an item very similar to one that contributed considerable variance to Palmer's ASC scale.

Most other ganzfeld experiments simply did not include state report measures, so their contribution to this trend cannot be assessed. I can report, however, that such trends were not found in two of my own experiments (Palmer and Aued, 1975; Palmer and Lieberman, 1975). However, when results from the latter study (a clairvoyance experiment that included a psychological set for "out-of-body experiences" in one condition) were combined with results from other comparable conditions from other phases of the project, I found a significant *positive* correlation between ESP scores and an ASC scale similar to the one reported in my most recent experiment (Palmer *et al.*, 1977). In this case, however, the overall results were *positive*, indicating that high positive scores were obtained by subjects who experienced the most pronounced ASCs. A report of these findings is in preparation.

The above results strongly suggest that even in "unsuccessful" experiments, significant levels of ESP scoring frequently occur among subjects for whom the ganzfeld succeeds in evoking a relatively pronounced alteration of consciousness, but that the direction of the scoring trend varies from study to study. The reasons for this variability are currently unknown.

A further significant finding in the two ganzfeld experiments where this variable has been examined is a tendency for subjects who, contrary to the norm, either overestimate or do not underestimate the duration of the ganzfeld session to score below chance and significantly lower than other subjects (Palmer *et al.*, 1977; Stanford and Neylon, 1975).

Finally, Honorton, Drucker, and Hermon (1973) used a sensory isolation technique called the witch's cradle to induce an ASC for a free-response experiment. The overall ESP mean was nonsignificantly above chance. Significant positive scoring, however, was evidenced by those subjects who reported above-average alterations in consciousness during the session (in line with the pattern of results from ganzfeld and hypnotic dream studies), but a significant overall relationship between state reports and ESP scores apparently was obtained from only one of several statistical tests.

2.6.2c. Meditation. Four experiments in the literature attempted to use standard meditation techniques to facilitate ESP. Two of these studies were conducted in the context of meditation groups meeting on a weekly basis, so the subjects either had or were in the process of acquiring experience with meditation (Osis and Bokert, 1971; Roll and Solfvin,

1976). Both experiments were extremely complex, and complicated multivariate statistical techniques were used to analyze the results. Roll used a free-response test and Osis both a free-response and a forced-choice test. The report of Roll and Solfvin was simply too short to allow an adequate assessment of their conclusions, but one hopes a more detailed report will follow. The Osis and Bokert report was sufficiently detailed, but this reviewer found it incomprehensible. Both sets of authors interpreted their results as indicating that subjects who had the most pleasant and self-transcending meditation experiences scored most negatively on the ESP test. Provided that the overall scoring level was below chance, this conclusion would fit nicely with the ganzfeld results, since it would imply the strong possibility of significant psi-missing on the part of those with the deepest meditation experiences. Mean ESP scores were not reported in Osis's experiment, while in Roll's it would appear that the mean on the most relevant GESP trials was right at chance.

The other two experiments were simpler and yielded more clearly positive results. Dukhan and Rao (1973) tested Western and Indian students of Yoga in an Indian ashram. Over three separate experiments, there was a generally consistent tendency for subjects to score significantly higher on a BM card-guessing test following a meditation session than before the session. The results represented a shift from psi-missing to psi-hitting. It is unclear from the report how consistent was the effect across subjects. Schmeidler (1970) gave six graduate students one clairvoyance run before and one after listening to a lecture on meditation and practicing a breathing exercise suggested by an Indian Swami. Subjects scored significantly above chance on the run following the exercise, compared to slightly below chance scoring beforehand. The difference, however, was not significant.

2.6.2d. Out-of-Body Experiences. Psychic experiences have often been reported anecdotally in conjunction with a specific ASC in which a person feels that his center of consciousness is located in space outside of his body (e.g., Crookall, 1961). A common characteristic of such out-of-body experiences (OBEs) is that the person "sees" his physical body as if from another point in space.

One of the more dramatic single episodes in the experimental parapsychological literature concerned a woman who correctly identified a five-digit number during an apparent OBE, which took place while her physiology was being monitored in a sleep laboratory (Tart, 1968). Unfortunately, sensory cues were not completely ruled out in this experiment, as the author points out. Another subject, who has written a popular book about his own OBEs (Monroe, 1971), produced more equivocal results in a similar experiment (Tart, 1967). Still another subject claimed to be able

to visit his pet cat during OBEs. In one experiment it was found that the cat was significantly less active during these OBEs than during control periods (Morris, 1974).

Another series of experiments was undertaken to induce OBEs in unselected subjects and to assess the effect on free-response ESP performance (Palmer and Lieberman, 1975, 1976; Palmer and Vassar, 1974). Progressive relaxation exercises followed by one of several techniques designed to induce a hypnagogic state were combined with suggestions to imagine leaving the body and traveling to an adjacent room to identify a target picture. Although a significant difference was obtained in only one of four individual experiments (one of which is yet to be published), the pooled results indicated that subjects who reported feeling that they were literally "outside their bodies" during the session were significantly more successful at identifying the target picture than were subjects who did not, but only when the induction procedure was limited to pure sensory isolation techniques such as the ganzfeld. However, OBE reports had a high positive loading on the ASC scale described earlier, suggesting that OBEs in this experiment (and perhaps in other situations as well) may have paranormal elements simply because they tend to occur in psi-conducive hypnagogic states—not because the person has somehow literally left his body as suggested by some occult theories.

2.6.2e. Miscellaneous Techniques. Charlesworth (1975) obtained significant psi-hitting with a guided-imagery technique, in which the subject was guided through a fantasy journey and asked to identify objects along the way. The agent was simultaneously guided through the same fantasy, except that she was told what the objects (i.e., ESP targets) were. Results in two control groups were nonsignificant, and there was no significant difference between experimental and control groups. No significant overall results were obtained in a second experiment where the subject and agent pairs were twins, but there was an interesting interaction that we will discuss later (Sec. 3.5.4).

Finally, there have been two studies in which naturally occurring hypnagogic states were compared to other ASCs. Krippner (1968) compared the success of eight subjects following three different induction techniques in a free-response GESP experiment. Subjects first went through a standard "hypnotic dream" procedure. Later, they were instructed to take a nap and given the posthypnotic suggestion to dream about another picture. This procedure was the most likely of the three to involve a hypnagogic state. Last, it was suggested that subjects' nocturnal dreams during the week would correspond to yet another picture, and they were instructed to keep dream diaries. Eight other subjects went through the same regimen without hypnosis. Based on judges' but not

subjects' ratings, hypnotized subjects scored significantly above chance in the hypnagogic condition and control subjects in the dream condition. There apparently were no significant differences between conditions. Although these findings are quite marginal, the trend seems to indicate that alterations of consciousness associated with sleep or presleep states may be more effective than simple hypnosis in facilitating ESP in free-response tasks.

William Braud (1977) evaluated free-response GESP scoring in two conditions methodologically similar to Krippner's nocturnal dream condition. Each subject responded to two targets, one "sent" right before he went to sleep (hypnagogic) and the other "sent" late at night (dream). Significant scoring occurred for the hypnagogic targets but not the dream targets. The difference approached but did not reach significance.

2.6.2f. Conclusion. An impressive number of experiments have produced significant psi-hitting when small samples of unselected subjects were submitted to induction techniques designed to produce hypnagogiclike states. Most of these were free-response studies in which each subject completed only one trial. Although most of these experiments lacked control groups, the ratio of studies reporting significant overall psi-hitting seems much higher than in studies where such induction techniques have not been used. Furthermore, most studies that did use control groups found only chance scoring in these conditions.

Among the small proportion of experiments in which subjects filled out state report scales, the evidence is rather consistent in revealing that the most extreme mean deviation scores occurred among those subjects who experienced the most pronounced ASCs. This evidence comes primarily from the ganzfeld literature, but not exclusively so (e.g., Braud and Braud, 1974; Honorton, 1972b). It would appear from this evidence that ASCs effect the magnitude of the deviation from chance, whereas the direction (i.e., psi-hitting or psi-missing) is determined by other factors that vary across experiments but that seem to be consistent within a given experiment.

Finally, it is conceivable that the induction techniques described in this section are effective not because they produce ASCs but because they introduce demand characteristics that might influence subjects' confidence or orientation toward the task (Rogo, 1976). Although questions concerning subject expectancies have not correlated significantly with ESP scores in those experiments where they have been employed (see Sec. 3.6.2b), such questions themselves are likely to be contaminated by demand characteristics and may reflect response biases more than actual attitudes. Thus the issue raised earlier in the discussion of the ESP–hypnosis research (Sec. 2.6.1d) is also relevant to the research on hypna-

gogiclike states, although the simplest and most straightforward interpretation of these latter findings, at least, remains the ASC hypothesis. A review critical of the ASC interpretation of the studies reviewed in the section has been published by Rogo (1976).

2.6.3. Dreams: Losing Sleep for Science

The most common ASC to be associated with ESP in everyday life is clearly the nocturnal dream. Ever since biblical times, tales have been recorded of dreams that later came true. In an analysis of more recent reports of psychic experiences mailed to Rhine's laboratory at Duke, Louisa Rhine (1962) found that 65% of them occurred in the dream state and that the dream experiences tended to provide a more complete description of the target event than did waking experiences. Furthermore, psychotherapists began reporting cases in which their patients had dreams about the therapist's life that were related to therapy in dynamically meaningful ways (Eisenbud, 1970; Ullman, Krippner, and Vaughan, 1973).

With the advent of the rapid-eye-movement (REM) monitoring technique, research was initiated at Maimonides Medical Center in New York City to demonstrate under well-controlled laboratory conditions that ESP could occur in dreams. The basic procedure, described more fully in Chapter 1, was to waken subjects from REM periods, record their dream reports, and then assess the correspondence between these reports and randomly selected art prints "sent" by an agent in another room.

In the first Maimonides experiment, each of 12 subjects spent one night in the laboratory. The results of this study were marginally significant, in that subjects but not outside judges were able to "blindly" match the targets and dream reports better than expected by chance. Two agents, one male and one female, were used in the experiment, and the significance was found to be attributable to those nights when the male served as agent (Ullman, Krippner, and Feldstein, 1969).

However, most of the significant results from Maimonides have involved repeated testing of particular individuals selected either through a screening process, such as the experiment described above, or because the experimenters had reason to believe they would be successful in this type of test. Some pilot data possibly notwithstanding (Ullman, Krippner, and Honorton, 1970), the bulk of the significant findings have involved only three individuals: Dr. William Erwin, a psychologist (Ullman and Krippner, 1969; Ullman *et al.*, 1969); Dr. Robert Van de Castle, another psychologist (Hall, 1967; Krippner and Ullman, 1970); and Malcolm Bessent, a professional psychic (Krippner *et al.*, 1971, 1972). Nevertheless, 9 of 12 formal nocturnal dream studies conducted at Maimonides using the

REM monitoring technique have produced significantly positive results (Honorton, 1974a), and a number of individual correspondences have been quite impressive.

On the other hand, two attempted replications of successful Maimonides experiments conducted at the laboratory of a noted dream researcher were unsuccessful (Belvedere and Foulkes, 1971; Foulkes *et al.*, 1972). Another replication attempt with a single subject produced significant results only on those trials where the judges were confident of their ratings (Globus, Knapp, Skinner, and Healey, 1968). Several direct ESP–dream correspondences also were found in the experiment of Hall (1967).

The two experiments referred to at the end of the last section in which unselected subjects recorded their dreams at home produced equivocal results (W. G. Braud, 1977; Krippner, 1968).

2.6.3a. Conclusion. The results of the well-controlled Maimonides experiments have demonstrated that ESP can occur in dreams. An overview of these studies is contained in a semipopular book by Ullman *et al.* (1973). However, the generality of the Maimonides results beyond a select group of individuals is questionable, and the incidence of replication in other laboratories has not been particularly impressive. What little evidence we have comparing ESP in dreams and hypnagogic or related states indicates that the latter is the best place to look, in terms of both economy of effort and yield of ESP.

2.6.4. Drugs: Uppers, Downers, and Outers

Only a handful of experiments have been conducted to assess the effect of psychopharmacological agents on ESP test performance, all using human subjects.

2.6.4a. Stimulants versus Depressants. In the early Duke research, Rhine (1934/1973) noticed that sodium amytal markedly reduced scoring rates in three of his high-scoring subjects, while caffeine caused these subjects' normally high levels of scoring to resume after they had been low. He observed that fatigue and illness likewise depressed scoring rates in these subjects.

Two experiments have incorporated double-blind techniques to compare the effects of stimulants and depressants on ESP scoring. Cadoret (1953) had 11 young adults complete four testing sessions in which they ingested either sodium amytal, dexadrine, lactose placebo, or nothing. They completed five BT runs and four free-response drawing trials before drug administration and again one hour thereafter. Significant treatment main effects were found on the pre- to postdrug change scores on both

tests. Amytal produced a decrease in scoring in each case. Dexadrine produced a decrease on the card tests and an increase on the drawing tests. The latter of these dexadrine effects seemed to be attributable primarily to the subjects' associations to their drawings, in contrast to the drawings themselves.

Huby and Wilson (1961) conducted two experiments similar to Cadoret's. In their first experiment, 100 subjects produced marginally significant psi-missing on a two-run symbol guessing test following quinalbarbitone (a depressant). Scores following ingestion of this drug also differed significantly from scores following administration of a lactose placebo. Amphetamines produced nonsignificant psi-missing. These trends were not confirmed in a second experiment with 54 subjects (26 of whom had participated in the first experiment) and twice the number of runs per subject. A possible reason for the difference is that the ESP test was given two hours following drug administration as compared to 45 minutes in the first experiment. Another complicating factor is that subjects in both experiments were restricted to those who scored an average of plus *or minus* one hit from chance on a preliminary two-run card test.

2.6.4b. Anesthesia. In a clock-card experiment with 36 maternity patients, Gerber and Schmeidler (1957) inadvertently tested 6 while they were still under the influence of an unspecified anesthetic. These 6 subjects scored significantly below chance. However, the difference between the drug-influenced and non-drug-influenced subjects was significant only among a subgroup of the sample who had been rated by the experimenter as relaxed and acceptant during the test. The principal analysis of the experiment had confirmed a prediction for nondrugged subjects that those who were relaxed and accepting would score significantly higher than the others, so there is at least some justification in treating this subgroup separately.

2.6.4c. Psychedelic Drugs. Users of psychedelic drugs frequently report psychic experiences while under the influence of these substances (Tart, 1971). However, experimental research on this topic is virtually nonexistent, due in large part to the tight government restriction on the use of psychedelic drugs even for research purposes. The most substantial study was conducted in Holland by van Asperen de Boer, Barkema, and Kappers (1966), who compared the results of 37 subjects on a variety of ESP tests given when they either were or were not under the influence of psilocybin. Unfortunately, the order of sessions was not counterbalanced. Although there was overall significant psi-hitting on standard DT tests, scoring was slightly better in the control conditions. Whittlesey (1960) gave 27 psychiatric outpatients one card-guessing run before and one after ingesting an unspecified dose of LSD. There was significantly

below-chance run-score variance overall, but apparently no significant mean differences between the two runs. In a longer series of experiments, Cavanna and Servadio (1964) succeeded primarily in demonstrating that it is difficult to get subjects to attend to an ESP test while having an LSD experience.

2.6.4d. Conclusion. The evidence is fairly consistent in showing that central nervous system depressants tend to reduce the level of scoring in ESP card tests. The evidence that stimulants have the opposite effect is much less consistent. Too little research with psychedelic drugs has been reported to allow any conclusions whatsoever.

3. The Subject in ESP Experiments

In section 2, I paid little attention to the characteristics of the subject who happened to be on the receiving end of the experimenter's attempts to elicit ESP. This obviously is not a matter we can afford to ignore for long. First of all, subjects vary in the amount of potential ESP ability they bring with them to an ESP experiment, and a given subject's ESP talent may in turn be related to such things as his (or her) personality, cognitive skills, sex, age, and even species. Secondly, the attitudes and moods a subject brings to the experiment may be expected to influence scoring, and these in turn may be modified by the kinds of experimental manipulations discussed in section 2. This is especially true of manipulations such as hypnosis, which I discussed in the last subsection. The first topic of the upcoming section, physiological predictors, provides a convenient bridge between our studies of induced ASCs and individual differences as they relate to ESP test performance.

3.1. Physiological Predictors: In Search of the Mind–Brain Interface

Physiological variables have been studied both as predictors of ESP scores and as ESP measures themselves. In this section we will be concerned exclusively with the first of these functions.

3.1.1. EEG Studies: The Hard-Headed Approach to Altered States

The only physiological variable that has been studied to any appreciable extent as a predictor of ESP scores is the electroencephalograph (EEG), and this research has dealt almost exclusively with brain waves in the "alpha" band, i.e., 8–13 Hz. The reason why parapsychologists became so interested in alpha is that it is often associated with a relaxed,

passive state of mind, which has long been considered psi-conducive (e.g., White, 1964). Although a few alpha–ESP studies were reported in the early experimental literature (e.g., Wallwork, 1952), interest in the possible relationship between these variables was slight until about 1970, when evidence began to appear in the psychological journals suggesting that alpha could be increased in human subjects through biofeedback training (e.g., Nowlis and Kamiya, 1970). Such findings suggested to some parapsychologists that "alpha training" might be useful in training ESP; if a person were taught to increase his or her alpha, ESP performance might improve as well. Training people to increase their alpha production substantially above optimal baseline levels proved to be easier said than done, as parapsychologists themselves soon discovered (Honorton and Carbone, 1971; Lewis and Schmeidler, 1971). Nevertheless, an extensive body of data has surfaced that, while not always consistent, does suggest some kind of relationship between ESP scores and whatever it is that EEG recording techniques measure.

3.1.1a. Alpha Density—Between Subjects. Percent-time alpha (or alpha density) has been studied as a predictor both between subjects and within subjects. In some studies, between-subjects and within-subjects effects have been confounded. Let us look first at the between-subjects effects.

The first sign of a positive relationship between alpha and ESP came from a single-session card-guessing experiment by Honorton (1969b), who found a significant correlation of +.72 between these two measures. The subjects were ten high school students selected on the basis of high ESP scores in a pretest. In a follow-up experiment with a new sample of ten older subjects, the correlation was −.63, also significant (Honorton and Carbone, 1971). However, the ESP scores that entered into this correlation were pooled over ten sessions, nine of which occurred after subjects had been exposed to alpha feedback training. When only the results of the first session are considered, the correlation is positive (+.17), although nonsignificant.

Stanford and Lovin (1970) reported a significant negative correlation between alpha density and ESP in a single-session card-guessing experiment not involving feedback. The authors noted that both they and Honorton (1969b) used a scoring method of the EEG records that gave relatively little weight to alpha bursts of short duration. Alpha density failed to significantly predict ESP scores between subjects in three other ESP experiments (Morris and Cohen, 1971; Stanford, 1971; Stanford and Palmer, 1975). The latter experiment used a free-response procedure.

3.1.1b. Alpha Density—Within Subjects. Honorton and Carbone (1971) computed alpha–ESP correlations for each of their subjects across

ten sessions and found no more of them to be significant than expected by chance, although they were predominantly negative in direction. Cadoret (1964), on the other hand, found significantly higher ESP scores on "trials accompanied by slow EEG" than on "relatively fast" EEG trials. Although between-subjects and within-subject effects apparently were confounded in this experiment (a brief abstract is all we have to go on), the trend was relatively consistent across his seven subjects. No straightforward differences between mean ESP scores on trials made simultaneously with attempts to respectively generate or suppress alpha were found in either of two biofeedback experiments with unselected subjects (Honorton, Davidson, and Bindler, 1971; Pleshette, 1975).

In another experiment where between-subjects and within-subject effects were confounded, Stanford and Stanford (1969) examined changes of alpha density within the run in relation to card-guessing performance. They failed to confirm their prediction that the half run showing the most alpha would yield the greater number of ESP hits. However, a post hoc analysis revealed significantly higher run-score variance in runs with an above average increase in alpha density from the first to the second half of the run. These high-change runs also were significantly associated with a tendency for subjects to avoid calling an equal number of each symbol on each run. This result gave the initial post hoc finding a measure of construct validity, because previous research had shown a relationship between unbalanced calling sequences and high run-score variance (Stanford, 1966a,b). Apparently, increases in alpha within the run reflect a tendency not to try to balance calling probabilities at the end of the run.

A number of experimenters have tested single subjects selected for outstanding ESP talent or for proficiency in controlling their alpha. Three forced-choice experiments with the psychic Harribance included EEG monitoring. In the first two, Harribance's overall scoring rate was significantly and substantially above chance (Morris *et al.*, 1972). The highest scoring runs were selected for comparison with chance runs, and in each experiment significantly more alpha was present in the high-scoring runs. Analyses using alpha to predict ESP scores were not reported. In the third experiment, Harribance's overall score was slightly below chance (Kelly and Lenz, 1976b). Spectral analysis was used to compare individual hit and miss trials. The only significant effect was an excess of power in the 12- to 13-Hz range on the missing trials, a finding not predicted in advance. The only other forced-choice experiment with a selected subject was by Wallwork (1952), who simply classified GESP trials as concurrent with strong, average, or no alpha. Overall ESP scores were near chance, and there were no significant alpha–ESP relationships.

Turning to free-response experiments, Rao and Feola (1973) tested an

experienced meditator who also had gained proficiency in controlling his alpha through feedback training. Alternate trials with instructions to generate or suppress alpha during the image-reception period revealed significantly higher ESP scoring on the generation trials. In a correlational study with another experienced meditator, no significant relationship was found between ESP scores and alpha density either during the reception periods or during pretest mind-clearing periods (Stanford and Stevenson, 1972).

Finally, Tart (1968) found an unusual slow alpha pattern during the apparent time a subject reporting an out-of-body experience correctly identified a five-digit number (see Sec. 2.6.2d).

3.1.1c. Alpha Density and ASCs. Studies examining the relationship between alpha density and ESP clearly have yielded inconsistent results. An experiment that may shed some light on the matter is a complex study by Honorton *et al.* (1971). This experiment, the main purpose of which was to examine card-guessing performance in relation to alpha feedback training, differed from the EEG experiments described so far in that subjects were asked to give periodic verbal reports of their "states of consciousness" during the ESP test. Although several significant relationships were uncovered, the analyses reported are not the most appropriate for documenting the point the authors wish to make. Nevertheless, it is clear from the overall pattern of results that positive ESP scores occurred most often when generation of alpha was combined with verbal reports of an alteration of consciousness. Although demand characteristics might have been a contributing factor to the results, it nonetheless would appear that alpha was a necessary but not sufficient condition for high scores. Indirect support for this latter proposition comes from a free-response experiment (Stanford and Palmer, 1975). Although subjects in this experiment who produced high percentages of alpha did not necessarily get high ESP scores, above-chance scoring subjects produced significantly more alpha during the reception period than did below-chance scoring subjects. Unfortunately, no state report measures were included in this experiment.

The hypothesis that *both* alpha and a concomitant ASC are needed to boost ESP scoring levels blends well with the ASC–ESP results from nonphysiological experiments discussed earlier in the chapter, and it may help to explain the inconsistent results from EEG experiments where the ASC factor was not taken into account. Evidence from the nonphysiological ASC literature that pronounced ASCs produce psi-missing in some experiments *might* help to explain the significant negative correlations between alpha density and ESP found in some of the EEG experiments.

If alpha is only psi-conducive to the degree it reflects an alteration of

consciousness, one would not expect it to be a consistently successful predictor of ESP scoring rates. Conversely, requiring that state reports be accompanied by physiological indices may weed out invalid reports (e.g., those influenced by demand characteristics) and thereby lead to a strengthening for the evidence for an ASC–ESP relationship. A cogent argument for the "convergent operations" approach in ASC research has been made by Stoyva and Kamiya (1968).

3.1.1d. Alpha Frequency. While most parapsychologists have restricted the EEG analyses to the study of alpha density, Rex Stanford has examined the frequency of the EEG (i.e., cycles per second) within the alpha band. In each of three experiments, he found ESP scores to be positively and significantly correlated with the net increase in alpha frequency from a pretest mind-clearing period to the test period itself (Stanford, 1971; Stanford and Lovin, 1970; Stanford and Stevenson, 1972). In two of these experiments, there was also a significant negative correlation between ESP scores and pretest alpha frequency (Stanford and Lovin, 1970; Stanford and Stevenson, 1972).

Neither of these relationships was found in a free-response experiment where subjects listened to Indian flute music along with a mental set designed to stimulate visual imagery during the pretest period (Stanford and Palmer, 1975). Moreover, no correlation between ESP scores and alpha frequency in a pretest meditation period was found in an experiment where the psychic Malcolm Bessent was asked to give "readings" about subjects' personal lives (Stanford and Palmer, 1973). No EEG recordings could be taken during the readings themselves in this experiment.

Neither of these latter experiments undermines the consistency of the relationship between ESP scores and pretest to test increase in alpha frequency, provided the pretest involves a simple mind-clearing exercise. Stanford interprets this finding to mean that successful subjects achieve an initial state of relaxation and mental quietude but then become more aroused during the ESP test. Unfortunately, this interpretation depends solely on inferences from physiological data, although its plausibility is reinforced by data from research bearing on the relationship between ESP and alpha density.

