THE PARAMORPHIC REPRESENTATION OF TEACHER DECISION MAKING AS A PREDICTOR OF INQUIRY PERFORMANCE

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ABSTRACT

THE PARAMORPHIC REPRESENTATION OF
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OF INQUIRY PERFORMANCE

By

Merlyn Mildred Mondol

The skill with which humans integrate information based on uncertain data is acquired over a long period of practice and experience. Previous studies have shown that ignorance and uncertainty about one's own cognitive judgmental processes are at the root of the problem of ineffective application of knowledge in judgmental tasks. Therefore, one solution to this problem would be to devise procedures to make explicit the characteristics of persons' judgmental systems and relate these to the characteristics of the judgmental task.

The major purpose of the present study was to investigate the possibility of training people to modify their judgmental policy preferences by using a form of cognitive feedback and a discussion and reflection training which would make them sensitive to the relevance of the information sources to their judgments. It was also intended to study the effects of such training on subsequent judgmental tasks.

A second phase of this experiment was to study the relationships between judgmental policy preferences and

inquiry performance. The beta weights assigned to the various sources of information utilized to make the judgments were used to predict the inquiry behavior of the subjects. Selected personality tests were also given to all subjects and the relative contributions of personality and cognitive variables to inquiry performance were studied.

Fifty-four female college students were selected and randomly assigned to three treatment groups, namely: the discussion and reflection training group, the in-basket followed by discussion and reflection training and the control group. A repeated measures design was used in which a pre-judgmental task, requiring all the subjects to rate the likelihood of hypothetical students having instructional problems in a classroom setting was administered. After the training was completed the judgmental task was repeated.

For this particular study the judgmental post test revealed significant differences between the control group and experimental groups taken together. Further analysis suggested that the differences between the two experimental groups was not significant.

Turning to the prediction of inquiry performance, results showed that the judgmental weights were not potent predictors of inquiry. Of the personality variables, internal locus of control was the best predictor. Although

neither group of variables predicted inquiry very well, all the independent variables together predicted the dependent variables significantly. The prediction was significant especially for the inquiry dependent variables of bits, competence and problem sensitivity.

The results have at least two implications for a theory of judgment. First, the equation is a "paramorphic" rather than "isomorphic" representation of subjects' judgmental policies therefore, any inferences regarding the actual sequence or process of information utilization might not be warranted.

Second, training involving cognitive feedback and discussion and reflection on the subjects' weighting policies can modify the policy preferences of teachers.

For education the implications seem to be that optimal weighting patterns could be developed for the judgments teachers have to make regarding instructional problems of students. Training programs could then be developed to facilitate the learning of effective and efficient decision-making in the classroom.

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CHAPTER I

INTRODUCTION

Judgments or decisions require choices which control the lives of people and involve the efficient use of time, money and effort. So far no methods have been used in teacher-training programs to facilitate effective decision making by teachers regarding students' instructional problems. Any attempts by supervising teachers to enhance the sensitivity to and the diagnoses of possible difficulties in students would be impossible to convey to the student-teacher, as the supervising teacher is apt to be vague about the basis of her own judgments. Moreover, the student, relying on her own introspective processes, may disagree with the teacher's observation of her. "Communication under these circumstances is more likely to produce cooperative delusion than an accurate understanding", (Hammond, 1971).

The main purposes of this research are first, to characterize the existing judgmental policies of teachers; second, to study the stability of these judgments over time. Third, to assess the modifiability of judgmental policy preferences through training using a form of cognitive feedback; fourth, to predict the performance of teachers in an actual or simulated situation in which judgments have to

be made, from their policy preferences; and finally, to study the relative contributions of judgmental policy preferences and personality variables to the prediction of the performance of teachers in an inquiry situation.

Rationale

Diagnosis and identification of students' problems is a specific instance of the more general process of judgment or decision making that a teacher is involved in within a classroom setting. How a teacher integrates information conveyed by several cues to form the judgment cannot be reduced to a simple and infallible rule that can be taught. Yet, in exercising her judgment the teacher must learn to assign differential weights to the various cues or sources of information. Once having characterized judgmental policies in terms of differential weights, it then becomes necessary to validate the relevance of policy in a simulated real situation. This is the role of the inquiry situation in the present research.

Information Processing in Judgment

In previous years the difficulties encountered in making decisions were usually blamed on the paucity and inadequacy of available information. Devices were therefore developed to increase the availability of data and to improve the dissemination of information. In spite of the

technological expertise with which this problem has been remedied the effectiveness of decision making has not greatly changed (Slovic and Lichtenstein, 1971). There has therefore been a change in emphasis in recent studies to the process of integration and the interpretation of information itself. Interest now is with the cognitive operations performed on information and the processes and strategies humans employ in order to integrate discrete items of information into a decision.

One approach used in the study of judgment is known as the regression approach, so called because of its characteristic use of multiple regression and analysis of variance to study the use of information by a judge. The linear model is one in which judgments are described as a simple weighted sum of the values of the information available. For a given judge, judging a number of people, we let J represent the judgment and consider it as a dependent variable. The dimensions of information are designated by X's which are the independent variables. Given k sources of information the linear additive model can be described as follows:

$$J = f(X_i) \qquad i = 1, 2, \ldots.k$$

Since we are interested in a weighted sum of the X_i, we may write:

$$J = B_0 + B_1 X_1 + B_2 X_2 + \ldots. + B_k X_k$$

The basic approach requires the judge to make

quantitative evaluations of a number of stimuli, or sources of information, each of which is defined by one or more quantified cue dimensions. For example, a judge might be asked to predict the grade point average for each of a group of college students on the basis of high school grades and aptitude test scores. The regression analysis identifies the weights assigned to the information cues available to the judge. The Beta weights reveal the relative degrees that the judgments depend on the various sources of information available to the judge.

Although the linear model is a very powerful tool in predicting the judgments of the judges, it is only a paramorphic representation of the judgmental process, (Hoffman, 1960). The term paramorphic (Hoffman, 1960) borrowed from minerology and applied to judgment suggests that the model explains only certain properties of the judgment but not all its characteristics. Therefore, the mathematical description is incomplete and there is no way of knowing how accurately the underlying process has been represented. That is, the linear model adequately predicts the judgments made by the judge or will produce the same results as will the judge himself; however, the actual process by which the judge combines the cues to reach the judgment cannot be directly inferred. Thus, the relationahip between the mathematical model and the underlying judgmental process is not isomorphic but is paramorphic in nature.

Brunswik's Lens Model

The correlational paradigm can describe the judges' characteristic method of processing and weighting information. In the Brunswikian framework (Hammond, 1955), it can describe the adaptive interrelationship between the organism and its environment. Thus, in addition to studying the degree to which a judge utilizes cues one can analyze the manner in which the judge learns the characteristics of his environment.

In Figure 1, Brunswik's Lens Model, each cue dimension has a specific degree of relevance to the true state of the world. This true state, also called the criterion value, is designated Y_e. The correlation between cue X_i and Y_e indicates the relevance of the i^{th} information source. This value is called the ecological validity of the i^{th} cue. On the subject's side, his response or judgment is Y_s, and the correlation of his judgments with the i^{th} cue is $r_{i,s}$, also known as the utilization coefficient for the i^{th} cue, (Slovic and Lichtenstein, 1971).

From the following regression equations both the criterion and the judgment can be predicted from linear combination of the cues:

$$Y_e = \sum_{i=1}^{k} b_{i,e} X_i \qquad (1)$$

$$Y_s = \sum_{i=1}^{k} b_{i,s} X_i \qquad (2)$$

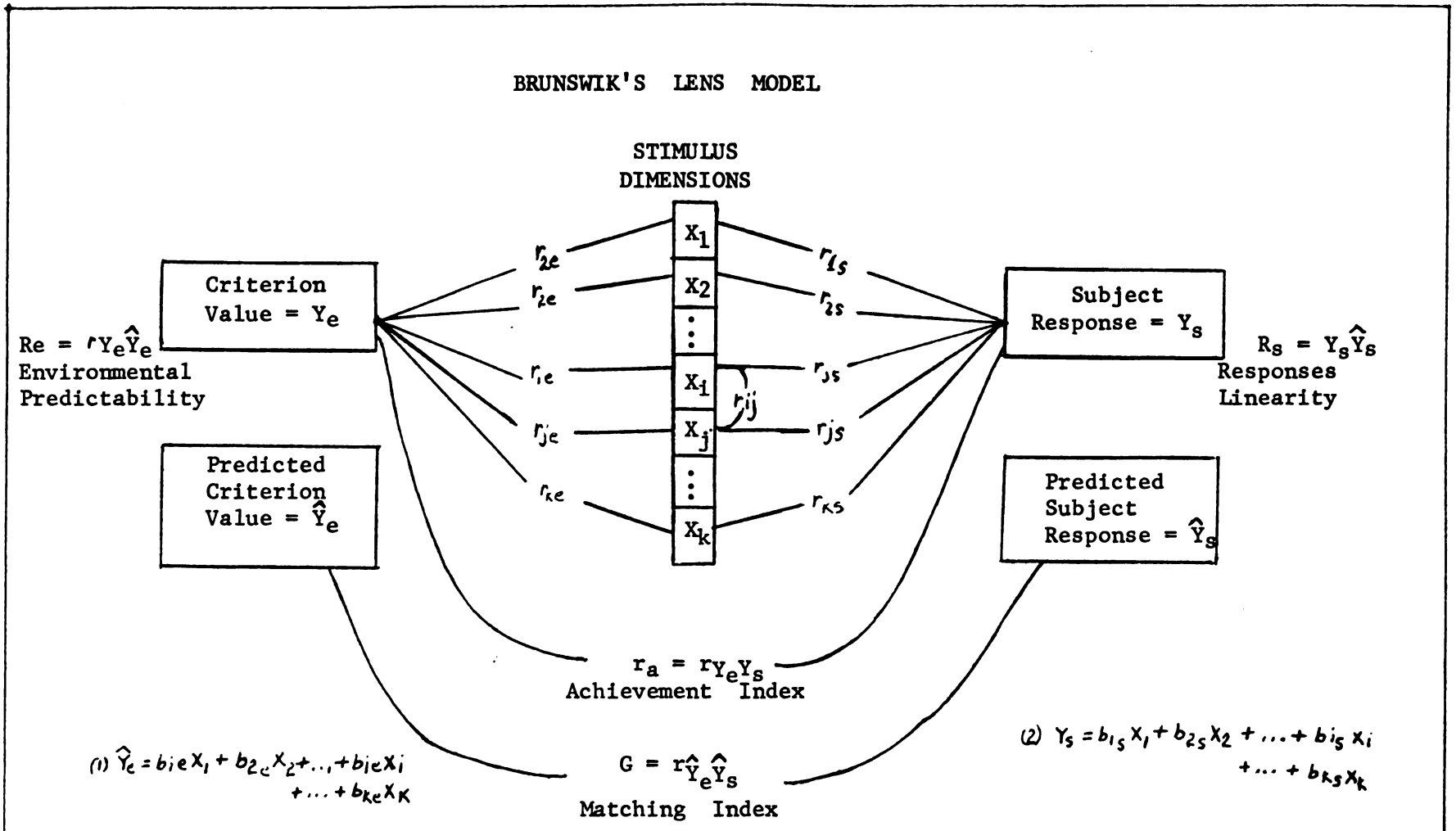

Fig. 1. Diagram of Lens Model showing the relationship among the cues, criteria, and subject's responses. (Based on Dudycha and Naylor, 1966b).

Equation (2) provides one possible model of the subject's decision making strategy and has been widely used to capture judgmental policies. That is, the actual weights the subject assigns to each of the cue variables in reaching the judgment are represented by the regression weights in the regression equation computed from the ratings of the judge. By virtue of the experimental control employed in the collection of the data, the only reliable source of judgment variance common across all subjects is the information supplied. Often these data appear as test scores on a set of protocols being judged. Assuming that a judge combined the information in linear additive fashion, the multiple regression analysis will be quite effective as a tool for describing the judgment process; that is, the set of regression weights when applied to the corresponding predictors can quite properly serve as a model for judgment. With certain limitations the regression weights signify the importance attached to each of the predictor variables by the judge. Regression weights could be converted into a set of relative weights in terms of which judges may be compared and contrasted with respect to their characteristic equations; and differences among judges may be related to training and other factors, such as personality, that could conceivably affect the utilization of data.

Since in the present study the main interest was in the decision making process of teachers regarding the likelihood of students having instructional problems in a

classroom setting, an attempt was made to relate the judgmental policies to actual situations in which decisions or judgments had to be made.

The In-Basket Technique and Teacher Decision-Making

Teaching is an ongoing process of inquiry and decision making. The effective teacher must be sensitive to the problems of the students, be able to formulate hypotheses, use available information effectively to test those hypotheses, and make important decisions. Hopefully, by understanding the manner in which teachers utilize information at their disposal to arrive at judgments or decisions, predictions can be made regarding their performance on tasks and actual situations where inquiry and decision making are an important and integral part. A teacher must adequately understand the personal and social problems posed by the children in order to effectively guide them in the learning process. The sensitivity to and the identification of such problems would then be a necessary prerequisite to the formulation of these problems and the making of the necessary decisions to resolve them.

The Teachers' In-Basket, designed by Shulman (1963) is an instrument developed to study individual decision making and inquiry behavior. It provides an opportunity to observe inquiry within a setting in which the structural cues are minimal, and yet the potential situational stimuli are essentially the same for all subjects. The instrument

maintains the realism of the situation as well as affords experimental control for the observation of inquiry. The subject, who is a female elementary school teacher-in-training, is seated at a simulated teacher's desk with its pile of potential problems. Many things have piled up on her desk and have been placed in her in-basket. It is her first day in the school and no pupils are present because of a school holiday. She may begin where she likes and do as she pleases. No time limit is suggested. Subjects are asked to think aloud in order to make their thoughts available to the observer. Thus, it is possible to determine what general information source the subject is utilizing, whether the subject has perceived the situation or information as problematic, and whether the information assisted the subject in resolving the problem.

There are three kinds of materials in the situation with which the subject may deal: 1) The contents of the in-basket which consists of telephone messages, test scores, schedules, memoranda and tasks and lists to be completed. 2) Written materials, records, report cards, etc. concerning both the school and the pupils in the teacher's class and 3) The human resources consisting of a school secretary, a school principal and "reference memory" available for consultation over an intercom with programmed answers to anticipated questions.

The Variables:

The Problem Sensitivity score is simply the total number of problems sensed by a particular subject.

Time is the number of minutes the subject chooses to spend in the inquiry situation.

Materials Attended is a measure of input, the number of pieces of material to which the subject attends in the inquiry period, representing the number of "bits" processed by the subject.

Information Sources is a count of the number of kinds or categories of information brought to bear by the subject on ten selected problems in the in-basket situation.

Competence is a measure of problem resolution. It is an independent judgment of how well each subject comes to understand the nature of the problem situation in the same ten selected problems used to score for Information Sources.

General Inquiry is the summed score for problem sensitivity, mean sources and competence.

