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VERBAL AND PERFORMANCE SKILLS IN RELATION TO ESP

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VERBAL AND PERFORMANCE SKILLS IN RELATION TO ESP

by

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ABSTRACT

Forty women were given a battery of psychological tests in order to obtain nine scores each for performance abilities and verbal skills. The tests included the Wechsler Adult Intelligence Scale (WAIS), an advanced vocabulary test, Purdue Pegboard, finger maze, and a modified Strong-Campbell Interest Inventory (SCII) introspective verbal and performance scale. Each woman also completed one verbal and one performance clairvoyant ESP test. Tests included 72 verbal trials to name six different color targets and 72 performance trials to place these targets in the correct color-coded letter-type chutes in a wall. Women were asked their personal color preferences among the color samples before the test began. Both subjects and experimenter filled out mood scale questionnaires before the ESP session and after it was completed.

There were no significant overall ESP results. However, by using signal detection theory to examine the tendency of psi-missing in the experiment, five of the six colors used as targets in the Verbal ESP (VSP) and Performance ESP (PSP) conditions showed a significant missing effect. Two of these findings occurred with VSP (orange and purple--nonpreferred colors) and three with PSP (red, green, and blue--preferred colors). VSP results with the

color purple were highly significant (t = -2.95, 39df; p = .003).

Two scoring techniques were used with the non-linear targets: hit and miss data, and proximity scoring (closeness of responses to targets). Pearson product moment correlations were obtained between VSP and PSP hit and proximity deviation scores and the 18 cognitive scores mentioned above. A test of significance of the difference between the two coefficients for each set of scores was also obtained.

The most significant correlation existed between VSP and modified SCII introspective verbal score. Both scoring techniques confirmed this finding: higher verbal introspective score--higher VSP scores and significantly negative correlations with PSP scores. Significance of the difference between coefficients were p = .001 with hit deviation scores and p = .01 with proximity scoring. SCII performance scores were negatively correlated to VSP and more positively correlated to PSP. Object Assembly scores (WAIS performance subtest) were negatively correlated to hit deviation VSP scores with a difference between coefficients significant at a p = .05 level. Using proximity scoring data, significant correlations existed between VSP and two WAIS verbal subtests, Information and Vocabulary. There was a significant negative correlation between PSP and the Comprehension subtest.

Overall correlations indicate that higher verbal

scores were associated with higher VSP scores; higher performance scores were associated with higher PSP scores; lower verbal scores were associated with lower VSP scores; and lower performance scores were associated with lower PSP scores.

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CHAPTER I

INTRODUCTION

In most discussions of thinking and problem solving, as well as extrasensory perception (ESP) and the human information processing system (Irwin, 1978a, 1978b), verbal and visual memory codes have been emphasized. There is a third type of memory code, however, which preserves motor activity. It has been called an enactive code (Bruner, Oliver, & Greenfield, 1966) or motor program (Keele, 1968). It will be necessary for us to understand skills, as well as images, if we are to develop a thorough investigation of the human information processing system.

Motor Learning

Motor codes are different from visual and verbal codes in the way they function and this difference has tended to exclude them from the study of thinking. Motor codes require reduced involvement of attention in both their storage and performance. It is just this difference which may prove important to their relationship to ESP functioning. If ESP operates along some specific information channel, it is reasonable to assume that it is "active" fairly consistently. However, one may not always

be consciously aware of its activity. ESP may operate more frequently on an unconscious level, in the service of needs, as in Stanford's psi-mediated instrumental response (PMIR) model (1974).

In cognitive psychology, motor codes have been somewhat neglected just as right hemispheric brain functions were largely ignored in physiological studies for fifty years while neurologists primarily examined the left hemisphere where damage could cause verbal impairment. Research on verbal retention is much more sophisticated methodologically than that on motor retention. In general, it appears that continuous motor responses are retained much better than verbal responses whereas discrete motor responses show a similar retention to verbal responses (Adams, 1967). Adams also gives us a clear distinction between motor and verbal learning:

> Motor behavior is bodily movement . . . . Speech is the motor behavior involved in the production of sounds, and it is comprised of lip, tongue, and jaw movements, and the muscular control of vocal cords . . . . Verbal learning, on the other hand, is the acquisition of new symbolic relations, not new motor movements.

Methodological bias in reseearch can create false impressions within society. As Guilford (1959) puts it:

> Verbal comprehension is undoubtedly a very important trait in a verbal civilization, but its relatively strong predicitive power and its obvious role in education has often obscured the importance of other intellectual factors. The overemphasis upon it in testing and in education may have led to serious neglect of other desirable qualities in the general population.

In education, as well as research, verbal skills have been deemed more important and valuable than performance skills. School populations are separated early into those who score high on verbal tests and those who score low. If the population were separated, taking performance tests into account, it might redress the bias in favor of the verbally oriented students by creating hands-on, how-to-do courses along with reading and writing assignments. Students could then be assigned to instruction from which they would be most apt to benefit and universities might not exclude prospective students solely on the basis of low verbal aptitude. In personnel testing, multiple aptitude test batteries are given, which include nonverbal and performance skills (Guion, 1965). Achievement batteries for college entrants do not take performance tasks into account.

Piaget and Bruner indicate that infants get initial information about their world by manipulating objects which they hold in their hands (Piaget & Inhelder, 1969; Bruner, 1968). This fundamental relationship between the child and its world exists as the perceptual experience emerges, followed by language. Because our understanding of ESP is considered still in its infancy, it may prove enlightening to try to find a way to examine these enactive codes or motor programs which appear to be storehouses of our first sense data. ESP information could be stored there too, rarely accessible to verbal description. ESP may very well operate at an unconscious level where an individual would

know how to perform extrasensorially, but not be able to describe that process.

Children learn to code information to a large extent into motor programs. These motor-memory patterns, at an unconscious level, are then stored for later use by the adult. That may be why when we see an adult who can perform an ESP skill, he or she usually does not know how to do it consciously, secure it as controlled behavior, nor to explain it verbally.

Lawther (1977) tells us that the human infant works steadily at motor learning from birth in a rather slow and laborious manner (trial and error). If using our bodies is the ultimate psychokinetic effect--and it may well be, since a conscious decision almost always precedes behavior--one can see how long it takes to get minimal physical skills, such as newborns' abilities to raise their heads, coordinate eye movements, raise head and upper trunk together and reach out and grasp things. Learning to walk usually precedes the more difficult task of learning to articulate words. Everyone must go through these learning processes and it is rather taken for granted, but using our bodies is probably one of the most difficult things we ever have to learn. If this is an act of psychokinesis, then I theorize that ESP phenomena are so massive that they are taken for granted and undefined, as opposed to the current idea that ESP operates at a minimal level and must be viewed through the microscope of statistics.

Kahn (1976) also views psi phenomena as a more natural experience of life which is likely to go unnoticed.

> . . . an alternative to our present concept of psi--(is) one which argues that psi represents a broad process through which individuals are linked in far more fundamental and perhaps presently unimagined ways than by the occasional sharing of unusual perception.

Through adequate mathematical models such as signal detection theory, information theory, and ranked-target scoring, we may be able to lessen the so-called "rarity of psi" and thereby claim some scientific priority for more intensive and serious study of the phenomena.

Kahn realizes that ". . . the idea of mental action at a distance remains peculiarly offensive to the scientific mind" (p. 214) and suggests that what passes as scientific skepticism is often a more basic fear that has its roots in early childhood memory patterns. From the psychoanalytic viewpoint, infantile beliefs of magical actions superseding time and space are repressed in adulthood, but never entirely abandoned. When we are confronted with the possibility of their reality (as in the case of evidence for ESP), it can be extremely anxiety-producing. One needs to be skeptical in analyzing the evidence but the skepticism must not be allowed to become a barrier against changing long-held concepts of reality. We would know very little about the physical universe had physicists not been skeptical and willing to change their worldview with new discoveries.