3.1.1e. Conclusion. There is no simple relationship between EEG alpha density and ESP scoring levels. There is some evidence that alpha is a facilitater of psi only if other factors are present, and the results of Honorton *et al.* (1971) suggest that one such factor may be some kind of ASC. Stanford has consistently found a significant relationship between changes in mean alpha frequency and ESP scores under certain conditions. Surprisingly, no other experimenters have attempted to replicate this work.

If, as suggested in an earlier section, hypnagogiclike states may be psi-conducive, one might expect theta rather than alpha to be the brain wave pattern most closely associated with high ESP scores, especially in those experiments where visual mediation of ESP responses is encouraged. This, of course, remains to be seen. Alpha, on the other hand, may be most desirable prior to the test, when a preparatory period of mind clearing may be useful.

3.1.2. Hemispheric Specialization: Which Hand Has the ESP?

A series of behavioral experiments not involving physiological measurements are included in this section because of their relevance to recent data disclosing different primary cognitive functions of the two hemispheres of the brain. This research suggests that spatial, holistic functions are characteristic of the right hemisphere, while verbal, analytic functions are more characteristic of the left hemisphere (Dimond and Beaumont, 1974). Given this dichotomy, ESP would appear to be primarily a "right-hemisphere" process (Braud, 1975b).

Braud and Braud (1975) compared the activation of these so-called right- and left-hemisphere processes on immediately subsequent performance in a free-response ESP test. One group of subjects was asked to solve logic and math problems while the other group listened to sounds suggesting depth and imagery. The former, "left-hemisphere" group scored significantly below chance on the ESP test while the "right-hemisphere" group's scores were at chance. The difference was significant. Stanford and Castello (1977) gave their subjects an ESP test disguised as a word association test (see Sec. 5.1.1). Half of the subjects were given a mental set to produce abstract associations characteristic of left-hemisphere functioning, and the other half were given a set to produce concrete associations characteristic of right-hemisphere functioning. The ESP scores were near chance for both groups.

Richard Broughton hypothesized that ESP should function best when the ESP response is mediated as much as possible by the right hemisphere while the left hemisphere is occupied with a competing task. In the first three experiments, subjects were asked to make their ESP responses by lifting one of five wooden objects (each representing one of the five ESP symbols) with either their right or left hands. For half the trials the left hemisphere was occupied with a mental task (Broughton, 1976). In two of the three experiments, significant results were obtained suggesting that the most ESP occurred when the response was made with the left hand (right hemisphere) and the left hemisphere was engaged in the distracting task. However, the specific effects in the two experiments

were not the same, and the support provided for the hypothesis by the first experiment was rather indirect.

In the second series of experiments, a reaction time task was used (Broughton, 1977a). The idea was to determine whether having an agent listen to a tone would influence subjects' reaction time to that tone when they made their responses with their left hand (right hemisphere) but not their right hand. A significant interaction consistent with this hypothesis was found only when the subjects were engaged simultaneously in a "left-hemisphere" reading task.

On the other hand, Maher and Schmeidler (1977) found significant ESP performance only in a condition where a "verbal" type of discrimination response was made with the right hand while the left hand was engaged in a pattern-tracing task. This result suggested that successful ESP performance was being mediated by the left hemisphere, although the failure to find any significant differences between conditions renders the finding marginal. The authors suggest that either hemisphere is capable of showing ESP on a task related to its inherent skills but that results are enhanced if the other hemisphere is agreeably occupied with an irrelevant task.

3.1.2a. Conclusion. More research will be needed before a distinctive pattern of results emerges from this paradigm. The findings so far do suggest, however, that dissociative states (in a more literal sense of that term than one usually finds in the altered states area) might be particularly psi-conducive. If so, it follows that persons with a natural aptitude for performing two competing tasks simultaneously may prove to be good ESP subjects. For theoretically oriented discussions of hemispheric specialization in relation to psi, see Broughton (1975) and Stanford and Castello (1977).

3.1.3. Other Physiological Predictors: Slim Pickings

A few experiments have explored autonomic variables as predictors of ESP scoring. Woodruff and Dale (1952) found no relationship between GSR and ESP scores in two experiments where a shock paradigm was used in an unsuccessful effort to reinforce correct responses. In another experiment, a single subject completed four BT runs in each of 37 sessions, alternating between a relaxed and concentrating mental set either within sessions or between sessions (Otani, 1955). A significant interaction between set and within-run change in GSR was reported, the principal deviation consisting of significant psi-missing in the relaxed runs when GSR did not increase during the run. According to Tart (1963), an unpublished replication of this experiment was unsuccessful (cf. Otani, 1958).

Finally, Price (1973a) reported a negative correlation ($N = 5$) between the heart rate variability of five female "psychics" while giving free-response "readings" of anonymous target persons and a measure of the accuracy of their statements.

A review of the relationship between ESP and physiological variables has been written by Beloff (1974).

3.2. The "Psychic Personality": Profiling the High Scorer

Although performances on ESP tests can fluctuate widely in any given individual, the existence of exceptional subjects such as those described at the beginning of this chapter document the fact of individual differences in psychic ability. Although clinical approaches sometimes have been used to study psychic ability (e.g., Pratt, 1973; Tenhaeff, 1962), by far the most common approach has been to correlate ESP scores with various paper-and-pencil tests of personality. In fact, this literature has become quite extensive.

In this section, I will restrict myself to an examination of the relationship between ESP scores and behavioral dispositions or tendencies that are relatively stable over time. Most personality–ESP experiments can be classified according to the two broad trait clusters of neuroticism and extraversion that frequently emerge in factor-analytic studies of personality (e.g., Cattell, 1965; Eysenck, 1960), so I will begin with these two categories.

3.2.1. Neuroticism: ESP Test Anxiety

I will use the term *neuroticism* to refer broadly to tendencies toward maladaptive behavior caused either by anxiety or by defense mechanisms against anxiety. "Objective" personality inventories meeting this criterion that have been used in ESP experiments include the Taylor Manifest Anxiety Scale (Carpenter, 1971; Freeman and Nielsen, 1964; Honorton, 1965; Nielsen and Freeman, 1965; Rao, 1965b; Roll and Solfvin, 1976; Sailaja and Rao, 1973; Schmeidler and Lindemann, 1966), the Maudsley or Eysenck Personality Inventory (Brodbeck, 1969; Freeman, 1972a; Green, 1966b; Nielsen, 1972b, c; Osis *et al.*, 1971; Randall, 1974), Cattell's 16PF or HSPQ (Kanthamani and Rao, 1973a; Kramer and Terry, 1973; Nicol and Humphrey, 1953, 1955), the Minnesota Multiphasic Personality Inventory (Nash, 1966), Guilford's personality scales (Crumbaugh, 1958; Nash and Nash, 1967; Nicol and Humphrey, 1953, 1955), Maslow's Security–Insecurity Questionnaire (Smith and Humphrey, 1946; Stuart, Humphrey, Smith, and McMahan, 1947), Spielberger's State–Trait Anx-

iety Inventory (Ballard, 1977), the Bernreuter Personality Inventory (Humphrey, 1945b; McElroy and Brown, 1950), the Heston Personal Adjustment Inventory (Kahn, 1952), the Mental Health Analysis (Rivers, 1950), the Mosher Sex Guilt Scale (Carpenter, 1971), and a composite measure of openness versus defensiveness (L. W. Braud, 1976, 1977). Only the experiments by Braud and by Roll and Solfvin used free-response methods.

Projective measures that have been correlated with ESP scores include the Rorschach (Schmeidler, 1958, 1960, 1961; Schmeidler and LeShan, 1970), the Blacky Test (Schmeidler, 1962a), and Kragh's Defense Mechanisms Test (Carpenter, 1965; Johnson, 1974; Johnson and Kanthamani, 1967; Miller and York, 1976). Only Miller and York used free-response methodology.

Discounting experiments where significance was based on post hoc classification of subjects or analysis of extreme scorers only, just a handful of experiments have yielded significant simple relationships between ESP and neuroticism (L. W. Braud, 1977; Carpenter, 1965; Kahn, 1952; Johnson and Kanthamani, 1967; Kanthamani and Rao, 1973a; Nicol and Humphrey, 1953; Rao, 1965b). All of these significant relationships, however, have been in the direction of the least anxious or defensive subjects getting the highest ESP scores. The most successful predictors have been Cattell's scales and the Defense Mechanisms Test, especially the latter.

The pattern between neuroticism and ESP becomes more consistent when one eliminates from consideration those experiments where subjects were tested in a group or classroom setting. Of the remaining experimental series where the direction of the effect could be determined from the report, the less neurotic subjects scored higher in 20 series (Carpenter, 1965; Humphrey, 1945b; Johnson and Kanthamani, 1967; Kanthamani and Rao, 1973a; Miller and York, 1976; Nash, 1966; Nash and Nash, 1967; Nicol and Humphrey, 1953, 1955; Sailaja and Rao, 1973; Stuart *et al.*, 1947), while the more neurotic subjects scored higher in only six series (Carpenter, 1971; Green, 1966b; Nash and Nash, 1967; Nielsen and Freeman, 1965; Rivers, 1950). A more detailed discussion of a similar breakdown is published elsewhere (Palmer, 1977).

Interactions between neuroticism and other variables, discussed elsewhere in the chapter, have been reported by Carpenter (1971) and Schmeidler (1960). Randall (1974) found significantly high between-subjects variance in three of six classroom experiments among high school students who scored above average on the Junior Eysenck Personality Inventory.

3.2.1a. Conclusion. There is a clear trend in the data indicating that persons whose responses on personality tests indicate relatively good

emotional adjustment score more positively on standard ESP tests than do more "neurotic" subjects. The results of Randall notwithstanding, the effect seems to be on the direction of the deviation (hitting versus missing), rather than on its magnitude per se. The fact that the relationship is more consistent when subjects are tested individually may be because neurotic tendencies do not become engaged in relatively nonthreatening group testing situations, where a subject can "lose himself in the crowd." Differences in *predispositions* to anxiety (which is what these personality inventories measure) would be expected to have their greatest influence when subjects must face a strange experimenter alone and have their performances singled out for evaluation. A possible boundary condition of the neuroticism–ESP relationship is discussed in Sec. 3.7.2a.

3.2.2. Extraversion: Neuroticism's Siamese Twin?

The second major personality variable to be correlated with ESP scores is extraversion. Relationships have been reported involving Cattell's scales (Kanthamani and Rao, 1972; Nicol and Humphrey, 1953, 1955), Eysenck's scales (Aström, 1965; Brodbeck, 1969; Green, 1966a,b; Haraldsson, 1972; Nielsen, 1972a; Osis *et al.*, 1971; Randall, 1974), Guilford's scales (Nash and Nash, 1967; Nicol and Humphrey, 1953, 1955), the Bernreuter scale (Humphrey, 1945b, 1951a; Casper, 1952; McElroy and Brown, 1950; Nielsen, 1970), the MMPI (Nash, 1966; Szyczygielski and Schmeidler, 1975), a ten-item scale of unspecified origin (L. W. Braud, 1976, 1977), experimenter ratings (Kanthamani, 1966), and clinical ratings of "withdrawal" in emotionally disturbed children (Shields, 1962). Only a handful of these authors reported significant simple relationships between ESP and extraversion, but all were in the direction of more positive ESP scores among extraverts (Aström, 1965; L. W. Braud, 1976; Casper, 1952; Humphrey, 1951a; Kanthamani and Rao, 1972; Nash, 1966; Shields, 1962). A significant relationship in the same direction was also reported by Marsh (1962) in a free-response experiment, but I lack access to the full report, which presumably described the measure of extraversion used. Charlesworth (1975) suggested that a significant difference favoring fraternal as opposed to identical twins in a free-response experiment may have been attributable to the fact that the fraternal twins were significantly more extraverted, but no measure of extraversion was described in the published report. Again, the great majority of all experiments where the direction of the effect could be determined from the report revealed higher scores for extraverts, but there have been exceptions (Nash, 1966; Nash and Nash, 1967; Randall, 1974; Szyczygielski and Schmeidler, 1975). Whether subjects were tested individually or in groups had less

effect on the extraversion–ESP relationship than on the neuroticism–ESP relationship, so the trends reported in this paragraph are based on studies of both types. For a more detailed analysis, the reader again is referred to Palmer (1977).

3.2.2a. Conclusion. There is a clear trend in the data indicating a positive relationship between social extraversion and scores on standard ESP tests. The trend is similar to that between neuroticism and ESP; in fact, the evidence for the two relationships often comes from the same experiments. There is a high degree of correlation between the extraversion and neuroticism scales that have been used in ESP research, especially in those "objective" scales that have been most successful as predictors of ESP scores. This obviously introduces interpretational problems. The only attempt to partial out these effects was by Kanthamani (1968), who found that her significant neuroticism–ESP relationship with Cattell's HSPQ survived the partialing out of extraversion but not vice versa.

In my judgment, the most reasonable and parsimonious conclusion that can be drawn from the data is that there is a weak but generally consistent tendency for the highest ESP scores (at least on initial testing) to be obtained by subjects with superior social adjustment, especially as this affects their ability to adapt to and be comfortable in social situations such as psychology experiments. A stronger interpretation of the ESP–extraversion relationship is presented by Eysenck (1967).

3.2.3. Other Personality Measures: Place Your Bets and . . .

Several other personality variables have been used as predictors in ESP experiments, but their use has been too infrequent to allow clear trends to emerge.

3.2.3a. Aggression. Some significant negative relationships between ESP scores and externally directed aggressiveness have been reported using the Rosenzweig Picture Frustration Study (Eilbert and Schmeidler, 1950; Schmeidler, 1950, 1954) and Cason's Test of Annoyance (Nicol and Humphrey, 1953, 1955). Osis found complex and inconsistent effects with the Rosenzweig that do not support the generality of these earlier findings (Osis and Fahler, 1965; Osis and Turner, 1968; Osis *et al.*, 1971). Schmeidler's results suggested that the relationship only holds for subjects who are "moderately annoyed" at the test, and this factor may be responsible for the inconsistent results.

3.2.3b. Hypnotic Susceptibility. Using a within-subject design, Stanford (1972b) found that susceptibility to hypnosis as measured by the Barber Suggestibility Scale was positively related to ESP scores in a conventional card test but negatively related to scores in an "augury" test

more relevant to PK. Both trends were significant, based on the pooled results of two series. Honorton (1969a) also found a positive (but nonsignificant) correlation between the BSS and card-guessing scores. In a GESP experiment involving a restricted range of scores on the Stanford Hypnotic Susceptibility Scale, McBain *et al.* (1970) found a significant positive correlation between ESP scores and the agents' scores on the SHSS, but not the percipients'. Hypnotic susceptibility has not proven to be significantly related to ESP scores in free-response experiments (Palmer and Lieberman, 1976; Roll and Solfvin, 1976). For other data relevant to hypnotic susceptibility, see Sec. 2.6.1.

3.2.3c. Self-Concept. In each of two experiments, Stanford (1964a, 1965) found that subjects who believed in ESP and who scored above chance on an ESP card test with multiple calls (see Chapter 1,) had a significantly greater difference between their self- and ideal-self-concepts, as measured by a Semantic Differential technique, than did believers who scored below chance. Unfortunately, it could not be determined whether the mean self–ideal discrepancy of the high scorers indicated realistic self-perception or feelings of inferiority.

3.2.3d. Perception of Time. Several experiments have employed a projective technique called the Time Metaphor Test. Designed to directly assess subjects' preferred ways of viewing time, it has been shown to correlate with measures of need for achievement. The test does not seem to relate to ESP card-guessing scores in any simple way, but some complex effects have been reported (Goldberg, Sondow, and Schmeidler, 1976; Heyman and Schmeidler, 1967; Mihalsky, 1972; Osis *et al.*, 1971; Schmeidler, 1964c; Taetzsch, 1965).

3.2.3e. Values. Nash (1958) reported a significant positive correlation between ESP card-guessing scores and the religion subscale of the Allport–Vernon Scale of Values, but a nonsignificant relationship was reported by Buzby (1963). The subscale measuring a theoretical value orientation was not found to relate significantly to ESP scores (Schmeidler and McConnell, 1958).

3.2.3f. Other Scales. Roll and Solfvin (1976) found a significant positive correlation between clairvoyance but not GESP scores and the Time Competence Scale of the Personal Orientation Inventory in a free-response experiment. In another free-response experiment, Palmer and Lieberman (1975) reported a significant negative correlation between ESP scores and a projective measure of articulation of body concept. Carpenter (1973) found a significant interaction between belief in ESP and the California *F* Scale of authoritarianism as predictors of card-guessing performance. McGuire, Percy, and Carpenter (1974) found that scales from the California Psychological Inventory contributed to a multiple regres-

sion equation predicting ESP scores. Stanford (1965) found among subjects who believed in ESP a significant negative correlation between ESP scores and an item concerning the pleasure derived from touching and fingering physical objects. Other scales used in only one experiment that have failed to correlate significantly with ESP scores include Allport's Ascendance–Submission Scale (Kanthamani, 1966), Rotter's Internal–External Control of Reinforcement Scale (Stanford, 1972a), Rokeach's Dogmatism Scale (Schmeidler and Lindemann, 1966), and the need–achievement subscale of the Edwards Personal Preference Schedule (Schmeidler and Lindemann, 1966).

3.2.3g. Conclusion. Among these other personality variables, aggressiveness and self-concept appear to be the most promising. More research with these variables will be needed, however, before any conclusions can be drawn.

3.2.4. The Stuart Interest Inventory: A Case of Raw Empiricism

Another approach to the prediction of ESP scores is represented by the Stuart Interest Inventory, a scale designed exclusively for ESP research on which subjects express their degree of liking for 60 objects and events on five-point scales (Stuart, 1946b). Because of earlier research suggesting a relationship between ESP and "affectability" (Stuart, 1941), scores on the scale were based upon extremity of attitude rather than direction. Although the specific scoring scheme Stuart used did not prove to be a very valid measure of affectability, a significant difference in favor of midrange scorers on the SII was found in the pooled results of 32 card-guessing series including 900 subjects (Humphrey, 1949, 1951b). Casper (1951), however, was unable to significantly replicate the effect with a sample of 146 subjects.

Using a more empiricist approach, Humphrey (1950) submitted the SII to item analysis, selecting the 14 items that best discriminated high and low ESP scores in three previous experiments in terms of the percentages of subjects choosing each response alternative. The new scale was successfully cross-validated in 13 subsequent series but not in still later series (Humphrey, 1951b). However, its predictive utility was significantly confirmed in a more recent experiment (Carpenter, 1969). Honorton (1964, 1966) found that the scale successfully predicted direction of scoring following hypnotic induction, but not in control runs.

3.2.4a. Conclusion. The new version of the Stuart scale shows some promise as a predictor of ESP scoring direction, but I wouldn't bet my money on it. The old version is longer, certainly no better, and may be outdated. No research has been reported attempting to provide either

version with any construct validity, and neither has much face validity as a measure of underlying dispositions that might be conceptually related to psi. In other words, even if the SII–ESP relationship is genuine, we have no idea what it means.

3.3. Cognitive Variables: From Substance to Style

In this section, we will take a look at how individual differences in cognitive abilities and styles are related to ESP test performance. All the experiments in this section used forced-choice testing procedures unless otherwise indicated.

3.3.1. Intelligence and Scholastic Ability: IQ and Psi Q

A number of experimenters have correlated ESP scores with scores on standard intelligence tests. However, sample sizes have usually been small and representative of a limited range of intellectual ability, e.g., college students. Most of these correlations have been nonsignificant, although predominantly in the positive direction (Bond, 1937; Drucker *et al.*, 1977; Eason and Wysocki, 1965; Humphrey, 1945a, 1948; Kanthamani and Rao, 1971; Nash and Nash, 1964; Nicol and Humphrey, 1953, 1955; Rivers, 1950; Shields, 1965; Vasse and Vasse, 1958). The few significant relationships have been exclusively positive (Humphrey, 1945a; Nash and Nash, 1958; Schmeidler, 1962a). Although this pattern suggests a positive relationship between ESP and intelligence in the population sampled, the fact that highly significant psi-hitting has been found among mentally retarded children (Bond, 1937; Drake, 1938) suggests caution in making any broad generalizations.

A related variable that has been studied as a predictor of ESP scores is school grades. Anderson (1959b) reported a significant relationship between ESP scores and class grades among 1,228 high school and junior college students. Schmeidler (1960) likewise found a significant positive relationship between these variables in a large sample of college students, but only among those who believed ESP was possible under the conditions of the experiment. Other experiments, however, produced nonsignificant relationships (Anderson and Gregory, 1959; Nash and Nash, 1964; White and Angstadt, 1961).

As far as interactions are concerned, Freeman (1967, 1968, 1970a) conducted a series of complex experiments suggesting a relationship between type of target and relative spatial and verbal aptitude. These complex effects were not entirely consistent.

3.3.1a. Conclusion. Correlational studies have shown a weak but fairly consistent positive relationship between ESP and intelligence test scores within restricted samples. However, the crucial predictor variable may not be intelligence. For example, Anderson's finding of a positive relationship between ESP scores and grades was highly confounded with the relationship described previously between ESP scores and teachers' attitudes toward their pupils (see Sec. 2.5.2b). One interpretation of this pattern of results is that the brighter students feel more comfortable in the classroom situation than do their less intelligent counterparts, and this is why they score better on ESP tests. In Schmeidler's (1960) research, a measure of personal adjustment produced the same pattern of results as described above for class grades. Although no correlation between personal adjustment and class grades was reported in Schmeidler's article, measures of intelligence and personal adjustment are often positively correlated. In the context of other research findings described in the last section, it seems most reasonable to conclude that the positive relationship between ESP and intelligence, assuming its validity, is the by-product of a more fundamental relationship between ESP and personal adjustment.

3.3.2. Short-Term Memory: Not Much to Remember

Only a handful of experiments have considered individual differences in short-term memory in relation to ESP scoring. In a series of four preliminary experiments, Feather (1965) gave subjects 15 or 20 seconds to memorize a list of 25 ESP symbols or digits. In between memorization and recall the subjects completed a conventional ESP card test. Results for the four series pooled indicated a significant positive relationship between the ESP and memory scores, and a significantly high proportion of subjects with "low" memory scores scored below chance on the ESP test. A significant confirmation of the memory–ESP correlation was obtained in the pooled results of three confirmatory experiments of similar design (Feather, 1967). However, subjects in all these experiments were given so little time to memorize the lists that the "memory" test may have functioned merely as a second ESP test, a point made by K. R. Rao (personal communication).

Kanthamani and Rao (1975c) found a significant positive correlation between ESP scores and recall of paired associates with low association strength. In this case, subjects with above-median memory scores scored significantly above chance on the ESP test. On the other hand, Parker (1976) found a significant negative relationship between ESP and a mea-

sure of digit-memory span, but only in one of two experiments. The overall mean in this experiment was very close to chance. In both sets of experiments, the memory test was incorporated in the ESP test.

Other research pertinent to the memory–ESP relationship is discussed in section 4.1.2d.

3.3.2a. Conclusion. The few studies relating ESP to short-term memory have yielded inconsistent results.

3.3.3 Creativity: A Creative Interpretation Needed

An important aspect of intelligence that psychologists have found very difficult to quantify is creativity. In each of two experiments with college students, Schmeidler (1962b, 1964d) found negative correlations between ESP scores and two measures of creativity: a "classes-of-use" test and Barron's Independence of Judgment Scale. Only one of the four correlations was significant. The overall negative scoring in both experiments suggests that the results should be interpreted as psi-missing on the part of the *more* creative subjects.

Honorton (1967) tested high school students and found significant positive correlations between ESP scores and scores on a classes-of-use test and Torrance's Social-Motivation Inventory. This time the more creative subjects averaged close to chance while the *less* creative subjects manifested significant psi-missing. McGuire *et al.* (1974) reported a positive correlation between ESP and scores on the Welsh Figure Preference Test in an unspecified population, but the relationship apparently was not significant.

Anderson (1966) reported the results of a classroom experiment with 591 grade school children in which the ESP test was presented as a rocket-launching game. Teachers rated each pupil's creativity on a three-point scale. The most creative students scored significantly above chance and the middle group significantly below chance. The mean of the least creative group was nonsignificant. Group means and the method of statistical analysis were not reported. Levine and Stowell (1963) reported nonsignificant correlations between clairvoyance scores and classes-of-use tests in each of two experiments.

Finally, Moss found that pairs of subjects at least one of whom was engaged in an artistic profession had significantly more hits than other pairs in two free-response GESP experiments (Moss, 1969; Moss and Gengerelli, 1968). In a later study, the relationship was in the predicted direction but nonsignificant, perhaps due to the smaller sample size (Moss *et al.*, 1970). In the first two experiments, the artistic pairs scored significantly above chance. A chi-square analysis, which I computed of results

reported by Gelade and Harvie (1975) in an attempted replication of Moss' experimental procedure, again revealed significantly more hits in pairs composed of two artists than in other pairs. However, in a card-guessing experiment, music majors were found to score no higher than other subjects (Jackson, Franzoi, and Schmeidler, 1977).