Shifting is the total number of times the subject shifts his search from a bit of information in one source category to information in another.

Cognitive Feedback Training and Transfer

"Although learning theorists have long emphasized the distinction between learning and performance, little attention has been given to skill in the application of

knowledge in tasks which do not involve motor performance. Rather, there is an implicit assumption that once knowledge has been acquired, the application of this knowledge is largely dependent on certain experimental circumstances .... The position taken here, however, is that acquisition and application are independent components of learning in cognitive tasks as well as psychomotor tasks" (Hammond 1972).

Psychologists have used the multiple-cue probability learning task in the study of human judgment typically carried out within the Brunswikian framework. In this type of learning the judge learns to integrate differential cues of various degrees of dependability so that the cue weights in his judgmental system match the differential cue weights in the task itself. An example of this kind of learning was demonstrated by Hammond (1971). The learning task required the subject to arrive at a diagnosis or judgment that integrated the information provided by three cues. Cue A was correlated 0.8 with the criterion; and cue B and C were correlated 0.4 and 0.2 with the criterion, respectively. The relationship between the cues and the criterion were curvilinear, and due to the uncertainty built into the task no infallible rule for reaching the judgment would be formulated by the subject. Two hundred trials were used. On each trial the three cue values were presented on a 5-inch by 8-inch card in the form of bar graphs. The height of each bar indicated the value (1 to 10) of that cue. The subject was asked to interpret the three cue values and

arrive at his diagnosis on a scale from 1 to 20 for each display. Cognitive feedback was provided pictorially, informing the subjects about the correct weights of the cues, and by informing them verbally about the correct functional relationships between the cues and the criterion. The results showed that the probabilistic learning, utilizing multiple cues in the complex cognitive task was facilitated by cognitive feedback. Since such tasks require judgmental learning analogous to that needed to make diagnostic judgments, it could well be used to study the changes in judgment or decision making by teachers when dealing with students' problems.

The skill with which humans integrate information based on uncertain data is acquired over a long period of practice and experience. The judge is, however, vague about the basis of his own judgments and it cannot be assumed that experience will increase his awareness of his cognitive processes. Slovic et al, (1968) found that the more experienced the judge was, the less able he was to describe accurately how he arrived at his judgments. If ignorance and uncertainty about one's own cognitive judgmental processes are at the root of the problem of ineffective application of knowledge, then one solution would be to devise procedures to make explicit the characteristics of a person's judgmental system and relate these to the characteristics of the judgmental task. More specifically, a judge should be provided with a picture of the properties of the

task and a picture of his own cognitive judgmental system in terms that will allow him to compare the two. Hammond has employed computer graphics (Hammond, 1971), to provide these kinds of information for the learner.

This research will investigate the possibility of changing teachers' judgmental policy preferences by training involving discussion and reflection on one's policy preference as a form of cognitive feedback.

This study will also attempt to predict the performance of teachers-in-training in an unstructured in-basket situation in which they would be able to utilize information, sense and formulate problems about students, and make decisions about them. These predictions will be made from the weights subjects assign to various categories of information in the policy preference task and from personality variables.

CHAPTER II

REVIEW OF LITERATURE

The literature to be reviewed for this study falls under four domains: 1) literature on the models of the representation of the judgmental process or the way in which information or criteria are combined in order to reach a decision, 2) literature on multiple cue probability learning or cognitive control, 3) studies on the inquiry process using the Teacher's In-Basket and 4) internal vs. external locus of control as a personality construct.

Literature on the Judgmental Process

Several studies have been conducted in recent years within the topic of information utilization in judgment or decision making. As Slovic and Lichtenstein (1971) point out, there has been a shift in emphasis from studies concerning the problem of the inadequacy of knowledge and the availability of information to studies of the integration process itself.

"Their efforts center around two broad questions.... 'What should we be doing with it'? The first is a psychological problem, that of how man uses information. The second problem is a more practical one and involves the

attempt to make decision making more effective and efficient". (Slovic and Lichtenstein, 1971).

Studies attempting to represent the judge's weighting policy by means of the linear regression model include judgments about personality characteristics, (Hoffman, 1960), performances in college, (Dawes, 1970), physical and mental pathology, (Goldberg, 1968; Goldberg, 1970; Hoffman, Slovic and Roser, 1968).

There are several studies that could be cited that would be relevant for the model, however, it was decided to limit the review to the works of Hoffman (1960), Dawes, (1970), and Goldberg (1968, 1970).

The studies selected for review have one thing in common; namely, they all used the linear regression model to capture the judge's idiosyncratic weighting policy.

The paramorphic representation of clinical judgment. Hoffman (1960), points out that the term "mental process" is often directly equated with subjective experience. The only way such a process can be inferred is through verbal phenomena such as verbal responses. It is, however, possible to "describe" mental activity by means of mathematical models. The judgmental process can be studied in a controlled situation wherein the input (information) and the output (judgment) are known or capable of quantification. The accuracy with which judgment can be predicted would enable one to assess the adequacy of the functional

relationships between the input and the output hypothesized.

In developing models that could be used to study the judgmental process, Hoffman describes the restrictions and limitations of information available to the judge. Uncontrolled use of clinical data might make judgment an "artistic venture" rather than a subject for scientific study. Controlling the judgment task is necessary in order to ensure objectivity and uniformity of procedure. He suggests that the situation be restricted in the following ways: a) the information available is reduced to a set of variables with respect to which all clients in the sample are evaluated; b) the information is expressed in number or in categorical responses; and c) each variable is at least on an ordinal scale.

The Linear Model in which judgments are described as a simple weighted sum of the values of the information available has already been discussed in Chapter I. The use of relative weights or standardized weights was then developed by Hoffman following which the configurational models were developed and discussed. The Interaction Model was described as an "appropriately weighted composite of all possible first order interactions of the predictors". As the hypothesized relationships become more complex judgments become less dependent upon a simple weighted sum of the categories of information. It may be also true that for some categories of information extreme scores are more

decisive in judgment than scores in the middle range.

Hoffman then discussed suppressor effects wherein a predictor carries negative weight because it accounts for variance in another predictor that is independent of the criterion. The use of relative weights however, obviates this difficulty since a predictor must correlate significantly with the judgment in order to obtain a significant relative weight.

The emphasis is on the fact that these models or representations of human judgment are paramorphic representations which describe the judgment process and approaches the chemical description of minerals. The only relationship they are known to bear with the judge's mental processes is that, when employed, they will produce the same results as will the judge himself. This description, however, is incomplete for there are other properties of judgment which it does not describe.

Illustrations of linear models were given of subjects making judgments of "intelligence" of 100 persons using nine predictors and judgments on "sociability" of 150 persons on the basis of profiles containing scores on eight selected Edwards Personal Preference Schedule variables. It was found that the judgments of two judges correlated .948 and .829 respectively with the best linear combination of the predictor scores. Thus, for the first judge, the linear model did an accurate job of describing the judgmental

policy. For the second judge, however, the linear model was not appropriate.

Another question was considered. Is a judge able to describe the manner in which he utilizes information in arriving at his judgment? Judges were asked to distribute 100 points among the sources of information available in such a way that the distribution would reflect the relative importance of those variables. Comparison of subjective and relative weights showed that in one case there was a high degree of agreement of relative and subjective weights but great discrepancies for the other. It was found that, given the variables, a computing machine would come closer to producing the subject's judgments than he could himself.

Finally, by using a configurational model the R obtained was .88 but by application of the linear model the R was .91. Thus, it was found that the linear model was the better predictor of the judgment.

Dawes, (1970) did a study using the linear regression model to see whether 'bootstrapping' would work in the selection of student applicants into graduate programs. Dawes points out that from all the research done in this area the linear combination of criterion variables, which is a simple actuarial method, consistently does better than clinical judgment.

In his paper on graduate admissions Dawes examines three principles, namely; a) the simple linear combination

of the criteria the admissions committee considers will do a better job of predicting performance in graduate school than will the admissions committee itself; b) behavior of the admissions committee studied can be simulated by a linear combination of the criteria it considers; and c) under certain circumstances the paramorphic representation of the judge's policy, i.e., the results of the simulation, may be more predictive of the outcome criterion than is the judge himself. Goldberg (1970) terms this latter phenomenon, in which a model of a judge works better than the judge who was the basis for the model, "bootstrapping".

The Admissions Committee of four members required all applicants to produce GRE scores, a transcript of past work and letters of recommendation. Each member rated the applicants on a six-point scale ranging from 'reject now' to 'offer a fellowship'. The following spring faculty ratings of actual performance in graduate school were obtained. It was found that GPA and QI (quality of undergraduate institution) correlated more highly with later faculty ratings than the ratings of the admissions committee.

In order to study the possibility of bootstrapping, three hundred and eighty-four applicants for the fall were studied. The dependent variable of interest was the average rating of the admissions committee. The multiple correlation predicting the admissions committee rating from GPA, GRE and QI was .78. A cutoff point based on a linear

combination of the three predictor variables was found. 55% of the applicants scoring below this point could be eliminated on the basis of the paramorphic representation of the admissions committee's behavior without a single error being committed. The correlation between the linear combination and later faculty ratings was higher than that between the admissions committee's ratings and later faculty ratings. These results indicate that decisions made by such methods might be more valid than those made by judges relying on their own intuitions.

He suggests that a mathematical model is an abstraction of the mental process being modeled. A decision maker may be distracted by physical, mental and emotional extraneous variables that influence his most recent applications of knowledge. A paramorphic representation of his behavior would not be affected by such extraneous variables.

Goldberg (1968) focuses on clinical judgments and the diagnoses of physical and mental pathology, with an emphasis on the process of clinical inference rather than the validity or reliability of such judgments. He suggests that a search for a model should be made which uses information as its "input", combines the data in some optimal manner so as to produce as accurate as possible a copy of the responses of the judge regardless of the actual validity of the judgments themselves.

The answer according to Goldberg is to start with the

simplest linear additive regression model and then to proceed to introduce complications only so far as is necessary to reproduce the inferential responses of a particular judge.

If we assume that the judgments can be reproduced by the model

$$J = b_1 X_1 + b_2 X_2 \ldots + b_k X_k$$

The b values found on one subset of the judge's responses can be cross validated on another subset of judges responses to determine the accuracy of the linear model. The resulting correlation (Ra) represents the extent of agreement between the linear model and the inferential products of the judge. It is possible to represent the stability of the responses (r_{tt}) or the extent to which one can predict his judgments from his own previous judgments of the same stimuli. This reliability coefficient could be viewed as the upper limit on the predictability of any model. To the extent that the value of Ra approaches the Value of r_{tt}, the model can be seen as representing the cognitive processes of the judge.

Since clinicians frequently describe their judgmental processes as complex involving curvilinear, configural and sequential utilization of cues one might expect that the linear additive model would be inadequate in providing a good representation of their judgments. Goldberg suggests that the analysis of variance (ANOVA) could be used

alternately if a) the cue values are treated as categorical rather than continuous variables and b) the cues are orthogonal. If the number of cues or the number of levels per cue is not too large it might be possible to use a completely crossed experimental design, (all possible combinations of each of the cue levels). Thus, a significant interaction between cues X_1 and X_2 implies that the judge was responding to particular patterns of those cues.

In study after study it was found that the accuracy of the linear model was almost always as reliable as the judgments themselves and the introduction of complex terms rarely served to increase the cross-validity of the model significantly. Goldberg postulates three possible reasons for these findings: a) human judges behave like linear data processors, but somehow believe that they are more complex than they really are; b) human judges behave in fact in a rather configural fashion, but the power of the linear regression model is so great that it serves to obscure the real configurational process in judgment; c) human judges usually behave in a decidedly linear fashion on most tasks but on a few tasks they use more complex judgmental processes.

Subject matter experts in three different fields were consulted to help select diagnostic decisions of a clearly configural nature and three judgmental tasks, one from each field, were developed for intensive study. Nine judges were

asked to make diagnoses for 192 hypothetical patients (two administrations of each of the 96 possible cue combinations). The judges made their diagnoses on a seven-point scale. The inferences of each judge were analysed by ANOVA. The major finding was that the largest of the 57 possible interactions for the most configural judge accounted for only 3% of the variance of his responses. On the average, roughly 90% of a judge's reliable variation of response could be predicted by the simple linear additive regression model. The results of the other two studies were remarkably similar. Therefore, he concluded that the hypothesis that judges can process information in a configural fashion, but that the general linear model is powerful enough to reproduce most of those judgments with very small error was the most plausible one. That is, the configurational model showed no demonstratable gain over the linear model.

Goldberg (1970) considers the question of whether the accuracy of prediction from the linear model can be improved when the criterion information is not available to the judge. This he points out could be done if the clinician's judgmental strategy can be separated from his judgmental unreliability. This is what the linear model can do. Since a mathematical model is an abstraction of the process it models it is free from the influences of extraneous variables such as boredom, fatigue and other physical, mental and emotional distractions. By modifying

the lens model, he goes on to develop a model which specifies the conditions under which the model outperforms the performance of the judge.

In his study the judgmental problems of differentiating psychotic from neurotic patients on the basis of MMPI profiles was used (Meehl, 1959). The profiles of 861 psychiatric patients who had been diagnosed as either psychotic or neurotic were used as predictors. The validity coefficients in Meehl's study were used as an index of diagnostic accuracy. Since criterion information was available for this task it was possible to compare the validity coefficients of each judge's model with that achieved by the judge himself. In each case it was found that the model was more valid than the judge himself. When a composite judgment of all 29 clinicians was used it was seen to be more accurate than the typical individual judge and was not improved by using the "modeling" procedure. In situations where criterion information is lacking the most accurate predictions may come from the composite judgments of the total group.

This concludes the discussion of the literature pertaining to the judgmental process and the models that describe it. In the present study the linear model is used to capture the judgmental policies of subjects and the relative or standardized beta weights are used to predict inquiry performance.

Empirical studies of multiple cue probability learning or cognitive control. Multiple cue probability learning is represented schematically by the lens model in which the judge learns to integrate differentially weighted cues of various degrees of dependability. The differential cue weights in the task must be matched by the cue weights in the judgmental system of the subject. An example of multiple cue probability learning has been cited in Chapter I.

Hammond (1971) and his colleagues have focused on the learning aspect of judgment. They have contended that specific feedback derived from the lens model (i.e., feedback about the weight the subject gives to each cue, and the weight the environment gives to each cue) is more effective than non-specific or outcome feedback.

Hammond has taken the position that acquisition and application are independent components of learning in cognitive tasks and demonstrates that even when knowledge is complete imperfect cognitive control can prevent high achievement in judgmental tasks.

Previous studies relating to the learning of clinical inference have shown no improvement in the predictive accuracy of clinical judgments. Goldberg and Rorer (1965) did a study in which judges were given immediate feedback on a task requiring the differential diagnosis of psychosis versus neurosis from MMPI profiles by three groups of judges: expert, middle and naive. Only the naive group showed any

transfer on the testing profiles. In spite of introducing a number of experimental variations in an attempt to increase judgmental accuracy none of the experimental group showed any substantial learning.