Dissociated states, such as hypnosis, dreams,

sensory deprivation as in the ganzfeld, have been shown to be psi-conducive states (Honorton & Krippner, 1969; Ullman & Krippner, 1969; Honorton, 1977). It seems that as one has less attention on the body, ESP is facilitated. Bartlett (1947) stated, concerning the muscular part of a skilled operation: "The more efficient it is, the less is known about it." British psychologist U. T. Place (1954) states the same idea in another way: ". . . we say frequently of someone whose skill is already well developed that his performance suffered because he paid too close attention to what he was doing."

Posner (1973) tells us motor codes are used in such activities as riding a bicycle, batting a ball, or using a typewriter without looking at the keyboard. Also, one may be able to arrive at a specified location by making correct turns in walking there, but not be able to describe the route beforehand. These operations are not simple and require complex coordination and "programming." One may show another how to perform in one of these situations, but basically people must use their own bodies and learn for themselves through practice. Motor skills do not require constant vigilance once they are learned and it is just this reduced involvement of attention in motor code storage and performance that makes it different from other memory coding and possibly more amenable for ESP processing.

Prior to Roll's article on ESP and memory (1966), there were only specualtions on the involvement of memory structures (verbal and visual) and processes in ESP

(Marshall, 1960; Price, 1964). However, a role for memory in ESP has always been anticipated by psychical researchers from F. W. H. Myers (1903/1961) to J. B. Rhine (1934/1973).

After twelve years active investigation of memory and ESP using word-pairs with high and low association words; symbol, digit or word recall lists; story recall; and similar linguistic techniques, we know little more now than when we started. We know that memory and ESP are both affected by psychological factors such as mood, attitude, and attention. A review of findings to date can be studied in Rao et al. (1977). Rao indicates on page 197 of the same journal that his group still feels that similar processing of information may be involved in both memory and ESP and that we should continue in our attempts to understand memory-ESP interactions.

I agree with Rao that memory-ESP research may hold great promise for understanding the ESP process, but I believe that memory work must include enactive codes, as well as verbal and visual ones. This seems especially important for ESP because of the evidence that ESP can show itself by correct autonomic physiological responses, which are not brought to consciousness and cannot be verbalized.

Autonomic Responses

Stefan Figar, a Czechoslovakian M.D., neurophysiologist, and expert in plethysmography is not now nor has ever been interested in psi research. However, he did make

an accidental discovery in his work which he felt could be of use to parapsychologists (Figar, 1959). The plethysmograph measures fluid volume in the finger and thus shows autonomic changes and is, like the GSR, a measure of affect. A chart recorder plots these changes.

In Figar's experiments, he would connect a person's hand to the plethysmograph and obtain a straight baseline recording. Then he would give the person a card containing instructions to multiply two numbers mentally. As soon as the subject began to do mental arithmetic, there was a rapid vasoconstriction in the finger. Figar began to observe something odd with several of his subjects. When he simply thought of giving the arithmetic card to his subject, a vasoconstriction would occur. It was as if the person read Figar's mind and knew the card was about to be presented.

Figar was so impressed with this finding that he placed two subjects on either side of a curtain to see if there were simultaneous vasoconstrictions in both subjects when he presented arithmetic cards to only one of them at random times. It worked and he felt so strongly that some form of psi communication was occurring that he offered his findings to psi researchers for a further look into their implications.

Nash & Nash (1962) attempted to replicate this latter work by Figar but instead of placing their subjects on either side of a curtain, the two members of ten husband and wife teams were separated by a distance of seven miles

during experiments. Spontaneous responses under these conditions gave only chance results.

Dean (1962, 1966, 1967) has done the most extensive plethysmographic work in relation to ESP studies. Mental arithmetic didn't work with his engineering college students and so he tried names. He used five personal names submitted by the sender, five from the receiver, five phonebook names, and five blank cards in a randomized deck. The receiver was hooked up to a plethysmograph and only knew that a sender was in another room looking at the names on cards.

Twenty-second sending periods were marked on the plethysmograms. Independent judges, blind to procedure, measured the vasoconstrictions in each period. Receivers produced significantly larger vasoconstrictions to the names they had submitted (p = .012), contrary to Dean's hypothesis that they would give larger reactions to senders' names, since sender could not discriminate receivers' names from phonebook names. Combined personally known names differed from phonebook names and blanks at a significance level of .004. Dean & Nash (1967) collaborated their efforts and confirmed these original findings by Dean.

In most ESP tests of the card-calling variation, results tend to decline over time due to boredom. Dean's experiments held up over time and showed no decline effects. He felt this was so because the ESP task was completely unconscious and therefore it was not necessary for the conscious

mind to overcome boredom in order to continue to score in a consistent manner.

Tart (1963) tried an ingenious approach in order to evoke physiological responses in his subjects. An assistant administered fifty randomized trials where Tart would or would not receive a two-second, painful electrical shock to his ankle unexpectedly. Subjects in another room were hooked up to GSR, EEG, and plethysmographic equipment and responses were measured for each trial. Plethysmographic responses showed a significant difference between Shock and Nonshock trials compared to their respective controls. There was greater subject activation during Nonshock trials for all three physiological measures. Subjects could also press a key to indicate what they thought might be a Shock trial. These consciously-selected choices did not differ from chance.

Beloff (1974) summarizes some of the findings in physiologically oriented ESP research. He claims Dean's experiments were "slight affairs" and assumes EEG (alpha and evoked potentials) will yield the most rewarding results in this direction. After more than twelve studies of the EEG in respect to ESP, findings have been contradictory and more or less abandoned. We are still in search of a physiological index for ESP.

Hypotheses

A different approach to the problem of possible

relationships between ESP and cognitive factors is now proposed. The purpose of this study is to administer a battery of psychological tests to forty adults in order to obtain verbal and performance scores. Each subject will also complete two ESP tasks, one requiring a verbal response and one a matching (performance) response.

There are four hypotheses to be tested in this experiment:

1. Subjects whose test scores on performance are high, as compared to their verbal scores, will score higher on a matching technique for responding to ESP targets than on a verbal technique.
2. Those with higher verbal scores will score higher on a verbal response ESP test than on a performance ESP test.
3. By using psychological test batteries, it will be possible to differentiate between women who have a higher degree of verbal abilities or performance skills.
4. In the matching test, better results will be obtained by use of the left hand than the right. (All subjects were right-handed.)

Comparison of Verbal Responses and Matching Techniques in ESP Research

Considerable work has been done since 1937 providing us with personality correlates to ESP ability (Mangan, 1958; Eysenck, 1967; Schmeidler, 1975; Palmer, 1977). Psychological variables such as intelligence, interest ratings, introversion/

extraversion, expansion/compression, level of adjustment, combinations of personality correlates, expectancy, belief attitudes, moods, Rorschach adjustment ratings, frustration reactions, and value ratings have been studied by several experimenters in different laboratories. This has been one of our most productive areas of research and has contributed to parapsychological theory.

Less work, however, has been done on cognitive variables and their correlation to ESP ability. Most of the cognitive work has been done in memory, mental imagery, visualization, and associative processes. Attempts to localize psi processing in the brain include studies of brain-wave activity and hemispheric lateralization.

Psi representations may consist solely of physical behavior without any associated introspective awareness. Such activities have been referred to, since the beginning of psychical research, as "automatisms." For instance, it was automatic writing (holding a pen and allowing it to write without conscious thought of what was being written, i.e., by unconscious muscular action) that provided all the cross correspondence scripts, which many still consider the best evidence obtained so far for the case of survival of the human personality beyond death (Murphy, 1961).

Dowsing for water is a common practice today. Dowsing for other natural resources is not as well publicized but anecdotal material indicates that this has been done successfully, also. In fact, people through the centuries

have been using dowsing rods and pendulums to obtain all sorts of information that they could not obtain from conscious thought.

Other examples of automatisms are tilting tables and/or moving planchettes which sometimes give messages of a veridical nature of which none of the participants are consciously aware. Researchers have witnessed and theorized about these automatisms since the nineteenth century.

Psychologists could compare these unconscious expressions of psi information, for example, moving out of the way of a falling object without knowing it is falling, to expressions of unconscious drives and conflicts, for example, in psychosomatic symptoms and instances of conversion hysteria. Interest in body language suggests that people also use their bodies to express conscious material. Mahl (1967) states that people often express themselves more openly and honestly through their muscular movements than through verbalizations.