3.3.3a. Conclusion. Integrating this disparate set of findings is left as an exercise for readers more creative than this reviewer. It is likely that the relationship between creativity and ESP depends on the particular measure of creativity used, the type of ESP test, and the nature of the experimental situation. Until such factors are systematically studied, conclusions in this area will continue to be hard to come by.

The one consistent finding discussed in this section is a tendency for agent–percipient teams to be most successful in Moss's free-response GESP paradigm if both members of the team are artists. Although profession is only an indirect measure of creativity, it may be at least as valid as the direct measures currently available. Again, however, social psychological variables cannot be ruled out as possible mediators of this relationship.

3.3.4. Mental Imagery: Still More Confusion

Because of indications that ESP responses are frequently mediated by visual imagery (e.g., Honorton and Harper, 1974; McCallam and Honorton, 1973), a number of experimenters have recently examined ESP scores in relation to one of the few objectively scored measures of imagery, Sheehan's (1967) version of the Betts QMI. The test requires the subject to generate images of various objects and events and to rate the vividness of each image on a seven-point scale.

Honorton *et al.* (1974) found that above-average imagers on the Betts scored significantly above chance and below-average imagers significantly below chance on a six-run DT test. In a strict replication attempt, Schechter *et al.* (1975) obtained a significant reversal of Honorton's finding, with the below-average imagers scoring significantly above chance. A significant negative correlation between ESP and Betts scores also was found by Pleshette (1975) in an ESP test completed simultaneously with efforts at brain wave control, but the mean ESP score was not reported. No significant nonartifactual relationships between ESP and Betts scores have been found in free-response experiments (Palmer and Lieberman, 1975; Roll and Solfvin, 1976; Smith *et al.*, 1976).

A companion scale to the Betts is the Gordon Test of Visual Imagery Control, in which subjects are asked how well they can manipulate images. When he combined the results of two experiments using this scale,

Price (1973b) found in a post hoc analysis that the scores of "autonomous" imagers were significantly more variable (i.e., between-subjects) than those of "controlled" imagers. The effect was independently significant in the first experiment and approached significance in the second. The two types of imagers also manifested significantly different run-score position effects (see Sec. 4.1.1) in each experiment, but the two interactions were not the same.

3.3.4a. Conclusion. The Betts has been shown to be heavily influenced by subtle variations in testing conditions (Marks, 1972; Palmer and Lieberman, 1975; Sheehan and Neisser, 1969), and such factors conceivably could be responsible for the inconsistent results with this measure. For a review, see Honorton (1975). More research will be needed to see if the Gordon scale is a more consistent predictor.

3.3.5. Dream Recall: A Dream Yet to Come True

A variable of possible relevance to the ability to evoke vivid visual imagery is the frequency with which persons recall their dreams. Honorton (1972a) found that adult education students who reported recalling their dreams at least once a week scored significantly above chance on a card-guessing test and significantly higher than the other members of the class. According to Honorton, a significant relationship between ESP scores and dream recall briefly reported by Johnson (1968) also was positive. However, Haraldsson (1975, 1976) twice failed to find significant relationships between these variables among large samples of Icelandic high school, vocational school, and college students. The trend in the first study, at least, would seem to be inconsistent with that found by Honorton. Two classroom card-guessing experiments with British high school children likewise yielded no significant relation between ESP and dream recall (Randall, 1972).

3.3.5a. Conclusion. A significant positive relationship between ESP and dream recall has been reported in two of six experiments. More data will be needed to determine if this indicates a genuine trend.

3.3.6. Field Dependence: A Merging of Present and Future?

Several tests have been devised to assess a person's ability to differentiate a figure in space from its surrounding environment or "ground." Persons who are relatively unsuccessful at making this discrimination are called "field-dependent" (Witkin, Dyk, Faterson, Goodenough, and Karp, 1962). A prominent measure of field dependence, the Embedded Figure Test (EFT), has related significantly to precognition scores in two

experiments (Buzby, 1967a; Nash and Nash, 1968). In each case, the precognition scores of field-dependent subjects deviated from chance in either direction to a significantly greater degree than those of field-independent subjects. A measure of articulation of the body concept derived from the Draw-a-Person (DAP) test, which is positively correlated with the EFT, significantly differentiated subjects in the same direction as the EFT in the Nashes' experiment; but it would appear that a reversal occurred in the research of Buzby (1968a), inasmuch as significantly high variance was restricted to subjects who were both field-dependent on the EFT and field-independent on the DAP.

Relationships between clairvoyance scores and both the EFT and DAP test have consistently produced only chance results overall (Buzby, 1967a, 1968a, b; Nash and Nash, 1968, 1971). In an experiment with grade school children, however, Schmeidler (1962a) found a significant positive correlation between clairvoyance scores and scores on a test similar to the EFT, a trend indicating more psi-hitting among field-independent subjects.

3.3.6a. Conclusion. There is some preliminary evidence of a positive relationship between field dependence, as measured by the EFT, and the magnitude of precognition deviation scores, regardless of sign. Why this apparent relationship only holds for precognition is unclear; an admittedly metaphorical interpretation might be that field-dependent persons, who perceive more "globally," have a less rigid psychological boundary between the present and future that makes them more open to precognitive stimuli that more field-independent subjects tend to block out. Tart (1977a) proposes a somewhat similar interpretation to account for some precognitive displacement effects (see Sec. 6.1.1c).

3.4. Disabilities: ESP among the Less Fortunate

3.4.1. Mental Illness: Psi in the Psychically Disturbed

In medieval times and even in colonial America, psychic powers were considered to be a form of mental illness. The infamous Salem witch trials bear witness to the brutality sometimes suffered by those who were considered to be psychic. In our now more enlightened era, ESP no longer is considered a mark of insanity, but the question remains whether those diagnosed as mentally ill on what we hope are more rational grounds have more or less ESP ability than the population at large.

3.4.1a. Noninstitutionalized Patients. Hudesman and Schmeidler (1971) gave ESP clock-card tests to three outpatients following

psychotherapy sessions. ESP scores were significantly above chance in sessions independently rated "good," and they were significantly better than scores following sessions rated "mediocre" or "poor." A follow-up experiment with two new patients failed to confirm these results, but a third patient showed a significant tendency to avoid both the target and its diametric opposite on the clock face (Hudesman and Schmeidler, 1976). The authors concluded that individualized hypotheses must be formulated for particular patients.

Jampolsky and Haight (1975) gave various forced-choice ESP tests to ten hyperkinetic children and a control group. The groups did not differ significantly in their performance, although nine of the ten hyperkinetic children had scores above chance.

3.4.1b. Institutionalized Patients. Shulman (1938) gave ten or more STM runs to each of 141 psychotic patients with various diagnoses. Overall results were at chance, but he did find significant and consistent psi-hitting among 12 manic-depressives in the depressed state and significant psi-missing (by *t* test) among 9 patients afflicted with involutional melancholia. If valid, these findings may reflect in part the generally superior performance of extraverted as compared to introverted subjects. Shulman states that melancholia patients are considered to be more withdrawn than depression patients, and he noted this difference manifested in the test situation. Randall (1974) found that high school males who reported depression on a questionnaire had card-guessing scores that deviated significantly from chance in either direction, i.e., significant "between-subjects variance." Combined with the findings of Shulman, these results suggest that depression may contribute to the magnitude of ESP effects, while direction is influenced by other factors such as extraversion.

Bates and Newton (1951) reported an experiment conducted 13 years earlier in which 95 patients were given a variety of forced-choice ESP tests. The overall results were highly significant, but there were no clear differences as a function of diagnostic category. Since the experimenter, Margaret Price, consistently obtained highly significant results with a variety of populations (see Pratt and Price, 1938), these results tell us nothing about the psychic ability of psychotics relative to other groups. West (1952), who has the reputation of being an unsuccessful experimenter, did nothing to damage his reputation in three DT series with psychotic patients, nor did 15 patients tested by Zorab (1957) show any evidence of ESP.

Finally, Humphrey (1954) tested 28 patients before and after electroshock therapy and 11 others before shock only. No pre-to-post-shock differences were found, but post hoc analyses revealed significant pre-

shock psi-hitting among those patients diagnosed as schizophrenic. Humphrey found the schizophrenics to be unusually cooperative for patients with this diagnosis.

3.4.1c. Conclusion. There is little evidence that mentally ill patients have any more or less psychic ability than anyone else. However, only Jampolsky's experiment systematically compared such patients to a control group. The possibility that depression may enhance the bidirectional magnitude of ESP effects should be explored further. The discussion of ESP and mood (section 3.7) will be relevant to this issue. For a more extensive review of the literature on psi and psychosis, see Rogo (1975).

3.4.2. Physical Disabilities: Could the Thyroid Be the Key?

3.4.2a. Brain Injury. Since ESP must be at least mediated by the brain, one might expect its manifestation to be affected by brain injury. Unable to find subjects with localized brain lesions, Schmeidler gave a ten-trial card-guessing test to 18 concussion patients and 11 controls who either had recently recovered from concussion or who were hospitalized for fractures of regions other than the head (Schmeidler and McConnell, 1958). The concussion patients scored significantly above chance and significantly higher than the controls. Schmeidler noted that in comparison to the controls, the concussion patients were extremely passive, and the ones who got the highest scores, in addition, were cooperative during the test. Smythies and Beloff (1965) found no significant card-guessing performance in patients suffering from Parkinson's disease tested either before or after stereotactic surgery.

3.4.2b. Blindness. Price achieved her usual highly positive scores with a group of blind subjects, mostly adolescents, and a partially matched group of orphanage children, but no significant differences between them (Price, 1938; Price and Pegram, 1937).

3.4.2c. Thyroid Conditions. A number of persons with hyperthyroid conditions have seemed to possess unusual psi abilities (Taves, 1944). A young hyperthyroid woman tested by Reiss (1937, 1939) achieved the incredibly high average score of 18.24 hits per run over 1,850 trials in a GESP distance experiment. Following an unspecified treatment, the mean plummetted to 5.30. Almost as impressive a scoring rate was obtained by an 11-year-old mentally retarded boy in GESP runs with his mother as agent (Drake, 1938). This child apparently had hypothyroidism, and his scores declined following injections of thyroxin. Unfortunately, as the author was aware, some of the most successful runs with this subject were completed with less than adequate controls for auditory cues.

In neither of these two cases can the decline in scoring be clearly

attributed to the thyroid condition (e.g., Reiss's subject suffered an emotional breakdown in between the two testing periods) and things obviously would be clearer if both subjects had the same type of thyroid imbalance. Nevertheless, the fact that two of the highest scoring card-guessing subjects in the history of parapsychology both had thyroid conditions points to an area of research that has been neglected far too long.

3.4.2d. Conclusion. All we have from the limited research on physical disabilities in relation to ESP are leads. However, the lead involving thyroid disturbances, in particular, could prove to be a very important one. Brain damage also may be worth a second look.

3.5. Biological Variables: ESP in the Life Cycle

Although our personalities and intellectual skills are conditioned to a large degree by the environment, certain other characteristics are for the most part fixed at birth. Whether an organism comes into the world as a human or an infrahuman species, male or female, firstborn or later born, has a profound and irreversible impact on his or her life experience. All organisms pass through the life cycle from birth, through childhood and adolescence, and into adulthood and old age. How is ESP ability affected by these biologically determined individual differences and life processes?

3.5.1. Sex Differences: Females Are More Intuitive, Sometimes

It is a common belief in our society that women are more intuitive than men. If intuition is any way connected to ESP, one also might expect women to be more psychic than men and thus to obtain higher scores on ESP tests.

3.5.1a. GESP Classroom Experiments. For some reason, analyses of sex differences have been reported most faithfully when the experiments involved the testing of primary or secondary school students in a classroom setting. Van Busschbach (1959) found that girls in the first and second grades of Dutch schools scored significantly higher than boys. However, other samples of Dutch and American school children did not reveal significant sex differences (Van Busschbach, 1955, 1956, 1961), and in some cases the boys scored better. Overall scoring generally was above chance in these experiments.

Louwerens (1960) found that when the teachers served as agents in a GESP experiment with 684 Dutch nursery school children, the girls scored significantly above chance and significantly higher than the boys. When some of these students were retested later, however, with the experimenter serving as agent, exactly the opposite result occurred. This time, however, the sex difference was not significant. Such reversals are

common in ESP experiments when the same subjects are tested under two different conditions (Rao, 1965a), so the identity of the agent may not be a crucial variable. However, it is worth mentioning that the teachers served as agents in most of Van Busschbach's experiments.

In a more recent GESP experiment with 1,402 Dutch school children and the teacher serving as agent, girls again scored significantly higher than boys (Bierman and Camstra, 1973). An earlier pilot study failed to yield a significant difference, however. White and Angstadt (1963a, b) failed to find any significant sex differences in two experiments where the agents were classmates of the subjects, but the sample sizes were much smaller than those of the Dutch investigators, and the latter of White's experiments produced no significant evidence of psi whatsoever.

Finally, Van de Castle (1971) gave GESP card tests with the experimenter as agent to two groups of adolescent Cuna Indians, a tribe inhabiting islands off the coast of Panama. Pooled results for the 285 subjects revealed that girls again scored significantly higher than boys, but the result was primarily attributable to a significantly high proportion of the boys (62%) scoring below chance.

3.5.1b. Other GESP Experiments. In GESP experiments where subjects are tested individually, a common approach is to create a number of agent–percipient pairs. Sometimes the scores of these pairs are analyzed in terms of their sexual composition. McBain *et al.* (1970) found that same-sex pairs scored significantly higher than mixed-sex pairs in an experiment with significant overall positive scoring. However, in four GESP experiments in which senders attempted to bias the responses of naive subjects on various unstructured psychological tests (e.g., perception of the autokinetic effect, awareness of subliminal stimuli), sexual composition of the agent–percipient pairs had no significant effect (Kreitler and Kreitler, 1972, 1973).

In a review of the Maimonides dream experiments, Krippner (1970) reported that only the pooled results of male subjects were significant, and the results were not affected by the sex of the agent. However, it must be remembered that much of these data were contributed by a handful of highly selected subjects. In a modified ganzfeld experiment, Habel (1976) found significant psi-missing among all-male pairs and nonsignificant psi-hitting among all-female pairs, with mixed pairs scoring close to chance. No overall analysis comparing these groups was reported.

3.5.1c. Clairvoyance and Precognition Experiments. Experiments without an agent, including those conducted in a classroom setting, have consistently failed to yield any significant main effects for sex. I was able to find 34 experiments of this type in the literature where sex breakdowns were mentioned, and in only two of these was there a significant main effect for sex (Freeman, 1963; Rao, 1963b). The boys scored highest in

each of these experiments, although Freeman's conclusion was based on analyses that used the trial rather than the subject as the unit of analysis.

However, sex has occasionally been shown to interact with other variables as predictors of ESP scores. These variables, discussed elsewhere in the chapter, include type of target symbol and arrangement (Freeman, 1963, 1964, 1965, 1966b, 1967, 1968, 1970a,b, 1972b), language of ESP target words (Rao, 1963b, 1964b), belief in ESP (Layton and Turnbull, 1975; Schmeidler, 1960), and precognition versus clairvoyance (Zenhausern *et al.*, 1977).

3.5.1d. Sexual Dominance. Two experimenters examined the sexual composition of intact groups, each predicting that scoring would be influenced by whether the group was dominated by males or by females. Mihalasky (1972) reported that some kind of complex interaction involving sex of subject, whether the leadership of the group was male or female, and a homemade personality scale measuring "dynamism" was found to be in the predicted direction in 12 of 15 groups tested. In a simpler experiment, Friedman, Schmeidler, and Dean (1976) defined sexual dominance in terms of the relative numbers of each sex in the group. Results of a card-guessing test given to 1,100 subjects in 11 intact groups revealed that in groups where sexual dominance was evident, subjects of the dominant sex scored significantly higher than subjects of the nondominant sex, when the groups were pooled for analysis. Finally, Wiklund (1977) found on the basis of a post hoc analysis that 15 of 16 subject triads scored highest when the experimenter was of the opposite sex from the majority of the triad members.

3.5.1e. Conclusion. There is evidence that among Dutch school children, females tend to score more positively than males in GESP card tests conducted in a classroom setting, at least when the agent is their teacher. Outside of this limited context (and with the exception of the psi-missing of Van de Castle's male Cuna Indians), sex of subject seems to have no direct effect on ESP scoring, although it occasionally has been shown to interact with other predictor variables. The sexual composition of agent–percipient pairs in more individualized GESP experiments has been shown to affect scoring in some experiments, but the patterns have been inconsistent and probably interact with other aspects of the test situation. Sexual dominance may be a useful variable to examine further in experiments with certain intact groups.

3.5.2. Age Differences: The Power of Youth

It is especially difficult to study age differences in ESP test performance, particularly over a large age range, because of the problems in finding a test procedure suitable for all ages. Until very recently, the only

attempt to systematically compare the performance of children and adults were Rhine's early precognition experiments. In the first of three series, involving 19 adults, 5 children, and over 2,000 runs, the children scored significantly above chance and the adults significantly below chance (Rhine, 1941a). Two subsequent series of similar extent yielded results that were in the same direction but not significant (Rhine, 1942). In these latter experiments, the children were always tested in groups with a "party" atmosphere, while the adults were tested individually. Thus testing conditions were not very comparable for the two age groups.

In his classroom GESP experiments, Van Busschbach (1953, 1955, 1956) found that primary school children (ages 10 to 12) scored significantly above chance, while secondary school students (ages 12 to 20) scored at chance. Several thousand students were tested, and the differences were significant. Bierman and Camstra (1973), on the other hand, failed to find such a difference in their classroom GESP experiments.

Both Rhine and Van Busschbach relied exclusively on statistical techniques that indiscriminately pooled hits across subjects. Therefore, we have no firm basis of knowing how uniformly the effects were distributed among the subjects in their samples. Practically speaking, this does not introduce a serious bias in Van Busschbach's case, but it may well be a factor in Rhine's, where the number of runs per subject was quite large.

The most ambitious attempt to compare ESP test results in different age groups was a recent GESP experiment by Spinelli (1977). He tested 150 children of ages 3 to 8 and 50 adults of ages 19 to 21. Subjects were tested in pairs, each member alternating as sender and receiver. The children scored above chance to a highly significant degree, while the adults scored close to chance. An earlier experiment with a wider range of ages produced comparable results, but the agents in this experiment were allowed to choose which target to send on each trial, a methodological no-no that conceivably could have biased the results. In this experiment, subjects from 3 to 8 scored significantly above chance while those 14 or older scored at chance. Van Busschbach (1959) also found significant scoring among children aged 6 to 8 in classroom GESP experiments conducted in Holland, but comparable series conducted in the United States yielded only chance results, a fact he attributed to poor testing conditions (Van Busschbach, 1961).

The significant age differences that have been found all involved comparing subjects before and after puberty. Experiments comparing age ranges within these broader categories have failed to yield significant main effects (Anderson and Gregory, 1959; Anderson and McConnell, 1961; Green, 1965; Musso, 1965; Shields, 1962; Spinelli, 1977; Van Busschbach, 1961; White and Angstadt, 1963a, b), with one exception (Van Busschbach, 1959). However, White and Angstadt (1963b) found an

interaction suggesting that younger subjects were most successful in discriminating between two competing target sequences in the predicted direction.

3.5.2a. Conclusion. There is some evidence that children score more significantly and positively on forced-choice ESP tests than do adolescents or adults. Puberty seems to be the crucial cutoff point. However, the failure of fifth and sixth grade students to score any better than high school students in the large-scale Anderson–White clairvoyance experiments (see Sec. 2.5.2b) and the weakness of design of some of the confirmatory experiments suggest caution in drawing conclusions. Conceivably age, like sex, has a straightforward effect on scoring only in GESP experiments. More and better research on the relationship between age and ESP is needed.

3.5.3 Birth Order: Shall the First Be First?

In a correspondence experiment involving over 6,000 readers of a magazine or newspaper, Green (1965) reported a post hoc effect indicating that magazine readers who had been only children scored below chance on −1 displacement, eldest children above chance, and younger children at chance. The groups differed by one-way analysis of variance to a highly significant degree. No such effect was found with the newspaper readers, whom Green considered to be of generally lower economic status than the magazine readers. Eastman (1967) reported significant psi-hitting among firstborn college students, who apparently scored significantly higher than later born or only children. No significant birth order effects were found in two other experiments (Brodbeck, 1969; Schmeidler and Lindemann, 1966).

3.5.3a. Conclusion. Despite some suggestive evidence that psi-hitting may be more prevalent among eldest children, a clear trend has yet to be established between birth order and ESP.

3.5.4. Twins: Togetherness Outside the Womb

Twins often have been considered potentially ideal subjects for GESP experiments in which one twin would try to "send" a target to the other. It is tempting to speculate that twins might be particularly able to "tune in" to each other telepathically because of their common biological origin. Although such twin studies are frequently talked about, very few have been published in the serious literature.

Kubis and Rouke (1937) tested six pairs of twins by having them respond simultaneously to cards looked at by the experimenter. Informal testing with two of these pairs involved having the twins take turns send-

ing to each other. Results were essentially of a chance nature, as were the results of a GESP experiment by Rogers (1960). Duane and Behrendt (1965) reported remote driving of the EEG in 2 of 15 pairs of identical twins. The report was very sketchy, but it would appear that alpha waves evoked in one twin by photic driving spontaneously and simultaneously appeared in the EEG of the other twin located in another room. In a similar experiment where an effort was made to induce plethysmographic reactions in a percipient by showing emotional verbal stimuli to the agent, friends or spouses achieved somewhat better results than did twins (Esser, Etter, and Chamberlain, 1967). Barron and Mordkoff (1967) found suggestive evidence of autonomic responses in one twin coincident with arousal in his counterpart, but three other pairs of identical twins produced null results. Nash and Buzby (1965) tested 25 pairs of twins ranging in age from 5 to 13. Each twin completed six DT clairvoyance runs. Overall results were nonsignificant, but a post hoc analysis revealed that 10 of the 11 pairs of identical twins had overall scores of the same algebraic sign (i.e., either above or below chance) as compared to only 5 of 12 pairs of fraternal twins suitable for this analysis. The difference was significant. In another clairvoyance experiment, however, France and Hogan (1973) found no evidence of similar hit patterns between members of pairs of identical twins, pairs of fraternal twins, or pairs of ordinary siblings.

The best of the twin studies was a recent experiment by Charlesworth (1975). Pairs of identical and fraternal twins were tested in a free-response GESP experiment presented in the context of an imaginary dream (see Sec. 2.6.2e). Each twin was sender once and receiver once. The fraternal twins had significantly more hits than expected by chance and significantly more than obtained by the identical twins, although the twin types apparently differed also on extraversion, a possible confounding variable.

3.5.4a. Conclusion. There is no evidence that twins have any special aptitude for "telepathic" exchange. However, more research on the topic is needed, especially studies comparing twins and ordinary siblings.

3.5.5. ESP in Animals: The Carrot and the Stick

The suggestive evidence that children may have greater psychic ability than adults seems to indicate that advanced brain activity may be inhibitory to psi. If this is the case, infrahuman species might be expected to manifest considerable ESP. There have been numerous anecdotal reports of ESP in animals, the best documented being so-called psi-trailing cases, in which pets left behind by a family when they move eventually turn up at the family's new residence, often after traversing considerable distances (Rhine and Feather, 1962).

ESP experiments involving animals have been and will be discussed in other sections of the chapter where appropriate. The purpose of this section is to briefly review these "anpsi" experiments from the standpoint of the evidence they provide that animals do in fact have ESP abilities.

3.5.5a. Experiments with Cats. The first systematic attempt to demonstrate ESP in animals under experimental conditions was by Osis. In the first set of experiments, the experimenter attempted to exert a telepathic influence over which of two food cups kittens would approach first (Osis, 1952). In the second set, a clairvoyance procedure was adopted, the cats being required to choose which of two doorways at the end of an alley would lead to a food reward. Significant evidence of psi was obtained in both sets of experiments (Osis and Foster, 1953). Although controls against sensory cues were probably adequate, I would not go so far as to say they were ruled out. Furthermore, results of the first set of experiments could just as easily be attributable to the agent's PK as to ESP on the part of the kittens, a possibility that exists in any GESP experiment with human or animal percipients. I also am not convinced that experimenter knowledge of the target was ruled out in the second set, rendering telepathy or "agent" PK as possibilities there as well. ESP and PK are also alternate interpretations of an experiment by Morris (1974), who demonstrated that the activity level of a kitten was altered when his master "visited" him during out-of-body experiences. Unfortunately, results of later experiments when the cat was older were less consistent (Roll, Morris, Harary, Wells, and Hartwell, 1975).

3.5.5b. The Shock-Avoidance Paradigm. One of the more elegant approaches to testing psi in animals was the shock-avoidance paradigm of Duval and Montredon (1968a, b). A random number generator controlled the delivery of brief shocks to one or the other side of an electrified grid floor divided by a low barrier. The animal could avoid shock by precognizing on which side the shock would be delivered next and positioning himself on the opposite side. The procedure was completely automated and could be run in the experimenter's absence, thereby reducing, if not entirely eliminating, the possibility of experimenter PK confounding the interpretation of results.