Hammond, (1971) discusses the inadequacy of this approach and contends that providing the correct answer after having made a judgment is virtually useless since the outcomes are related to the cues in complex and uncertain ways. An approach to the solution involves making explicit the characteristics of a person's judgmental system and relating these to the judgmental task. In general the subject should be able to compare what should be done with what he is doing. Information about the task properties enables the subject to perceive not only that his judgment was in error but why it was in error. More specifically, the subject should be provided with the differential weights he actually assigns to the cues and allowed to compare them with the weights required by the task.

Studies were done using traditional outcome feedback as a control, verbal and pictorial feedback, and computer graphics to provide cognitive feedback. The results clearly showed the superiority of the cognitive feedback group.

Hammond and Summers (1972) point out that multiple-cue probability learning tasks can be varied in three ways: a) the number of cues related to a criterion can be varied; b) the uncertainty associated with each cue can be varied

by creating differential cue validities; and c) the form of relationship between cue and criterion can be varied. They use the "lens model" equation to explain the relationship between the subject and the task. Two subjects might have identical achievement indexes either because of perfect knowledge or because of perfect cognitive contro. Thus, poor performance in complex inference tasks can be attributed to difficulties in cognitive control, as well as to difficulties in acquiring knowledge about the task. When the criterion is a simple linear function of the cues subjects achieve a high level of performance with little difficulty. They conclude that cognitive feedback can facilitate performance on judgmental tasks as there is evidence that computer technology can be used to produce this kind of feedback.

In the present study cognitive feedback was provided to the subjects verbally and from computer printouts. Since computers were not available this could be done only once. In addition, however, the relationships between the cues and the task were discussed and reflected upon. Since no criterion was available the interest in this research was in the changes in policies per se.

Research on the inquiry process using the Teacher's In-Basket.

The teacher's In-basket designed by Shulman (1963) is a situational simulation in which the subject is asked to

role-play an inexperienced teacher beginning her first teaching job. The in-basket technique has been described in Chapter I; and in Chapter III a more detailed description of the instrument and the variables of interest are fully discussed. Therefore, in this chapter a brief review of the findings of the following studies will be made: Shulman (1963); Shulman, Loupe and Piper (1968); Piper (1969); and Loupe (1969).

Shulman (1963) was interested in investigating seeking style, as a determinant of inquiry behavior. Seeking style, according to Shulman, is a continuum, the two extreme poles of which are the dialectical and didactic seekers. The basic prediction was that subjects identified as dialectical would surpass those identified as didactic in their ability to inquire effectively. It was hypothesized that the personality characteristics that typified the dialectical seeker would predispose her to be a more effective inquirer than her didactic counterpart since she preferred the complex, was willing to risk, and was more open to her environment she would be more willing to engage in inquiry.

In both studies of inquiry (Shulman, 1963; Shulman et al., 1968) the results indicated that dialectical seekers exceeded didactic seekers in all measures of inquiry. The dialectical seekers spent more time in inquiry, attended to more "bits" of information, consulted more sources of information, sensed more problems and reached more competent

solutions.

In the study by Shulman et al.(1968), each subject participated in the teacher's in-basket twice, once before and once after student teaching. The results showed that as the influence of seeking style increased from the first to second administration, the influence of GPA on inquiry decreased. It was also found that shifting was highly correlated with inquiry variables and relatively uncorrelated with seeking style. This indicated that inquiry may be a function of two very different factors; namely, seeking style and a learned strategy.

Based on the above finding, Piper (1969) and Loupe (1969) used different training experiences to facilitate inquiry performance. Loupe focused on changing the learned strategy component of inquiry performance, whereas Piper studied the effect of changes in the affective component.

The results showed that seeking style was not a significant predictor of inquiry performance; however, it did predict performance on the problem solving test used at the end of the training program. A possible explanation was that seeking style is a meaningful determinant of inquiry only when intellectual prerequisites have been met by all subjects.

Openness training did increase time spent and information used in the inquiry situation but there were no significant changes in problem sensitivity or inquiry

competence due to the training.

Problem solving training increased the variety of information used in solving a problem.

The differential results of the two training techniques tended to confirm the distinction drawn by Shulman et al. (1968) between commitment to inquire and learned problem solving strategies. The present experiment attempted to sift out the relative contributions of personality variables and judgmental beta weights in the prediction of inquiry performance and to see whether the independence of the affective and the cognitive components could be replicated, treating judgmental policies as cognitive component predictors and personality variables as predictors of the affective component.

Literature related to internal versus external locus of control as a personality construct.

In studying the personality determinants of inquiry a new personality dimension was included in the present experiment. Locus of control is a personality construct which refers to a person's perceptions of the agency of control of the reinforcements he receives. If a person perceives that an event is contingent upon his own behavior he is said to have internal locus of control. That is, he feels that the reinforcements which he receives occur primarily because of his own purposeful behavior. On the other hand if he feels that the reinforcements he receives

occur primarily because of forces beyond his control such as luck or chance, then he is said to have an external locus of control.

Rotter (1966) developed scales to measure this dimension and related these measures to a wide variety of behaviors. He explains the theory behind his hypotheses. "In social learning theory, a reinforcement acts to strengthen an expectancy that a particular behavior or event will be followed by that reinforcement in the future.... It follows as a general hypothesis that when the reinforcement is seen as not contingent upon the subject's own behavior that its occurance will not increase an expectancy as much as when it is seen as contingent.... It seems likely that, depending upon the individual's history of reinforcements, individuals would differ in the degree to which they attributed reinforcements to their own actions".

Rotter goes on to explain how a generalized expectancy is developed for a class of related events which might affect a wide variety of behaviors in a variety of situations. Such generalized expectancies can be measured and are predictive of behavior under different circumstances. The scale developed by Rotter to measure these expectancies for control is a 29 item scale including 6 filler items. He reviews a series of studies in which support was found for the following hypotheses. A person high in internal locus of control is likely to: 1) place greater value on skill or

achievement reinforcements and is more concerned with his ability and failures; 2) he is likely to take steps to improve his environmental condition; and 3) he is resistant to subtle attempts to influence him.

Butterfield (1964) studied the relationship between locus of control and frustration; and locus of control and anxiety responses. He also investigated the relationships between locus of control and students' academic aspirations and expectations. The results revealed that frustration reactions become less constructive as locus of control becomes more external. It was also found that debilitating anxiety reaction scores increased and facilitating anxiety reaction scores decreased as locus of control became more external. Regarding the relationships between locus of control and achievement, interesting results were reported; as locus of control became more external the range of expected grades increased and the grades which subjects earned increased. This was interpreted to show that inner directed students study those things which they regard interesting while externals are more other-directed, thus mostly study what their professors regard as important.

Mirels (1970) did a factor analysis on the I-E Scale to study its factor structure. He found that the scale was not unidimensional but found two factors: one concerning the mastery over the course of one's life and the other concerning the belief of the extent to which a citizen can effect

political change.

Schnieder (1972) studied the relationship between locus of control and activity preferences. The preference for skill versus chance activities was studied. He found that 'internals' tend to prefer skill activities over chance to a greater extent than do 'externals'. He also found that the correlations of skill-chance preferences and locus of control varied as a function of the sex of the sjubect and with masculinity or femininity of the skill items. He concludes from this study that the construct of locus of control is multidimensional.

The use of this scale in the present study was purely exploratory. No relationships were hypothesized between locus of control and inquiry performance except that an individual high on the internal end of the scale would tend to sense and solve more problems in an instructional situation. He would tend to fall into the personality type that Shulman calls dialectical.

This study will attempt to research the following questions: 1) Are judgmental policy preferences stable over time? 2) Can policy preferences be modified by training involving cognitive feedback and discussion and reflection on one's policy preference? 3) Can inquiry performance be predicted by the weights subjects assign to different cues in reaching a judgment? 5) What are the relative contributions of personality variables and judgmental beta weights

in the prediction of inquiry performance?

In the following chapter the design of this study, including the training and testing conditions will be discussed in detail.

CHAPTER III

METHOD

The research design for this study involved the following steps:

(1) The development of cardexes having information on hypothetical children in the classroom, and the development of rating scales on which all the subjects would rate the likelihood of these hypothetical students being instructional problems in a classroom setting.

(2) The capturing of the judgmental policies of all subjects from the rating of the cardexes using a multiple linear regression analysis.

(3) The prediction of inquiry performance of a randomly selected subgroup of subjects measured by the teacher's in-basket from the judgmental beta weights and from selected personality tests.

(4) The development of training procedures using discussion of the variables on the cardexes and the reflection of subjects' policy preferences.

(5) The administration of the in-basket and training sessions.

(6) The administration of the post judgmental task or rating of the cardexes again on the same question.

(7) The testing of the hypotheses based on the theories of judgment or decision-making, cognitive feedback and inquiry.

Subjects

Fifty-four female students in elementary and secondary education were randomly selected from the Educational Psychology classes at Saginaw Valley College. The subjects were contacted personally in their classes and were asked to participate in the present study for a total of seven hours for credit toward their grade in Educational Psychology. They were allowed to drop their lowest test score out of six tests given during the term. Subjects were randomly assigned to one of three treatment groups. Each subject was given an identical description of the task and was contacted individually by telephone to set up appointments for each training and testing session. Subjects were told that they would learn things relevant to teaching and that their work was valuable only if they completed all phases of the study and would thus receive credit only if they completed all the work.

Pre Tests

All the fifty-four subjects were given a group of selected tests and inventories which took approximately thirty-five to forty-five minutes to complete. The measures were comprised of Complexity (Barron, 1967); Lecture-Discussion (Shulman, Loupe and Piper, 1968); Political Position (Shulman, Loupe and Piper,(1968); and Internal vs. External Locus of Control (I-E Scale, Rotter, 1966).

The Complexity Scale consists of thirty items designed to elicit a statement of preference for either simple or complex situations. The subject either agrees or disagrees with each item. A high score indicates preference for complexity, ambiguity, etc.

The Lecture-Discussion Scale consists of six items which relate to a student's preference for lecture or discussion in a classroom situation. The subject responds to the items in an identical fashion as the items in the complexity scale. The items were therefore presented interspersed with the complexity items. A high score on lecture-discussion indicated a preference for the discussion approach in the classroom.

The Politics Scale is a simple four-item self-report from which subjects' political positions could be elicited. The scoring of the items was in the direction of liberalism. This Political Scale was a revision of the one used by Shulman, Loupe and Piper, (1968).

The Internal versus External Locus of Control Scale is a twenty-nine item forced choice test including six filler items intended to make the purpose of the test somewhat more ambiguous. Subjects were told to select those items which they actually believed to be more true as far as they were concerned; that this was a measure of personal belief and that there were obviously no right or wrong answers.

These four personality tests were used to predict

inquiry performance in the in-basket situation. Those high on these variables were classified as dialectical seekers by Shulman (1963) and were shown to be highly successful in inquiry. In the present study the contribution of these personality variables in the prediction of inquiry performance was examined.

The pre judgmental task was administered to all the subjects individually. They were asked to rate one hundred and eight hypothetical students on five different variables. The ratings were to be made on a seven-point-scale on the following question: "What is the likelihood that this student will be an instructional problem in a classroom setting?" The development of the cardexes and their use in the judgmental tasks are fully described later in this chapter.

Design

This research was comprised of two related studies. The first study or phase was concerned with the modification of judgmental policy preferences of subjects through training. The second phase investigated the prediction of inquiry performance from judgmental policies and selected personality tests.

In Study I the experimental design consisted of three levels of training: discussion-reflection training, in-basket followed by discussion-reflection training, and

control. This study had a repeated measures design. The major dependent variables were the judgmental policies or beta weights of the subjects on the post judgmental task. A linear regression analysis was used to capture the judgmental policies for both the pre and the post tests of all the 53 subjects. This phase of the experiment involved all 53 subjects in different kinds of training and the post judgmental task.

In Study II or the second phase of the experiment the performance of a subgroup of 21 subjects was predicted in the inquiry situation from their policy preferences and from selected personality tests. The measures of performance were: the number of problems sensed within various information sources in the in-basket, the competence measure of problem solving, the time spent in inquiry, the amount of shifting, and the number of "bits" of information attended to. An attempt was made to determine how far a teacher's policy preference is predictive of inquiry performance.

Figure 2 presents the experimental procedures in the form of a chart.

Development of Cardexes

Five variables or categories of information sources were selected which would correspond, with a little modification, with the information sources categories in the Teacher's In-Basket. The five variables were: 1) SES,

CHART OF EXPERIMENTAL PROCEDURES

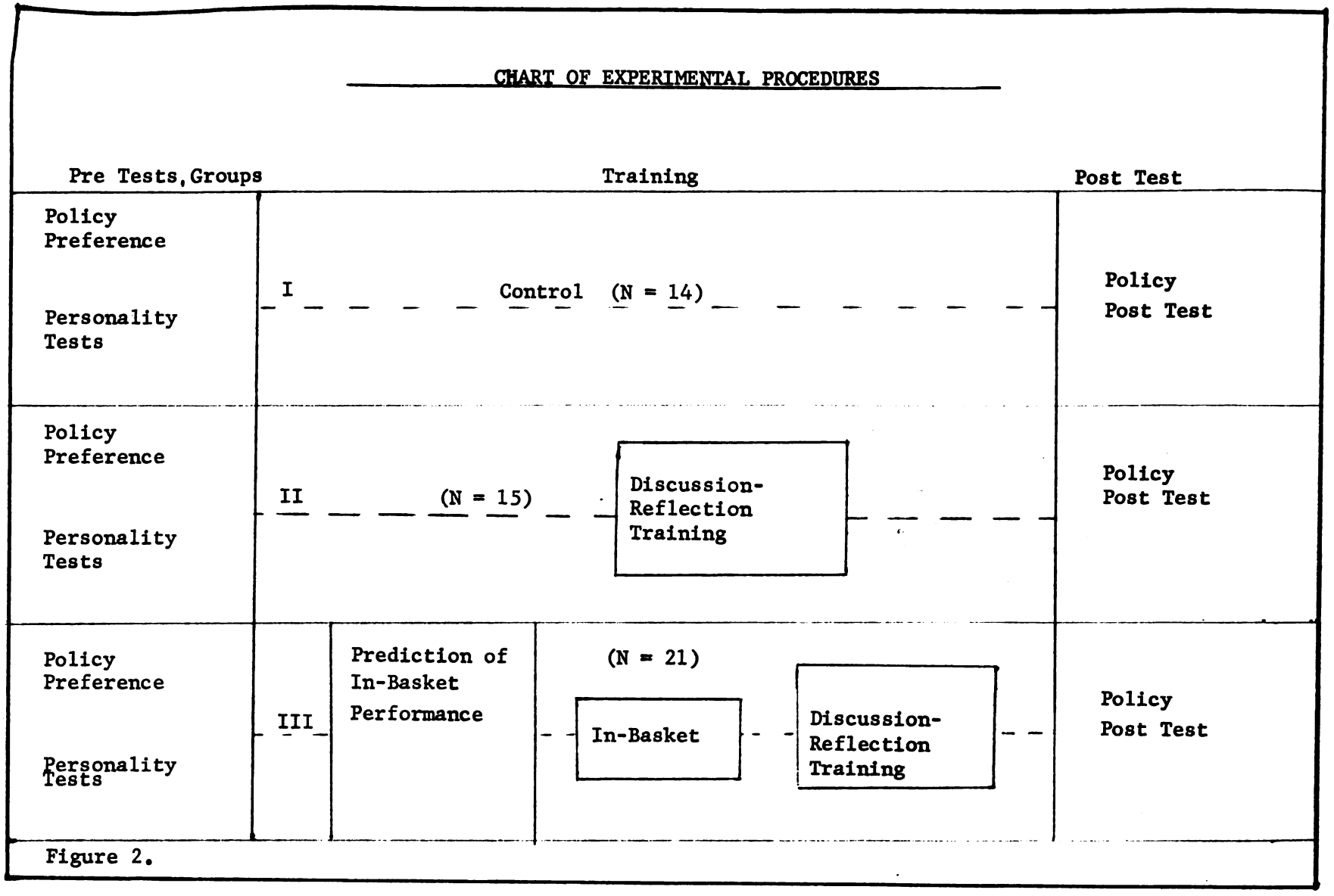

Figure 2.