In the 1930s there was a controversy in ESP research as to whether verbal responses or matching techniques produced better ESP results. Tyrrell (1936) was probably the first experimenter to develop an ESP research design specifically to examine this problem of whether a more motor (and less conscious) mode of choice-response or judgment would favor success superior to one involving conscious choice, as in card-calling tests. He had been doing card-calling tests with his excellent subject, Gertrude Johnson, when he hit

upon the idea of constructing an apparatus (Tyrrell, 1938) which, in his words,

> . . . allows for the use of a motor response. This is not necessarily an advantage for all subjects, but is an advantage where aphasia appears connected with the condition of the subject under test, as is not infrequently the case.

A brief description of Tyrrell's devices, pointer and electric machine, as well as all ESP techniques used in the work described below, are given in Appendix 1. Results of his original attempts to allow for instrumental responses to ESP trials, which were highly significant, may be seen in Table 1. (Results of all the following experiments are summarized in Table 1.) Today, manually operated machines are created for training, as well as testing, ESP results (Tart, 1966, 1976; Targ, 1972), but typical learning curves have not been achieved. A reliable training device is yet to be invented.

Woodruff & George (1937) tested seventeen people in a verbal calling procedure and two matching procedures. These three procedures were also carried out with cards totally screened from subject's view, making six conditions in all. ESP was confirmed in the experiment and the highest total score came from the open matching technique. In 78;850 trials, the calling procedure yielded a somewhat higher average than the matching technique.

These experimenters claimed that conscious attention was important to the significant results of their experiment.

Since some subjects did outstandingly better than others, they commented on the individual differences in subjects performing under different conditions. In the present experiment, one aim is to test individual differences as far as verbal and motor skills are concerned.

Gibson (1937) reported a significant psi-hitting result (positive deviation from chance) in his experiment which involved 59,000 trials. He obtained a higher average score for matching techniques than for verbal. The BT technique was not used, which may have accounted for lower scores in comparison with Woodruff & George. Subjects achieved their poorest results when they were not allowed to handle the cards themselves in the matching technique and when positioned a longer distance away from experimenter in the verbal GESP test.

Price (1938) tested sixty-six blind and forty sighted children using two calling techniques and two matching techniques. Blind subjects did consistently better than the sighted, but not to a statistically significant degree. Overall statistics showed a positive deviation of 1,296 on 52,975 trials with an average of 5.61 hits per 25 (MCE = 5 hits per 25 trials). The critical ratio was 14.06 and the probability of chance occurrence about 10^{-44}. The matching procedures yielded slightly higher averages than calling procedures. There was a significant difference in favor of enclosed cards (BT and BM) over open techniques.

Price & Pegram (1937) used both sealed and open cards in testing blind subjects only. Twenty-eight of 66 subjects had significant psi results. Sealed cards worked better than open ones. Scores are not broken down into specific techniques but in 27,325 verbal trials, an average score of 5.75 was obtained for each run of 25 trials and an average score of 5.77 was obtained in 14,900 matching trials. The 28 significant scorers had a slightly higher average on matching trials (6.26) than on verbal trials (6.21). A technique called matching piles (described in Appendix 1) was used along with OM and BM.

Pegram did a 50,000-trial study with children, which is unpublished, but summarized in Pratt et al. (1940). With psi-hitting results, she obtained a higher average (5.39) on 20,000 matching trials than the average of 5.14 obtained in 30,000 verbal trials. She attributed the chance scoring on GESP (verbal) to the circumstance that it came first in the experimental session and therefore suffered from an initial need of adjustment by subjects to experimenter. This contradicts most ESP data, which tend to show that first trials are generally more successful. Techniques will be counterbalanced in the present experiment to prevent order effects which distort results and mask the true state of affairs.

Humphrey & Pratt (1941) tested 37 college students using five different ESP procedures involving a total of 50,025 trials. Only one procedure, open matching chutes,

gave independently significant results ($p < .001$) and that is the technique chosen for the present experiment. Humphrey devised this procedure using ESP cards. Five key-cards were visible to subjects over each of five openings. Their task was to sort 500 envelopes (with target cards sealed inside) into their correct slots. In other words, they were to match the hidden symbol in each envelope with one of the key-cards, drop it into that opening, and then the card would pass through a chute into a designated box in the next room.

Other techniques included a GESP calling method, a blind matching method, and a novel procedure using a marble machine constructed by Scherer, as described in Appendix 1. Subjects using the marble machine in situations which allowed for spontaneity, produced an average run score of 7.15 for $p = .00004$ (Scherer, 1948).

The other procedure used, which is not included in Table 1, was a precognition test in which subjects' responses to 250 card trials were recorded by them on sheets and sealed in opaque envelopes. After the sealed envelope was given to experimenters, a random order of targets was generated, recorded and then checked against responses made previous to the randomization.

Most of the 37 subjects completed 500 trials in each condition. Overall test results yielded $p = .01$ with a negative deviation from mean chance expectation (psi-missing). This large number of trials per subject could have been responsible for such significant psi-missing results.

This may have occurred because of several factors, including chance, but most likely subjects or experimenters, or both, became bored and scoring rates declined. This is not uncommon in ESP tests with many forced-choice trials. It was probably difficult, if not impossible, to maintain interest over such a large number of trials and there was little room for spontaneity in these ESP tests. Novelty and spontaneity have been shown to be important factors over the years for obtaining significant psi-hitting results.

Subjects expressed a definite preference for the open matching chutes. They seemed to like this procedure for several reasons. It was simple and direct; they were alone and in complete control of the handling and distribution of the target envelopes; the response allowed for a degree of spontaneity; and rational factors were minimized as the envelopes disappeared from view as soon as a choice was made.

In the present experiment, subjects were standing (Humphrey's subjects were seated) and making significantly fewer matches, and it was felt this would cut down on boredom and allow for increased spontaneity. Another reason for having subjects standing is indicated by Nash (1976). Forty students completed four runs of four trials each where they were instructed to enter an empty room, stand in the center, count to five, then select any corner, walk to it, and touch it. In random order, experimenters

concentrated on a particular corner of the room. First and second trials were most effective. A chi-square test of total scores for the four trials yielded a result with probability of less than .01.

After evaluation of the above studies, the results of which are given in Table 1, Pratt et al. (1940) indicated that both means of response were equally efficacious. This finding is questioned for the following reasons:

1. Many personality correlates to ESP ability have been designated (Schmeidler, 1975). The personality/ESP research was usually conducted by measuring certain personality variables, such as expansion and compression, within a group of people who also participated in ESP tests. The population was separated into expansives and compressives and ESP scores for each subgroup were compared.
2. While researchers have been unsuccessful at tapping a way in which memory facilitates ESP ability, they have considered only verbal and visual coding of information. It is possible that ESP information is coded through enactive, unconscious means, that is, motor programs. People may know something in the sense of a motor code without being able to translate that knowledge into another type of code.
3. Unless we separate our population into those with

TABLE 1

VERBAL AND MATCHING RESULTS OF SEVEN EXPERIMENTS

	Tyrrell		Woodruff & George		Gibson		Price & Pegram		Price		Pegram		Humphrey & Pratt	
Verbal	Trials	Av/25[a]	Trials	Av/25	Trials	Av/25	Trials	Av/25	Trials	Av/25	Trials	Av/25	Trials	Av/25
GESP	1,000	5.70			4,535	5.97			24,350	5.47	10,000	4.99	9,550	4.91
DT					8,450	5.49					10,000	5.21		
GESP(1.d)					4,750	5.25								
BT			28,075	6.46					10,675	5.83				
SBT			9,325	6.02										
Overall							27,325	5.75						
TOTALS[b]	1,000	5.70	37,400	6.24	17,735	5.57	27,325	5.75	35,025	5.65	20,000	5.10	9,550	4.91
Matching														
OM			13,475	6.98	6,875	6.67			15,000	5.60	10,000	5.48		
SOM			12,125	6.13										
BM			8,700	5.51	20,690	5.51			2,950	6.05	10,000	5.29	11,550	4.95
SBM			7,150	5.36										
STM					13,700	5.19								
OM Chutes													12,250	4.66
ESP Shuffle											10,000	5.21		
ESP Marbles													7,175	4.87
Pointer	75,600	6.36												
Electric Machine	11,764	6.04												
Overall							14,900	5.77						
TOTALS[c]	87,364	6.20	41,450	6.00	41,265	5.79	14,900	5.77	17,950	5.83	30,000	5.33	30,975	4.83

[a] Mean Chance Expectation = 5.00.
[b] Total number of verbal trials = 148,035; Average hits per 25 trials = 5.56.
[c] Total number of matching trials = 263,904; Average hits per 25 trials = 5.68.

more capability to use motor codes for storing and processing information and those with a preference for verbal coding, it is impossible to answer the question as to whether verbal or matching techniques are best for getting at ESP information.