Duval made the a priori decision to evaluate only what he called "random behavior trials" (RBTs), which he defined as trials during which the animal crossed the barrier once without the stimulus of a previous shock.* Cases where the animal simply stayed on the same side or crossed in response to shock were considered instances of stereotyped

*Duval's criterion for RBTs did not account for double jumps within a single trial, which some might consider to be instances of "random behavior."

behavior not likely to be psi-mediated. In each of two experiments involving four and ten mice, respectively, Duval demonstrated that the mice crossed the barrier to avoid shock significantly more often than they crossed into shock. Morris (1970) examined the target sequences used in these experiments and found them to be satisfactorily random. Such a test had not been reported by Duval.

An impressive series of apparent replications and extensions of Duval's work was invalidated when the experimenter, Walter J. Levy, was caught manipulating data by his associates (Rhine, 1974). A subsequent series of replication attempts at Rhine's laboratory only yielded spotty evidence of significance in nine experiments (Levin, 1975; Terry, 1976b), the average number of trials per experiment being roughly comparable to that reported by Duval.

Eysenck (1975) reported the results of two shock-avoidance series with rats, the series differing only in the intensity of the shock administered. In the low-shock (0.1 mA) series, the animals *approached* the shock to a degree significantly greater than chance; in the higher-shock (0.2 mA) series, only chance results were obtained. Eysenck tentatively interpreted his results as supporting the applicability of optimal level theories of arousal to psi research. Duval, unfortunately, did not report the level of shock he used, so Eysenck's results cannot be integrated with this previous work.

Finally, Extra (1972) reported no overall significant scoring in two shock-avoidance experiments with rats, but in each case he found significantly greater avoidance under GESP than under clairvoyance conditions.

3.5.5c. Positive-Reinforcement Paradigms. Duval's research also led to attempts to see whether ESP could be demonstrated in positive-reinforcement paradigms. Schouten (1972) trained ten mice in a brightness-discrimination task. The mice were to press a black or a white lever for water reward when a buzzer and light came on in a corresponding black or white portion of the chamber. For test trials, the light stimulus was removed to a corresponding cage in another room and only the buzzer remained as a (nondiscriminable) cue stimulus. Thus the animal had to use psi to determine which lever would yield reward.

The overall results revealed a marginally significant tendency for animals to receive reward more frequently than expected by chance. However, an extensive series of follow-up experiments yielded virtually no evidence of psi (Schouten, 1976b).

Nevertheless, other experimenters have reported significant results with positive reinforcement. In a precognition experiment otherwise similar to Schouten's, Terry and Harris (1975) trained five rats to make a

brightness discrimination in a Skinner box for water reward. The rats scored significantly above chance in the subsequent ESP test, but only on RBTs. (Schouten's significant results in 1972 also were attributable to such trials.) In another precognition experiment, this time with gerbils, Parker (1974) reported a significant excess of correct choices on all trials combined, but nonsignificant results were obtained in each of two independent replication attempts (Broughton and Millar, 1975).

3.5.5d. The "Russian Roulette" Paradigm. In a third approach to testing ESP in animals, which I call the Russian Roulette paradigm, the behavior of the animals at a particular time is noted. Subsequently, some of the animals are randomly selected to receive a noxious stimulus (usually resulting in death) while the other animals are spared. Differences in the preselection behavior of the two groups are interpreted as evidence for precognition.

The first exploratory experiments of this type were undertaken by Morris (1970), who found encouraging results with both rats and goldfish, the behavioral measures being the amount of free-field activity. As expected, the targeted rats were less active than controls (i.e., "freezing") and the targeted goldfish were more active than controls.

A series of systematic attempts to provide further evidence of ESP with this paradigm have been reported by James Craig. Craig and Treurniet (1974) found that rats scheduled to be killed immediately after the experiment were *more* active than rats to be killed at least three weeks later. However, the effect was significant on only one of three activity measures, and no significant effects were found in a later experiment (Treurniet and Craig, 1975). In a related series of experiments, the behavioral measure was which direction rats would turn at the end of a T-maze (Craig, 1973, 1975). For some of the rats, the decision as to whether death would be imminent or delayed was partly contingent on their choices, while for other rats it was not. In each of three experiments, there was no significant tendency for rats in the contingent condition to make choices that would postpone their deaths. There were significant post hoc effects in most of Craig's experiments, but these tended to be inconsistent across experiments.

3.5.5e. "Clever" Animals. Numerous accounts have appeared in the popular literature describing animals who seem to be able to perform mental feats beyond their presumed intellectual capacities, the most famous perhaps being the horse Clever Hans (Pfungst, 1911/1965). It sometimes is suggested that such abilities may have a psi component, although responses to intentional or unintentional cues by the trainer seems to be the preferred explanation in most cases (Rhine, 1951).

The only experiment where ESP in such an animal has been tested

under reasonably well-controlled conditions involved a dog named Chris, whose forte was answering mathematical questions by pawing an appropriate number of times on his master's arm. Chris was trained to make ESP responses in this way by means of a numerical code and then tested on several occasions with standard card-guessing procedures (Wood and Cadoret, 1958). Results were significantly positive and quite impressive when only the trainer and/or his friends or family were present during the test. Less impressive but still significant psi-missing occurred when Cadoret, a parapsychologist, was present as an observer.

3.5.5f. Conclusion. Although some significant evidence of ESP has been found in experiments with animals, the results are not noticeably superior to those obtained with humans. The possibility of experimenter or agent psi clouds the interpretation of several animal experiments. The positive-reinforcement paradigm seems to be slightly more promising than the shock-avoidance paradigm and substantially more promising than the Russian Roulette paradigm, trends that certainly should be greeted with joy by the world's rodent population. Research with "clever" animals is only likely to pay off if the animal can perform in the absence of its trainer and other persons who might give sensory cues. An excellent review of most of the "anpsi" research has been written by Robert Morris (1970).

3.6. Attitudes toward ESP: Faith Conquers All

3.6.1. Belief in ESP: Speaking of Animals . . .

Parapsychological jargon contains its share of colorful terms, but none are better known than Gertrude Schmeidler's labels of "sheep" and "goats," which she applied to believers and nonbelievers in ESP. This "sheep–goat effect" has become perhaps the most thoroughly studied relationship in the field of parapsychology. Interpretation of this deluge of data is not as simple and straightforward as one might expect, and to make sense of it we will need to introduce certain distinctions that are often overlooked by the experimenters themselves.

3.6.1a. Belief in ESP—in the Test Situation. In a detailed summary of her early research on the sheep–goat effect, Schmeidler reported the results of 18 separate card-guessing series (excluding 3 that were arbitrarily stopped when the results reached significance), 14 of which were conducted in a classroom setting (Schmeidler and McConnell, 1958). A total of 1,248 subjects were tested in these series. Subjects were asked whether they believed ESP to be possible *under the conditions of the experiment.* Those who totally rejected this possibility were labeled goats and all

others were labeled sheep, even those who were doubtful about it. When the results for both the individual and classroom series were separately pooled, a highly significant difference was found in each case, the sheep scoring significantly above chance and the goats scoring significantly below chance. However, the effect was an extremely weak one in terms of the magnitude of the deviations; the high significance levels were the result of the large sample sizes.

Because the sheep–goat hypothesis is so easy to test, belief questions have been included in a large number of forced-choice ESP experiments (although not, surprisingly, in free-response experiments). However, many experimenters have claimed to be testing this hypothesis using questions and/or classification criteria that differed substantially from Schmeidler's. In particular, investigators often overlook the fact that Schmeidler did *not* ask her subjects whether ESP exists but only whether it can occur in the test situation. Any experienced investigator knows that there are many people with strong beliefs in ESP who don't believe that it can be manufactured on demand in a laboratory, especially by means of "sterile" card tests.

Considering only those experiments where Schmeidler's procedure was replicated essentially, if not precisely, we find several significant confirmations of the sheep–goat hypothesis (Bevan, 1947b; Carpenter, 1971; Eisenbud, 1965; Palmer, 1973; Schmeidler, 1971; Wilson, 1964). Carpenter's and Eisenbud's effects reached significance only by a one-tailed test, and Eisenbud's belief question could be interpreted as referring to the subject's confidence in his own scoring ability rather than his belief in the utility of the procedure. Another significant confirmation was reported by Schmeidler (1962b), but only on the basis of a secondary post hoc analysis. Finally, the effect was confirmed in two experiments where classification was based on a multiple-item scale heavily loaded with items reflecting Schmeidler's criterion (Bhadra, 1966; Ryzl, 1968b).

On the other hand, a large number of studies have produced nonsignificant results with this type of breakdown (Adcock and Quartermain, 1959; Beloff and Bate, 1970; Friedman *et al.*, 1976; Honorton, 1972a; Kahn, 1952; Nash, 1965; Nash and Nash, 1967; Schmeidler, 1964e, 1968; Schmeidler and Craig, 1972; Schmeidler and Lewis, 1968, 1969; White and Angstadt, 1961; Wilson, 1964). Thus we see that only about a third of these replication attempts have been successful, and even this figure is probably too high if one takes into account publication biases. However, the important point is that all the significant sheep–goat differences have been in the predicted direction; none of the reversals has even approached significance. In fact, the overall pattern of results is strikingly similar to that of Schmeidler's original research, where significant effects (all in the

proper direction) were found in only 4 of the 18 separate series (Schmeidler and McConnell, 1958).

3.6.1b. Belief in ESP—in the Abstract. Questions asking subjects simply whether or not they believe in ESP have produced a pattern of results not too different from the pattern based on Schmeidler's question. In these experiments, the usual procedure is either to divide subjects into approximately equal groups or to use correlational methods of analysis; classification criteria are not as precisely defined as those suggested by Schmeidler. Believers scored significantly higher than nonbelievers in four of these experiments (Barrington, 1973; Eilbert and Schmeidler, 1950; Haraldsson, 1976; Moss and Gengerelli, 1968). In three other experiments, a question of this type contributed to a multiple-item scale that significantly discriminated these two groups in the expected direction (Bhadra, 1966; Palmer and Miller, 1972; Ryzl, 1968b). One significant reversal has been reported (Moss *et al.*, 1970), but this finding is not particularly meaningful because the goats were preselected on the basis of high ESP scores in previous testing. All other experiments have yielded essentially chance differences (Casper, 1951; Haraldsson, 1975; Harary, 1976; Kahn, 1952; Nash, 1958; Nash and Nash, 1967; Osis and Dean, 1964; Palmer, 1973; Palmer *et al.*, 1976; Rhine, 1968; Roll and Solfvin, 1976; Schmeidler and Lindemann, 1966; Smith and Canon, 1954; Woodruff and Dale, 1950). An indirect projective measure of belief in ESP has also yielded generally nonsignificant results so far as ESP deviation scores are concerned (Osis and Dean, 1964; Van de Castle, 1957; Van de Castle and White, 1955).

This pattern is not quite as strong as the previous one, but it does seem to be nonrandom. The question then becomes whether belief in ESP is an independent correlate of ESP scores, or whether its discriminating power depends upon its confounding with Schmeidler's criterion. Questions regarding belief in ESP in the abstract and belief in ESP in the test situation have been directly compared in only three experiments (Kahn, 1952; Nash and Nash, 1967; Palmer, 1973). Only Palmer's experiment yielded a significant attitude effect. In this case, the sheep–goat hypothesis was significantly confirmed using a slightly modified version of Schmeidler's classification, while the abstract belief question resulted in a nonsignificant reversal.

There also have been a number of experiments that I have seen only in abstract form where sheep–goat questions were included in the design and the results of the relevant analyses were either reported as nonsignificant (Banham, 1968; Crumbaugh, 1958; Gerstein and Merker, 1964; Jackson *et al.*, 1977; McGuire *et al.*, 1974; Peterson, 1972; Taetzsch, 1964, 1965) or not reported at all (Carpenter, 1973; Dean and Taetzsch,

1963; Nash, 1964; Rogers, 1967c). It would appear likely from the abstracts that most if not all of these authors defined the sheep–goat variable in terms of belief in ESP in the abstract.

At this point, the most reasonable conclusion would seem to be that abstract belief in ESP is not an independently valid predictor of ESP scores.

3.6.1c. Manipulating Belief. Some experimenters have sought not only to measure already existing belief in ESP but to manipulate such beliefs experimentally. Layton and Turnbull (1975) instructed an experimenter to tell one group of subjects that the existence of ESP had been scientifically verified and that he expected it to be demonstrated in this test, but to give a second group the opposite information. Although the manipulation was apparently effective in creating the appropriate beliefs, a straightforward confirmation of the sheep–goat hypothesis was not obtained in either of two experiments.

Taddonio (1975), on the other hand, obtained significant confirmations of the hypothesis in each of two experiments of similar design to Layton's, the effect in each case being strongest among subjects who were undecided about their own ability to score well on ESP tests before the session began. Perhaps Taddonio's experiments were more successful than Layton's because her belief manipulation stressed the adequacy of the test for measuring ESP, whereas Layton stressed the existence of ESP per se.

Two other experimenters also attempted to manipulate subjects' beliefs by identifying themselves with attitudes either favorable or unfavorable to the ESP hypothesis (Alkokar, 1968; Waldron, 1959). Both experiments yielded significant results, but they were more complex than those of Taddonio.

3.6.1d. Variance Effects. Several experimenters have examined belief in ESP in relation to ESP variance measures. Although Schmeidler and McConnell found no significant difference between the scores of sheep and goats with respect to run-score variance (Schmeidler and McConnell, 1958), three other investigators reported results that generally indicated higher run-score variance among goats and conflicted subjects than among sheep (Nash and Nash, 1958; Osis and Dean, 1964; Van de Castle, 1957).

Van de Castle and Osis in their experiments also examined the variance of subjects' total scores, where the finding was that such variance was greater among extreme sheep and conflicted subjects than among goats and less enthusiastic sheep. Buzby (1967b) found significantly higher between-subjects variance among sheep who were "vitally" interested in ESP than among sheep whose interest was only "casual." The

effect was significant in two independent series, but it only appeared in precognition (in contrast to clairvoyance) runs, and the effect could not be replicated by Nash and Nash (1968). Finally, Jones and Feather (1969) found consistently higher between-subjects variance among persons who reported a variety of psychic experiences than among less "psychic" individuals. It is usually safe to assume that persons who have had a variety of psychic experiences believe strongly in ESP, although Jones reported no data on this point.

In a tentative attempt to integrate the results of the variance studies, Palmer (1972) suggested that extreme sheep, and perhaps others who are strongly involved emotionally with the issue of ESP, produce the strongest and most reliable scores on ESP tests, but that some of these subjects score above chance and others below. This inference was based primarily on trends that indicate high between-subjects variance and low run-score variance among extreme sheep.

This factor conceivably could explain a tendency noted in some sheep–goat data for the highest scoring subjects to be those who think a positive outcome in the experiment to be possible but not likely (Friedman *et al.*, 1976; Palmer and Miller, 1972; Schmeidler, 1968; Schmeidler and McConnell, 1958). In other words, there is a tendency for the mean of the more extreme sheep to regress back to chance, a tendency that might be attributable to a cancellation of high- and low-scoring subjects. An alternative interpretation of this regression is suggested by an experiment of Stanford (1964b), who found that scores of extreme sheep declined within the run, while scores of other subjects inclined. Stanford only gave his subjects one run, but if the decline of his extreme sheep is the kind of thing that can continue beyond one run, it could lead to mean differences between extreme and moderate sheep in multirun experiments. However, it should be emphasized that evidence for lower mean scores among extreme than moderate sheep is only suggestive, and there is at least one significant exception (McBain *et al.*, 1970).

3.6.1e. Interaction Effects. Because of the fragility of the sheep–goat effect, it is fortunate that several investigators have looked for interactions between belief in ESP and other variables as predictors of ESP scores. The other predictor that has recieved the most attention so far is sex differences. In secondary analyses of her original series of sheep–goat experiments, Schmeidler (1960) found a significant interaction indicating that the sheep–goat effect was strongest for females. Layton and Turnbull (1975) found a similar interaction favoring females in the first of two experiments in which belief was experimentally manipulated, but the effect did not reappear in the replication attempt. These results prompted me to look for this interaction in data I had recently reported (Palmer *et*

al., 1976). I also found a significant interaction ($F = 4.77, df = 1/1708, p < .05$), but this time the predicted effect occurred only for males.

Another set of secondary analyses caused Schmeidler to conclude that the sheep–goat effect in her original studies did not appear for subjects who showed signs of maladjustment on the Rorschach (Schmeidler, 1960). Carpenter (1971) found a complex interaction between belief in ESP, a measure of sex guilt, and whether ESP targets were accompanied by erotic photographs (see Sec. 5.1.2). In an experiment devoid of goats, Nielsen (1970) reported that sheep scored significantly above chance and significantly higher than "open-minded" subjects, but only in sessions where they rated their moods as either extremely positive or extremely negative. Finally, Palmer and Miller (1972) found a significant interaction indicating that the sheep–goat effect was eliminated when a monetary reward was offered for the highest score.

3.6.1f. Conclusion. Research described by Schmeidler and McConnell (1958) provides strong evidence that subjects who believe ESP to be possible under the conditions of the experiment score more positively on card-guessing tests than subjects who do not. Although most smaller-scale replication attempts have failed to produce significant confirmations of this finding, the fact that all the significant effects have been in the predicted direction reinforces Schmeidler's conclusion. Still further support comes from experiments in which the sheep–goat question was phrased in terms of belief in ESP in the abstract, although the results suggest that Schmeidler's classification scheme is the most effective. Attempts to influence ESP scoring by manipulating belief in ESP have produced mixed results.

The results of variance studies suggest, among other things, that strong or emotionally involved believers in ESP have a tendency to score reliably above or below chance on ESP tests, possibly contributing to a suggestive tendency for extreme sheep to average closer to chance on ESP card tests than moderate sheep. Evidence of within-run decline effects among extreme sheep suggests an alternate explanation of this apparent regression.

Belief in ESP has shown a tendency to interact with other variables such as sex, mood, and emotional adjustment as predictors of ESP scoring. However, the direction of such interactions may depend on situational factors not now understood.

3.6.2. Questions Related to Belief: Wolves in Sheep's Clothing

Sheep–goat experiments frequently include questions that are related to belief in ESP, but deal with other aspects of subjects' cognitions about this topic.

3.6.2a. Psychic Experiences. One such question concerns whether the subject has ever had a psychic experience or belives that he is "psychic." In only two cases have subjects admitting such experiences or talent scored significantly higher than other subjects (Alkokar and Deshpande, 1966; Moss and Gengerelli, 1968), the latter being a free-response experiment. Such a question was included in the successful composite scales of Bhadra (1966) and Palmer and Miller (1972), but in the latter, at least, its contribution to the scale's success was considerably less than the contribution of the abstract belief question. Beloff and Bate (1970) found that subjects who believed they had psychic ability scored differently from other subjects to a significant degree across seven samples, but the direction of the effect differed from sample to sample. Also, Jones and Feather (1969) found significantly higher between-subject variance among subjects who reported a relatively wide range of psychic experiences. Otherwise, this question has failed to yield significant discriminations (Casper, 1951; Gelade and Harvie, 1975; Harary, 1976; Moss, 1969; Osis and Dean, 1964; Palmer, 1973; Roll and Solfvin, 1976; Schmeidler, 1964e, 1968, 1971; Schmeidler and Lindemann, 1966; Woodruff and Dale, 1950).

3.6.2b. Confidence of Success. Sheep–goat experiments often include a question asking how well the subjects themselves think they will score or have just scored on the ESP test. The only experiment I can find in the literature where such predictions proved to be accurate involved Argentine grade school children (Musso, 1965), although Eisenbud's (1965) experiment may also qualify if the belief question is interpreted as a confidence question. Nash (1958) found a significant *negative* relationship between predictions of success and actual ESP scores. A confidence item was included in two of the successful composite scales (Bhadra, 1966; Palmer and Miller, 1972), but its contribution to the success of the latter experiment, at least, was negligible. Schmeidler (1971) found that subjects who predicted above-chance scores revealed a significantly different relationship between a composite mood scale and ESP run-score variance than did subjects who did not predict above-chance scores.

Confidence items have failed to yield significant discriminations in numerous other forced-choice experiments (Eilbert and Schmeidler, 1950; Friedman *et al.*, 1976; Kahn, 1952; Michie and West, 1957; Osis and Dean, 1964; Palmer, 1973; Ryzl, 1968a; Schmeidler, 1964e, 1971; Schmeidler and Craig, 1972; Woodruff and Dale, 1950). Schmeidler (1964e) found that her subjects could make significantly accurate predictions on a run-by-run basis, but subjects tested by Nash (1960a) were not so successful. Expectancy of success has also been a poor predictor in free-response experiments (Braud and Braud, 1974; Braud *et al.*, 1975; Parker *et al.*, 1977; Stanford and Mayer, 1974), although complex curvilinear effects

were found in two experiments where subjects were given the mental set to have out-of-body experiences during the session (Palmer and Lieberman, 1975; Palmer and Vassar, 1974).

To keep things in perspective, it should be pointed out that simple questions asking a person how well he expects to perform on a test, because they get into the area of personal competence, are very susceptible to response biases. Genuine confidence, a rather rare commodity in ESP tests, may yet prove to be helpful. In fact, the creation of such confidence is one explanation of why hypnosis seems to facilitate ESP (see Sec. 2.6.1a).

3.6.2c. Attitude toward ESP. Finally, several experiments have included questions addressing subjects' "attitudes" toward ESP as distinct from their "beliefs" about its existence (see Fishbein and Raven, 1967). In other words, these questions refer to whether the subject would *like* for ESP to exist. The results can be succinctly summarized by saying that no significant or consistent relationship between attitudes toward ESP and ESP scores has been uncovered (Kahn, 1952; Layton and Turnbull, 1975; Ryzl, 1968a; Schmeidler and Lindemann, 1966).

3.6.2d. Conclusion. Neither previous psychic experiences nor predictions of ESP scores nor attitude toward ESP have been shown to correlate with ESP test performance in a straightforward manner, although any or all of them may interact with other variables in this capacity.

For a detailed review of the sheep–goat literature and studies on related questions, see Palmer (1971, 1972).

3.7. Spontaneous Transient States: Good Days and Bad Days

3.7.1. Mood and Emotional Variables: The Effect of Affect

Personality traits and attitudes are less likely to influence ESP performance directly than through the mediation of dispositions that are present at the time of the test itself. Spielberger (1966) has operationalized this notion with his "state–trait" theory of anxiety. If this reasoning is valid, one might expect measures of a subject's mood, anxiety, or other emotional states to be associated with ESP scores, perhaps to an even greater degree than underlying trait measures.

Two classes of ESP experiments are relevant to this issue. The first group of studies deal with what might be called the subject's mood, i.e., how good or bad he or she feels, or how much he or she feels like taking the test. The second group of studies have sought to define these affective

states more precisely, dealing with predictor variables such as state anxiety, surgency, and social affection.

3.7.1a. General Mood. One of the first mood studies was a correspondence experiment conducted in England by Fisk and West (1956). Fisk displayed three clock-card targets in his home each day, which subjects were asked to identify from their homes. There were 162 subjects who completed at least the minimum of 96 trials, and most of these filled out a simple scale rating their moods at each session on a continuum from "elation" to "depression." Sessions where subjects' moods were classified as "pleasureable" were associated with significantly positive scoring, while the outcomes with other moods depended upon how the results were analyzed.

The bulk of subsequent mood studies have been conducted by three investigators: Winnifred Nielsen, David Rogers, and James Carpenter. The most elaborate approach has been that of Nielsen, who has attempted to explore the interaction between mood and personality variables. In her first experiment (Nielsen, 1956b), eight subjects completed 20 sessions, each of which included five precognition runs and a three-part mood scale measuring physical, mental, and emotional vitality. Because a precognition procedure was used, subjects could complete the sessions at home anytime they wished. The results indicated that significant above-chance scoring was restricted to subjects who rated their moods consistently across all three subscales within the session, regardless of whether the mood was pleasant or unpleasant. Nielsen interpreted this as a relationship between ESP scores and extremeness of mood. In a follow-up experiment (Nielsen, 1970), the same effect was found using the same mood scale scored in a way that more directly measured extremeness rather than consistency of mood. However, the effect reversed for a small subsample who were not believers in ESP.

Secondary analyses of these two experiments, plus a third experiment briefly discussed by Nielsen (1970), revealed another interaction. This one indicated the relationship between ESP scores and extremity of mood consistently appeared only for subjects classified as introverted on the Bernreuter Personality Inventory. Nielsen explored this interaction further in a series of 12 experiments with high school and college students tested in a classroom setting (Nielsen, 1972a, 1972b). The Eysenck Personality Inventory was substituted for the Bernreuter, and subjects' responses were scored against both their own individual target orders and a single target order for the whole group. Unfortunately, the reports of this research are quite sketchy. In general, though, the results seem to confirm the previously reported interaction between introversion and extremity of mood for individual targets. In one experiment, however, it was the rela-

tively neurotic (rather than introverted) subjects on the EPI who showed the mood effect (Nielsen, 1972b), and a complex interaction generally consistent with this latter finding also was reported by Freeman (1972a).

Since the Bernreuter "introversion" scale is as much a measure of neuroticism as of introversion, perhaps the best way to summarize Nielsen's overall results is to say that anxious, introverted subjects tended to obtain positive ESP scores when they were in extremely pleasant or extremely unpleasant moods, in marked contrast to their usual tendency to obtain negative scores (see Sec. 3.2.2).