2) IQ, 3) grades, 4) sex, and 5) comments. The first three variables had three levels each of high, medium, and low. The remaining two variables had two levels each, namely male and female, and either favorable or unfavorable. These variables or cues were treated as categorical variables and a completely crossed experimental design was used where all possible combinations of each of the cue levels were presented on the cardexes.

To avoid any misinterpretations of scores or values presented within the categories of high, medium and low, special procedures were adopted. A pilot test was developed consisting of grades ranging from A+ to E, IQ scores ranging from 130 to 85 and a list of occupations selected from published lists of vocations and professions in different socioeconomic classes. All these values were presented in a random order to a group of teachers-in-training in an elementary Science Methods class. Comments were selected from cards presently being used in various school systems and were also presented to the subjects in a random order to be rated as favorable or unfavorable. (See Appendix A). The subjects were instructed to rate the scores and occupations as high, medium or low and the comments as favorable or unfavorable according to their own subjective perceptions. Only those values were used on the cardexes where a two-thirds majority of the subjects agreed upon the rating.

A completely crossed experimental design was used where all possible combinations of each of the cue levels were presented on the cardexes. This procedure was necessary to obtain the independent contributions of the cue dimensions in the prediction of the judgment and to ensure obtaining reliable beta weights.

In order to have all possible combinations of the levels of information sources presented on the cardexes, it was necessary to develop one hundred and eight hypothetical students having different combinations of those variables (3 x 3 x 3 x 2 x 2 = 108). To control for order effects, a 5 x 5 latin square procedure was used to present the information in all five positions of sequence an equal number of times. The presentation of the cardexes was randomized and the random order was kept constant across subjects. The names of the hypothetical students were selected at random from the telephone directory, the occupation of the father was used as an indicator of SES and comments were used to describe the personality of the hypothetical students.

Development of the Cardex Rating Scale

In order to quantify the judgments made on the basis of the five specific cues on the cardexes a seven-point rating scale was developed. Each cardex was to be rated on one such scale on the following question: "What is the chance that this student will be an instructional problem in a classroom setting?" If the subjects felt that the

hypothetical student showed a 95% or greater chance of becoming an instructional problem they were asked to place a checkmark at 7. If they felt that the student had a 50% chance of becoming an instructional problem they were asked to place the checkmark at 4; and if they felt that the student had a 5% or less chance of developing instructional problems, they were to place the checkmark at 1. Appendix C has the completed directions that were used when administering the judgmental task. To prevent a subject from being influenced by her prior ratings, each rating scale was presented on a separate page. The scales were numbered from one to one hundred and eight. Corresponding numbers were used on the back of the cardexes to ensure that the individual ratings could be identified if necessary. This also kept the order of the presentation of cardexes constant across all subjects.

Computer cards were punched including the five cues in a certain combination of levels as independent variables and the corresponding rating as the dependent measure for one hundred and eight ratings per subject. By doing a multiple linear regression analysis judgmental weighting policies were derived, thus each subject's policy preference was represented in the form of a regression equation.

Training

All training took place in small groups of four to five subjects for approximately an hour and one half. As

stated in Chapter I, the central problem of this document was to modify judgmental policy preferences through discussion and reflection training as a form of cognitive feedback. A second training procedure was the in-basket experience followed by discussion-reflection training. The effect of these two forms of training was studied by measuring the differences in policy preferences of the three training groups on the post judgmental task.

Discussion-Reflection Training

The discussion-reflection training consisted of feedback and reflection on subjects' policy preferences presented to them in the form of a standardized regression equation and discussion of categories of information sources used in the cardexes. The objectives of the training were to make explicit the judgmental policy preferences of each subject by providing feedback regarding the beta weights that they had assigned to the various cues on the pre judgmental task and to sensitize them to the effect of these variables on student behavior in classroom settings.

The instructional materials were taken primarily from Learning and Human Abilities (Klausmeier and Ripple, 1971) and were discussed under the five headings corresponding to the five variables used in the development of the cardexes. (See Appendix E).

There were two distinct learning situations employed to attain the objectives:

1) Feedback and reflection discussion of policy preferences. This phase was conducted on an individual basis. The subject was made aware of her policy preference and by being allowed to study the relative weights she actually assigned to the five cues. A discussion and reflection on why she had assigned those weights and whether her subjective weights coincided with those were discussed.

2) Discussion of cue variables as related to student behavior. During this phase a ten minute didactic presentation was given to subjects in small groups followed by a discussion of each variable. Prior to the discussion of each section in the training booklet (see Appendix E), subjects were asked to read the section aloud to the rest of the group in turn. This procedure seemed to encourage the active participation of each member in the group. The variables were discussed in the following order: 1) what SES means, the plight of the child from low SES families, environmental factors contributing to the various characteristics of the low SES child; 2) what IQ means, range of IQ's in school children, limitations of IQ scores in organizing instructional programs; 3) what grades mean, sources of information about achievement, precautions regarding the use of grades as valid measures of achievement; 4) sex roles, sex differences, precautions; 5) comments on student records, personality characteristics related to school achievement.

At the end of the session, subjects were asked to take

the booklet with them and were given instruction to read the information, noting the important points and reflecting on their policy preferences before the post testing. There was a least a week's time lapse between the training and the post judgmental task.

The In-Basket Experience

A major purpose of this study was to study the relationship between judgmental policy preferences and inquiry performance; or to test whether policy preferences could predict teacher decision making and problem solving in a realistic, teacher relevant situation. Further, if the underlying processes in the two situations were similar, the in-basket experience would have the effect of sensitizing subjects to the influence of certain variables on problem behavior in the classroom. Therefore, the experience would have the effect of changing the differential weights one assigned to those sources of information on the post judgmental task.

The Teacher's In-Basket was employed since it provided the realism necessary to serve as an externally valid test of teacher decision-making. It is composed of specific sets of material into which potential problems are embedded to stimulate maximum inquiry. Subjects were asked to role play the part of a sixth grade teacher and were asked to think aloud in order to make their thoughts available to the observer. Thus, it was possible to determine the sources of

information the subject was utilizing, whether the subject perceived the situation or information as problematic and whether the information assisted the subject in resolving a problem.

The subject was brought into a one-way observation room and was told that this was her new classroom in Ridge Forest Elementary School. She was seated behind a desk on which was an intercom, the in-basket materials, a folder containing current report cards, cardexes, attendance book, anecdotal records and paper and pencil. The in-basket materials included telephone messages, tasks and lists to be completed, test scores, schedules, etc. The subject was told that she was a new sixth grade teacher taking over the class in December after a succession of substitute teachers. She could call out for additional information to the school secretary and "reference memory" over the intercom. She was next told that the success of the research depended on her ability to think out loud so it was necessary to make all her thoughts verbal whether she deemed them trivial or not.

Prior to being left alone to proceed with her inquiry the subject was given training to think aloud. She was given five or six different objects and was asked to group them in all possible ways giveing reasons for why they belonged together as she went along.

Before leaving the room the experimenter explained the situation to the subject. The subject was informed that she

could use materials from the cumulative records and medical records only one at a time. They were placed on a table across the room, all other materials were for her unrestricted use but that she should only write on the pieces of paper provided. The subject was then asked to proceed by reading the written description of the situation out loud. Embedded within the in-basket were tasks, letters and memos designed to structure the situation to the degree that all subjects would at least attempt to undertake the same basic set of tasks for example, identify those students who must see the school psychologist. The choice of whether to continue inquiring or not was up to the subject. The subject was observed in the above situation by a single observer who also functioned as reference memory and school principal. Everything the subject did could be viewed through the one-way mirror and everything the subject said was heard by the observer. The observer dictated a complete log of what the subject did during her stay in the situation on a tape recorder and simultaneously checked off lists of information attended to within categories of information sources. Appendix F gives a typical scoring sheet used to keep count of the bits within information sources. Detailed scoring and interpretations of the subject's inquiry performance were done after all the observations were made.

Dependent-Variables

A number of scores were abstracted from the observations of inquiry behavior of the subject. The potential problems, embedded in the in-basket and students' records were of two basic types, the first being a simple isolation of expectancy and the second kind was in the form of conflict between sources of information. There were approximately 250 such potential problems identified in the problems manual. The Problem Sensitivity Score was simply the number of problems sensed by a particular subject.

Since use of information is important to the process of inquiry two measures of information usage were used. Bits was simply the number of times the subject consulted any source materials including her own written notes, for information; and Information Sources was a measure of diversity of information usage. For scoring purposes the Teacher's In-Basket was divided into ten basic problem areas. A record was kept of the different sources consulted within each area. Thus, if a subject looked at a cardex, the sociogram, a cumulative record, the attendance book and the same cardex again, the number of sources consulted would be only four if they all concerned a particular problem. Total sources were all the sources used across the ten problem categories; whereas, the mean sources was calculated by dividing the total sources by the number of problem areas into which the subject inquired.

Competence was a qualitative measure of problem resolution. For each of the ten problem areas, model resolutions were written at varying levels of complexity, the lowest being a simple recognition of the problem and the highest represented the fullest understanding of the problem achieved with the use of all available materials (see Appendix G). The model solutions were rated 1-5, according to their complexity. The competence score was derived by comparing the subjects' problem resulution with this standard.

Time was another variable of interest since a subject remained in the situation until she called on the intercom and said she was done.

A cognitive process variable was shifting which was the total number of times the subject shifted his search from one bit of information in one source category to information in another. Two other variables of interest were the problems sensed within categories pertaining to SES, IQ, grades, sex and personality variables. These were labeled Problems Info. Bits Info on the other hand, were bits of information attended to involving SES, IQ, grades, sex and personality variables. Thus, the two measures were not entirely independent.

Finally, the dependent measures of major interest were the beta weights for each subject on the post judgmental task. The cardexes used on the pre test were used again on

the post test.

Measures of Performance, Experimental Questions and Hypotheses.

Much research effort has been directed toward increasing our understanding of the relationship between different personality types and the general manner in which individuals mediate the world around them cognitively. But so far no effort has been made to relate the judgmental process and active inquiry or problem-solving even though both processes involve the utilization of information in the making of a decision. Therefore, it will be of interest to determine how far a teacher's policy preference is predictive of inquiry performance and whether an individual when faced with a situation which must be categorized and acted upon will tend to pick up cues that will allow him to classify it in his most commonly exercised schemata.

Questions regarding modifiability of judgmental policy preferences due to training:

In order to develop sensitivity to the problems of students in a classroom a teacher-in-training must be aware of possible difficulties a student can encounter due to factors such as low aptitude, emotional disturbance, poor economic conditions at home, poor past achievement and advantages and disadvantages of being male or female. Awareness of one's own biases and weights that one gives to these variables in making a judgment about student problems is also a critical variable in understanding how one integrates

information to reach a decision. Previous studies (Hammond, 1971) have used cognitive feedback to improve the accuracy and the effective application of knowledge in judgmental tasks. The possibility of the modification of one's judgmental policy by such procedures could raise the following questions:

1. Can the judgmental policies of teachers-in-training be modified by giving them training using discussion and reflection in which the characteristics of their judgmental system are made explicit and are related to the judgmental task?

2. Will the in-basket experience serve to modify the judgmental policies of teachers-in-training on subsequent judgmental tasks?

3. Are there significant differences between teachers-in-training who do not receive discussion training and those who receive discussion training in the way they perform on subsequent judgmental tasks?

4. Are there significant pre test, post test differences in the judgmental policies of teachers-in-training who have had both the discussion training and the in-basket experience and those who have had no training at all and those who have had the discussion training only?

5. Are the contributions of personality variables and policy preferences as predictors of inquiry performance independent of each other? Which makes the largest

contribution to the prediction of inquiry performance?

Questions Regarding Prediction of Inquiry Performance:

6. Is there a positive relationship between the number of problems sensed within categories of information sources used by a teacher-in-training in the in-basket and the weights she gives to those sources of information in her judgmental policy?

The embedded problems in the teachers' in-basket are generally of two kinds: one, which could be sensed by attending to information within one category of information sources and the other, which involves a discrepancy between two bits of information within two different categories of information sources. Different kinds of questions might be asked regarding the second type of potential problem.

7. Is there a positive relationship between the amount of shifting in the in-basket situation and the assigning of equal weights to those categories of information sources in the subjects' judgmental policies?

Since there are several "bits" of information within the various categories of information sources, one might also ask the following question:

8. Is there a positive relationship between the number of bits of information attended to within each category of information sources and the weights used in the subjects' judgmental policies?

However, since the total number of bits available within each information source is different a correction factor will have to be used.

The foregoing questions have dealt with the relationships between different levels of training and subsequent judgmental tasks. They were also concerned with the validation of certain predictions of inquiry performance.

Hypotheses:

1. The judgmental policies for the discussion and reflection training group will be different from the policies for the control group on subsequent policy making as determined by the post judgmental task.
2. The policies of the in-basket plus discussion-reflection training group will be different from the policies for the control group on the judgmental post test.
3. The in-basket plus discussion-reflection training group will differ from the discussion-reflection only training group in their policy preferences on the post judgmental task.
4. The two training groups, that is, the discussion-reflection training group and the in-basket followed by the discussion-reflection training group will differ on the post judgmental task from the pre test measure.

To determine the differences between groups due to the three treatments an analysis of covariance will be used. Thus, after controlling for pre test differences the differences on the post judgmental task due to training will be examined. This analysis will be followed by planned comparisons to study the effects of training in each individual group. Confidence intervals for each least square estimate of treatment effects will be computed. These intervals would show for which cues the differences were significant among the groups.