In Table 1, Humphrey obtained psi-missing results on her open matching chutes procedure at a significance level of .001. To add these results to all the psi-hitting results lessens the overall difference between verbal and matching techniques. Therefore, omitting the Humphrey data gives a slightly larger difference: Total number of verbal trials = 138,485; average hits per 25 trials = 5.67 and total number of matching trials = 232,929; average hits per 25 trials = 5.82. This is a difference of .15 as compared to .12 before omitting the psi-missing data.

Table 2 gives the verbal and matching results by specific techniques. BT verbal technique was used in the present experiment and OM chutes were used for the matching technique. BT is a basic clairvoyant technique where experimenter handles each concealed target while subject, in another room, gives a verbal response to each target when a light signal is presented. This technique and OM chutes are described fully in Chapter II, as well as in Appendix 1.

One other experiment may be of interest in terms of movement during matching techniques. Stuart (1938) determined that his 41 subjects did better when they matched ESP

TABLE 2

VERBAL AND MATCHING RESULTS BY SPECIFIC TECHNIQUES

Technique	Trials	Av/25
Verbal		
GESP	49,435	5.41
DT	18,450	5.35
GESP (long distance)	4,750	5.25
BT	38,750	6.15
SBT	9,325	6.02
Matching		
OM	45,350	6.18
SOM	12,125	6.13
BM	53,890	5.46
SBM	7,150	5.36
STM	13,700	5.19
OM Chutes	12,250	4.66
ESP Shuffle	10,000	5.21
ESP Marbles	7,175	4.87
Pointer	75,600	6.36
Electric Machine	11,764	6.04

cards at their preferred rate of movement rather than faster or slower. The "normal tempo" of subjects was found by having them tap out a 3/4 rhythm as the experimenter adjusted a metronome to their speed. Subjects deposited envelopes into the OM chutes in the present experiment at their preferred rate of movement.

CHAPTER II

METHOD

Subjects

Forty subjects were preselected by the experimenter. She tried to select twenty women who use motor skills in their daily lives (for example, musicians, carpenters, painters, dancers, and so forth) and twenty who rely more on verbal skills (for example, college students, writers, teachers, and so forth). The only prerequisites for participating were that subjects be right-handed, preferably between the ages of 25 and 34 years of age, believe in ESP, and in the possibility of their being successful under these particular conditions. Schmeidler and others have shown that belief in ESP is conducive to positive, statistically significant results in ESP experimentation (Palmer, 1971).

Psychology Tests

A battery of psychological tests was given to determine whether each woman was more adept at verbal abilities or performance skills. Each participant obtained scores on a number of verbal and performance subtests, as well as total scores for their overall skill in each area. Along with the objective tests listed below, self-rated scales were also

completed by each individual as to her own motor or verbal preferences. This test, developed by experimenter, was a shortened version of the Strong-Campbell Interest Inventory (SCII) with some additional items. Subjects rated activities from one to seven indicating how much they enjoyed doing things, such as making a speech, repairing mechanical objects, writing a report, and so forth (see Appendix 2).

Both subject and experimenter filled out mood scales before each ESP experiment. They each also completed a postsession questionnaire describing how well they felt the session went (see Appendix 3).

To check for color blindness, samples of the colors to be used in the experiment were placed in front of the participants. Experimenter named the six colors one at a time and subject indicated which sample was which. No subject was found to be color blind. Subjects also placed the color samples in order of personal preference.

Dynamic time imagery has been shown to correlate with good results in precognition tests (Schmeidler, 1964). Knapp & Garbutt (1958) devised the Time Metaphor Test (TMT) and correlated it to achievement motive. A shortened, non-sexist version of the TMT was used to inquire about our subjects' sensing of time (see Appendix 4).

Psychological tests slected for use in this experiment in order to arrive at verbal and performance scores were the 1955 Wechsler Adult Intelligence Scale (WAIS), which consists of 11 subtests; six grouped into a verbal

scale and five into performance. Rate of speed was taken into account for all subtests. Precision of motor skill was also measured by the performance subtests. Scaled scores were used for each subject. Intelligence quotients (IQs) obtained by the WAIS in age groups from 19 to 54 yielded reliability coefficients of .97. Verbal IQs yielded a .96 reliability coefficient and Performance IQs had reliability coefficients of .93 and .94 (Anastasi, 1976).

Correlations between verbal and performance subtests in the 25 to 34-year-old group ranged from .30 to .67 indicating that the scales do have some commonality or overlap. However, differences in scoring among subtests appear to be most frequent and detectable in this age group (Anastasi, 1976).

Factor analyses of the WAIS by Cohen (1957a, 1957b) yielded three major group factors. A verbal comprehension factor had large weights in the Vocabulary, Information, Comprehension, and Similarities subtests. A perceptual organization factor was found chiefly in Block Design and Object Assembly. A memory factor was indicated, which includes both immediate rote memory for new material and recall of previously learned material. Ability to concentrate and to resist distraction may also be involved in this factor.

The verbal test selected to be included in the overall test battery with the WAIS verbal IQ scale was Advanced Vocabulary (V-4), adapted from a Cooperative Vocabulary Test and taken from the Kit of Reference Tests for Cognitive Factors (French, Ekstron, & Price, 1963). This kit of tests is designed for research purposes only. The test is a five-choice synonym test, consisting of words of variable difficulty (see Appendix 5).

The Purdue Pegboard was selected for use in the performance battery because it utilizes no tools, whereas most manual dexterity tests employ pliers, screwdrivers, tweezers, and so forth. The test measures two types of activity:

1. Manual Dexterity--Ability to make skillful, well controlled arm-hand movements in manipulating fairly large objects under speed condi-

2. Finger dexterity--Ability to make skillful, controlled manipulations of small objects, involving primarily finger movements.

Tasks are given for right hand, left hand, and simultaneous use of both hands. Four hundred thirty-seven Purdue college students were given the test and reliabilities for one-trial and three-trial tests were as follows (Tiffin, 1948):

	One trial	Three trials
Right hand	.63	.84
Left hand	.60	.82
Both hands	.68	.86

Reliability coefficients of the one-trial test are sufficiently high to justify its use for many industrial purposes. We used only one trial in the present experiment and the score for use of both hands.

An additional performance test was given to test the motor memory of subjects. A finger maze was constructed according to a sample from Porteus Maze Tests--Vineland Revision (Porteus, 1965). The wooden finger maze is 12" X 16" and the paths are 3/4" wide and 1/8" deep.

The test involved first blindfolding the subject. Experimenter then sat beside subject and with her right hand directed subject's right hand, holding a stylus, along the correct maze path, instructing subject to pay close attention to time and direction of movement. Experimenter then placed subject's hand back at the starting point and asked her to find her way through the maze by memory alone with no visual cues.

There were five possible ways subject could leave the correct maze path. Weighted scores were recorded for every wrong turn or every time subject missed a correct turn. The maze with its scoring system is shown in Appendix 6. Subjects went through the maze until they found the correct path from motor memory alone, or a maximum of

three trials. Thus, a total score for threading the maze was obtained for each subject.

The use of these five tests yielded nine scores each for verbal and performance skills. Each subtest score was considered a predictor variable to be correlated with verbal ESP scores and performance ESP scores. In this way, it was possible to determine the contributions of individual variables, as well as sets of variables.