Both Rogers and Carpenter found that mood was related to the variability of ESP run scores (regardless of direction) around MCE. Effects involving the more common ESP deviation scores were either not significant or not reported.

The simpler of these two paradigms was that of Rogers (1967b), whose subjects were asked to complete standard precognition runs at times when they were either in a good mood (and really wanted to take the test) or in a bad mood. This stipulation probably led to more variability on the mood dimension than occurred in Nielsen's experiments. Both in this experiment and in an earlier experiment where Rogers tested himself (Rogers, 1966), there was significantly below-chance variance (i.e., run scores consistently close to five) in the negative mood state, and nonsignificant above-chance variance in the positive mood state. In each experiment, the variances in the two conditions differed significantly.

Carpenter had his subjects complete precognition runs (four or five per session) at their leisure. His subjects also filled out at each session a mood scale consisting of items selected from Nowlis's mood adjective checklist. In each of three experiments, an interaction was found between pleasantness and extremity of mood in relation to ESP run-score variance (Carpenter, 1968, 1969). Variance was consistently higher in moderately pleasant than in moderately unpleasant moods (this subeffect was independently significant in two of the three experiments), but in sessions where moods were rated as extreme, unpleasant moods were associated with the higher variance.

Carpenter (1973) briefly reported on five subsequent experiments of similar design, using a truncated mood scale that consisted only of items that were significant predictors of ESP scores in his previous experiments. In two of the five experiments, this new scale significantly replicated the effect found previously, and there were clear trends in the predicted direction in two others. Two experiments revealed interactions between this effect and attitude or personality variables, suggesting that a systematic multivariate approach might result in greater predictability.

Carpenter's results are similar to those obtained by Rogers, but only

if one assumes that Rogers' subjects were in "moderate" moods when they completed their ESP runs. As mentioned before, the instructions Rogers gave his subjects would seem to encourage them to do their runs when they were in "extreme" moods. Also, the effect with Rogers's subjects was contributed primarily by low variance in negative moods. On the other hand, the effect in Carpenter's moderate-mood sessions consisted predominantly of high variance in positive moods (at least in the earlier experiments, where mean scores were reported).

Mood questions have occasionally been included as secondary variables in other experiments. In forced-choice experiments, simple mood questions have failed to correlate significantly with ESP deviation scores (Banham, 1974; Mussig and Dean, 1967; Nash, 1958; Palmer *et al.*, 1976; Pleshette, 1975; Woodruff and Dale, 1950), but the more substantive research discussed above suggests that such simple effects should not be expected.

Simple relationships between mood and ESP scores also have not been found in free-response experiments (Braud and Braud, 1974; Braud *et al.*, 1975; Palmer and Vassar, 1974; Parker *et al.*, 1977; Stanford and Mayer, 1974). Stanford and Mayer found the best scoring among subjects who were not in the mood to take the test but in a good mood generally. However, such an effect has not been reported (or looked for) in other free-response experiments.

3.7.1b. Discrete Affective States. Schmeidler's approach to the mood–ESP question has been to examine ESP scores in relation to subjects' self-ratings of more precisely defined affective states, based on Nowlis's adjective checklist. In her first series of three experiments (Schmeidler, 1971), a complex but consistent relationship was found between ESP run-score variance and a composite mood index including the sum of "concentration," "surgency," and social affection in one of the two groups tested. Generally speaking, this index correlated negatively with the variance scores for subjects who predicted high scores for themselves on the ESP test; among the remaining subjects, the correlation was positive. The correlations from the two subgroups differed significantly in each of the two experiments where the scoring predictions were requested, the results of the first experiment providing the hypothesis for the second. These latter two experiments involved group testing of the same high school students.

This pattern of results did not appear to a significant degree in any of three subsequent group experiments representing highly divergent subject populations (Schmeidler and Craig, 1972). A somewhat similar pattern appeared for the only group that was composed of students, but only in the first of two sessions. Having anticipated that the affect–ESP relation-

ship would differ for different groups, Schmeidler's strategy again was to use each group's results in a first session to predict that group's results in a second session. This strategy was successful for only one of the three groups. In this group, which consisted of young businessmen, a positive correlation between ESP deviation scores and a mood index of egotism minus the sum of aggression and anxiety was independently significant in both sessions.

In a more recent experiment, Hudesman and Schmeidler (1976) gave a clock-card ESP test and the Nowlis checklist to a psychotherapy patient at the beginning and end of a series of therapy sessions. The results indicated that high ESP scores were associated with hostility and low scores with depression. Given the obsessive-compulsive nature of the patient's neurosis, these findings suggest that ESP scores were highest when the patient's defenses were being successfully mobilized. The authors speculate that ESP tests may have value as a projective technique in psychotherapy.

Whereas Schmeidler depended upon "eyeball" detection of patterns within a matrix of bivariate correlations, other investigators have employed multivariate statistical techniques to study the relationship between ESP scores and discrete affective states (Friedman *et al.*, 1976; McGuire *et al.*, 1974; Osis and Bokert, 1971; Osis and Turner, 1968; Osis *et al.*, 1971). While all of these reports claimed to have demonstrated some kind of significant relationship between ESP and affect, the effects were predominantly post hoc and directional trends were consistently inconsistent (to coin a phrase) across samples.

A handful of experiments have focused more exclusively on what might be called "state anxiety." In two of three experiments with Indian college students, Sailaja and Rao (1973) found that subjects rated as "nervous" during a job interview scored significantly higher than subjects rated as "confident." In both cases, I computed t tests that indicated that the nervous subjects scored significantly above chance. The ESP test had been presented to subjects as one criterion for employment. This finding is puzzling in the context of studies with trait measures that suggest that low-anxious subjects score best on ESP tests. In fact, results with the Taylor Manifest Anxiety Scale indicated slightly better performance among Sailaja's less anxious subjects, contrary to the "nervousness" ratings. The authors suggest that nervousness may reflect strong motivation to get the job, rather than anxiety. Finally, Ballard (1977) reported a post hoc effect indicating that subjects who showed the greatest decrease in "state anxiety" (as measured by Spielberger's scale) following a pretest relaxation exercise scored significantly higher on ESP targets clandestinely matched with erotic photographs than did other subjects. Other

findings discussed in section 2.6 on altered states are also relevant, especially those that demonstrated a relationship between ESP scores and subjective reactions to induction techniques.

3.7.1c. Conclusion. No simple statement that has any generality can be made regarding the relationship between ESP and affective states, except for the highly nonspecific comment that the magnitude of the affect seems to be at least as important as its hedonic tone. The pattern among simple "mood" studies seems to be for one experimenter to consistently obtain a certain complex effect that differs from the consistent complex effect obtained by another experimenter using superficially similar procedures. There is some similarity, however, in the patterns of results obtained by Rogers and Carpenter. Results from studies attempting to look at more discrete affective states can only be described as chaotic. Nevertheless, it is evident that mood variables can influence ESP scoring, but they do so by interacting with other variables in complex ways that we are only beginning to understand. Such interactions may well provide the key for unlocking the mystery of how to make ESP more reliable. From a more cynical point of view, these complex results suggest that experimenters make an effort to either control affective states (if this is possible) or at least measure them, if for no other reason than to partial out their confounding effects on more tractable relationships.

3.7.2. Graphic Expansiveness: State or Trait?

A projective personality test that I did not include in the section on personality traits involves ratings of the graphic expansiveness of freehand drawings. Because of evidence that such drawing tendencies often change from session to session and can be influenced by the test situation (see Humphrey, 1946b; West, 1950), I have included this discussion in the section on transient states. Although the transient state reflected by these drawings has never been specified, one might speculate that "expansive" drawings (i.e., those made in a free-and-easy style using a large amount of the sheet) reflect a more positive and uninhibited mood or response set than do "compressive" drawings.

Graphic expansiveness has been incorporated in a number of ESP drawing experiments by having the ESP responses themselves rated on this dimension. Generally speaking, results have revealed a tendency for expansive drawings to yield higher ESP scores than compressive drawings in clairvoyance tests, but a reversal of this trend in GESP tests (Bevan, 1947a, b; Humphrey, 1946a, b; Stuart *et al.*, 1947). A minority of studies have shown nonsignificant reversals of this pattern, however (Nash and Richards, 1947; West, 1950). Graphic expansiveness has also

been used as a predictor of performance in card-guessing tests conducted at the same session. These experiments have yielded the same pattern as the drawing experiments, although not quite as strongly (Bevan, 1947a; Casper 1951; Kahn, 1952; Kanthamani and Rao, 1973b; McMahan, 1946; Smith and Humphrey, 1946; Stuart *et al.*, 1947; West, 1950). For both types of ESP tests, the results suggest that graphic expansiveness affects the direction of scoring rather than the absolute magnitude of the deviation from chance. A more detailed analysis of the above trends is presented elsewhere (Palmer, 1977).

Further evidence that a "compressive" attitude may facilitate hitting in GESP tests comes from a classroom experiment that provided data for some of Humphrey's analyses referred to in the previous paragraph (Stuart, 1945). Stuart manipulated mental set directly by having subjects make half of their drawings in an "unrestricted" manner (either "automatically" or by means of "free association") and the other half in a "limited" manner (by concentrating on either the agent or an object). Significant psi-missing occurred with the "unrestricted" set, while the "limited" set produced nonsignificant psi-hitting. The difference was significant. However, this effect could not be repeated in a follow-up experiment also considered by Humphrey, possibly because subjects were given less time to make their drawings (Stuart, 1947). There is indirect evidence that psi-hitting was transformed into +1 displacement among subjects who felt "rushed" in this latter experiment (see Sec. 2.3.1). Unfortunately, in neither experiment is it reported whether the induced sets influenced the actual expansiveness of the drawings.

3.7.2a. Conclusion. Although systematic within-experiment or within-session comparisons are generally lacking, there is a quite consistent tendency for expansiveness of freehand drawings to be associated with relatively positive ESP scoring in clairvoyance experiments and relatively negative scoring in GESP experiments. The reason for the interaction is unclear, although Humphrey (1946b) has speculated that "compressiveness" in the GESP situation may indicate social responsiveness to the agent that might be helpful in this type of test.

Despite the deficiencies of expansiveness ratings as a trait measure, they do possess some construct validity as a measure of emotional adjustment (Elkisch, 1945; Humphrey, 1946a). Interpreted as such, they support my previously stated conclusion of a positive relationship between ESP scores and trait measures of emotional adjustment only with respect to clairvoyance tests. Since most of the experiments supporting this relationship that I discussed in the section on personality traits (Sec. 3.2) also used clairvoyance (precognition) procedures, the findings on graphic expansiveness raise the possibility that the relationship should

not be generalized to GESP tests. More research will be needed to shed light on this matter.

4. Toward More Reliable ESP

A major concern of most thoughtful parapsychologists is how to make ESP more reliable. I have really been addressing this question indirectly all along. Experimenters customarily choose the procedures they will adopt and the kinds of subjects they will test with precisely this goal in mind. Any knowledge they gain about the effects of manipulations and individual differences on ESP scores contributes to our understanding of how to make ESP more reliable.

I have set aside for special consideration in this section two topics whose relevance to this issue is somewhat more direct than that of topics discussed so far. The first has to do with attempts to segregate particular responses or sets of responses that are likely to be ESP hits. The second has to do with attempts to actually increase the incidence of these "psi-prone" trials by means of training.

4.1. Psi-Prone Trials: Separating the Wheat from the Chaff

When a subject makes a series of responses on a forced-choice ESP test, it is quite possible that some responses will be more likely to be influenced by ESP than other responses. If these psi-prone trials could be identified independently of the actual scores, the information yield of ESP data could be increased, perhaps substantially. In this section, I will examine three approaches parapsychologists have utilized in their efforts to define psi-prone trials.

4.1.1. Position Effects: The Salience of U

This first approach attempts to designate psi-prone trials in terms of their position in the run. Its use has been restricted almost exclusively to standard card tests using the five ESP symbols. In his first monograph, Rhine (1934/1973) reported that when DT procedures were used, most of his star subjects produced *U* curves, defined as the highest scoring on the first and last five-trial segments of the run. However, one subject produced an inverted *U* function, indicative of better scoring in the middle of the run. When procedures such as BT were used that required the subject to make his calls more slowly and deliberately, a decline effect (i.e.,

above-chance scoring declining to chance as the run proceeded) was the most common tendency.

4.1.1a. The "DT Curve." Rhine attributed this *U* curve (or DT curve, as it was often called) to a kind of "salience" of the end points of the run, which was only apparent when the structure of the run as a unit of 25 trials was clear to the subject. He argued that such structure was more evident with the DT procedure than with other procedures, hence the preponderance of *U* curves with this method. He suggested that ESP was concentrated at the beginning and end of DT runs because it is at these stages that spontaneity would be at a maximum and mechanical guessing patterns least operative (Rhine, 1969a).

A large-scale experiment in which 30 adult and child subjects completed a total of 1,114 DT runs reinforced Rhine's earlier observation (Rhine, 1941b). Overall scoring was significantly below chance, and a plot of the deviation scores on the five segments of the run, pooled over subjects, revealed an inverted *U* function, i.e., the most extreme psi-missing in the first and last segments. Furthermore, a similar curve was apparent within the segments, i.e., the most extreme scoring on the first and fifth trials of the segments. These two functions (i.e., within the run and within the segments) were shown to be significantly similar by a special correlation technique called the "covariation of the salience ratios."

Some internal effects in these data fit in nicely with Rhine's reasoning. Among the adult subjects, *U* curves were most prevalent in those conditions where subjects wrote their responses on paper instead of calling them out, and also when brief interruptions were introduced following each segment of the run. In other words, salience was most prevalent under those conditions in which the structure of the run was most evident and among those subjects who would most likely be sensitive to such structuring.

In three additional series of approximately 1,000 runs each using precognitive DT (PDT) procedures, the *U* curve for the segments of the run and the significant covariation of salience ratios were confirmed (Humphrey and Rhine, 1942; Rhine, 1942). However, in these experiments the overall results were close to chance, so the deviation scores did not differ more from chance in the middle segments than in the outer segments. The *U* curve was much clearer within the run than within the segments.

Searching for position effects within segments has not been in vogue since the 1940s. Rhine himself argued that segment salience is not likely to be observed unless the run segments are clearly demarcated (Rhine, 1941b), which often is not the case even in DT experiments. The covaria-

tion ratio thus fell into disuse as well. Before it died, however, significant ratios were reported in a group experiment (Humphrey and Rhine, 1944) and the first of several experiments with the "gifted" subject Marchesi (Rhine and Humphrey, 1942). The ratio was not significant in subsequent research with this subject (McMahan and Rhine, 1947; McMahan and Bates, 1954).

However, simple *U* curves within the run have frequently been reported in experiments using DT or similar procedures with both selected subjects (Gibson, 1937; Osis, 1955; Pegram, 1937; Rhine and Humphrey, 1942; Rogers, 1967a) and unselected groups of subjects (Anderson and Gregory, 1959; Dean, 1972; Joesting and Joesting, 1970; Martin and Stribic, 1940; Pratt, 1961; Schmeidler, 1944; Sharp and Clark, 1937; Taetzsch, 1964). In a somewhat related experiment where the targets were numbers of various lengths, Nash and Durkin (1959) found that the most hits occurred on the first and last digits. The salience was reported as statistically significant only in the experiments of Dean, Nash, Osis, Pratt, and Schmeidler (as reported by Humphrey and Rhine, 1944).

This level of repeatability is not as impressive as it might appear on the surface. While most of the curves were *U*-shaped (more or less), some investigators reported inverted *U*s (Anderson and Gregory, 1959; Rogers, 1967a). Of more concern is the fact that the most significant scoring sometimes occurred in the middle segments (Anderson and Gregory, 1959; Martin and Stribic, 1940; Osis, 1956).

Finally, *U* curves of any type are far from universal in DT-type experiments. The star subject of Martin and Stribic (1938a,b) showed significant decline effects within the run when tested with DT or UT procedures, as did a subject tested by Anderson (1959a) using a precognition procedure. Another high-scoring subject, Harribance, revealed both highly significant decline (Stump *et al.*, 1970) and incline (Roll and Klein, 1972) effects in runs consisting of 10 or 12 trials, but no clear pattern in a series of 25-trial runs (Child and Kelly, 1973). One parapsychologist who tested himself with a DT procedure found a significant decline effect (Cadoret, 1952), while another found a decline in variance, i.e., regression to chance from either above- or below-chance scoring early in the run (Carpenter, 1966; Carpenter and Carpenter, 1967). *U* curves also have failed to show up in other experiments with selected subjects (McMahan and Rhine, 1947; McMahan and Bates, 1954; Osis, 1956; Steilberg, 1971).

Disconfirming instances are harder to document in experiments with groups of subjects, although many undoubtedly exist that have not been reported or were reported inadequately. One disconfirming experiment yielded a rather clear-cut decline effect (Humphrey and Pratt, 1941), while the results from two others could best be summarized as incline effects

(MacFarland, 1938; Schmeidler, 1964b), the latter a regression to chance from psi-missing. None of these effects were reported as significant.

Although one might argue that *U* curves are more likely than some other kind of function to occur in group DT experiments, the precise nature of this effect is far from clear. As usual, the problem is the penchant of parapsychologists to pool results over subjects. While the overall *U* curves reported in these experiments might be composed of *U* curves contributed by the individual subjects, they just as easily could be composed of individual incline and decline effects. Indeed, this latter interpretation seems somewhat easier to reconcile with the curves of individual subjects described above.

Both Martin and Stribic (1940) and Rhine (1941b) noted tendencies in their data for *U* curves to be most prevalent among those subjects and conditions that yielded the least significant overall scoring. This also may help explain the relative lack of *U* curves among selected individuals, many of whom are "selected" because they generally achieve very high scores.

Testing procedures such as GESP and BT that involve longer trial durations have provided *U* curves (Humphrey, 1943; Mitchell, 1971; Rose, 1955; Rose and Rose, 1951), decline effects (Estabrooks, 1927/1961; Humphrey, 1943; Humphrey and Pratt, 1941), and incline effects (Keil, 1965; Steilberg, 1971). Only the effects of Rose (1955) and Estabrooks were reported as significant. There is not much of a pattern here, except that, contrary to what was found with DT procedures, all of the experiments that yielded *U* curves, with the exception of Humphrey (1943), involved testing of "gifted" subjects. The only one of the other experiments falling into this category was that of Steilberg.

4.1.1b. Individual Differences. Given the inconsistency of position effects, surprisingly little research has been done examining individual differences in this area. Stanford (1964b) found evidence of a decline effect among above-chance-scoring subjects who had a strong belief in ESP and an incline effect among disbelievers and subjects whose belief was more equivocal. In another sheep–goat experiment where both hitters and missers were included in the analysis, Schmeidler (1944) reported that her overall *U* curve (which may have involved a combination of inclines and declines) was attributable to the extreme goats. Carpenter found that his decline of variance effect did not hold up when he adopted special expansive or compressive response sets (Carpenter and Carpenter, 1967).

4.1.1c. The Cancellation Effect. Position effects have been used to explain another unusual effect in parapsychology: cases where run-score variance around mean chance expectation is significantly below chance.

(An extreme example of this would be a series of consecutive scores of five.) It was suggested that such low variance would result if positive scoring in one part of the run were to be "cancelled" by negative scoring in the other part. Stanford (1966b), in fact, found in each of two experiments significant position effects (i.e., differences between the first 10 and last 15 trials) in runs from a condition with significantly low run-score variance which he failed to find in runs from a condition completed by the same subjects at the same session where variance was significantly high. Suggestive position effects in low-variance runs also were found by Rogers (1967a). Variance analyses were not introduced into the parapsychologist's repertoire until the mid-1960s, so unless some raw data can be reanalyzed we will not know whether low run-score variance characterized earlier experiments where significant position effects were found.

4.1.1d. Conclusion. There is some evidence, predominantly from the early Duke period, indicating that ESP hitting and missing tends to be concentrated in the first and last segments of the run, provided that DT or other techniques with short trial durations are used which encourage the subject to perceive the run as a unit. However, it is clear that many individual subjects do not conform to this pattern, and the *U* curves often reported in group studies may in fact represent the pooling of individual incline and decline effects. Slower procedures such as BT and GESP have produced no consistent position effects in group experiments, although some relatively recent experiments with selected subjects have revealed *U* curves. Although position effects seem to be influenced by individual and situational differences, very little systematic research has been undertaken to elucidate such differences. A theory that position effects may be the cause of significantly low run-score variance around mean chance expectation has received some support from preliminary research.

Although position effects may be real, they are too inconsistent to have much value as a basis for defining psi-prone responses, even in the limited contexts where they are applicable. If the card-guessing paradigm continues to wane in parapsychology, interest in position effects as such will probably continue to decline. For a review of the literature on position effects see Rhine (1969a).

4.1.2. Response Bias: Turning a Liability into an Asset

Although the promise held out by early research on position effects has not been realized in later work, a second approach to detecting what might be called psi-prone trials has been more successful. Earlier in the chapter, evidence was presented which suggested that elimination of sys-

tematic calling biases in forced-choice tests might improve scoring levels, provided that responding indeed became more spontaneous. However, eliminating such biases is easier said than done. Some relatively recent research suggests that response biases may actually have some positive value by providing a frame of reference against which more spontaneous responses can be more readily detected. This section will be devoted to an examination of such research.

4.1.2a. Response Bias in High-Scoring Subjects. In reanalyzing five extensive card-guessing series completed by Gloria Stewart (one of the two "outstanding" subjects of S. G. Soal), Pratt (1967b) found highly nonrandom patterns with respect to pairs of calls. In the first four series, this nonrandomness was reflected primarily in Stewart's tendency to undercall "doubles" (i.e., pairs of the same symbol), and Pratt found a significant excess of hits on the second trials of these undercalled doubles. In other words, when Stewart violated her normal bias against calling doubles, her rate of hitting was significantly higher on the doubled responses than on other trials. Perhaps when the ESP "message" was strong enough to cause her to break her normal calling pattern, it also was strong enough to cause her to choose the correct target.

Because of the questions raised about Soal's integrity, the above results must be evaluated cautiously, even though Soal had never to my knowledge predicted this effect and it was not discovered until about 20 years after the data had been collected.

Regardless of its validity, Pratt's finding has had considerable heuristic value. Stanford (1967) noted that in two card-guessing series completed by a high-scoring subject (Martin and Stribic, 1938a,b), there was a significant tendency for the subject to obtain the largest percentage of hits on the symbols he called least frequently. Ryzl and Pratt (1963) found that their star subject, Pavel Stepanek, revealed a comparable scoring tendency in a two-choice task, as did Harribance using standard ESP cards (Morris, 1972). In neither case, however, is it clear whether this was a general characteristic of the subject's performance over his career.

Neither Martin nor Ryzl reported the data in a way that would allow the response bias hypothesis to be tested for pairs of calls, as was the case with Stewart. Morris reported that Harribance had a bias in *favor* of calling doubles, but it is unlikely one could argue that avoiding doubles constituted a genuine response bias in this case. In any event, scoring rates on doubles and nondoubles were not significantly different in this research.

Finally, no response bias effect is evident in data from Rhine's subject Hubert Pearce (Greenwood and Stuart, 1937), but neither was there any clear evidence of response bias in Pearce's calls.

4.1.2b. Response Bias in Unselected Subjects. All the results discussed so far were obtained with subjects who revealed highly significant overall psi-hitting and (with the exception of Pearce and, possibly, Harribance) highly significant response biases on the unit of analysis where the scoring differences were found. The first study to report a response bias effect in subjects not preselected for ESP ability was a number-guessing GESP experiment with retarded children (Bond, 1937). Bond found that the children often would fall into very routinized calling patterns (e.g., calling the numbers in order), and on runs where they did so, their otherwise significant level of positive scoring was reduced to chance.

While Bond's finding is not especially profound, more subtle response biases also have been shown to interact with scoring rates in unselected subjects. Stanford found support for the response bias hypothesis in two modified forced-choice experiments in which response biases were built into the tests themselves. In the first of these experiments, subjects were asked to answer a series of multiple-choice questions based on a dream transcript they had just read (Stanford, 1970). Unbeknownst to the subjects, one of the answers to each question had been randomly selected as an ESP target. As predicted, when subjects gave answers that were wrong in terms of the transcript, they obtained significantly more ESP hits than when they gave "correct" answers. Furthermore, this effect was strongest for those subjects who obtained the highest scores on an independent test of incidental memory. Thus, when subjects with relatively good memory ability went against their natural tendency (or "response bias") to accurately recall the content of the dream, they scored significantly above chance on the covert ESP test. This study will be discussed from a point of view relevant to its covert aspects later on.

In the second experiment, subjects' ESP scores were determined by whether they gave primary or secondary responses to items on a word-association test (Stanford, 1973). The list was limited to words with high-commonality primary associates, and either the primary or the secondary associate was randomly selected as the ESP target for each trial. Two measures of response bias, the number of primary responses given on the tests and the shortness of the response latencies, both correlated significantly with the difference between the percentages of ESP hits on primary and secondary responses. In other words, subjects who had the strongest bias to give primary responses were the ones who scored *relatively* high when they violated that bias and gave secondary responses. However, there apparently was no tendency for these subjects to score significantly above chance on their secondary responses, or even to score higher in the absolute sense than they did on their primary responses. This outcome was attributable in part to a significant tendency among all subjects for

significantly higher scores on primary than on secondary responses. Stanford had predicted this latter result on the basis of Roll's (1966) theory that responses that depend upon "well established associative connections" (Stanford, 1973, p. 150) are most likely to be psi-mediated.