5. Judgmental policy variables will significantly predict inquiry performance as measured by the Teacher's In-Basket. The measures are: problem sensitivity, competence, information sources, bits and shifting. Time is a measure of commitment to inquire therefore would not be predicted by the cognitive policy variables.
6. There is a positive relationship between the number of problems sensed pertaining to SES, IQ, grades, sex and personality variables in the teacher's in-basket and the beta weights assigned to those cues in the pre judgmental task.
7. There is a positive relationship between the number of bits of information subjects attend to in the teacher's in-basket related to SES, IQ, grades, sex and personality factors and the weights

assigned to these variables in their judgmental policies.

8. There is a positive relationship between the amount of shifting in the in-basket and the equal weighting of the cue variables in the judgmental policies. That is, a subject who tends to take all information sources into account before reaching a judgment will tend to assign equal weights to all categories of information sources in the judgmental task. Such a person would tend to look for information in all categories of information sources in the in-basket and would therefore tend to shift from one source to the other more often than a subject who just considered one or two cues to be important in making a judgment.
9. The contributions of personality variables and policy preferences are independent of each other in the prediction of inquiry.

To validate the predictions made in the above hypotheses regarding inquiry performance, correlational and regression analyses will be conducted. Predictions from judgmental beta weights and personality tests on inquiry performance will be analyzed using multiple linear regression analyses.

The results of the experiment including tests of the above hypotheses and questions are presented in Chapter IV; and the interpretations of the results follows in Chapter V.

CHAPTER IV

RESULTS

This chapter will report the basic findings of the present experiment. In order to aid the reader in interpretation, the following scheme will be used to inspect, organize and report the data. First, the effectiveness of training in achieving changes in judgmental policy preferences will be explored in terms of the judgmental policy post test. The effects of discussion-reflection training and the in-basket experience on subsequent decision making will be carefully examined. Second, the hypothesis regarding the relationships between beta weights representing judgmental policies and the inquiry processes in the in-basket will be examined in the light of the research findings applicable to them. Third, the relationships between the personality variables and the inquiry variables will be explored. Fourth, the relative contributions of personality variables and judgmental policy variables (beta weights) as predictors of inquiry performance will be inspected. Finally, individual policy profiles will be plotted and examined in order to describe the weighting patterns characteristic of the experimental and control groups on the post-judgmental task.

The Judgmental Policy Variables

The reader is reminded that all the subjects were requested to rate one hundred and eight cardexes which reported information about one hundred and eight hypothetical students regarding the SES, IQ, grades, sex and personality of the students. The ratings were to be made on a seven-point-scale on the following question: "What is the likelihood that this student will be an instructional problem in a classroom setting?" The information was presented in all possible combinations of the cue levels. The three levels of high, medium and low for SES, IQ and grades were coded 3, 2 and 1 respectively; and the two levels of sex and comments were coded 2 and 1 on the computer cards. That is, males were coded 2 and females were coded 1; and the favorable comments were coded 2, whereas, unfavorable comments were coded 1. This procedure was necessary in order to obtain a judgmental policy preference for each subject in the form of a regression equation. The regression weights in the equation indicated the amount of weight the subject gave to each of the cues in reaching a judgment.

The same procedure was adopted in capturing judgmental policy preferences on the subjects at the end of the training period. Thus, pre and post policy preferences were obtained for each subject.

It was necessary to convert the raw regression coefficients in the regression equations, obtained for each subject, into standardized beta weights in order to make comparisons among subjects, and between the pre and post judgmental policies of subjects in the three experimental groups.

The pre judgmental beta weights were used as the covariables in determining post judgmental policy differences in the three groups. The pre judgmental beta weights were also used as predictors of inquiry performance. The post judgmental beta weights were the dependent variables used to study the effectiveness of training in achieving changes in judgmental policy preferences.

Due to the nature of the question on which the ratings were made; (that is, the higher the rating, the greater the likelihood of the hypothetical student being an instructional problem); and the coding of the cue levels, (that is, the higher the IQ, etc. the less the probability of a student being an instructional problem), the beta weights were usually negative. Therefore, to eliminate the need to put negative signs repeatedly before the beta weights, the signs are reversed in all tables and graphs. In conducting the various analyses, however, the original signs of the beta weights were maintained on the computer cards.

Finally, since the standardized beta weights were always below 1.0, they were multiplied by 100 for the sake of

convenience and were used in that form in all the tables, graphs and analyses.

Reliability of the Instrument

To assess how well the linear model was representing the judgments of the judges the mean R^2's for the judgments was calculated and frequency distributions of the R^2's of the individual regression equations were plotted in the form of histograms for both the pre and the post judgmental tasks. The R^2's are the coefficients of determination which inform us of the amount of the variance accounted for in the judgments by the five cue variables. Figure 3 shows the frequency distributions and means of the R^2's on the two administrations of the judgmental task. Except for a few extreme cases the instrument seems to be fairly reliable. The mean of the pre test R^2's is 60.26 (62.49 after excluding the two extreme cases); whereas the mean R^2 for the post test is 65.30.

Judgmental Policies and Stability of Beta Weights

Since the judgmental task was given again to all the subjects after a period of eight weeks, stability or reliability across time (for the same subject making the same decisions) were calculated. Table 4.1 reports means, standard deviations and coefficient of stability or reliabilities of beta weights of each of the five cues on the pre and post test measures.

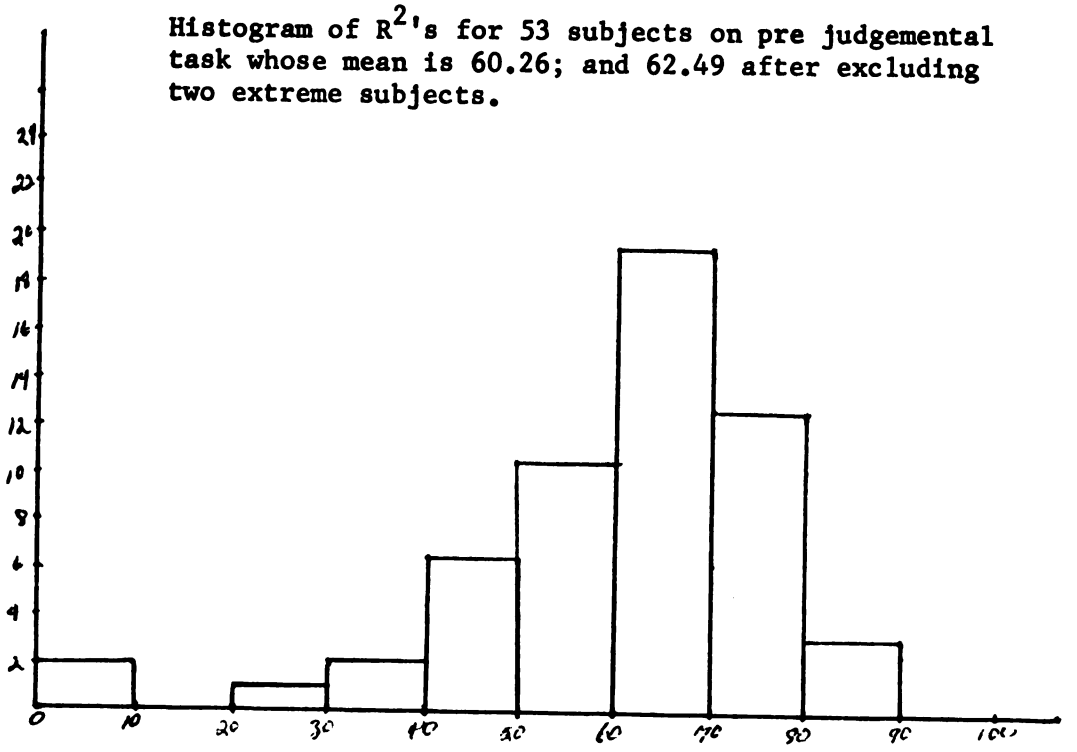
Histogram of R^2's for 53 subjects on pre judgemental task whose mean is 60.26; and 62.49 after excluding two extreme subjects.
0
10
20
30
40
50
60
70
80
90
100

Fig . 3A

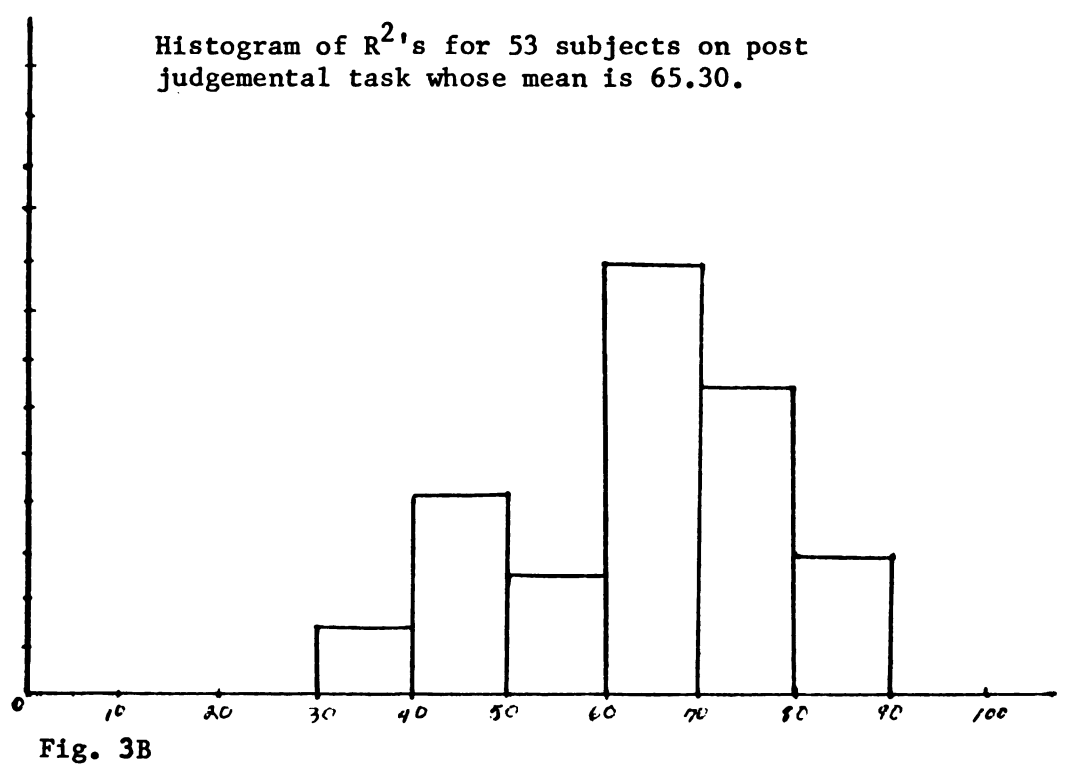
Histogram of R^2's for 53 subjects on post judgemental task whose mean is 65.30.
0
10
20
30
40
50
60
70
80
90
100

Fig. 3B

TABLE 4.1

MEANS AND STANDARD DEVIATIONS OF STANDARDIZED BETA WEIGHTS X 100; AND STABILITY COEFFICIENTS OF BETA WEIGHTS OF FIVE CUES ON PRE AND POST TEST MEASURES (N=53)

Variable	$\bar{X}$	SD	Stability
Pre SES	- .23	6.73	-.05
Post SES	6.86	13.56	
Pre IQ	5.27	18.07	
Post IQ	13.41	18.70	.37
Pre Grades	48.35	37.59	
Post Grades	60.41	25.70	.21
Pre Sex	1.56	7.66	
Post Sex	.90	9.61	.44
Pre Comment	32.65	24.54	
Post Comment	27.70	21.77	.35

For N = 53 the probability of a correlation of .27 occurring by chance = .05; the probability of a correlation of .23 occurring by chance = .01.

Figure 4 shows the average weights assigned to the five variables on the pre and post judgmental tasks.

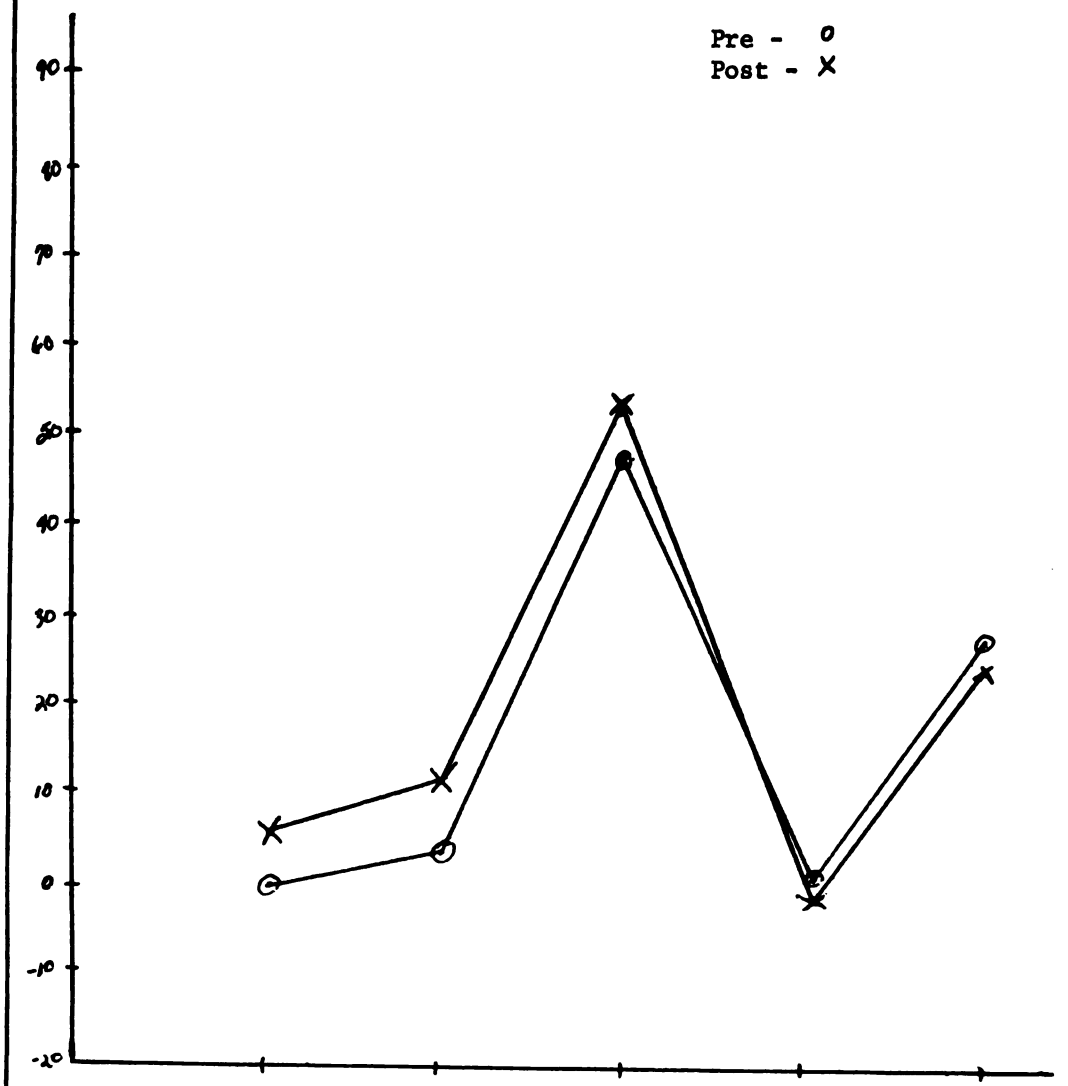

Figure 4. Means of Beta Weights of five cues on pre and post test measures.
(N=53)

Table 4.2 reports prediction of the five post test beta weights with the five pre beta weights as covariates using a regression analysis. Only the F's for post comment, post sex and post SES are significant.