All of these psychometric measures were administered and scored by a professional psychometrician who volunteered her services for this research. The principal experimenter was blind to psychological test scores and the psychometrician was blind to ESP scores, until subject had completed both testing session. A list of subjects was contacted independently by each researcher. Every effort was made to conduct each individual's two testing sessions within a period of two weeks.

ESP Tests

ESP tests were administered by the principal investigator at the American Society for Psychical Research at 5 West 73rd Street in New York City. Target objects in ESP tests were 3" X 4" pieces of construction paper sealed inside opaque envelopes. Six colors were used as a complete visual spectrum: blue, green, yellow, orange, red, and purple. It was considered that stimulus generalization curves might be derived from the data. Responses were ranked as direct hits or in terms of how many colors in the spectrum they were

away from the target (explanation of scoring method is given in the ranked-target scoring section).

The tests involved two modes of response, verbal and matching. These techniques were alternated (first or second) between participants. The verbal mode was conducted in the following manner.

Subject relaxed in a semidark room for a few minutes. In an adjoining room, experimenter had a randomized stack of 36 envelopes with targets enclosed. Holding one envelope at a time, experimenter pressed on a light signal in subject's room. Light presentation consisted of a small, dim, projected slide of the six color names typed in black on white in a circular pattern, which remained fixed for all subjects (see Appendix 7). Each time light was presented, subject called out the name of one of the six colors. This procedure was repeated for each of the 36 envelopes. Calls were relayed via an intercom system to experimenter, who recorded responses. Each choice was also tape recorded for double checking later. A short break and a check to see that subject was comfortable preceded a second series of 36 envelopes.

Whereas there was physical quiescence in the verbal mode, the matching technique involved body movement. A wall partition, 92" high by 70" wide, was constructed between two rooms. There were six color-coded openings in a circular pattern in the partition and subjects were moving from side to side, trying to match 36 envelopes (with colors

inside) by inserting each of them in the correct color-coded slot. Each envelope slid down a chute out of view into a color-coded storage box. It was hoped this procedure would help prevent patterning tendencies often found in matching tests.

The first 36 envelopes were sorted by either the right or left hand (alternated between subjects) and after a short break, a second stack of 36 envelopes were sorted by the opposite hand. A 12" brown mitten was worn on the hand not in use so the woman would not forget and start to sort with both hands.

Both testing situations were constructed with a view toward letting the subject feel absolutely private and free. With the experimenter absent, it was subjects would not feel self-conscious or restrained. Envelopes were checked for opacity, stapled, and sealed for precaution against fraud or inadvertent cues. Experimenter was always in hearing range, but out of sight.

Randomization of Targets

Color targets were randomized in four sets of 36 by taking an order of numbers 1 through 6 from a random number book (Rand Corp., 1955). Targets were then placed in envelopes, stapled, and sealed. A person uninvolved in the experiment cut each of the four stacks of envelopes. Two stacks were numbered 1 through 72 for the performance task and two stacks were numbered V1 through V72 for the verbal task.

After each matching test (right or left hand) and after recording placement of envelopes in boxes, the stacks now formed (one per box optimally) were placed in a row. One envelope was taken from the top of each stack until a new stack of 36 was formed. This stack was then secured and ready for the next matching test of another subject.

An independent person generated 80 computer printouts of random numbers from 1 through 36 for the verbal sessions. Before each experiment, the stack of envelopes was put into random order according to the list for that particular session.

Ranked-Target Scoring

It was decided that ESP responses would be scored by the ranked-target method, in an effort to obtain more information than hit and miss scoring. Targets were chosen in accordance with the visible section of the electromagnetic wave spectrum and they were assigned weights in a nonlinear fashion. Blue, green, yellow, orange, red, and purple were chosen as target colors. A score of 4 was assigned to a direct hit, a score of 3 to a choice one step away from the target on either side, a score of 2 for a two-step-away choice, and a score of 1 for a choice which was three steps away. For example, if blue were the target, a blue response would receive a score of 4, purple or green = 3, red or yellow = 2, and orange = 1. With 36 targets, a subject's score could range from 36 to 144 in either verbal

or right and left-handed matching techniques.

This method of scoring was chosen because it gives more information and can be expected to yield stronger levels of significance if hypotheses are confirmed. The trend of the data in Friedman et al. (1976) seems to support this expectation.

Myers' (1903/1961) group-mind theory postulated ESP as a pervasive interaction which could influence responses in various ways to varying degrees. Kahn (1976) suggested that this model should be reevaluated and retested with our current technological advantages. The alternate model, which is most prevalent in ESP research, treats data as if ESP were an all-or-none phenomenon and simple binary scoring of hits and misses has been considered adequate for analyzing most data. This could contribute to the low reliability of ESP scores over the decades. In effect, ranked-target scoring is comparable to using Bayesian statistics in a business decision-making situation where one must deal with unknowns and probabilities.

Analysis of Results

Each psychological subtest score was considered a predictor variable to be correlated with verbal ESP scores and performance scores. Pearson's product moment correlations were calculated. Multiple linear regression and canonical correlation analyses did not produce additional significant data. Factor analysis indicated best predictors for

the two types of ESP.

Six-by-six tables reveal response and hitting patterns for each of the six target colors. According to subjects' initial color preferences, response bias and hits on choice colors were checked.

Signal detection theory was used to analyze the consistent missing effect in these data. The parameters d' and L_x were computed for each color for each subject. Means and standard deviations were then calculated for all subjects' d's for a particular color. A t-test was then done to see if each mean was significantly different from zero.

CHAPTER III

RESULTS

Ranked targets were used in ESP tests in order to obtain more information than hit and miss ESP data. A proximity (closeness of responses to targets) score was obtained for each woman, thus giving part credit for "near misses." Mean chance expectation (MCE) for hits on each test was 12 and MCE for proximity scores was 180.

Neither scoring technique yielded overall significant ESP results. In 2880 performance trials, there were 445 direct hits (MCE = 480), and for 2880 verbal trials, there were 484 direct hits. Some individuals' deviations from chance were highly significant, but when scores were summed for all subjects, no significant overall ESP effect emerged. Eleven women's scores deviated from chance at a significance level beyond .01 and four women scored below the .05 level. Verbal ESP (VSP) scores were very near MCE, whereas Performance ESP (PSP) scores showed a nonsignificant tendency toward psi-missing, rather than psi-hitting.

Signal detection theory was used to more closely examine the psi-missing effect in these data. The parameters d' and L_x were obtained for each color in the experiment (see Table 3). Five of the colors showed a significant missing, two for VSP and three others for PSP.

TABLE 3

ANALYSIS OF ESP RESULTS BY SIGNAL DETECTION THEORY

Colors	Verbal Means		Performance Means	
	L_x	d'	L_x	d'
Red/Not Red	1.0161	.0070	.8586	-.1805**
Orange/Not Orange	.8241	-.2516**	.9435	-.1611
Yellow/Not Yellow	.9699	-.0843	.9150	-.1475
Green/Not Green	.9229	-.1217	.8228	-.3125**
Blue/Not Blue	1.0992	.0700	.9044	-.2194*
Purple/Not Purple	.9274	-.1593***	.9783	-.1074

*$p < .05$.

**$p < .01$.

***$p = .003$.

Hit deviation and proximity deviation scores, both without sign, were correlated (using Pearson's product moment correlation) with psychological test scores in order to obtain the following results. Hypothesis 1 is concerned with performance abilities. Using hit deviation scores, one of the five WAIS performance subtests, Object Assembly, showed a significant difference in the predicted direction (see Table 4). There was a significant negative correlation between the Introspection Score Performance score and VSP, also in the predicted direction. Three other WAIS scores, Picture Arrangement, Block Design, and Performance IQ showed suggestive differences between coefficients in the predicted direction, $p = .07$, .15, and .11, respectively.