The results so far suggest that response bias effects only occur among subjects who have strong response biases to begin with, as we would expect, given the underlying rationale of response bias theory (which is closely related to signal detection theory in psychology). In a somewhat different experiment, Stanford (1967) found that subjects who designated a smaller-than-average number of segments on a mock "radar screen" as containing ESP targets obtained significantly more hits on segments actually containing targets than did subjects who designated a larger number of segments.

Two experiments have dealt with response bias effects in the context of a paper-maze test (Glidden, 1974; Child and Singer, 1977). The mazes consist of concentric circles, and the subject's task is to move from the center to the periphery of the maze while avoiding barriers, some of which are knowable only by ESP. (See Chapter 1 for a more complete description.) In both experiments, attempts were made to define violations of response biases as moves other than those leading most directly out of the maze. In neither case were such counterbias responses found to be significantly associated with more psi-hitting than other responses. However, the proper way to define counterbias responses in this paradigm is unclear, and such responses may simply represent naturally based strategies no more spontaneous than the "biased" responses.

Finally, in a test where subjects had to choose either a word or a nonsense syllable as the ESP response, Kanthamani and Rao (1975d) found that subjects who had a bias toward choosing words scored significantly higher overall than subjects with the opposite bias in each of three experiments. There was no evidence that any of the subjects had *significant* response biases, or that there was any relationship between the *degree* of bias and scoring on *counterbias* responses. Thus Kanthamani's experiment is irrelevant to the response bias hypothesis as subsequently stated by Stanford, although the main effect they uncovered may be indirectly relevant to this hypothesis in ways that are at present unclear.

4.1.2c. Response Bias in Animals. A number of the animal experiments discussed earlier (Sec. 3.5.5.) provided data relevant to the response bias issue. In an experiment in which cats had to choose one or the other side of a T-maze for food reward, scoring rates were significantly lower when the cat had chosen the same side on three or more previous trials than when such severe side biases were not present (Osis and Fos-

ter, 1953). In a conceptually similar experiment with rodents using a Skinner-box format, Schouten (1972) found significant psi-hitting only on trials where the animals violated their normal habit of pressing the same bar that had given reward on the previous trial. (I computed a chi-square test on Schouten's data which demonstrated that scoring rate was significantly higher on nonbiased than on biased responses.) Although follow-up research failed to yield significant evidence of ESP on either kind of response (Schouten, 1976b), a similar experiment by Terry and Harris (1975) revealed significant psi-hitting restricted to trials where their rats changed response bars for no apparent reason. Parker (1974) found significant positive scoring on both kinds of trials, although scoring rates were somewhat higher on counterbias responses for two of his three gerbils. (In the other experiments described in this section, it is unclear how uniformly the effect was distributed among the animals.) In two nonsignificant replication attempts of Parker's experiment, there was no appreciable difference between scoring on biased and counterbiased responses (Broughton and Millar, 1975).

In the research of Duval and Montredon (1968a,b), avoidance of shocks would appear to be restricted to "random behavior trials," but some parapsychologists question the relevance of this particular concept to response bias theory (e.g., Schouten, 1972).

4.1.2d. Related Paradigms. Two other research paradigms, both involving human subjects, are indirectly related to the response bias question. The relationship can only be considered indirect because, in contrast to Stanford's research, the responses evaluted for bias are not the ESP responses. Thus the relevance of these studies to the response bias issue must be considered limited.

The first of these is more directly concerned with the relationship between ESP and memory on a trial-by-trial basis. Kanthamani and Rao (1974) gave three groups of high school students a word-association test, the ESP score being determined by the manner in which the subject recorded his or her response (e.g., in capital or lower-case letters). In each case, subjects scored significantly above chance on those trials where the associate was correctly recalled, but below chance on the other trials. The difference was only significant in one of the three series, but it was significant for the three series pooled. Two additional studies where subjects were tested in groups produced more equivocal results (Kanthamani and Rao, 1975a), and significant psi-missing was found for correctly recalled pairs in a third study (Gambale, Margolis, and Crucci, 1976). Kreiman (1975) found psi-missing on incorrectly recalled trials and chance scoring on correctly recalled trials in each of two experiments. Generally nonsignificant results were found in a study by O'Brien (1976).

Parker (1976) attempted to obtain a comparable effect using a digit-span test instead of a word-association test and succeeded in one of two experiments.

In the second stage of their research with the word-association technique, Kanthamani and Rao (1975b) manipulated the association strength of paired associates. In each of two series they found a significant difference in ESP scoring between correctly and incorrectly recalled words, but only for low-association pairs. Scoring was above chance on correctly recalled words and below chance on incorrectly recalled words, and both of these effects differed significantly from chance for the two series pooled. These results are consistent with the authors' earlier studies in which low-association pairs were used. However, this effect was not confirmed in three other experiments (Gambale, 1976; Harary, 1976; Lieberman, 1976).

As pointed out by Lieberman (1976), the research described in the preceding paragraph is relevant to the response bias hypothesis in the sense that correct responses should be more consonant with built-in response biases for high-association pairs than for low-association pairs. Thus Kanthamani's results are consistent with the notion that ESP should be most prevalent when the subject is forced to give a low-commonality (i.e., counterbias) response. However, her results are not consistent with the memory theory of Roll (1966), who I expect would predict high-association pairs to be the most psi-facilitory. Still another possibility is that low-association words create a more challenging memory test, and this kind of mental attitude is relatively psi-conducive.*

The second paradigm involves having subjects indicate whether they like or dislike a particular word by placing an *L* or a *D* on one of five lines, the choice of line constituting the ESP response. Using the simple version of this test called the Word Reaction Test, Freeman (1964, 1969b) found in each of two group experiments that subjects scored significantly higher on trials where the response (*L* or *D*) was consistent with the subject's general response tendency than they did on other trials. For example, subjects who made more *D* responses than the group average scored higher on *D* responses than on *L* responses.

Although it is questionable whether the *L*/*D* responses provide a valid measure of response bias in Stanford's sense, these results seem to suggest that subjects obtained the most ESP hits on responses that were consistent with their biases. However, Feather (1967a) reported a significant reversal of this effect using Freeman's test. Furthermore, Freeman's effect generally has not occurred in experiments with a later

*This possibility was suggested by Dr. K. R. Rao.

version of the Word Reaction Test (called the Word Feeling Test) in which subjects were asked to express *degree* of like and dislike for the words on an expanded scale (Freeman and Nielsen, 1964; Nielsen and Freeman, 1965).

Finally, Freeman (1973) developed a related testing technique in which subjects answered questions similar to those on intelligence tests by indicating the answer in one of five ways. He found that subjects who scored above the class average got more ESP hits on the questions they missed, whereas the other subjects reversed this trend. The overall pattern was statistically significant, this time in a direction consistent with response bias theory.

4.1.2e. Conclusion. Experiments with both humans and animals support the hypothesis that responses on forced-choice ESP tests that violate strong nonrandom response tendencies of the subject are more likely to be correct than are responses consistent with such biases. Although such effects are by no means universal, all significant trends have been in the predicted direction.

Response bias research may provide a valuable means for detecting psi-prone responses, but only among subjects who have such biases and whose overall scores may suffer because of them. For subjects who either respond more spontaneously or whose biased patterns are not identifiable, other methods will need to be found.

4.1.3. Confidence Calls: Letting the Subject Do It

Earlier in the chapter, I pointed out that subjects were not very good at predicting their total scores on ESP tests (see Sec. 3.6.2b). However, this does not preclude the possibility that they might be more successful at picking out particular trials where something told them that their response was more than a mere guess. This possibility provides yet another potential source for designating psi-prone trials in ESP experiments.

The most striking evidence of successful confidence calling was provided by the high-scoring subject Bill Delmore (Kanthamani and Kelly, 1974a). Pooling the results of three series using psychic shuffle and BT-like techniques, the authors found that Delmore completely identified playing cards on 91% of his confidence calls as compared to only 4% of his other calls. (Even the 4% was significantly above chance.) Delmore made confidence calls on only 8% of his trials. Another "high-scoring" subject, Carlo Marchesi, failed to reveal significant ESP scoring on confidence calls distributed over 180 DT runs, but his overall scoring at this stage of his career was nonsignificant (McMahan and Bates, 1954).

Fahler instructed two subjects under hypnosis to indicate trials they

thought were likely to be correct or that felt "different" in some way (Fahler and Osis, 1966). The results revealed not only significant psi-hitting on the "marked" trials but also significant psi-missing on the unmarked trials.

Humphrey and Nicol (1955) reported the results of two card-guessing experiments in which subjects were asked to make five to ten confidence calls per run. In each experiment, those subjects who followed the instruction scored significantly higher on checked than on unchecked trials, but only on those runs where they did *not* receive trial-by-trial feedback of the correctness of their guesses. Combining the two series revealed that significant psi-hitting on the checked calls was balanced by significant psi-missing on the unchecked calls, the same pattern reported by Fahler.

Two experiments by Nash reveal that significant scoring on confidence calls can occur under conditions where scoring on other trials remains close to chance. In the first experiment the checked calls yielded significant psi-hitting (Nash and Nash, 1958) while in the other it was psi-missing (Nash, 1960a). In both cases, the difference between the checked and unchecked trials was significant. Kreiman and Ivnisky (1973b) reported significant psi-missing on runs where confidence calls were requested in a GESP experiment, the effect being mostly attributable to trials where emotional targets were used. No significant difference between checked and unchecked trials was reported in the abstract (my only source for this experiment), but results on unchecked trials would appear to have been close to chance.

In his second experiment, Nash asked his subjects to predict on a run-by-run basis how they expected to score. He found that the psi-missing on confidence calls was primarily attributable to those runs on which subjects in fact predicted below-chance scoring. Schmeidler (1964e) obtained the same effect in a precognition experiment, except that checked and unchecked trials did not differ significantly for all runs combined. Perhaps those subjects who predicted below-chance scores desired at some level to confirm their predictions, in which case the confidence calls reflected a correct "awareness" of the target which somehow got manifested by an incorrect response.

Nash and Nash (1963) found a significant excess of confidence call hits in the first of two sessions, but this was followed by a significant decline to chance scoring on confidence calls in the second session. Such declines were not reported in Nash's earlier experiments, which also involved more than one session. In an experiment where subjects were not given the usual set to give about five confidence calls per run, Schmeidler (1964e) found that confidence calls produced significantly more positive scores than other trials only for subjects who averaged fewer than one

confidence call per run. Schmeidler (1961), in an earlier set of experiments, found significant psi-hitting on such infrequent confidence calls, but no difference test was reported.

A number of other forced-choice experiments have failed to yield any significant differences between the proportion of hits on checked and unchecked calls (Honorton, 1970, 1971b, 1972a; Honorton *et al.*, 1974; Jackson, Franzoi, and Schmeidler, 1977; Kreiman and Ivnisky, 1973; McCallam and Honorton, 1973; Schechter *et al.*, 1975) although several obtained significant relationships involving confidence calls (Sec. 4.2.2a). These experiments generally involved fewer total trials than those discussed previously, and this may have something to do with the nonsignificant differences.

In the only free-response experiment to incorporate confidence calls, agents attempted to "send" the content of pictorial slides to percipients in another room (Gelade and Harvie, 1975). Following each of five trials, the percipient was asked to pick out the correct slide from a pair of slides and to rate his or her confidence on a four-point scale. Subjects scored significantly above chance on trials where they rated themselves as either "fairly confident" or "very confident," while they scored below chance to an almost significant degree on the remaining trials. Unlike the confidence calls in the forced-choice experiments, however, these confidence calls could have been (and likely were) influenced by subjects' sensory knowledge of the degree of correspondence between calls and targets.

4.1.3a. Conclusion. The literature on confidence calls provides its share of significant effects, but their directions have not been consistent and significance sometimes has depended upon selecting out portions of the data post hoc. There is some evidence that the direction of scoring on confidence calls may depend upon subjects' expectations regarding their total run scores, at least when low scores are expected. The puzzling tendency found in three experiments for psi-hitting on confidence calls to be balanced by psi-missing on other trials may be an example of Rao's (1965a) "differential effect."

It has been customary in analyzing confidence call effects to pool trials over subjects. This procedure led one observer to suggest that such effects could occur artifactually if the subjects who had the highest total ESP scores also made the most confidence calls (Thouless, 1956). While the "guilty" experimenters have generally countered this criticism by demonstrating that this precondition was not met by their data (e.g., Humphrey and Nicol, 1956), it is not always clear in these reports how uniformly confidence call effects are distributed among subjects. This makes it difficult to judge the generality of the effects.

Confidence calls nevertheless show some promise as a vehicle for

identifying psi-prone responses, but more research will be needed to tease out the conditions under which they will be most effective and whether they will expose psi-hitting or psi-missing. Individual differences in ability to make accurate confidence calls, in particular, need some study. A first step in this direction was provided by McCallam and Honorton (1973), who found that subjects who showed the greatest increase in percentage of correct confidence calls following feedback training were those who based their confidence calls on a multiplicity of internal cues.

4.2. Effects of Repeated Testing: Monotony and Monotonicity

4.2.1. Decline Effects: Too Much of a Good Thing

Ask any parapsychologist what is the most consistent finding in parapsychology, and he or she is likely to tell you that it is the decline effect, which means that subjects' scores are likely to get lower the more they are tested. Although decline effects indeed are common in parapsychology, some species are more common than others. As usual, we are going to have to make a few distinctions if we are to avoid overly simplistic conclusions.

4.2.1a. Long-Term Declines—"Gifted" Subjects. When a subject comes along with outstanding ESP ability, it is natural for the enterprising parapsychologist to want to collect large amounts of data. It is not uncommon for such benevolent souls to complete hundreds and even thousands of card-guessing runs over periods ranging from several weeks to several years. It is not surprising that many of these subjects eventually "burn out."

The list of cases where high-scoring subjects sooner or later lost their ability is a long one (Banham, 1966; Brugmans, 1922; Drake, 1938; Freeman, 1966a; Mangan, 1957; McMahan and Bates, 1954; Mitchell, 1953; Pratt, 1937, 1974b; Rhine, 1934/1973, 1938b; Riess, 1937; Rose, 1955; Soal and Bateman, 1954). Even this survey is probably not exhaustive. Although one might expect scores of preselected high-scoring subjects to decline simply as a result of regression artifact, the initial scoring levels of these subjects were too high and/or maintained for too long for this to be a viable explanation.

The length of time subjects maintain their talents is quite variable. Some declined after only a few runs (e.g., Banham, 1966; Mitchell, 1953), while others endured for much longer periods (e.g., Pratt, 1973; Rhine, 1934/1973). The star subject of Martin and Stribic (1940) maintained a scoring rate of 6.85 hits per run through 3,659 card-guessing runs adminis-

tered over a three-year period. I have seen no reports that this subject's ability ever declined, although he has not been formally tested in many years. However, the endurance record goes to the Czech subject Pavel Stepanek, who maintained his card-guessing ability for ten years before finally dropping off (Pratt, 1973). However, the nature of his scoring tendencies changed over the years, and his ability still may exist in some as yet undetected form. In fact, this may be true of other subjects who seemingly have lost their abilities. Furthermore, subjects who have lost the ability to achieve high scores may later regain this talent. An Australian Aborigine whose initial scoring level was quite high saw her scores decline markedly over a course of 68 runs (Rose and Rose, 1951). When retested several years later, she temporarily regained her initial scoring rate but again declined sharply (Rose, 1955).

Although a number of contemporary "gifted" subjects, such as Harribance and Delmore, have as yet to evidence decline (perhaps because they haven't been tested long enough), I am aware of only one experiment in which a subject's scores increased significantly during a period of repeated testing, outside of a "training" context (Anderson, 1959a). This subject completed 90 precognition runs over a nine-month period.

4.2.1b. Between-Sessions Declines—Unselected Subjects. Subjects who lack outstanding psychic ability are not tested as extensively as those who have such abilities, for obvious reasons. Nevertheless, it is not too uncommon for such subjects to participate in more than one session. The first investigators to report significant decline effects under these circumstances were Taves and Dale (1943), but others have reported them from time to time (Honorton and Carbone, 1971; Humphrey, 1945c; Osis, 1952; Osis and Turner, 1968; Parker and Beloff, 1970). In most cases, the decline was from psi-hitting to chance scoring. However, the effect reported by Honorton and Carbone was a shift from psi-hitting to psi-missing, and Osis and Turner did not report their means. The only (apparently) significant incline effect I could find was in a free-response experiment, where significant psi-hitting was restricted to the second of two sessions (Keeling, 1972).

4.2.1c. Within-Session Declines. Significant declines or inclines of scoring rate within one experimental session are a potential effect in almost all ESP experiments, but they have been reported in only a handful. While there is obviously no way to tell how many effects of this type have gone undetected, it is safe to assume that they are quite rare. Among the significant findings however, decline effects are somewhat more prevalent than incline effects. Significant declines have been reported with both selected subjects (Osis, 1956; Roll and Klein, 1972) and unselected subjects (Dean and Taetzsch, 1963; Freeman, 1962; Humphrey, 1945c; Kahn,

1952; McMahan and Lauer, 1948; Parker and Beloff, 1970; Schmeidler, 1968; Schmeidler, Friedenberg, and Males, 1966; Van Busschbach, 1959). All except Dean and Taetzsch's results involved a decline from psi-hitting to chance scoring. Schmeidler (1964b) reported a significant incline effect, but it was from significant psi-missing to chance scoring. I could find only one experiment that produced an overall significant increase from chance scoring to psi-hitting (Palmer *et al.*, 1976). In a third experiment where subjects completed both card and drawing tests in the same session, a significant incline was reported for the drawing trials only. Overall scores were slightly above chance (Stuart *et al.*, 1947). I could find no consistent directional trend among the nonsignificant studies, nor could I find any relationship between scoring trends and the number of runs per session.

A potentially more reliable finding comes from a series of experiments in which declines of run-score variance were found within sessions (Carpenter, 1966, 1968, 1969; Carpenter and Carpenter, 1967; Rogers and Carpenter, 1966). In other words, run scores started out either high or low at the beginning of the session but approached chance as the session progressed. The decline was significant in three of five experiments, and in one other experiment the run-score variance was significantly high in the first half of the experiment. Length of session in the significant series varied from 4 to 36 runs. In the one experiment with a single subject, a significant decline was found in sessions consisting of 16 to 36 runs but not in longer sessions (Carpenter and Carpenter, 1967).

When factors are operating in an experiment that tend to produce psi-hitting in one condition or group of subjects and psi-missing in another, Carpenter's findings indirectly suggest that difference scores might be more prevalent early in a session that later in a session, i.e., the difference scores will decline automatically as the psi-hitting and psi-missing both regress to MCE as the session proceeds. Such a trend was found very consistently in a series of experiments by Sailaja and Rao (1973), and it conceivably could have influenced the results of countless other experiments in which overall decline effects were not found.

4.2.1d. Experimenter Declines. A few post hoc analyses have been reported which suggest that scoring levels in experiments with multiple subjects declined during the course of the experiment (Casper, 1951; Taddonio and O'Brien, 1977; Taves and Dale, 1943). Such results have been attributed to waning interest or enthusiasm on the part of the experimenter. It is much too early to draw even tentative conclusions on this topic, but experimenter decline effects clearly deserve more systematic investigation.

4.2.1e. Conclusion. It is clear that most high-scoring ESP subjects sooner or later lose their ability to achieve high scores, some considerably

sooner than others. However, spontaneous recovery has been noted in at least one case, and it is possible that "loss of ability" may really reflect a diversion of scoring to other modes, such as those I will discuss later in the chapter.

Decline effects are considerably less prevalent among less talented subjects. Of course, one would not expect decline effects unless the scoring level were initially high, and significant declines are somewhat more frequent than significant inclines, both within and between sessions. Decline of run-score variance is a potentially more reliable within-session effect, but it needs to be validated by other investigators.

4.2.2. Immediate Feedback: Can ESP Be Learned?

There are several possible explanations for decline effects in ESP testing, a discussion of which is beyond the scope of this chapter. However, most parapsychologists would attribute them to declining motivation on the part of the subject (Rhine, 1964). Another interpretation has been stated by Tart (1966), who compared decline effects to extinction effects in learning. When an animal in a learning experiment is no longer given a reward for a correct response, the rate of emission of the response declines. Likewise, if high-scoring ESP subjects are not rewarded after each *trial* by knowledge of the outcome, their rate of emitting psi-mediated ESP responses also will go down, until their percentage of hits is no greater than that expected by chance. In the ESP case, the decline of scoring is seen by Tart as not being entirely due to a decline in motivation. Testing makes subjects self-conscious about their manner of using psi, and unless guided by immediate feedback, this self-consciousness merely upsets the delicate balance of mental processes that control psi, thus creating confusion (Tart, personal communication). Although ESP subjects receive such feedback at the end of the session, and sometimes after each run, Tart considers this delay too long to prevent extinction.

The other side of this coin is that subjects cannot learn to improve their ESP performance without the information provided by immediate feedback. Such feedback is necessary if subjects are to learn to identify subtle internal cues that might differentiate a psi-mediated response from a wild guess. However, Tart was careful to point out that learning could only be accomplished by subjects who had a fairly high level of ESP talent to begin with. Subjects lacking such talent would not make enough psi-mediated responses spontaneously to allow them to discriminate cues associated with psi-mediated hits (which are inevitably mixed with some "chance" hits) from irrelevant cues. On the other hand, immediate feedback would have some information value for subjects with moderate

levels of talent, so moderately high levels of scoring would not be likely to decline during the course of testing. Thus, at a minimum, immediate feedback should eliminate most decline effects.

A relatively large number of ESP experiments providing subjects with immediate feedback have been reported, especially since the introduction of automated testing devices such as the Schmidt machine. Let us now take a look at these studies.

4.2.2a. Unselected Subjects. Among experiments using subjects not selected for initial ESP talent, the results have been mixed. Among studies with humans where temporal trends could be deduced from the reports, quite a few have reported negative results as far as learning is concerned (Beloff, 1969; Beloff and Bate, 1971; Dale, Taves, and Murphy, 1944; Haraldsson 1970; Jampolsky and Haight, 1975; McElroy and Brown, 1950; Taves, Dale, and Murphy, 1943; Thouless, 1971) McElroy supplemented informational feedback with electric shock for incorrect guesses in some runs, and he found not only that there was no learning but also that there was a significant decline effect across the shock runs. None of the reports of the animal experiments discussed in section 3.5.5 mentioned temporal trends, so one may assume that significant learning effects most likely were absent here as well.

The picture is not all negative, however. A young girl tested by Targ and Hurt (1972) improved dramatically on clairvoyance and then on precognition tests using a machine similar to Schmidt's. In a later experiment, 6 out of 147 subjects showed significant increases in performances as compared to none who showed significant decreases (Targ and Cole, 1975). Although none of these subjects had been preselected for ESP talent, it cannot be ruled out that they had such talent.

This latter possibility is more remote in experiments where conclusions are based on the results of all members of a group of unselected subjects. In an experiment with young children, Drucker *et al.* (1977) found a significant increase in performance from the first to the second run. Subjects were asked to guess on each trial the color of an *M & M* candy the experimenter would "blindly" pick from the bag. Subjects received an *M & M* of that color from another source for each correct response. The incline effect was primarily attributable to those subjects who scored above the group mean on an intelligence test, despite a rather restricted range of intelligence in the sample. However, no incline effect was reported in an earlier experiment of similar design reported in the same article.

Dagel and Puryear (1971) gave subjects 200 trials on an ESP testing machine, half of which were with feedback and half without. The order was counterbalanced across subjects. Neither the methodology nor the

results were reported in adequate detail, but it would appear that subjects scored significantly higher on feedback than nonfeedback trials only when the nonfeedback trials were given first. If the significant difference involved a shift from chance scoring to psi-hitting, these results are consistent with a learning interpretation.

The most extensive series of learning studies with unselected subjects used a card-guessing procedure (Honorton, 1970, 1971b; Jackson *et al.*, 1977; Kreiman and Ivnisky, 1973a; McCallam and Honorton, 1973). The typical procedure in these studies was for subjects to complete three practice runs with trial-by-trial feedback sandwiched between two sets of three standard DT runs without feedback. Subjects in control conditions received either false feedback during the practice runs or no feedback during the "practice" runs, or the practice runs were omitted entirely. (This varied from experiment to experiment.) During the test runs, subjects were asked to make confidence calls on about five trials per run.