TABLE 4.2

REGRESSION ANALYSIS FOR THE PREDICTION OF POST BETA WEIGHTS FROM FIVE PRE BETA WEIGHTS AS PREDICTORS

Variable	Multiple R^2	Multiple R	Overall F	P Less Than
Post SES	0.24	0.48	2.76	0.029
Post IQ	0.17	0.41	1.84	0.124
Post Grades	0.11	0.33	1.07	0.386
Post Sex	0.32	0.57	4.31	0.002
Post Comment	0.26	0.51	3.23	0.014

Chi square = 52.458 DF = 25 $P < .0011$

Although the correlations between the pre and post beta weights as shown in Table 4.1 are not very high, individual weighting policies as shown in the individual weighting profiles, pre and post, seemed to be highly consistent. To explore this further, each individual's weighting profile on the pre test was compared to the same subject's weighting profile on the post test. There appeared to be a high degree of stability between the two sets of beta weights.

It was therefore thought proper to compute product-moment correlations for the pre and post training beta weights for each subject using the pre beta weights and the post beta weights as the two variables to be correlated with five observations each. The 53 correlations were then converted into Fisher Z's using the appropriate statistical tables. After averaging the Fisher Z's over all the subjects, the overall correlation between pre and post beta weights was found by converting the average value of the Z's back to a correlation coefficient by using the tables. This was found to be quite high ($r = .89$). This clearly shows that individual judgmental policies are stable over time and resistant to change. That is, the relative pattern of weights assigned across the five variables remains quite stable, although the magnitudes of particular weights may not be stable.

Judgmental Policies and Training

One of the major interests of this study was to investigate the effects of discussion and feedback training and the combined effect of the above training with the in-basket experience on subsequent decision making.

Hypothesis 1: The judgmental policies of teachers-in-training can be modified by giving them training using discussion and reflection in which the characteristics of their judgmental system are made explicit and are related to

the judgmental task.

One phase of the present study involved training subjects by giving them cognitive feedback, i.e., by showing them their weighting policies on the pre judgmental task. The actual weights each subject had assigned to the five cues in reaching a decision as to the likelihood of a hypothetical student being an instructional problem in a classroom setting were taken from the computer printout and given to the subjects. Thus feedback was provided to the subjects individually. The rest of the training was devoted to a discussion in small groups of the five variables and their effect on student behavior in the classroom.

Hypothesis 2: The in-basket experience will serve to modify judgmental policies of teachers-in-training on subsequent judgmental tasks. Therefore, the policies of the in-basket plus discussion-reflection training will be different from the policies for the control group on the post judgmental task.

Experimental Group III had the in-basket experience prior to the feedback and discussion training.

Hypothesis 3: The in-basket plus discussion-reflection training group will differ from the discussion-reflection only training group in their policy preferences on the judgmental post test.

To test the above hypotheses an analysis of covariance was done, followed by planned comparisons. The analysis of

covariance revealed that there were significant differences in all three groups in their weighting policies from pre to post tests ($F = 19.079$ $P<.0001$). The post beta weights were significantly different from the pre beta weights on SES, IQ, grades and comments but the difference between the pre sex and post sex beta weights was not significant. The univariate F's for post SES, post IQ, post grades, post sex and post comments were 20.01, $P<.0001$; 12.46, $P<.0010$; 68.51, $P<.0001$; 0.735, $P<.395$; and 22.09, $P<.0001$, respectively (See Appendix H).

The planned comparisons were H_1, testing the difference between the control group vs. the average of the two experimental groups; and H_2, testing the differences between the two experimental groups. Table 4.3 reports the F-Ratio for the multivariate test of equality of mean vectors.

The two training groups were different from the control group in their overall post judgmental policies ($F = 2.23$ $P<.069$). The univariate F's show that only post SES and post IQ were significantly different for the groups. Post SES had a univariate $F = 3.95$, $P<.052$ and post IQ had an $F = 6.03$, $P<.018$. The remaining three variables were not significantly different for this contrast.

However, it was found that the two training groups did not differ significantly from each other. Table 4.4 reports the means, standard deviations and ranges for the beta weights on the pre and post judgmental tasks for the three

groups; and Table 4.5 summarizes the least-square estimates of the contrast adjusted for covariates, standard errors of adjusted estimates and approximately 95% confidence intervals of the pre and post beta weights.

TABLE 4.3

CONTROL GROUP VS. AVERAGE OF TREATMENT GROUPS. F-RATIO FOR MULTIVARIATE TEST OF EQUALITY OF MEAN VECTORS = 2.23
DF = .5 and 41.00, P<.0695

	Variable	Univariate F	P Less Than	Step Down F	P Less Than
1)	Post SES	3.957	0.053	3.957	0.052
2)	Post IQ	6.035	0.018	5.104	0.028
3)	Post Grades	0.262	0.611	1.282	0.263
4)	Post Sex	0.002	0.967	0.479	0.492
5)	Post Comment	0.214	0.646	0.239	0.628

N = 53

TABLE 4.4

MEANS, STANDARD DEVIATIONS AND RANGES FOR STANDARDIZED BETA WEIGHTS* FOR INFORMATION SOURCES ON PRE AND POST JUDGMENTAL TASKS FOR THREE GROUPS (N = 53)

Groups	SES	IQ	Grades	Sex	Comment
Group I					
Pre $\bar{X}$	- 0.57	2.79	47.21	- 0.57	32.79
SD	6.93	16.62	41.70	10.50	21.05
Range	-21.00 to 8.00	-29.00 to 27.00	-73.00 to 89.00	-25.00 to 13.00	-10.00 to 61.00
Post $\bar{X}$	1.57	4.07	60.79	0.14	30.50
SD	6.58	16.14	26.31	12.61	17.50
Range	-16. to 10.	-24. to 30.	-00. to 90.	-42.00 to 11.	- 1. to 62.
Group II					
Pre $\bar{X}$	- 0.20	4.80	42.40	2.00	33.07
SD	5.68	13.14	41.74	5.69	27.31
Range	-13. to 11.	-30. to 28.	-71. to 82.	- 9. to 12.	-30. to 80.
Post $\bar{X}$	10.93	13.07	64.80	0.53	26.40
SD	18.93	16.17	16.03	9.05	17.05
Range	-12. to 60.	-20. to 40.	29. to 82.	-19. to 14.	- 5. to 58.
Group III					
Pre $\bar{X}$	0.16	7.8	55.28	2.8	33.52
SD	7.05	20.83	31.41	6.98	25.13
Range	-12. to 18.	-25. to 63.	-66. to 89.	-16. to 18.	-48. to 68.
Post $\bar{X}$	8.94	22.064	55.64	2.24	27.4
SD	12.27	20.97	29.23	7.72	26.21
Range	- 6. to 33.	-22. to 59.	-56. to 88.	-23. to 15.	-54. to 66.

* N.B. The signs for the beta weights are reversed. The standardized beta weights are multiplied by 100.

N.B. Group I - Control Training; Group II - Discussion-Reflection Training Group; Group III - In-Basket Plus Discussion-Reflection Training Group.

TABLE 4.5

ADJUSTED LEAST-SQUARES ESTIMATE OF THE CONTRAST
H_1 = CONTROL GROUP - AVERAGE OF TREATMENT GROUPS

	Adjusted Least-Square Estimate of the Contrast	Standard Error of Adjusted Estimates	95% Confidence Intervals (Approximate)
Post SES	8.17	4.03	.11 to 16.23
Post IQ	13.12	5.79	1.54 to 24.70
Post Grades	- 2.85	8.26	-19.47 to 13.67
Post Sex	- .31	2.69	- 5.69 to 5.07
Post Comments	- 3.30	6.35	-16.00 to 9.40

N = 53

Table 4.5 reports the least-square estimate of the treatment effect. That is, it reports an estimate of the differences between the effect of being in the control group and the average of the effect of being in the treatment groups. The findings reported in this table explain the findings in Table 4.3 more precisely. Confidence intervals were computed around the adjusted least-square estimates using $\pm$ 2 S.E. of the estimates to obtain approximately 95% confidence intervals. The confidence intervals show that

the differences between the two groups is in post IQ and post SES since these intervals do not include zero. Post IQ seems to be the variable in which the effects of training can be seen most clearly.

Hypothesis 4: The two training groups, that is, the discussion-reflection training group and the in-basket followed by discussion-reflection training group will differ on the post judgmental task from the pre test measure.

Another approach was tried to study the differences among groups in their weighting policies on the pre and post judgmental tasks. Individual weighting patterns were plotted on graphs to obtain weighting policy profiles for both pre and post tests for each subject. Definite differences in weighting patterns could be noticed in the post test profiles of the subjects belonging to the three treatment groups. In studying this further it was decided that any individual beta weight that had a large standard error of measurement might in fact not be significant in making the judgment and was not an important variable in the subject's policy preference. Therefore, $\pm$ 2 S.E. of the individual beta weights was used to separate weights that were large enough to be included in a subject's judgmental policy, and those that were not, for both pre and post judgmental tasks. Each profile was inspected and check marks were made under each of those variables that had confidence intervals which did not include zero. Thus, a

count of the number of significantly weighted variables for each subject on the pre and the post judgmental tasks was obtained. In order to study the differences between the three groups in weighting patterns a total of check marks under each variable for subjects in the three groups was made. Table 4.6 summarizes the total number of weights that were significant on the pre and the post tests in the three groups. Pre-post differences for each variable and the total number of differences for each group are also reported.

The interesting weighting patterns which showed differences in post judgmental policies due to training in the three groups were as follows: In the control group the weighting policies were essentially the same on the pre and the post tests. The number of significant weights being 34 and 35 on the pre and the post tests respectively.

For Group II, the increase in significant beta weights was 13, that is, from 30 to 43 from the pre to the post test.

For Group III, the increase was also greater than in the control group. The number of significant weights increased to 73 on the post judgmental task from 64 on the pre judgmental task. The patterns in Group II show an increase in SES, IQ, and grades, a slight increase in sex and a slight drop in comments. However, Group III shows an increase in SES, an increase in IQ, no increase in grades,

a slight increase in sex and a slight decrease in comments.

The individual patterns will be discussed and inferences from there will be drawn at the end of the chapter.

TABLE 4.6

SIGNIFICANT BETA WEIGHTS IN PRE AND POST JUDGMENTAL TASKS WITHIN THREE GROUPS

		SES	IQ	Grades	Sex	Comment	Totals
Control Training							
Group I (N=14)	Pre	1	7	13	2	11	34
	Post	1	7	14	1	12	35
	Diff.	0	0	1	-1	1	1
Reflection and Discussion Training							
Group II (N=15)	Pre	0	5	11	1	13	30
	Post	7	8	15	2	11	43
	Diff.	7	3	4	1	- 2	13
In-Basket + Discussion and Reflection Training							
Group III (N=24)	Pre	2	12	24	3	23	64
	Post	7	18	24	4	20	73
	Diff.	5	6	0	1	- 3	9

N = 53 N.B. Group III had N = 24 for analysis of policy preferences alone. For in-basket data, group III had N = 21 due to the loss of three tapes. The recordings were not clear enough for scoring purposes so had to be discarded.

Search For an Ideal Policy

The training was directed towards making the subjects aware of the effects of all the cue variables on the decision or judgment. The attempt was to change their judgmental policies in such a way as to equalize the weights given to all the sources of information.

As shown by the results cited above, the number of significant weights assigned to variables other than grades and comments did increase on the post judgmental task due to training.

In order to confirm this observation an analysis of the extent of deviation of each subject's beta weight for all the five variables from a theoretical optimal policy was determined. The optimal policy selected was: SES, .20; IQ, .20; grades, .40; sex, .10; and comment, .10.

The rationale for selecting these weights to describe an ideal profile is as follows: grades are the chief indicators of a student's performance in a classroom setting. Most problems in instruction are reflected in a student's grades. Although grades are an important source of information for a teacher to use in predicting the future performance of a student, she should be aware of their unreliability as well. Grades should therefore, be weighted more than the other variables. However, the reliance on grades alone should be reduced. On an *a priori* basis a

weight of .40 was considered optimal. SES and IQ both are important sources of information, in diagnosing instructional problems in students. Therefore, equal weights of .20 each were considered to be optimal for them. On the other hand, sex differences are not important in distinguishing between problematic students and good students. Since an awareness of sex differences was stressed in the training procedure it was considered that a beta weight of .10 would insure that information on sex differences would be taken into account without weighting it unduly. Finally, the comments used on the cardexes were not stated in behavioral terms, nor were they indicative of severe personality problems. Weight given to such comments ought to be minimal. An ideal policy would, therefore, have a beta weight of .10 for comments. Thus, the optimal profile would theoretically have beta weights as follows:

SES	IQ	Grades	Sex	Comments
.20	.20	.40	.10	.10

The deviations of each subject from this optimal profile were computed and squared to correct for differences in sign. The sum of the squared deviations, when divided by the respective sample sizes, could then be treated as variances; and the significance of the differences between the variances could then be tested as with any F-ratio.

Since average squared deviations had to be computed for the five cue variables from the ideal beta weights, five

sets of average D^2's were obtained for the pre and the post judgmental tasks respectively.

The interest was in the differences between the pre and the post tests for the three groups. One way of doing this was to compute the differences between the average D^2's for each of the five variables on the pre and post judgmental tasks. If the differences were in the right direction, that is, if there was a decrease in variance from the pre to the post test, then the difference was considered positive. If the difference was in the opposite direction, then it was considered negative. Thus, by summing the differences in each group the total differences between the average D^2 for the policies as a whole was determined for each of the treatment groups.

Table 4.7 reports the average D^2's, differences between pre and post D^2's for the three treatment groups and the total differences between the pre and the post D^2's towards the ideal policy.

Comparison on Post Deviations From Ideal Policy Using Pre Deviations as Covariables.

Another way to determine the changes in the treatment groups towards the ideal policy profile due to training was to calculate individual deviations of the beta weights from the optimal beta weights for the five cue variables. The absolute values of the deviations from the ideal policies

were summed to obtain a total deviation score for each subject on the pre and the post tests respectively. An analysis of covariance was done on these total deviations for each subject in the three treatment groups. This was followed by planned comparisons. The post test differences in the total deviations were used to study the effects of training, and the pre test summed deviations were used as the covariables. The analysis revealed significant differences due to training ($F = 72.06$, DF 1 and 49, $P < .0001$).