TABLE 4

PEARSON CORRELATION COEFFICIENTS
(Hit Deviation Scores)

Cognitive Skills	Verbal ESP	Performance ESP	Significance of Difference Between rs
Verbal			
WAIS Subtests:			
Information	.0701	-.0449	n.s.
Comprehension	.0224	-.1307	n.s.
Arithmetic	-.1396	.0391	n.s.
Similarities	-.0679	-.0671	n.s.
Digit Span	.0878	-.0174	n.s.
Vocabulary	-.0137	-.1570	n.s.
Verbal IQ	-.0267	-.1036	n.s.
Advanced Vocabulary	-.0944	-.1453	n.s.
Modified Strong-Campbell Interest Inventory	.3400*	-.3482**	.001
Performance			
WAIS Subtests:			
Digit Symbol	.0417	.1157	n.s.
Picture Competion	.0269	-.1142	n.s.
Block Design	-.1055	.1394	n.s.
Picture Arrangement	-.2266	.1257	n.s.
Object Assembly	-.3090*	.0505	.05
Performance IQ	-.1644	.1229	n.s.
Purdue Pegboard	.0811	.0957	n.s.
Finger Maze	.0870	.0097	n.s.
Modified Strong-Campbell Interest Inventory	-.2827*	-.0342	n.s.

**$p = .01$.

*$p < .05$.

Correlating proximity deviation data with cognitive scores (see Table 5), the SCII performance score was the only test to show a significant difference in the predicted direction.

Hypothesis 2 concerns verbal abilities. Using hit deviation scores (see Table 4), the SCII or introspective verbal score produced a statistically significant positive correlation with VSP and a significant negative correlation with PSP. Significance of the difference between these two coefficients yielded a $p = .001$.

Using proximity scoring (see Table 5), Information and Vocabulary subtests of the WAIS had significant positive correlations with VSP. Suggestive correlations ($p < .10$) in the predicted direction existed between VSP and Verbal IQ, Arithmetic, Digit Span, and Advanced Vocabulary. The Comprehension subtest and verbal SCII both had a significant negative correlation with PSP. Significance of the difference between coefficients on the SCII produced a $p = .01$. Other significant differences between coefficients appeared with Verbal IQ and Information ($p < .05$), and Vocabulary ($p = .03$). The Advanced Vocabulary test and Comprehension subtest showed suggestive differences between coefficients in the predicted direction.

A test of the difference in means of verbal and performance IQs yielded a $t = 3.75$, 39 df; $p < .001$ (two-tailed) to confirm hypothesis 3. Scores ranged from 84 to 143 with a verbal mean of 117 and a performance mean of 110.

TABLE 5

PEARSON CORRELATION COEFFICIENTS
(Proximity Deviation Scores)

Cognitive Skills	Verbal ESP	Performance ESP	Significance of Difference Between rs
Verbal			
WAIS Subtests:			
Information	.2909**	-.0934	.05
Comprehension	-.0003	-.2825**	n.s.
Arithmetic	.2149*	.0084	n.s.
Similarities	.0497	-.1120	n.s.
Digit Span	.2053*	-.0190	n.s.
Vocabulary	.2899**	-.1255	.03
Verbal IQ	.2194*	-.1567	.05
Advanced Vocabulary	.2395*	-.0602	n.s.
Modified Strong-Campbell Interest Inventory	.1870	-.3080**	.01
Performance			
WAIS Subtests:			
Digit Symbol	.1105	.1659	n.s.
Picture Completion	.1532	-.1562	n.s.
Block Design	-.0702	.0345	n.s.
Picture Arrangement	.0760	-.0398	n.s.
Object Assembly	-.0775	-.0100	n.s.
Performance IQ	.1013	.0275	n.s.
Purdue Pegboard	.0656	.1628	n.s.
Finger Maze	.1382	-.2003	n.s.
Modified Strong-Cambell Interest Inventory	-.1920	.1924	.05

**$p < .05$.

*$p < .10$.

Hypothesis 4 was not confirmed. A nonsignificant t-test indicated that women did not score higher on PSP when sorting targets with their left hand. A left-hand mean of 5.5 and a right-hand mean of 5.625 produced a $\underline{t}$ = .10, 39df; n.s.

Women were asked to rank their color preferences before ESP testing. Blue and red were most often selected as first choice and yellow was least often chosen. Choices are listed below in Table 6.

TABLE 6

PERSONAL COLOR PREFERENCES

Choice	Blue	Green	Red	Purple	Orange	Yellow
1	11	7	11	8	2	1
2	7	7	9	12	2	3
3	11	9	5	7	4	4
4	8	5	5	7	10	5
5	2	8	7	1	10	12
6	1	4	3	5	12	15

Table 7 shows hitting patterns by color choices. Verbal hits suggest better ESP scores on preferred than on nonpreferred colors.

In the VSP test, positive deviations from MCE of 80 occurred on the blue target (+21) and the green (+11). Equally strong negative deviations occurred with the orange target (-21) and the purple (-17) (see Table 8). The PSP missing trend was more generalized with a range of 68 to 79

TABLE 7

COLOR PREFERENCE DATA

Rank of Color Preference	Verbal				Performance			
	Number of Responses	Hits MCE	Number of Hits	Deviation	Number of Responses	Hits MCE	Number of Hits	Deviation
(Most Preferred)								
1	499	83.2	95	+11.8	477	79.5	75	- 4.5
2	486	81.0	92	+11.0	487	81.2	77	- 4.2
3	477	79.5	78	- 1.5	511	85.2	77	- 8.2
4	454	75.7	70	- 5.7	472	78.7	67	-11.7
5	515	85.8	82	- 3.8	485	80.8	78	- 2.8
6	449	74.8	67	- 7.8	448	74.7	71	- 3.7
(Least Preferred)								

TABLE 8

VERBAL ESP TRIALS

Stimulus	Number of Responses: Purple	Blue	Green	Yellow	Orange	Red	Trials
Purple	[63 -17]	92	111	78	68	68	480
Blue	60	[101 +21]	87	92	69	71	480
Green	62	88	[91 +11]	92	70	77	480
Yellow	81	64	89	[86 +6]	70	90	480
Orange	67	84	101	73	[59 -21]	96	480
Red	63	88	78	95	72	[84 +4]	480
Totals	396	517	557	516	408	486	2880
Hits							[484 +4]

Note: Numbers in boxes indicate hits on each color with deviation from MCE (80).

target hits. Most hits were on purple (79), blue (78), and yellow (78), all showing a slightly negative deviation from chance (see Table 9). Table 10 summarizes hitting patterns according to VSP and PSP responses.

Varimax orthogonal and image-type factor analysis produced two factors, verbal and performance. Best predictors for PSP were: Performance IQ, Object Assembly, Picture Completion, and Block Design. Best predictors for VSP were: Verbal IQ, Vocabulary, Advanced Vocabulary, Comprehension, Information, and Similiarities. See Table 11 for factor descriptions and loadings.

TABLE 9

PERFORMANCE ESP TRIALS

Stimulus	Number of Responses						Trials
	Purple	Blue	Green	Yellow	Orange	Red	
Purple	[79 -1]	73	78	82	80	88	480
Blue	76	[78 -2]	85	81	74	86	480
Green	89	91	[68 -12]	74	74	84	480
Yellow	75	71	91	[78 -2]	69	96	480
Orange	75	84	90	91	[71 -9]	69	480
Red	67	83	85	91	83	[71 -9]	480
Totals	461	480	497	497	451	494	2880
Hits							[445 -35]

Note: Numbers in boxes indicate hits on each color with deviation from MCE (80).