In three of the five experiments, there was a significant increase in overall scoring from the prefeedback to the postfeedback runs when the practice period consisted of no more than three runs (Honorton, 1970; Kreiman and Ivnisky, 1973a; McCallam and Honorton, 1973). Three experiments also yielded a significant increase in the proportion of correct confidence calls (Honorton, 1970, 1971b; McCallam and Honorton, 1973). Significant increases were never obtained in control conditions. However, there is a respect in which these results do not fit a learning interpretation. In one of the successful experiments, the significant increase in overall scores was from significant psi-missing on the pretest to a mean just slightly above chance on the posttest (Honorton, 1970). This looks more like regression to the mean than learning. Jackson *et al.* (1977) found significant psi-missing on pretest confidence calls in their feedback group as compared to only chance scoring on the posttest. Confidence call means exhibited this same pattern in two of Honorton's three experiments (Jackson *et al.*, 1977). Kreiman and Ivnisky (1973a) do not report their means in the abstract of their full report (to which I do not have access), but they shy away from interpreting their own results as evidence of learning.

Braud and Wood (1977) attempted to adapt Honorton's paradigm to a free-response situation using the ganzfeld to facilitate a psi-conducive state. The four practice sessions consisted of tonal feedback indicating the accuracy of individual mentation reports during the session. According to one of the two measures of ESP the authors used, ESP scores for the feedback group were significantly above chance in the posttraining ganzfeld sessions and significantly higher than their scores in the pretraining sessions. No such difference was found in the control group. The only

significant effect by the second measure was the regression effect found in the feedback group in two of the card-guessing studies described above: significant psi-missing in the pretest followed by chance scoring in the posttest, but in this case the effect appeared in the control group only.

The only significant decline effect I could find in an experiment with immediate feedback was by Banham (1973), and this involved a contrast between the first and last 10 trials of a 100-trial test. It is doubtful that this effect would have been significant had the author used the more conventional procedure of analyzing data from all the trials.

4.2.2b. Selected Subjects. The crucial test of Tart's theory is whether subjects who have demonstrated ESP talent before training show increases in scoring rate as a result of training. Several studies using Schmidt machines with talented subjects were not reported in such a way that the learning hypothesis could be evaluated (Haraldsson, 1970; Schmidt, 1969a, b; Schmidt and Pantas, 1972), although we may assume that any obvious scoring increments would have been reported. There was no evidence that any of these subjects declined in performance, however. Delmore, on the other hand, increased his scoring dramatically between the first and second series of a card-guessing experiment with immediate feedback on most trials, an effect that might conceivably reflect learning (Kanthamani and Kelly, 1974b).

The most direct attempt so far to test Tart's theory has been by Tart himself (Tart, 1976a). He screened over 1,500 college students for ESP ability with simple card tests and invited those who scored significantly above chance to complete six additional runs on two electronic ESP testing machines. The machines provided immediate feedback and were adapted for testing in the GESP mode. Subjects who continued to score significantly were assumed to have genuine talent, and they were graduated to the training phase of the experiment, which consisted of 20 runs on the machine of their choice.

Ten of the 25 subjects who completed the training phase scored significantly above chance, most to an extreme degree. Only one of these subjects evidenced a significant increase in scoring across the 20 runs, but there were no significant decline effects. The most encouraging finding from the standpoint of Tart's theory, however, was a significant positive correlation for one of the machines between the individual performance curves in the training study (the measure of "learning") and the total number of hits on that machine in the second phase of the screening (the measure of initial talent). In other words, the most talented subjects were the ones who showed the most stable ESP performance over the 20 runs. The correlation for the other machine was in the opposite direction but not significant. Finally, the one subject who increased her scoring rate

significantly during training had the highest score of any subject on her machine during the screening phase. The validity of Tart's conclusions has been the subject of an extensive debate in the literature (Stanford, 1977a, c; Tart, 1977b).

4.2.2c. Conclusions. Although trial-by-trial feedback does not produce changes in ESP scoring rate over time with a high degree of consistency, the changes it does produce are much more likely to be incline effects than decline effects. As we saw in the last section, just the opposite is the case in experiments where immediate feedback is not employed. This pattern suggests that such feedback does indeed have a tendency to stabilize ESP scoring and perhaps to enhance it in some cases.

Whether the incline effects that have been found really represent learning is an open question. Such increases by themselves are not sufficient to verify learning; for example, they might reflect nothing more than heightened motivation as scoring continues to be positive. More secondary effects such as the suggestive interaction between scoring increases and intelligence reported by Drucker will be needed before the validity of the learning hypothesis can be clearly established, although a learning interpretation of their experiment is questionable due to the small number of runs. Tart's finding that his most talented subjects were the ones whose performance slopes during training were most positive holds promise that more clear-cut scoring increases might be found with more extensive training than Tart was able to provide, particularly if subjects are given aids for detecting internal cues. Biofeedback could prove to be a useful tool in this connection.

5. Short-Circuiting the Ego

Tart's training procedure involves the activation of what might be called ego processes toward the goal of enhancing ESP. That is, the subject uses conscious, intellectually guided effort to make correct responses. While recognizing the potential value of this approach, many parapsychologists also believe that ego processes may at the same time inhibit ESP by reducing spontaneity or mobilizing psychological defenses. Furthermore, an ESP message simply may not reach a level of consciousness where it can be dealt with by ego processes. Such considerations have led to the development of testing techniques that do not require the subject to make any conscious, intentional ESP responses at all, thereby effectively bypassing these ego functions. The findings generated by the use of such techniques are the topic of this section.

5.1. Covert ESP Tests: Keeping Subjects in the Dark

5.1.1. PMIR: . . . But I Thought You Were Testing My Memory!

ESP is clearly an unconscious process that functions primarily outside the voluntary control of the organism. Generally speaking, subjects are unaware on which particular trial an ESP message is getting through, or even if it is getting through at all. It is tempting to carry this logic one step further and speculate that ESP may sometimes function at times when we are not trying to use it or may not even want to use it, and in such a way that we are completely unaware of its operation. Rex Stanford (1974) has proposed an elaborate scientific model that assumes that ESP functions in just this way in order to fulfill the organism's needs. He refers to goal-directed behavior governed by the operation of psi as "psi-mediated instrumental response" or PMIR.

5.1.1a. The Word-Association Paradigm. The unintentional operation of psi can be demonstrated most clearly in a laboratory setting by experiments where the subject is not consciously aware that the experiment involves ESP at all. A number of such experiments have recently been conducted by Stanford himself in the guise of word-association tests (Stanford and Associates, 1976; Stanford and Castello, 1977; Stanford and Rust, 1977; Stanford and Stio, 1976; Stanford and Thompson, 1974). All these experiments were intended to test an assumption of the model that states that PMIR can function through an "unconscious timing mechanism," and their designs were basically similar. Subjects were each given a ten-item word-association test in a context supposedly unrelated to ESP. One of the ten trials was randomly designated as the crucial trial. If the subject's response latency on that trial met a certain criterion (e.g., the fastest of the ten trials), he subsequently experienced a pleasant task, such as rating *Playboy* photographs. (Stanford has exclusively tested male subjects in this paradigm.) If the subject did not meet the criterion, he experienced a tedious and boring task, such as crossing out letters in a manuscript. Thus the subject's performance on a covert ESP test was instrumental in determining whether he experienced a pleasant or unpleasant task later.

None of the above experiments produced overall significant positive scoring on the main dependent variable, which was a function of the mean difference in reaction time between the crucial trial and the average of all ten trials. However, in one experiment, significantly more persons entered the favorable condition than expected by chance (Stanford and Rust, 1977). This experiment differed from the others in that the person who experienced the consequences of the subject's ESP performance was

someone other than himself. Whether or not a significantly large number of subjects entered the favorable condition in Stanford's earlier experiments could not be precisely evaluated because timing of the response latencies was too insensitive to eliminate ties within subjects for the words with the shortest latencies. Stanford and Rust (1977) eliminated this problem by timing within 1/100″ instead of 1/10″.

Two of the experiments obtained results that supported specific predictions from the PMIR model. Stanford and Associates (1976) found that female experimenters obtained significantly higher ESP scores from their subjects than did male experimenters, the subsequent "pleasant" task having a sexual theme. Presumably the sexual arousal engendered by males interacting with female experimenters increased the need-relevance of the pleasant task such that it provoked more ESP than it would otherwise. The "need strength" hypothesis was not confirmed in another experiment (Stanford and Stio, 1976), but there is some independent evidence that the arousal manipulation was not effective in this experiment.

A second prediction derived from the model is that "PMIR occurs in part through psi-mediated facilitation or triggering of otherwise ready or available responses" (Stanford, 1974, pp. 45–46). This hypothesis had received support from an earlier word-association experiment not specifically designed to test the PMIR model (Stanford, 1973). Through a complicated logic, Stanford deduced from this hypothesis that PMIR should be more effective when the criterion for the crucial trial is a short response latency than when it is a long one. This prediction was confirmed by Stanford and Stio (1976). However, in two other experiments designed to test other hypotheses, both criteria nonetheless were incorporated. In one of these experiments there was a nonsignificant reversal of the effect found by Stanford and Stio (Stanford and Thompson, 1974), while data from the other are not at present available for reanalysis (Stanford and Associates, 1976).*

A third hypothesis involving the subject's self-concept was not confirmed (Stanford and Associates, 1976), but only a weak manipulation of self-concept was used for ethical reasons.

5.1.1b. The Academic-Exam Paradigm. The PMIR model has received additional support from a procedure developed by Martin Johnson (1973). On short-answer essay exams given to three college classes, he provided answers to half the questions in sealed envelopes to which the exams were attached. The targeted questions were randomly selected for each student individually. For two classes the answers were correct,

*Dr. Stanford kindly supplied me with this information in the course of reviewing the first draft of the chapter.

while for the third they were incorrect. In each case where the answers were correct, the students scored significantly higher on the targeted questions than on the control questions. However, when the enclosed answers were incorrect, they scored significantly higher on the control questions. It would appear that students who were unaware that ESP was involved with the exams used the concealed information to improve their scores in the first two experiments. However, in the third experiment their ESP presumably did not tell them that the answers were wrong and the "strategy" backfired. Although the scale used to score the answers was different in this experiment from that in the first two, it would appear that the *overall* scores in the first two experiments were higher, even when the scaling is taken into account.

The results of Johnson's first two experiments were successfully replicated twice by Braud (1975a), who also found that the subjects who used psi most effectively got the lowest scores on the part of the exam where answers were not supplied. However two attempted "replications" based on multiple-choice rather than essay questions failed to yield any significant results (Willis, Duncan, and Udofia, 1974).

An earlier experiment by Stanford (1970) is conceptually related to Johnson's paradigm and will be discussed in this section. In this case, subjects were asked to listen to the transcript of a bogus dream report and then to answer questions about its content. Unbeknownst to them, one of the four possible answers to each question was randomly selected as an ESP target. Thus, in contrast to Johnson's procedure, the correctness of the ESP responses bore no systematic relationship to the correctness of responses on the cognitive test. Among other things, Stanford found that when subjects gave answers that contradicted the transcript, they made significantly more hits than expected by chance. It would appear that designating an incorrect answer on the memory test as an ESP hit actually distorted subjects' recall of the transcripts without their awareness.

5.1.1c. PMIR and Overt ESP. Although the PMIR model stresses the role of unintentional psi as a mediator of instrumental responses, it assumes that intentional psi can serve this function as well. The hypothesized relationship between intentional and unintentional psi was supported by Stanford and Thompson (1974), who found a significant positive correlation between ESP scores derived from their word association test and scores from an orthodox card-guessing test administered immediately before.

Perhaps the best example of a case where intentional psi could be used to fulfill strong needs is a series of experiments in which subjects were led to believe that their scores on an ESP test would help to determine whether or not they would be allowed to enroll in a university course

or receive employment in the university library (Sailaja and Rao, 1973). An interview was sandwiched between the two ESP tests. Overall scores were nonsignificant, but in each experiment scoring was higher after the interview than before. The difference was significant in two experiments and approached significance in the other. Subsequent research suggested that the difference was primarily due to the fact that the first ESP test caught subjects by surprise, while by the second test they were able to develop a more appropriate mental set.

5.1.1e. Conclusion. There is evidence from a number of experiments that subjects can use ESP unconsciously and unintentionally to fulfill their own needs or the needs of others. The academic exam paradigm has so far been the most successful in producing significant overall ESP effects, at least with essay-type questions. Since multiple-choice items are scored in an all-or-none fashion, it is conceivable that procedures based on such scores are simply too insensitive to demonstrate the effect. Although support for the specific predictions of Stanford's PMIR model has been inconsistent, all significant relationships have been in the predicted direction.

5.1.2. Covert Target Impregnation: X-*Rated Parapsychology*

A number of more traditional ESP experiments in which subjects made intentional ESP responses that were not instrumental in achieving some other end nevertheless had covert elements. These experiments were designed to demonstrate that subjects can respond to emotionally relevant target stimuli, of whose nature they are consciously unaware, in ways that are relevant to their own needs.

5.1.2a. Anxiety and Emotional Stimuli. In a variation of the standard BM card test, Carpenter (1971) included erotic photographs (e.g., couples engaging in sexual acts) inside half of the envelopes containing ESP cards that subjects were supposed to match to the key cards. The subjects, who were high school students, were unaware that erotic photographs were involved in the experiment. Carpenter found a significant interaction between target type and trait anxiety as measured by the Taylor Manifest Anxiety Scale. As expected, high-anxious subjects scored higher on the neutral targets and low-anxious subjects scored higher on the targets associated with the erotic pictures.

In an experiment quite similar to Carpenter's except that college students were tested with a BT procedure and the pictures were somewhat less risqué, Ballard (1975) found a significant negative relationship between scores on Spielberger's Trait Anxiety Scale and ESP scores on erotic targets, but only for females. This relationship was not confirmed in

a follow-up experiment (Ballard, 1977), but his female subjects had an unusually high mean score on the anxiety scale, suggesting a possible restriction of range problem. He did find, however, that scoring on erotic targets was highest among subjects who reported the greatest decrease in *state* anxiety following a pretest relaxation exercise. These results fit in with the general pattern of better scoring on erotic targets among the least anxious subjects.

Carpenter (1971), in a second experiment with college males, used the Mosher Sex Guilt Scale and belief in ESP as predictors in an ESP experiment otherwise identical to his first endeavor described above. Among believers in ESP (who scored significantly lower on sex guilt than did nonbelievers) he found significantly higher ESP scores on erotic than on neutral targets. Among the more guilt-prone goats, he found generally chance scoring on the erotic targets, but there was a significant tendency for these goats to score lower on the neutral targets than the less guilt-prone goats. These findings are complex, but they show that psi-hitting on erotic targets was restricted to subjects who both believe in ESP and have relatively little sex guilt as measured by the Mosher scale. To the extent that "sex guilt" represents a kind of anxiety, these findings are consistent with those described above.

Finally, Johnson and Nordbeck (1972) tested a woman with frequent psychic experiences who also revealed signs of neuroticism on the Defense Mechanisms Test. A BM procedure was used, and the target cards (unknown to the subject) consisted of words having positive or negative emotional import for her, as deduced from personality tests and a clinical interview. She scored above chance on the positive words and below chance on the negative words, the difference being significant. A second experiment was unsuccessful, but in between experiments the subject had learned the nature of the target cards and expressed displeasure at the previous deception. Thus the psychological conditions were drastically altered in this second experiment.

5.1.2b. Other Experiments With Covert Emotional Stimuli. Rogers (1967c) found in each of two experiments that subjects who believed in ESP and reported sexual arousal after reading an erotic passage scored significantly higher on targets that consisted of provocative words from the passage than on ESP symbol targets. The difference was only significant when the word runs were given after subjects had read the passage and the symbol runs before, not vice versa.

Wiklund (1975) used pictures of beautiful or gruesome scenes as targets in two blind matching experiments. Subjects were unaware of the identity or nature of the pictures. In the first experiment, the overall mean was significantly below chance, and there was a signficiant interaction

between target type and perceptual response on a spiral aftereffect test. "Intraceptive" (subjectively oriented) subjects concentrated their psi-missing on the gruesome targets, while "extraceptive" (objectively oriented) subjects concentrated their psi-missing on the beautiful targets. Results in the replication attempt were nonsignificant, despite a larger sample size. Price (1973b) generally found that supplementing ESP symbols with erotic symbols had no significant effect on ESP scores, but the erotic symbols he used (the first letters of erotic words) would not be expected to have much emotional impact.

5.1.2c. Conclusion. The overall pattern of results from studies using covert emotional stimuli suggests that subjects who are relatively anxious tend to avoid responding correctly to targets associated with emotionally arousing or potentially threatening stimuli when they are not informed of the presence of such stimuli. Carpenter's experiment with the Mosher scale and Johnson's experiment are the most convincing in this respect, because the target material was related in relatively specific ways to the psychodynamics of the subjects.

5.2. Physiological Response Indices: ESP's Body Language

In the designs we examined in the last section, the ESP message was always mediated by a verbal or quasi-verbal response; i.e., the message still required some representation in consciousness. But what if a psychic impression is either too weak or too heavily censored to achieve even this secondary representation in consciousness? Such an impression could still influence the organism at an even more primitive level that might be detected by examining unconscious and/or unintentional physiological responses to the remote ESP stimulus. As was the case in the PMIR experiments described in the previous section, the subject need not be trying to make an ESP response or even know that he or she is in an ESP experiment. In this section I will discuss those experiments where physiological responses were used not as predictors of ESP responses but as ESP responses themselves.

5.2.1. Autonomic Responses: Let Your Finger Do the Talking

5.2.1a. Plethysmograph. The majority of studies have examined autonomic reactions, and the most common of these has been blood volume of the finger as measured by the plethysmograph. The first systematic attempt to use the plethysmograph as an ESP index was by Figar (1959), who simultaneously recorded subjects in the same room separated by a heavy curtain. At various times, one subject would silently perform men-

tal arithmetic while the physiological responses of the other subject were noted. Responses coincident with the agent's mental arithmetic were detected on a large number of trials, accompanied by a large number of spontaneous deflections occurring simultaneously in the two subjects. Statistical analyses of these results proved to be highly significant (West, 1959). However, Dalton (1960) pointed out that the spontaneous synchronicities of response could be due to common reactions to environmental stimuli, while Nash and Nash (1962) found errors in the statistical analysis of Figar's results which reduced the other effect to nonsignificance. The Nashes also replicated Figar's experiment with the participants seven miles apart and failed to obtain significant results. Sanjar (1969) likewise failed to achieve significance with a similar design, although he included a third subject who was not to receive an ESP message as a control for environmental effects. The design of this study has been criticized by Dean (1970).

A better experimental design than Figar's would be to compare autonomic reactions on experimental trials to reactions on control trials where the stimulus presented to the agent is not expected to evoke a response. Such an approach was pioneered by Dean and his co-workers (Dean, 1962, 1966a, b, 1971a, b; Dean and Nash, 1967; Dean and Otani, 1972). Dean used as target material cards with names that were emotionally meaningful to the percipient or to the agent, names selected at random from the phone book, and blank cards. The cards were looked at by the agent, in random order and with random intertrial intervals, while the reactions of the remote percipient were recorded. The principal method of analysis was to compare the magnitude of the pen deflection during trials where a name was presented to that of trials where a blank card was presented.

Dean reported generally significant results using this method with three percipients, including himself, although in only one case was a detailed experimental report published (Dean and Nash, 1967). Although the effect was generally strongest with names known to the percipient, trends approaching significance also appeared for other names, especially in the Dean and Nash experiment. In one case, a reversal (more response to blank cards) occurred when the student was tested around exam time (Dean, 1966b). However, a successful replication of the primary finding with a single subject was reported by Barry (1968).

In an experiment of a design similar to Dean's, Esser *et al.* (1967) found that 7 of 12 percipients made more responses to emotional stimuli presented to the agent than to neutral stimuli, while only one subject reversed this trend. However, a larger replication attempt by Haraldsson (1972) produced only chance results on the relationship of interest.

Two experiments employing methodology somewhat different from

Dean's have yielded significant results with plethysmographic measures. Tart (1963) examined percipients' responses on occasions when a remotely located agent received painful electric shocks randomly interspersed with other occasions when the shock was "sent" but, instead of being received by the agent, was diverted to a resistor. Compared to matched control periods, percipients evidenced significantly more plethysmographic responses on each type of experimental trial, the effect actually being somewhat stronger on those trials where the agent did not receive the shock. Percipients were asked to press a telegraph key when they felt that a "subliminal stimulus" had been presented to them during the session, but these conscious ESP responses were unrelated to any of the experimental manipulations.

In a more complex experiment, Schouten (1976a) used both name cards (of the various types employed by Dean) and loud tones to stimulate the agent at random intervals. Using numbers of responses as the dependent variable, significant results with the plethysmograph were obtained only with names. Although only names known to the percipient produced independently significant results, effects of comparable magnitude were found with names supplied by the agents and with neutral names.

5.2.1b. Skin Resistance. Skin resistance has been used almost as frequently as plethysmograph with this paradigm, but the results have been less encouraging. Woodruff and Dale (1952) used electric shock to condition a GSR to one of three ESP symbols. When the symbols were later presented in random sequence under conditions of sensory shielding, there was no evidence of discriminating GSR responses, despite periodic reinforcement to prevent extinction. Beloff, Cowles, and Bate (1970) obtained chance results using names or photos of the percipients as the crucial stimuli supplied to the agent.

A better comparison of skin resistance and plethysmograph is provided by those experiments in which both recording techniques were used. Tart's (1963) results with GSR were in the same direction as with plethysmograph but nonsignificant. Schouten (1976a) found that name stimuli had no effect on his skin resistance measure, but he did find that when sound stimuli were used, there were significantly *fewer* GSRs when the agent was being stimulated than during control periods. Schouten interprets this result as an increase of basal skin resistance (BSR) during the sending periods, indicative of lower sensitivity to *sensory* stimulation during periods of extrasensory stimulation. Why such an effect did not appear with name stimuli remains obscure. Sanjar (1969) used both measures only in a preliminary experiment. Although GSR seemed somewhat more effective than plethysmograph, the results were not impressive and controls were lax.

5.2.1c. Conclusion. Autonomic responses to remote stimuli of emo-

tional salience to agent and/or percipient have been demonstrated with a fair degree of consistency in properly designed experiments when the measure is the plethysmograph, but not when it is the GSR. Although I am by no means an expert in autonomic physiology, I know of no physiological reason to expect different results with these two measures. Experimenter effects may be responsible for some of the difference, but this explanation cannot readily account for the relatively superior results with plethysmographs in Tart's and Schouten's experiments.

The failure of Schouten to find significant plethysmograph results with tone stimuli suggests that stimuli must have either emotional valence or cognitive meaning to be effectively transmitted. On the other hand, the tendency of neutral names to be almost as effective as emotional names in the work of Schouten and of Dean and Nash, and the apparent transmission of information on pseudoshock trials in Tart's experiment, suggests that a stimulus need not have emotional impact to get through. Perhaps there is a generalization effect involved; i.e., if *some* of the stimuli in an experimental condition are of an emotional nature, neutral stimuli interspersed among them take on at least some of this emotional quality themselves and are also transmitted. Schouten's sound stimuli would not be predicted to be effective by this hypothesis because they were not interspersed with the name stimuli and (apparently, at least) did not arouse a specific emotion themselves.

5.2.2. EEG: Show Me Your Sine

A smaller number of experiments have attempted to influence central as opposed to autonomic nervous system responses by means of remote stimulation. The first substantial effort to determine whether the EEG could be influenced in this way was Tart's (1963) experiment discussed above. Using period analysis, he found a general desynchronization of the EEG during experimental (shock and pseudoshock) trials as compared to control trials, but the difference was significant only on the variable that measured EEG activity superimposed on the basic waveform. This is the most sensitive of the measures provided by period analysis.

5.2.2a. Stroboscopic Stimulation. The most common procedure for testing remote EEG effects has been to drive the agent's EEG with a strobe device and to determine whether comparable changes simultaneously appear in the brain waves of a sensorially isolated percipient. The first report I could find of such an experiment was by Duane and Behrendt (1965), who claimed remote driving of EEG alpha with 2 of 15 pairs of identical twins.

In a more sophisticated experiment, Targ and Puthoff (1974) ran-

domly interspersed 12 trials of 6Hz and 16-Hz stimulation, respectively, with 12 control trials. Although no photic driving was demonstrated in any of the six percipients, alpha blocking was observed in one of them during the experimental trials. Confirmatory research with this subject revealed continued significant alpha blocking with 16-Hz stimulation of the agent, and the same trend approached significance with 6-Hz stimulation. An attempted independent replication with one subject and omission of the 6-Hz condition yielded some significant effects based on post hoc analyses of EEG spectra, but the pattern of results differed from session to session and thus cannot be considered a clear confirmation of Targ's findings (Kelly and Lenz, 1976a).

5.2.2b. Evoked Potentials. Lloyd (1973) reported a pilot study in which an average evoked response (AER) occasionally was elicited in response to a single flash of light presented to a remote agent. However, the design of this experiment was criticized by Millar (1976), who proceeded to conduct his own experiment under better controlled conditions. He found no evidence of remote AER when the agent was repeatedly submitted to .5-Hz photic stimulation during a 75-second period.

5.2.2c. Conclusion. Attempts to influence EEG by remote stimulation so far have been less successful than attempts to influence blood volume, but the presence of some positive findings should encourage further research. Some of the EEG experiments discussed in section 3.1.1 that were primarily designed to find correlates of ESP behavioral responses could also be construed as involving EEG responses to ESP stimuli. Studies where EEG–ESP relationships are examined on a trial-by-trial basis are particularly relevant (Kelly and Lenz, 1976b; Wallwork, 1952).