The planned comparisons showed that the difference between the control group and the average of the experimental groups was significant ($F = 4.62$, $P < .0367$). However, the difference between the two experimental groups, that is, the discussion-reflection group and the in-basket plus discussion-reflection group, was not significant ($F = .171$, $P < .68$).

It could be concluded that the discussion-reflection training was effective in changing the policy profiles of the subjects towards the ideal policy.

Table 4.8 reports the means and standard deviations for the total deviations of policy profiles for each subject from the ideal policy for the three treatment groups on the pre and post judgmental tasks.

TABLE 4.7

AVERAGE D^2's FROM THE IDEAL POLICY AND DIFFERENCES BETWEEN PRE AND POST AVERAGE D^2's IN THE THREE TREATMENT GROUPS (N=53)

Groups		SES	IQ	Grades	Sex	Comment	
Control Training Group I							
	Pre	462	433	967	48	902	
(N=14)	Post	380	584	965	245	702	
	Diff.	82	-151	11	-197	200	
						Total=	- 55
Discussion Reflection Training Group II							
	Pre	438	392	874	88	1112	
(N=15)	Post	363	197	855	115	540	
	Diff.	75	195	19	- 27	572	
						Total=	834
In-Basket + Discussion Reflection Training Group III							
	Pre	456	572	1100	63	1045	
(N=24)	Post	279	418	674	82	812	
	Diff.	177	154	426	- 19	233	
						Total=	912

TABLE 4.8

MEANS AND STANDARD DEVIATIONS FOR TOTAL DEVIATIONS OF POLICY PROFILES FOR EACH SUBJECT FROM THE IDEAL POLICY ON THE PRE AND POST JUDGMENTAL TASKS FOR THE THREE TREATMENT GROUPS (N=53)

Groups	Total Deviations Pre		Total Deviations Post	
	$\bar{X}$	S.D.	$\bar{X}$	S.D.
Group I Control Group (N=14)	94.64	18.78	97.64	27.33
Group II Discussion-Reflection Training Group (N=15)	103.13	20.96	83.07	13.74
Group III In-Basket Plus Discussion-Reflection Training Group	103.63	35.34	85.71	16.15

Judgmental Policies and Inquiry

Hypothesis 5: There are relationships between the beta weights on the pre judgmental task and the inquiry variables on the basis of which inquiry performance can be predicted.

To describe the relationships between beta weights and inquiry we can look at the intercorrelations between the

individual beta weight predictor variables and the inquiry variables themselves. Table 4.9 reports the correlations of beta weights on the pre judgmental task with inquiry variables. Table 4.10 reports the intercorrelations among the inquiry variables and Table 4.11 reports the means, standard deviations and ranges for the inquiry variables.

TABLE 4.9

CORRELATIONS BETWEEN PRE JUDGMENTAL BETA WEIGHTS AND DEPENDENT INQUIRY VARIABLES N = 21*

	SES	IQ	Grades	Sex	Comment
Problem Sensitivity	.33	.35	-.08	.35	.03
Time	-.21	.20	.04	.04	.14
Bits	.19	.36	.25	.50	.30
Information Sources	.15	.11	.27	.12	.21
Competence	.20	.29	.17	.05	.17
Total Shifts	.08	.19	.16	.29	.20
Corrected Shifts	.42	.07	.21	.06	.18

* For N = 21 the probability of a correlation of .43 occurring by chance = .05; and a correlation of .37 occurring by chance = .10.

The correlations show that with the exception of Pre SES and problem sensitivity (.33); and corrected shifts (.42);

pre IQ and problem sensitivity (.35); and bits (.36); pre sex and problem sensitivity (.35) and bits (.50); and pre comments and bits (.30) the correlations between the two sets of variables are not different from zero. The beta weights on the pre judgmental task seem to predict problem sensitivity and bits more than any other criterion variable.

TABLE 4.10

INTERCORRELATIONS AMONG DEPENDENT MEASURES OF INQUIRY N = 21*

	Bits	Competence	Problem Sensitivity	Time In Minutes	Information Sources
Bits	1.00				
Competence	.36	1.00			
Problem Sensitivity	.61	.71	1.00		
Time in Minutes	.41	.33	.30	1.00	
Information Sources	.58	.55	.74	.21	1.00
Corrected Shift Ratio	.38	.19	.23	-.28	.43

* For N = 21 the probability of a correlation of .43 occurring by chance = .05 and a correlation of .37 occurring by chance = .10.

The correlation between problem sensitivity and competence is .71 as compared to .75 in the Shulman et al.(1968) study. Bits and problem sensitivity are more highly

correlated than the Shulman et al.study (.61 versus .28). Correlations of problems with time in the two studies are similar. The correlations are not significant and are .30 and .31 respectively. Information Sources are significantly related to bits (.58, Shulman et al..41), competence (.55 versus .51*) and problem sensitivity (.74 versus .66*).

TABLE 4.11

MEANS, STANDARD DEVIATIONS AND RANGES FOR THE IN-BASKET VARIABLES

	Means	S.D.	Ranges
Bits	99.38	43.76	25 - 164
Mean Competence	11.8	14.3	0.1 - 5.0
Problem Sensitivity	59.19	39.19	14 - 139
Time in Minutes	100.10	26.62	37 - 133
Mean Information Sources	39.86	20.72	1.3 - 9.1
Corrected Shift Ratio	54.67	34.01	.17 - .91

As shown by the Table 4.11, the variability of the group for problem sensitivity is great compared to subjects in the other studies of the inquiry process. For example,

* Correlations on second administration of in-basket in Shulman Study.

in Piper (1969) the standard deviations for time, bits and problems were 27.15, 50.27 and 17.37 respectively. In the Shulman et al.(1968) study they were 17.35, 53.68 and 19.43 respectively. A possible explanation could be that the subjects differed widely as to their college level and prior experience with teaching. Some students were beginning freshmen with no prior teaching experience whereas, others were juniors or seniors and some were older women with experience in teaching either as substitutes or as aides.

TABLE 4.12

CORRELATIONS BETWEEN POST JUDGMENTAL BETA WEIGHTS AND DEPENDENT INQUIRY VARIABLES N = 21*

	Post SES	Post IQ	Post Grades	Post Sex	Post Comment
Problem Sensitivity	-.24	.11	.53	.37	.15
Time in Minutes	.08	-.07	.20	-.08	.20
Bits	-.15	-.11	.04	.03	-.05
Information Sources	-.21	.04	.17	.29	.05
Competence	-.02	.31	.49	.09	.44
Corrected Shift Ratio	.08	.02	.06	-.11	-.17

* For N = 21 the probability of a correlation of .43 occurring by chance = .05 and a correlation of .37 occurring by chance = .10.

To explore the relationships between beta weights and inquiry variables further, correlations between the inquiry variables and beta weights on the post judgmental task were computed. Table 4.12 shows that the correlations between the inquiry variables and the post beta weights are even lower than those reported in Table 4.9. Only three correlations are significant at the .05 level. Competence is related to post grades (.49), and post comment (.44), and approaches significance with post IQ (.31). Post grades are related to problem sensitivity (.53).

Other hypotheses regarding prediction of inquiry performance from the pre beta weights will now be examined.

Hypothesis 6: There is a positive relationship between the number of problems sensed within categories of information sources used by a teacher-in-training in the in-basket and the weights she gives to those sources in her judgmental policy.

Since the categories of information or cues in the cards and the information sources in the in-basket were not equivalent, that is, there were ten information sources in the in-basket in which problems were imbedded vs. five categories of information on the cards, the number of problems sensed within the categories of interest did not equal or even approximate the total number of problems sensed by the individual subjects in the in-basket. Therefore, only problems sensed pertaining to SES, IQ, grades,

sex and comments or personality variables were rescored in order to obtain problems sensed within the categories corresponding to the information sources on the cardexes. Table 4.13 reports the correlations between the beta weights and number of problems sensed within the corresponding categories in the teacher's in-basket.

TABLE 4.13

CORRELATIONS BETWEEN THE PRE BETA WEIGHTS AND PROBLEMS SENSED WITHIN CORRESPONDING CATEGORIES IN TEACHER'S IN-BASKET N = 21*

	Problems SES	Problems IQ	Problems Grades	Problems Sex	Problems Comments
Pre SES	-.24	.20	.39	.00	.11
Pre IQ	.04	.39	.35	.00	.44
Pre Grades	-.18	-.23	.32	.00	-.06
Pre Sex	-.08	.13	.26	.00	-.22
Pre Comments	.06	-.13	.29	.00	-.17

* For N = 21 the probability of a correlation of .43 occurring by chance = .05 and a correlation of .37 occurring by chance = .10.

Examination of Table 4.13 indicates that there is a relationship between problems grades and pre SES (.39); and pre IQ (.35); pre grades (.32). There also seems to be a positive relationship between pre IQ and problem IQ (.39); and problem comments (.44). The only relationships of interest are between problems IQ and pre IQ (.39) and

problems grades and pre grades (.32). Except for these two significant relationships, the hypothesis was mainly not confirmed. The correlations between problems sex and the other variables was zero because no problems relating to sex differences of the hypothetical students in the in-basket were sensed by any of the subjects.

Table 4.14 summarizes means and variance of problems sensed within each category of information sources. It also reports the total possible problems that could be sensed within those categories.

TABLE 4.14

MEANS, STANDARD DEVIATIONS OF PROBLEMS SENSED WITHIN FIVE INFORMATION SOURCES AND TOTAL POTENTIAL PROBLEMS WITHIN THOSE CATEGORIES N = 21

Variables	Mean	Standard Deviation	Total Potential Problems
SES	.89	1.12	43
IQ	2.62	3.06	57
Grades	5.48	4.63	65
Sex	.00	.00	3
Comments	6.62	6.34	85

Hypothesis 7: There is a positive relationship between the number of bits attended to within each category of information sources and the beta weights assigned to those

categories of information in the pre judgmental task.

Since the number of bits available in all the categories of the in-basket were not equal within one source of information to the next, only those bits were scored that were utilized in reaching a decision or sensing a problem within the five categories corresponding to those found on the cardexes of the pre judgmental task. This reduced the number of bits within each category considerably.

A correlation analysis was done. Table 4.15 reports the correlations between beta weights on the five information sources on the cardexes and the number of bits of information attended within those categories of information sources in the in-basket.

TABLE 4.15

CORRELATIONS BETWEEN PRE BETA WEIGHTS AND BITS OF INFORMATION ATTENDED TO WITHIN CORRESPONDING CATEGORIES OF INFORMATION SOURCES IN IN-BASKET N = 21*

	Bits SES	Bits IQ	Bits Grades	Bits Sex	Bits Comments
Pre SES	.06	.28	.17	.00	.09
Pre IQ	-.02	.16	.20	.00	.20
Pre Grades	-.04	-.11	.44	.00	.01
Pre Sex	-.24	.14	.48	.00	.24
Pre Comments	.01	.51	.51	.00	.09

* For N = 21 the probability of a correlation of .43 occurring by chance = .05, and a correlation of .37 occurring by chance = .10.

The results show that there is a correlation between pre grades and bits grades (.44) but that there is no relationship between the other categories of beta weights and bits within corresponding categories of information sources within the Teacher's In-Basket. Bits grades are predicted by pre sex (.48) and pre comments (.51). Pre comments is also related to bits IQ (.51).

Inquiry Process Variables and Personality Variables

Having identified the contribution of weighting policy preferences to the prediction of the inquiry criterion variables, we now turn to analysis of personality determinants of inquiry performance. We will examine the relations individually in the form of single correlation coefficients. We will also examine the effects of the predictor variables by using a step wise multiple regression analysis. Table 4.16 reports the correlations between the four personality predictor variables and the seven inquiry process measures.

It can be observed from Table 4.16 that the internal locus of control is positively related to competence (.31), and negatively related to time (-.31), whereas, lecture-discussion is positively related to competence (.32), total shifts (.38) and corrected shifts (.32). Another interesting relationship is between complexity and corrected shifts (.35). These relationships will be further discussed in the forthcoming chapter.

TABLE 4.16

CORRELATIONS BETWEEN FOUR PERSONALITY PREDICTOR VARIABLES AND INQUIRY PROCESS CRITERION MEASURES
N = 21*

	Internal Locus of Control	Lecture Discussion	Politics	Complexity
Problem Sensitivity	.09	.22	-.12	.06
Time	-.31	.01	.14	.20
Bits	-.27	.21	.31	.02
Information Sources	-.09	.26	.15	.21
Competence	.31	.34	.03	.23
Total Shifts	.16	.38	-.08	.22
Corrected Shifts	.20	.32	.00	.35

* For N = 21 the probability of a correlation of .43 occurring by chance = .05 and a correlation of .37 occurring by chance = .10.

Since the number of subjects in the in-basket group was only 21 and since the personality tests, although administered to all the subjects, was used only in predicting inquiry performance, all the analyses pertaining to inquiry variables had N = 21.

Table 4.17 shows that internal locus of control is related to lecture discussion (.40) and to complexity (.41).

TABLE 4.17

INTERCORRELATIONS AMONG PERSONALITY VARIABLES
N = 21*

	Internal Locus of Control	Lecture Discussion	Politics	Complexity
Internal Locus of Control	1.00			
Lecture Discussion	.40	1.00		
Politics	.00	- .02	1.00	
Complexity	.41	.31	.35	1.00

* For N = 21 the probability of a correlation of .43 occurring by chance = .05, and a correlation of .37 occurring by chance = .10.

Hypothesis 8: There is a positive relationship between the amount of shifting in the in-basket situation and the equality of weights given to categories of information sources on the cards in the pre judgmental task.

For the test of this hypothesis, a measure of variability of the beta weights across the five cues had to be calculated for each subject. The lower the variability, the higher would be the equality of weight assigned to the five variables. The standard deviation of the five beta weights for each individual profile was used as that measure. It was hypothesized that a subject who gave equal weights to

the five variables on the pre test would tend to look for cues in all categories of information sources in the in-basket and therefore, the amount of shifting between information sources would be greater. That is, there would be an inverse relationship between the standard deviation of the beta weights on the judgmental task and the amount of shifting in the inquiry situation. A regression analysis revealed no significant relationship between the two variables. $r = -.125$, $R = .125$, $R^2 = .015$, $F = 0.299$, $P < 0.59$.

Relative contributions of personality variables and beta weights of policy preferences as predictors of inquiry performance.

Hypothesis 9: The contributions of personality variables and policy preferences are independent of each other in the prediction of inquiry.

The combination of predictor variables which accounts for the highest proportion of total variance in the individual inquiry criterion variables was studied as the determinant of inquiry in this research. A multiple regression analysis was conducted for this purpose using nine predictor variables and five criterion inquiry process variables. The regression analysis with all nine predictors and five dependent variables is reported in Table 4.18.

TABLE 4.18

STATISTICS FOR REGRESSION ANALYSIS WITH NINE PREDICTORS

Variable	Multiple R^2	Multiple R	F	P Less Than
Bits	0.780	0.884	4.35	0.013
Competence	0.697	0.835	2.81	0.055
Problem Sensitivity	0.696	0.834	2.80	0.056
Time in Minutes	0.670	0.818	2.48	0.079
Information Sources	0.588	0.767	1.74	0.191

N = 21, DF = 9 and 11

The Chi-square for test of hypothesis of no association between dependent and independent variables was = 65.56, DF = 45, P <.024. Bits, competence and problem sensitivity were significantly predicted by the nine covariates.