TABLE 10

COLOR RECOGNITION DATA

	Verbal				Performance			
Target	Target Responses	MCE Hits	Number of Hits	Deviation	Target Responses	MCE Hits	Number of Hits	Deviation
Purple	396	66.0	63	- 3.0	461	76.8	79	+ 2.2
Blue	517	86.2	101	+14.8	480	80.0	78	- 2.0
Green	557	92.8	91	- 1.8	497	82.8	68	-14.8
Yellow	516	86.0	86	0.0	497	82.8	78	- 4.8
Orange	408	68.0	59	- 9.0	451	75.2	71	- 4.2
Red	486	81.0	84	+ 3.0	494	82.3	71	-11.3

TABLE 11

FACTOR DESCRIPTIONS AND LOADINGS

Factor and Item	Factor Loadings	
	Varimax Rotated	Image Factor
Factor I: Verbal		
Verbal IQ	.883	.968
Vocabulary	.789	.689
Advanced Vocabulary	.824	.787
Comprehension	.746	.814
Information	.740	.820
Similarities	.735	.766
Arithmetic	.578	.756
Performance IQ	.415	.740
Digit Span	.404	.515
Block Design	.396	.649
Picture Completion	.296	.594
Factor II: Performance		
Performance IQ	.785	.667
Object Assembly	.732	.583
Picture Completion	.732	.456
Block Design	.648	.499
Digit Symbol	.197	.422
Performance SCII	.146	.354
Purdue Pegboard	.083	.318

CHAPTER IV

DISCUSSION

Forty women between the ages of 24 and 43 obtained scores on the beforementioned battery of psychological tests. Each woman also obtained scores on both a verbal and a performance ESP test of clairvoyance. Before testing, they each ranked the six colors of the ESP targets in order of their personal preferences. The women, as well as experimenter, filled out mood scales before and after the ESP tests.

Hypotheses 1 and 2 may be stated jointly: "Subjects whose test scores on performance are high, as compared to their verbal scores, will socre higher on a matching technique for responding to ESP targets than on a verbal technique. Those with higher verbal scores will score higher on a verbal response ESP test than on a performance ESP test."

These two hypotheses were tested using Pearson's product moment correlation to assess the degree of significance of the correlation between verbal and performance ESP abilities and verbal and performance cognitive skills. As can be seen in Tables 4 and 5, overall correlations indicate that higher verbal scores were associated with higher VSP scores; higher performance scores were associated with higher PSP scores; and vice versa.

The modified SCII, the only introspective test, proved most predictive of ESP ability, even when objective tests did not confirm subjects' opinions of their verbal and performance skills and preferences. The highest level of significance came with the verbal SCII, always in the predicted direction. That is, the women who considered themselves more verbal, did better on VSP. Those who preferred performance-type activities, had better scores on PSP.

Object Assembly was the strongest WAIS predictor of PSP. This test correlates poorly with most of the subtests. It tests a person's ability to deal with part-whole relationships. The usual approach to the task is an immediate perception of the whole, accompanied by a critical understanding of the relation of the individual parts. According to Matarazzo (1972), some experimenters comment that the Object Assembly test seems to get at some sort of creative ability. Some feel it reveals one's ability to work toward an unknown goal, while others say it reveals one's capacity to persist at a task. These comments are similar to ones heard concerning ESP--that it is probably correlated with creative ability, and that one must work persistently toward some unknown goal.

Information and Vocabulary subtests were significantly correlated with VSP. According to Wechsler (1955), these two tests have the highest intercorrelation (.81) of the WAIS subtests for the age group 25 to 34. They also

have the highest reliability coefficients of all WAIS subtests for this age group. The overall Verbal IQ was also significantly correlated to VSP according to proximity deviation scoring data.

The finger maze created anxiety in some subjects. By being blindfolded, they sometimes felt controlled or manipulated. Subjects who became extremely frustrated often showed less ability on the ESP test which followed the maze. Perfect scores were sometimes followed by increased psi-hitting, in one case at a significance level of .0002. There were no consistent findings but the maze test itself was the most interesting and emotion-eliciting part of the experiment to run. In proximity scoring data, it showed a difference of coefficients approaching significance in the opposite direction of the hypothesis.

This opposite effect also showed up with the Picture Completion subtest of the WAIS. This is not a puzzle-type test where one fits a missing piece into an incomplete picture. One looks at a picture on a small card and then discovers and names the missing detail, such as the heel of one shoe. It is actually more highly correlated with verbal Information and Vocabulary subtests than with most performance subtests. It has a relatively low correlation (.78) with Full Scale IQ in the 25 to 34 age group. These factors could be seen to contribute to its inverse relationship in the context of the present experiment.

For comparison, the Picture Arrangement subtest

consists of taking a series of pictures and placing them in the right sequence to reveal a logical little story. This subtest showed a difference in coefficients, which approached significance in the predicted direction. It has a low correlation (.77) with Full Scale IQ in the 25 to 34 age range, as does the Picture Completion subtest. This test however, asks people to place things in a certain order rather than to name them and it could be this part of the test, which facilitated its positive interaction with PSP.

Hypothesis 3 states that "By using psychological test batteries, it will be possible to differentiate between women who have a higher degree of verbal abilities or performance skills." Using this battery of tests, it was possible to differentiate between women who had a higher degree of verbal abilities or performance skills.

Hypothesis 4 stated, "In the matching test, better results will be obtained by use of the left hand than the right." There has been some suggestion in the literature that psi may be a right brain hemispheric function. It was therefore predicted that women would score higher with their left hand than with their right hand in the performance test. This prediction was not confirmed.

Additional Findings

Color Preferences. Whereas women obtained better VSP scores on preferred colors, PSP results did not show a similar pattern. There was much stronger psi-missing in the PSP data. When these data are looked at in terms of

deviation from chance scores rather than hitting, there were more positive deviations in the VSP data on the preferred colors. There were no positive deviations in the PSP data. Responses were not checked for stimulus generalization, as is often done in color perception tests, because of the psi-missing tendency of the ESP data.

There may have been position effects in the performance trials. Most responses were to the two end positions and the lower left. Other center positions received far fewer responses. Future research might question subjects as to favored positions in the performance test.

Signal Detection Theory. In forced-choice experiments with many responses, such as this one, signal detection theory appears to be a good method for analyzing ESP ability. The parameter d' is a measure of one's ability to discriminate between hits and false alarms (incorrect identification of a target). The likelihood ratio (L_x) is an index of how cautious one is in making decisions. A negative d' means that the percentage of false alarms were higher than hits. In the present experiment, significant negative d's demonstrate a consistent missing effect which seldom occurs in sensory experiments.

Individual d's were computed for each subject and each color in both ESP modes. VSP results gave significant missing effects on purple and orange (nonpreferred colors). In other words, with these two colors, the mean of the

individual d's was significantly different from zero, as tested by a standard t-test. PSP results produced significant missing effects with the colors blue, green, and red (preferred colors).

The largest effect (p = .003) appeared with the color purple in the verbal mode. This color received the least number of target responses. The color green in the performance mode produced the next highest effect but in this case, green received the largest number of target responses. Therefore, the consistent missing effect does not appear to be merely an artifact of number of responses to any particular color.

Moods. Subjects and experimenter filled out mood scales before ESP tests and completed a postsession questionnaire, without knowledge of ESP scores, as to how each felt about the session (see Appendix 3). Hit and proximity deviation scores, without sign, were correlated with mood scales to determine how moods were related to VSP and PSP (see Table 12).

Correlating hit deviation scores with presession mood scale scores, there was a highly significant negative correlation (p = .007) between subjects' feelings of elation and PSP. If experimenter felt contented with self, there was a suggestive positive correlation with VSP, whereas experimenter feelings of vitality were negatively correlated to PSP.

Postsession questionnaires revealed that subjects who felt more completely absorbed in the experiment produced better PSP scores ($p < .05$). Experimenter's moods after the session seemed to have a strong interaction with PSP. There was a significant positive correlation between PSP and how refreshed experimenter felt after the session. Other positive correlations were found with PSP when the experimenter felt the session had gone well, and when she had been completely absorbed in the experiment.

Significances of the differences between coefficients on the experimenter's postsession moods were all either significant or approaching significance in the same direction. That is, if the experimenter felt refreshed after the session, there was a significant difference between a negative correlation with VSP and a positive correlation with PSP ($p < .02$). The same kind of difference occurred if the experimenter felt the session went well ($p = .05$), and when the experimenter had been absorbed in the experiment ($p < .09$).

When subject had been more completely absorbed in experiment, there was a positive correlation with PSP and a negative correlation with VSP ($p < .02$). The more elated a subject was before the session showed a strong negative correlation with PSP and a positive correlation with VSP ($p = .02$). Strong differences between coefficients showed that when experimenter reported feeling content or with high vitality, PSP scores were lower than VSP scores.