6. The Ubiquity of It All

In the preceding sections we have seen a wide range of ESP effects: psi-hitting, psi-missing, variance effects, position effects, precognition, etc. However, all of these effects involve the relationship between each ESP call and the target designated for that trial. In this section, we will examine instances where ESP calls seem to be related in systematic ways to stimuli other than the target, or to patterns in the target sequences.

Results of this type present perhaps the clearest illustration yet of the ubiquity of psi. Almost every conceivable form of psi manifestation has been demonstrated at one time or another. This ubiquity must be taken into account when we finally confront the question of how we can best make sense of the experimental results we have considered in this chapter.

6.1. Displacement Effects: ESP Off Target

In most ESP tests, the subject is trying to use ESP to acquire information about a particular target as distinct from other potential targets. However, it is not uncommon for ESP to miss the target and pick up one or more of these other stimuli, the subject being completely unaware that this is happening. Such "displacement" represents one of the major barriers to the reliable application of psi.

6.1.1. Between-Trials Displacement: Expanding the Space–Time Frame

Between-trials displacement refers to scoring a hit on a target occurring either before or after the real-time target in a sequence of targets. Interest traditionally has been focused on the targets occurring immediately before or after the real-time target, and hitting on such targets is referred to as -1 and $+1$ displacement, respectively. The $+1$ displacement may provide evidence of precognition in cases where targets are selected randomly on a trial-by-trial basis, but this perspective will not be our primary concern in this section.

6.1.1a. Evidence for Between-Trials Displacement. If we can accept its credibility, the strongest evidence for between-trials displacement effects in the parapsychological literature comes from the extensive testing of Basil Shackleton (Soal and Bateman, 1954). In a screening experiment, Shackleton scored significantly above chance on both $+1$ and -1. He continued to score significantly above chance on $+1$ throughout most of his career while scoring nonsignificantly on the actual target and -1. With one sender, however, he reverted to his original habit of scoring significantly on both $+1$ and -1. Most of this latter effect subsequently was found to be attributable to cases where the $+1$ and -1 targets were the same symbol, thus giving him both a $+1$ and -1 hit on the same response. This was called the "reinforcement effect" (Pratt, 1951).

Significant displacement effects have occasionally been found with other subjects, but not nearly as frequently as direct hitting. Russell (1943) found no clear evidence of between-trials displacement in the results of eight major experiments conducted at Rhine's laboratory up to that time. Six of these involved single subjects. However, Mangan (1955, 1957) found a woman who consistently scored significantly above chance on $+1$, while her scoring on real-time targets was inconsistent.

The strongest evidence of displacement in research with unselected subjects comes from "home-testing" experiments organized by G. W. Fisk (Fisk, 1951a, b; West, 1953). Fisk mailed packs of standard ESP cards to 235 correspondents, who tested each other on varying numbers

of runs using a GESP format. The experiment was intended as a screening device to select talented subjects for additional testing under better controlled conditions. A significantly positive overall mean score in the actual targets in this experiment could not have been taken seriously, but scoring on these targets was not significant, although positive. The main finding of interest, which it would be somewhat harder to attribute to experimental error, was highly significant psi-missing on both +1 and −1. Evidence of "reinforcement" was also found in these data. Significant between-trials displacements have occasionally been reported in other forced-choice and free-response experiments, some of which have been described elsewhere in the chapter. However, they form no consistent pattern.

6.1.1b. Between-Trials Displacement in High-Scoring Direct Hitters. Tart (1977a) recently reported that all five of the high-scoring subjects on the ten-choice machine in his GESP learning experiment (Tart, 1976a) showed significant psi-missing on +1 and −1. Although the −1 effect was at least partly an artifact due to the immediate feedback, Tart cited internal evidence possibly suggesting a genuine bilateral psi-missing effect on the +1 and −1 targets. Very similar bilateral psi-missing on +1 and −1 was found in GESP tests with a high-scoring Aborigine woman (Rose and Rose, 1951). Pratt and Foster (1950) found significant evidence of psi-missing on +1 in the DT results of one of Martin and Stribic's high-scoring subjects. This analysis was based only on pairs of trials that included no direct hits. Pairs containing a direct hit revealed a significant excess of +1 hits, but Pratt later concluded that analysis of such pairs for displacement effects was inappropriate (Pratt, Martin, and Stribic, 1974). A comparable anlaysis of pairs of misses contributed by Martin and Stribic's best subject, C. J., revealed different displacement effects for different types of DT or UT tests (Pratt *et al.*, 1974). Two of the three effects involved significant psi-missing on either +1 or −1, while the other involved significant psi-hitting on −1. Analysis of pairs of misses from Gloria Stewart, one of Soal's high-scoring subjects, revealed a significant excess of +1 and −1 hits (Pratt, 1967a). Other high-scoring subjects such as Pearce have failed to show significant displacement (Russell, 1943).

6.1.1c. Conclusion. In the literature as a whole, significant scoring on displacement targets is reported much less frequently than on real-time targets. How much of this is attributable to the fact that displacement effects are analyzed less often than real-time effects is unclear. No consistent relationships have been found between displacmement scores and psychological variables.

A number of subjects who have evidenced strong hitting on real-time targets have shown secondary displacement effects. The nature of such

effects have been inconsistent, but most seem to involve psi-missing on either +1, −1, or both. If one ignores the controversial Stewart data, this type of pattern is most evident in GESP experiments, including, perhaps, Fisk's experiment with unselected subjects.

Tart (1977a) labeled the effect he found as "transtemporal inhibition," likening it to the secondary inhibition of stimuli immediately adjacent to the focal stimulus in all known sensory systems. Since +1 effects in his experiment were most likely precognitive because targets were generated on a trial-by-trial basis, he argued that his results suggested an expanded primary perception forward in time. In other experiments, the expansion of perception could be interpreted either spatially or temporally.

6.1.2. Within-Trial Displacement: Confusing Kings with Queens

A second kind of displacement occurs within a particular trial. In forced-choice experiments, it involves the tendency to consistently call a particular incorrect symbol when missing a particular target, e.g., consistently calling "circle" every time the target is "star." Parapsychologists refer to this effect as "consistent missing." In certain free-response experiments, within-trial displacement involves the evocation of imagery related to control pictures to be used in the judging process.

6.1.2a. Consistent Missing. Significant evidence of consistent missing in card-guessing experiments has been reported by Cadoret and Pratt (1950) and by Timm (1969). However, the most impressive evidence of consistent missing comes from a recent experiment with Bill Delmore, who reports strong visual imagery associated with his ESP responses (Kelly *et al.*, 1975). This "gifted" subject made 10,350 calls of ordinary playing cards concealed by heavy black paper. In addition, he made 1,875 guesses of playing cards projected tachistoscopically at a rate likely to induce mistakes of identification. The subject's overall positive score on the ESP runs was highly significant, and there was significant evidence of consistent missing concentrated in the runs with the highest scores. The most interesting aspect of the data was the fact that the particular errors the subject made were the same on the high-scoring ESP runs as on the visual task, for example, confusion among picture cards (e.g., calling a king a queen) and confusion among colors (e.g., calling a heart a diamond). As expected, such consistent missing effects were not found in high-scoring runs using a "psychic shuffle" procedure where visual mediation was not relevant (Kanthamani and Kelly, 1975). The results of these two experiments together strongly suggest that, at least for this one subject, ESP information is encoded in the same way as visual information in relevant types of ESP tests.

Consistent missing effects have also been found with a between-subjects design. In a correspondence experiment, Fisk and West (1957) invited subjects who were situated in their own homes to guess a common sequence of 12 clock cards displayed at Fisk's home, the order being rerandomized for each test. There was a significant tendency for particular cards to receive the same call regardless of their locations in the sequence. Although no formal statistical test of consistent missing was applied, for none of the 12 targets was the most frequent call the correct one. This kind of consistent missing effect seems to suggest that particular targets "pull" particular responses that may not be accurate.

6.1.2b. Free-Response Experiments. Within-trial displacement to control pictures in free-response experiments can occur, especially when the subject is asked to pick out a target picture from a group of pictures soon after the reception period. Such displacements are frequently reported anecdotally (e.g., Stanford and Neylon, 1975), and some statistical evidence of their occurrence has recently been found in a ganzfeld experiment (Palmer *et al.*, 1977).

6.1.2c. Conclusion. Within-trial displacement effects have never evoked much interest among parapsychologists, but they have been shown to occur in both forced-choice and (more equivocally) free-response experiments. In forced-choice experiments, at least, consistent missing has as much potential information value as direct hitting, and subjects who manifest this aberration possibly could be trained to compensate for it and become outstanding psi-hitters.

6.1.3. Focusing and Holistic Effects: Microscope and Macroscope

The kinds of displacement analyses we have looked at so far assumed that all targets in the sequence are equivalent as sources of ESP information. In this section, I will consider two opposite kinds of situation where this assumption does not hold.

6.1.3a. The Focusing Effect. The "focusing effect" refers generally to the tendency for psi-mediated responses to be focused on particular physical targets in a sequence. The term was coined as a label for a unique scoring tendency found in the data of the "gifted" subject Stepanek (Pratt, 1973). This subject, you may recall (Sec. 1.2.), specialized in guessing which side of a card concealed in an opaque envelope was facing upward. It later was discovered that Stepanek had developed a tendency to make the same call each time certain sides of *some* of the envelopes were presented to him, regardless of the status of the enclosed cards. This finding became of parapsychological interest when the envelopes were enclosed in cardboard covers and focusing on the same envelopes con-

tinued. Then *sensory* focusing began to appear on some of the covers, and this new effect continued when the covers were concealed. The focusing effect began soon after the containers were first introduced in the research and were consistent across different experimental series. Stepanek does not "focus" intentionally, and he claims his attention is always concentrated on the cards.

Pratt (1973) suggests that Stepanek unconsciously utilizes subtle sensory cues to classify exposed containers into two categories, which are responded to extrasensorially when the containers are concealed. However, ESP *might* be involved even when the containers are visible.

No evidence of focusing effects has yet been discovered with other high-scoring subjects. It was not found with Harribance when the targets were ten male or female photographs (Roll and Klein, 1972). Lucas and Roll (1973) asked a subject to repeatedly guess four decks of cards of different types, each card being concealed in an opaque envelope. The subject apparently did not know which deck she was guessing on a particular run. Results indicated a significant tendency *not* to repeatedly call the same symbol on a given card. This looks like the diametric opposite of the focusing effect demonstrated by Stepanek. However, the relevance of this finding to the focusing effect is limited by the fact that there was no evidence of the effect being concentrated on particular cards.

The closest thing I could find to a replication of the focusing effect was the experiment of Fisk described in the last section. West (1953) noted that the consistent missing effect found in Fisk's data was concentrated on 3 of the 12 target envelopes, although no statistical test was reported to back up this assessment.

6.1.3b. Holistic Effects. In an ingenious experiment with Harribance as subject, Child and Kelly (1973) created "unbalanced decks," which consisted of nine, seven, five, three, and one replications of the standard ESP symbols in random permutation. For example, a deck might consist of nine circles but only one star. Harribance was aware of this manipulation in general terms only. His scoring was significantly above chance, but the result was attributable at least partly to a significant tendency to unbalance his calls in the direction of the deck's composition. In other words, if a deck contained large numbers of stars and crosses he would tend to call large numbers of stars and crosses on that run. This effect was not simply an artifact of direct hitting, because it was independently significant when only misses were analyzed. These results suggest that Harribance responded holistically to the deck more than he did to the particular sequence of targets.

6.1.3c. Conclusion. The focusing effect clearly applies to Stepanek, but its generality to other subjects is questionable. Fisk's results with unselected subjects offer some hope in this regard, however, and they

suggest further that particular targets may engender identical calling biases in different individuals. The generality of Child's holistic effect is completely indeterminate because only one unbalanced deck experiment has been reported. This procedure certainly should be tried with other subjects.

6.2. Summary and Conclusion: What Does It All Mean?

It is now time to bring the chapter to a close and take stock of where we have been. How can we further integrate the over 700 references reviewed so far in the chapter and what guidelines can be suggested for the next stages of inquiry?

6.2.1. The Unreliability of ESP Scores: A Nemesis Revisited

Early in the chapter I made the point that ESP scores are quite unreliable, even by the standards of reliability customary in the social and behavioral sciences. The signal-to-noise ratio is very low, and one must endure a great deal of static to hear any message that may be present.

The implications of this fact can hardly be understated. Many psychologists, for example, are simply unwilling to study unreliable variables because of the problems they present. The willingness of parapsychologists to accept the challenge such variables offer is one of the major characteristics that distinguishes them from most other scientists.

In practice, the unreliability of ESP scores means that a large amount of data must be collected to obtain a small amount of information. Much dirt must be panned before any gold is discovered. At the level of relationships between ESP and other variables, we saw that almost never have such relationships appeared consistently in different experiments. As Rao (1977) has recently pointed out, it is unclear whether the null results in some cases is evidence against the validity of the relationship or whether the "ESP scores" in these experiments simply did not reflect any ESP. In the beginning of the chapter, subtle differences in methodology and sampling variability were cited as other plausible reasons for the inconsistency. However, the ability to explain this unreliability does not make it go away or make it any less frustrating to the theoretically minded researcher.

Nevertheless, our cloud has an important silver lining. Low or inconsistent reliability is not the same as no reliability. We saw numerous instances throughout the chapter where researchers were successful in replicating the results of their own previous experiments. Independent replications have also been reported from time to time, although not as frequently as "in-house" replications. (This ratio is not surprising, given

the greater opportunity for subtle methodological differences to intrude into independent replication attempts). In short, what this reliability means is that *trends* frequently emerge in the data. For example, we saw that some variables are better predictors of ESP scores than are other variables. We saw several instances where relationships which were usually not significant almost always occurred in the same direction when they were significant. These patterns are the elusive gold nuggets we have been seeking amidst the debris. They are what justify the tedium of our expedition into the kingdom of the unreliable.

On the other hand, I would be remiss not to point out the dangers of such a strategy. The human mind has a natural and irresistible urge to abstract order out of chaos, even when there is no order to be abstracted. Occasionally, relationships are significant simply by chance, the infamous "type 1 error" that statisticians talk about. Might not we find "meaningful" patterns of relationship between psychological variables and "scores" taken from a random number table? On a couple of occasions I have generated such relationships myself as a kind of control condition for an ESP experiment, and I have always found that the ESP scores provided more, and more meaningful, relationships (meaningful, at least, to me).

There really is no definitive way at present to resolve the issue raised in the previous paragraph, but that does not mean we should not be keenly aware of it. Like many things in life, the proof of the pudding will be in the eating. Some of the patterns I have pointed out in this chapter will collapse as more data are collected. Others, I am confident, will survive, although I would not wish to speculate which ones they will be. Thus, as the process of research continues, it will become clearer and clearer where the gold is. Such knowledge, in turn, will teach us how to make ESP scores more reliable so we can find still more gold.

Parapsychology has traditionally found itself in a vicious circle: We can't get reliable ESP scores until we discover and then "understand" the functional relationships between ESP and other variables; but we can't discover these functional relationships without reliable ESP scores. By capitalizing on the admittedly low reliability we already have, the cycle can be reversed. What we are seeing in contemporary parapsychology is the beginning of this shift in equilibrium: The vicious circle is gradually turning into a snowball.

6.2.2. ESP and Predictor Variables: The Pattern of the Patterns

Throughout the chapter, but especially in sections 2 and 3, I commented upon certain patterns of relationships (or "gestalts," if you will) that seemed to emerge from an examination of several experiments that

addressed similar research questions. I even went so far as to suggest possible interpretations of some of these relationships, although I never meant to imply that they were the only interpretations possible. What I plan to do in this section is carry the process to one higher level of abstraction. Do the patterns themselves fall into patterns that may further our understanding of the factors that influence scoring in ESP tests and thus guide future research? Again, I wish to stress that the interpretations I will propose are not the only ones possible, although they are the most reasonable ones to me.

In a methodological paper (Palmer, 1975), I stressed the importance of distinguishing between factors that influence the magnitude of psi (represented by the absolute deviation of the score from MCE) and the direction of psi (hitting versus missing). I will apply this distinction in the following discussion.

6.2.2a. Factors Affecting Magnitude: Cognitive Processing. In studying the patterns described in the chapter, I got the impression that the variables that most clearly seemed to affect the magnitude as opposed to the direction of psi had something to do with the manner in which subjects' cognitive processes were functioning during the test. The two most successful predictors of magnitude seemed to be spontaneity in the test (Sec. 2.3.2.) and the presence of a hypnagogiclike state of consciousness (2.6.2.). Spontaneity seems to be the primary variable here. Hypnagogiclike states may be expected to encourage spontaneity insofar as they are associated with a breakdown of rationalistic or "linear" (to adopt the current cliché) patterns of mentation.

Spontaneity appeared to facilitate ESP primarily through the vehicle of run-score variance. Most ASC experiments involved free-response procedures with only one or a very small number of trials per subject, so run-score variance could not be computed. What seemed to be happening in these experiments was that the subjects who reported relatively pronounced ASCs were responsible for most of the significant scores, but these scores tended to be all in the same direction in a given experiment. Thus it would seem that situational factors overrode individual differences as determinants of directional trends in these experiments. This is not surprising, because situational factors are more powerful in ASC experiments than in most experiments where subjects' minds are not being "tampered with."

The finding that significant psi-hitting is most likely to occur when subjects violate response biases (4.1.2.) also would seem to support the spontaneity hypothesis, since counterbias responses would appear to be more spontaneous than probias responses. Although there is no experimental evidence of psi-missing on counterbias responses (thus rendering

the assumption that this is a magnitude rather than a deviation effect somewhat equivocal), this is due to the fact that the response-bias hypothesis has simply not been evaluated in experiments where the overall scoring deviation was negative. Rhine's salience effect (4.1.1.) is more clearly a magnitude effect, although it has appeared less consistently than the response bias effect. Rhine speculatively interpreted the greater evidence of psi at the beginning and end of the test unit as attributable to greater spontaneity of response on these trials.

There is also some evidence that the magnitude of ESP scoring is greatest on confidence calls, when they are allowed (4.1.3.). It is reasonable to assume that such calls reflect to a large degree the subject's assessment of his or her cognitive processes during the trial, but the relation of this assessment to spontaneity remains a question for future research. There also is some evidence that "extreme sheep," or persons emotionally involved with the issue of psi, tend to score significantly on ESP tests, some as hitters and some as missers (3.6.1d.). The relevance of this finding to spontaneity is not nearly so obvious as those cited above, but neither is it contradictory.

Finally, one piece of evidence that might be cited against the above interpretation is the fact that graphic expansiveness (a test with face validity as a measure of spontaneity, at least in free-response tests) does not seem to predict the magnitude of ESP scoring (3.7.2.).

6.2.2b. Factors Affecting Direction: Social Psychological Variables. The variables that seemed to most consistently discriminate hitting and missing tendencies were almost exclusively social psychological in nature. The most obvious of these are the effect of the experimenter (2.5.2.) and the identity of the agent (2.5.1.). The effect of providing or depriving subjects of knowledge of their results (2.4.2.), strongly adverse environmental conditions (2.4.1.), and attractiveness of the targets and/or experimental procedure (2.2.1.) also fit into this category. A number of individual difference variables were also interpreted as reflecting the capacity of the subject to be comfortable in the test situation. These included neuroticism (3.2.1.), extraversion (3.2.2.), intelligence (3.3.1.), and the belief that ESP can occur in the test (3.6.1). The idea that psi-missing can be encouraged by adverse psychological conditions is by no means a new one (e.g., Rhine, 1969b), but it draws support from the data presented in this chapter.

A variable that reflects both social psychological factors (induction of a confident attitude) and cognitive state factors (induction of an ASC) is hypnosis (2.6.1.). Generally speaking, hypnosis seems to affect direction more than magnitude, but some studies also suggest an effect on magnitude per se (e.g., Honorton, 1964, 1966; Honorton and Krippner, 1969).

Another variable that seems clearly related to ESP scoring but that is

somewhat difficult to classify in one category or the other is age (3.5.2). Rhine's (1941a, 1942) precognition research, where he generally found psi-hitting in children and psi-missing in adults, could well reflect social psychological factors, especially since in at least some of this research special efforts were made to create a positive social environment for the children but not the adults. In most other research, younger subjects scored significantly above chance and older subjects near chance. Thus magnitude and direction effects cannot be distinguished in these studies. Since people tend to become less spontaneous as they grow older, I would expect this to prove to be a magnitude effect rather than a direction effect, but that remains to be seen.

6.2.2c. Some Equivocal Patterns. A third set of predictor variables have yielded significant results with relatively great frequency, but the results have either been contradictory or have made little psychological sense. These include mood or affective state variables (3.7.), EEG alpha density (3.1.1.), and "cognitive style" variables such as creativity (3.3.3.), imagery ability (3.3.4.), and field dependence (3.3.6.). In some cases, especially creativity, imagery ability, and EEG alpha, part of the problem may be inadequate measuring techniques or the inability to adequately define the underlying variables being measured. It is also likely that these variables interact with other, uncontrolled variables in determining ESP performance. The plausibility of this latter point is reinforced by the fact that some interactions have been demonstrated in ESP experiments between these variables and other predictors that have been treated systematically. Mood has been shown to interact with personality variables in the research of Nielsen (3.7.1a), and field dependence and graphic expansiveness were shown to interact with types of ESP test in the research of Buzby (3.3.6) and Humphrey (3.7.2), respectively.

6.2.2d. Physical Variables: Nothing Cooking. Among those variables that seem to show little or no relationship of any kind to ESP scores, the most apparent cluster consists of physical variables. ESP scores do not seem to be affected by the distance of the target from the percipient either in space (2.1.) or in time (2.2.), the physical characteristics of forced-choice targets (2.3.1.). Physical variables only seem to influence psi insofar as they have secondary psychological effects.

6.2.3. The Ubiquity of It All: Is ESP Really ESP?

Throughout the chapter I have been making certain implicit assumptions about the nature of the psi process. These assumptions are in part an outgrowth of the term *extrasensory perception*, which implies a kind of analogy between ESP and known sensory processes. More specifically, we have been conceptualizing ESP as the ability to acquire infor-

mation from sources not available to our known senses. This, in turn, implies transmission of information through some kind of channel from a source to a receiver.

At first glance, it seems perfectly reasonable to postulate such a model. After all, what a significant score on an ESP test seems to tell us is that information has been acquired, in much the same way that a student getting a certain proportion of the questions correct on a history exam tells us that he or she has acquired information about history. The problem is that in the case of the history course, or in any other case where sensory modes of information acquisition are operative, we have highly predictive theories that clearly specify how the information gets from the source to the receiver—physical theories of light, sensory physiology, etc. We have theories of this type in parapsychology, but they are very poorly developed and have little or no empirical support. We simply do not know how psi information is transmitted from source to receiver, and until we do, it is hazardous to take it for granted that such transmission occurs at all.

Another factor that should give us pause in prematurely embracing transmission models of ESP is the failure to detect any real limits to the manner of its manifestation. Subjects can score above chance, below chance, both, or neither. Their responses can relate to the intended target or to some other target in the sequence. It matters little whether the target exists in the past, present, or future, or how far away it is from the percipient. ESP can occur without the percipient's intent (as in Stanford's PMIR) or even without the subject making any voluntary response (as in studies of physiological ESP responses).

Given all this ubiquity, is it really that much of an inferential leap to add to our list synchronistic correspondences in nature (i.e., so-called meaningful coincidences) that do not involve the participation of a living mind or brain at all? In fact, wouldn't it really be more parsimonious to do so? While it is true that such synchronistic phenomena have not been as well verified as ESP, might this be simply because we have been so brainwashed by our transmission models that we have not sought to study them? There certainly is enough anecdotal evidence to justify such an examination.

Other anomalies in ESP data, although potentially explainable in terms of a transmission model, nonetheless strain that model. Rao's (1965a) differential effect looks more like some homeostatic principle in nature than the reflection of some psychological process affecting the processing of extrasensory information. In a similar vein, Nash and Nash (1963) have pointed out that the magnitude of psi-missing tends to match the magnitude of psi-hitting in so-called high aim–low aim ESP tests

with more than two response alternatives, despite the fact that more psi (so to speak) would seem to be necessary to produce a given negative deviation than the same positive deviation in such a test. Significantly low run-score variance (e.g., Rogers and Carpenter, 1966) does not follow readily from a transmission model, despite some evidence for a "cancellation effect" (see Sec. 4.4.1c). Finally, the provocative findings subsumed under the heading of "experimenter psi" (2.5.2d) burden the transmission model with some assumptions that can at best be called unwieldly.

My intent here is not to suggest that we perfunctorily abandon the transmission model, but only that we keep our options open and our construct systems flexible. Indeed, synchronistic theories of psi are showing signs that they may be coming of age. The most visible proponent of this viewpoint has been Koestler (1972). The skeleton of a synchronistic theory of psi has recently been proposed by Lila Gatlin (1977), and Rex Stanford (1977b) seems to be moving in this direction with his new "conformance theory."

I could elaborate further on these points, but this is a chapter on research findings, not theory. I will leave it to Dr. Rao to carry the ball from here!

7. *Acknowledgments*

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