TABLE 12

PEARSON CORRELATION COEFFICIENTS FOR MOODS

Moods	Hit Deviation Scores VSP	Hit Deviation Scores PSP	Hit Deviation Scores Sig. of Diff. Betw. rs	Proximity Deviation Scores VSP	Proximity Deviation Scores PSP	Proximity Deviation Scores Sig. of Diff. Betw. rs
Subject Presession:						
Content	.1048	-.1913	n.s.	.2005*	-.1650	.05
Vitality	.0095	-.0265	n.s.	.0830	-.1256	n.s.
Elated	.0701	-.3837 *	.02	.1207	-.1073	n.s.
At Ease	.0184	.1377	n.s.	.2415*	-.1209	n.s.
Experimenter Presession:						
Content	.2344*	-.0474	n.s.	.2341*	.0595	n.s.
Vitality	.1140	-.2047*	n.s.	.1505	.1085	n.s.
Elated	.0181	-.0490	n.s.	.2454*	.0074	n.s.
At Ease	-.0539	.0138	n.s.	.0880	.1239	n.s.
Subject Postsession:						
Session went well	-.0744	-.0662	n.s.	-.0778	.1679	n.s.
Was completely absorbed	-.1636	.3246**	.02	-.0984	.0010	n.s.
Feel refreshed	.0301	-.0622	n.s.	-.1149	-.0970	n.s.
Experimenter Postsession:						
Session went well	-.1714	.2022*	.05	-.0309	.0238	n.s.
Was completely absorbed	-.1067	.2019*	n.s.	.1051	.0197	n.s.
Feel refreshed	-.1670	.3092**	.02	-.1356	.0728	n.s.

*$p < .10$.
**$p < .05$.
***$p = .007$.

Subjects' presession ratings of higher self-confidence also showed a negative relationship with PSP scores lower.

Earlier analyses showed that proximity scoring yielded three more significant correlations with cognitive skills than did hit deviation scores. However, hit deviation scores yielded six more significant correlations with subject and experimenter mood scale scores. Replication is needed to substantiate the finding that proximity scoring yields more significant correlational statistics between ESP and cognitive scores. Logarithmic ranked-target scores or some other method of weighted scores may produce more meaningful results.

The better the presession moods, the better the VSP, according to hit deviation scores. Better postsession moods correlated with better PSP. Proximity scoring gave some slight indications of similar patterns. Further experimentation is needed to determine if either scoring method is superior.

Time Metaphor Test. Correlational results of the Time Metaphor Test with ESP scores showed a positive correlation between subject's choice of faster metaphors to describe time and VSP (hit data: $r = .20$, $p < .11$; proximity data: $r = .36$, $p = .01$). Significance of the difference between coefficients for verbal and performance ESP scores was $p = .17$ for hit data and $p = .05$ for proximity data. The data suggest the possibility that women who score higher on VSP, experience time as moving faster than those who obtain lower VSP scores.

APPENDIX 1

DESCRIPTIONS OF VERBAL AND MATCHING TECHNIQUES

Verbal

GESP (General Extrasensory Perception): A technique designed to test the occurrence of extrasensory perception, permitting either telepathy or clairvoyance or both to operate.

DT (Down Through): A clairvoyant technique in which cards are called down through the pack before any are moved or checked.

GESP (l.d.): General extrasensory perception over a long distance. In Gibson's experiment, the distances were 700 to 2,000 miles.

BT (Basic Technique): A clairvoyant technique in which each card is laid aside by experimenter as it is called by subject. Scores are checked at the end of each run.

SBT (Screened Basic Technique): Subjects call cards and lay them aside, but a screen blocks their sight of the cards.

Matching

ESP Shuffle: A key deck of cards or list of 25 symbols is placed beyond sensory range. Subject then shuffles

a deck of cards in such a way as to make it match as closely as possible the deck designated as the key deck. This has also been named deck matching.

OM (Open Matching): Five target cards are placed face up on a table. Subject attempts to place opposite the appropriate target cards, one at a time, 25 cards, which remain in a face-down position until the check is made at the end of each run.

SOM (Screened Open Matching): Target cards are in sight but cards to be placed are out of subject's sight by means of a horizontal wooden screen.

BM (Blind Matching): This differs from OM by the fact that this work is done with both the target cards and the deck of cards face down.

SBM (Screened Blind Matching): Target cards are face down and cards to be placed are out of sight under a wooden screen.

STM (Screened Touch Matching): Subject indicates in each trial (by pointing to one of five key positions) where she thinks the experimenter, holding an inverted deck of cards, should place the next card. The experimenter, behind a screen, then places the next card opposite that position.

OM Chutes (Open Matching Chutes): Five target-coded openings in a partition (for example, letter chutes) are visible to subjects. They try to sort opaque envelopes, with targets inside, into appropriate openings.

Envelopes pass through chutes into compartment boxes in the next room and are checked by experimenter after each run.

ESP Marbles: 1,000 marbles, 200 of each of five colors, were in a closed container, which would release one marble at a time. Subjects indicated their choices by pressing one of five colored levers, upon which a marble would roll down a tube into sight.

Pointer: Five boxes were arranged on each side of a wooden screen. Experimenter would randomly choose target box and subject would attempt to place a wooden pointer into the box on the opposite side of the screen from the target box.

Electric Machine: Five boxes were arranged on each side of wooden screen. A random light would be automatically switched on in one of the boxes on the experimenter's side. Subject would attempt, by flipping a switch, to light up the box opposite the target box.

APPENDIX 2

STRONG-CAMPBELL INTEREST INVENTORY (Modified)

Please indicate, on a scale from 1 to 7, how well each of the following statements describe you as you are now.

Mark a 1 if the statement is NEVER OR ALMOST NEVER TRUE.
Mark a 2 if " USUALLY NOT TRUE.
Mark a 3 if " SOMETIMES BUT INFREQUENTLY TRUE.
Mark a 4 if " OCCASIONALLY TRUE.
Mark a 5 if " OFTEN TRUE.
Mark a 6 if " USUALLY TRUE.
Mark a 7 if " ALWAYS OR ALMOST ALWAYS TRUE.

I am good at explaining ideas _____
I prefer actions to words _____
When I work out something new, I like to physically build a model of it _____
When I work out something new, I like to develop the ideas by writing them down _____
I learn best by doing something, that is, by trying it out _____
I learn best from readings _____
I learn best when I am told how to do something _____
I learn best when I am shown how to do something _____
I would rather describe in detail how to do a job _____
I would rather show someone how to do a job _____
I like to dance _____
I would rather watch a play than act in one _____
I have mechanical ingenuity (inventiveness) _____
I can write a concise, well organized report _____
I can smooth out tangles and disagreements between people _____
I enjoy tinkering with small hand tools _____
In general, I like physical activity and working with my hands _____
In general, I like working with words and ideas _____

Name_____

APPENDIX 3

BEFORE-SESSION QUESTIONNAIRE

Name_____ Date_____

1.	I feel very happy and content with myself.	:___:___:___:___:___:___:___:___:___:	I feel greatly dissatisfied with myself.
2.	I feel very tired.	:___:___:___:___:___:___:___:___:___:	My feeling is one of great vitality.
3.	I feel very much elated.	:___:___:___:___:___:___:___:___:___:	I feel very low and blue.
4.	I feel very anxious and and upset.	:___:___:___:___:___:___:___:___:___:	I feel very free and at ease.

POST-SESSION QUESTIONNAIRE

1.	I feel the session went well.	:___:___:___:___:___:___:___:___:___:	The session went poorly.
2.	I could not keep my mind on the experiment.	:___:___:___:___:___:___:___:___:___:	I was completely absorbed in the experiment.
3.	I feel unusually refreshed and full of energy.	:___:___:___:___:___:___:___:___:___:	My experience during the session left me completely exhausted.

APPENDIX 4

TIME METAPHOR TEST

Will you tell us your attitude toward time? Of the five metaphors listed below, would you indicate the one you like best?

1. A dashing waterfall
2. A galloping horseback rider
3. An elderly person spinning
4. A vast expanse of sky
5. A quiet motionless sea

Scoring:

1. Extreme dynamic
2. Dynamic
3. Neutral
4. Oceanic
5. Extreme oceanic

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