In order to identify that combination of predictor variables which accounted for the highest proportion of total variance in the inquiry criterion variables and thus could most appropriately be considered the major determinants of inquiry in this research, a series of step-wise multiple regression analyses were conducted.

The variables in the step-wise regression analyses were ordered so that the judgmental beta weights were added first, followed by the addition of the four personality variables.

Table 4.19 reports the percentage of additional variance accounted for in the inquiry variables by the addition of each independent variable as revealed by the step-wise regression analysis.

In another step-wise regression (see Table 4.20) analysis the personality variables were added in first, followed by the judgmental predictors. Other regression analyses were done using only the five judgmental variables as predictors, and the four personality variables alone as predictors of inquiry performance.

Table 4.21 shows the unique contributions of personality variables and the judgmental beta weights in the prediction of inquiry. Columns 4 and 5 of the table give the unique contributions of judgmental policy and personality variables respectively. The policies predict inquiry performances to a greater degree than the personality variables, particularly for problem sensitivity. The personality variables however, predict time better than the policy variables.

TABLE 4.19

STEP-WISE REGRESSION TO ANALYZE THE PERCENTAGE OF ADDITIONAL VARIANCE ACCOUNTED FOR IN INQUIRY VARIABLES BY ADDITION OF EACH INDEPENDENT VARIABLE (N = 21)

Predictors	Inquiry Variables					Chi-Square
	Bits	Competence	Problem Sensitivity	Time in Minutes	Information Sources	P
Pre SES	3.22	5.80	12.08	4.51	2.67	<.387
Pre IQ	10.29	5.87	7.58	6.71	0.39	<.586
Pre Grades	4.43	2.64	4.58	2.63	8.95	<.247
Pre Sex	14.78	0.42	14.10	1.19	4.39	<.060
Pre Comments	2.72	3.43	0.01	2.22	3.92	<.253
Internal Locus of Control	17.70	6.77	0.74	11.02	6.22	<.038
Lecture Discussion	9.42	12.60	4.06	4.93	10.15	<.642
Politics	8.23	30.48	24.71	20.62	19.43	<.161
Complexity	7.28	1.66	1.75	13.13	2.65	<.287
Total	78.1	69.7	69.6	67.0	58.8	
Percentage of Variance Accounted for (R^2)						

N.B. The policy variables are added first.

TABLE 4.20

THE PERCENTAGE OF ADDITIONAL VARIANCE ACCOUNTED FOR IN INQUIRY VARIABLES BY ADDITION OF EACH INDEPENDENT VARIABLE AS SHOWN BY A STEP-WISE REGRESSION ANALYSIS (N = 21)

Predictors	Inquiry Variables					Chi-Square
	Bits	Competence	Problem Sensitivity	Time in Minutes	Info Sources	P
Internal Locus of Control	7.17	9.53	0.79	9.55	0.74	< .13
Lecture Discussion	12.24	5.29	4.22	2.13	10.14	< .67
Politics	9.22	0.15	1.26	1.96	2.38	< .18
Complexity	2.17	0.81	0.12	5.57	1.69	< .86
Pre SES	2.01	1.43	10.81	2.38	7.29	< .68
Pre IQ	24.44	11.23	17.88	30.92	14.72	< .078
Pre Grades	2.71	4.68	6.20	2.28	12.05	< .17
Pre Sex	12.84	0.00	17.98	0.15	8.61	< .12
Pre Comments	5.25	36.54	10.34	12.03	1.15	< .097
Total	78.1	69.7	69.6	67.0	58.8	
Percentage of Variance Accounts for (R^2)						

N.B. The personality variables are added first.

Table 4.20 shows that pre comments and pre IQ contributed something to the prediction of the inquiry variables. Although individual contributions of the nine predictors were not significant, all predictors together predicted inquiry performance significantly.

TABLE 4.21

RELATIVE CONTRIBUTIONS OF JUDGMENTAL BETA WEIGHTS AND PERSONALITY VARIABLES IN THE PREDICTION OF INQUIRY PERFORMANCE (N = 21)

Inquiry Variables	(1) R^2 Prediction Personality plus Judgment	(2) R^2 Prediction Personality Alone	(3) R^2 Prediction Judgment Alone	(4) 1 - 2	(5) 1 - 3
Bits	.781	.308	.354	.473	.427
Competence	.697	.158	.182	.539	.515
Problem Sensitivity	.696	.064	.384	.632	.312
Time in Minutes	.670	.192	.173	.478	.497
Information Sources	.588	.150	.203	.438	.385

None of the individual contributions of the independent variables were significant except for locus of control. In general, the most potent predictors of inquiry appeared to be, internal locus of control, pre sex (beta weight) and

lecture-discussion. Table 4.22 reports the step-wise multiple regression finding after adding the sixth predictor (internal locus of control), chi-square = 11.797, DF = 5, $P < 0.037$. (Refer to Table 4.19 for full step-wise regression analysis).

TABLE 4.22

STEP-WISE REGRESSION ANALYSIS ADDING PREDICTOR SIX (INTERNAL LOCUS OF CONTROL)

Variable		P Less Than	Step-Down F	P Less Than	% of Variance Accounted for
Bits	5.29	0.037	5.286	0.037	17.699
Competence	1.26	0.280	7.646	0.016	6.768
Problem Sensitivity	0.17	0.686	1.343	0.269	0.742
Time in Minutes	2.15	0.164	1.304	0.278	11.019
Information Sources	1.19	0.294	0.251	0.627	6.218

DF = 1 and 14 Chi square = 11.797 DF = 5, $P < .037$

Bits and competence seem to be predicted most highly. These results are not surprising in the light of the data reported earlier in this chapter. Those variables whose individual correlations with inquiry were highest were added to the regression earliest.

Examination of Individual Decision Making Profiles

Each individual's judgmental pattern is characterized in this research by a group of beta weights on a series of cue variables or information sources. Individual weighting patterns which had been graphed to show differences in judgmental patterns on pre and post judgmental tasks were also recorded on summary sheets. These summary sheets for all fifty-three subjects in this study are reproduced in Appendix I, to allow for inferences about individual judgmental policies and comparisons of individuals.

Table 4.23 includes a few samples of these summaries to enable one to compare and contrast a few of the illustrative weighting patterns which were typical of the three treatment groups on the post judgmental task. The six subjects chosen for this purpose are numbers 1, 12, 18, 36 and 33.

Subjects number 1 and number 12 from the control group, subjects number 18 and number 26 from the discussion-reflection training group and subjects number 36 and 33 from the in-basket followed by reflection and discussion training group are prototypes of the three groups respectively.

Figure 5 shows the weighting patterns for the six subjects; and Figure 5b shows the weighting patterns of subjects 12, 18 and 36 on the pre test, and illustrates the

differences in policy preferences for the same three subjects on the post test.

Figure 6 shows the differences in the means for the three groups on the five cues for the pre and post judgmental tasks.

TABLE 4.23

STANDARDIZED BETA WEIGHTS FOR SIX REPRESENTATIVE SUBJECTS ON PRE AND POST JUDGMENTAL TASKS

Variables	Control Group		Reflection and Discussion Training		In-Basket Plus Reflection and Discussion Training	
	No. 1	No. 12	No. 18	No. 26	No. 36	No. 33
Pre SES	.02	.01	-.01	.04	.02	-.04
Post SES	.03	-.05	.00	-.01	.28	.33
Pre IQ	.01	.11	.12	-.04	.06	-.17
Post IQ	.05	.06	.23	.40	.37	.40
Pre Grades	.40	.67	.75	.67	.73	.74
Post Grades	.76	.75	.65	.72	.59	.45
Pre Sex	.06	.01	.03	.09	.00	.03
Post Sex	.03	-.01	.07	.05	-.06	-.23
Pre Comments	.57	.48	.25	.29	.40	.31
Post Comments	.35	.44	.18	.07	.20	.42

N.B. The signs are reversed.

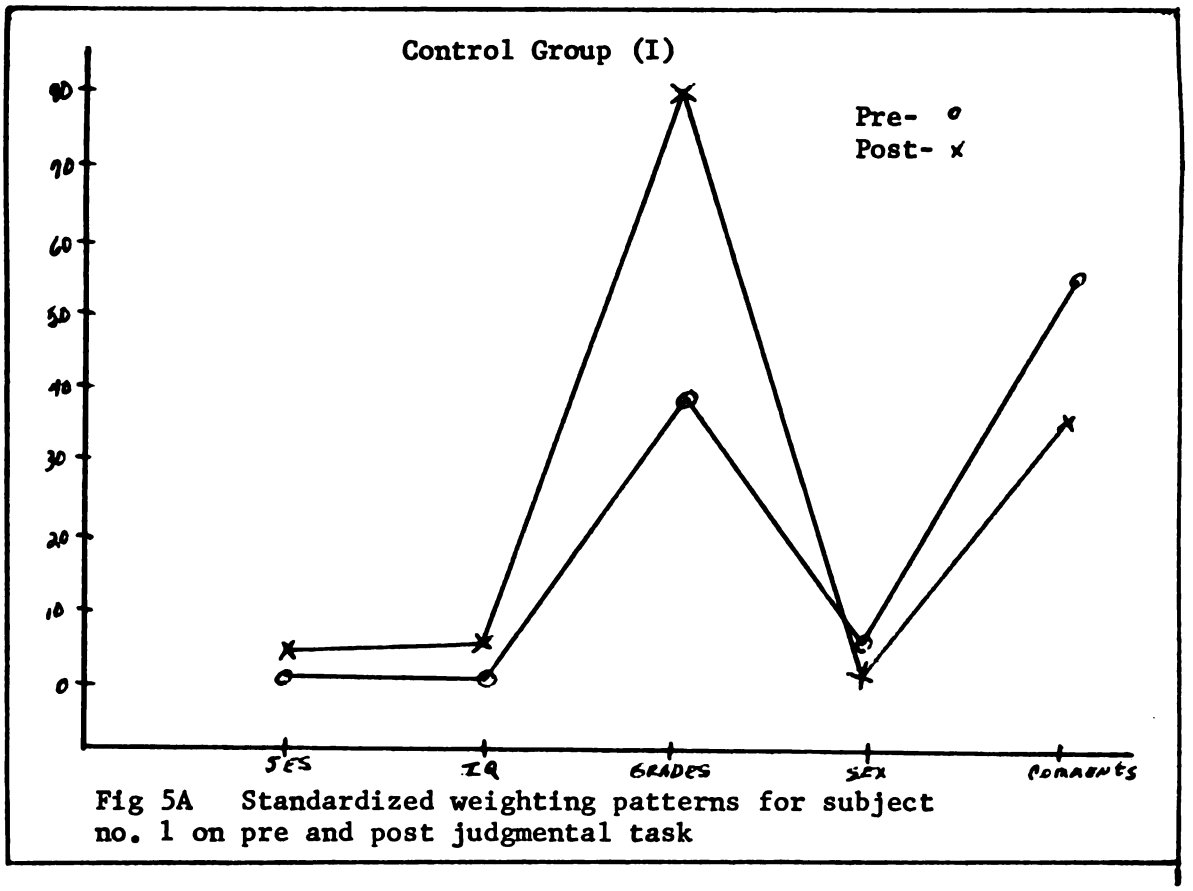

Fig 5A Standardized weighting patterns for subject no. 1 on pre and post judgmental task

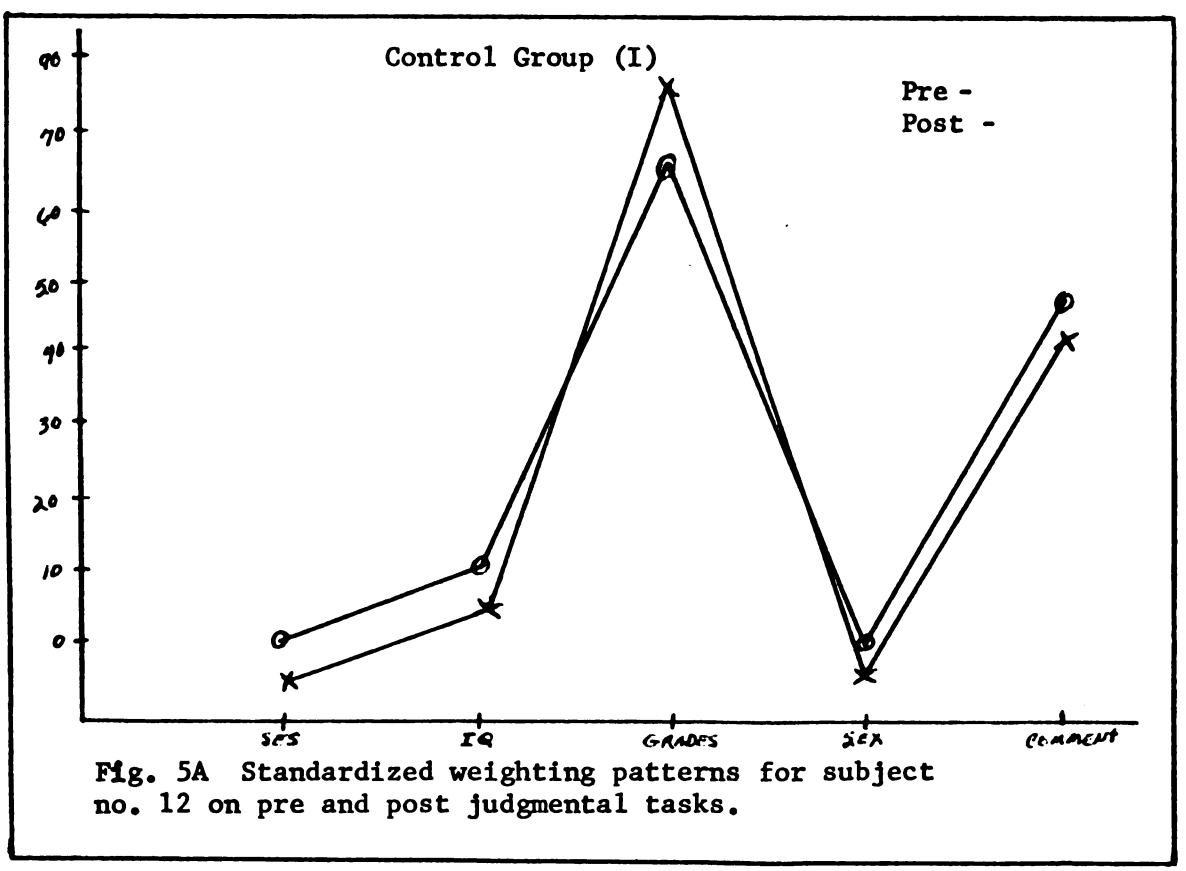

Fig. 5A Standardized weighting patterns for subject no. 12 on pre and post judgmental tasks.

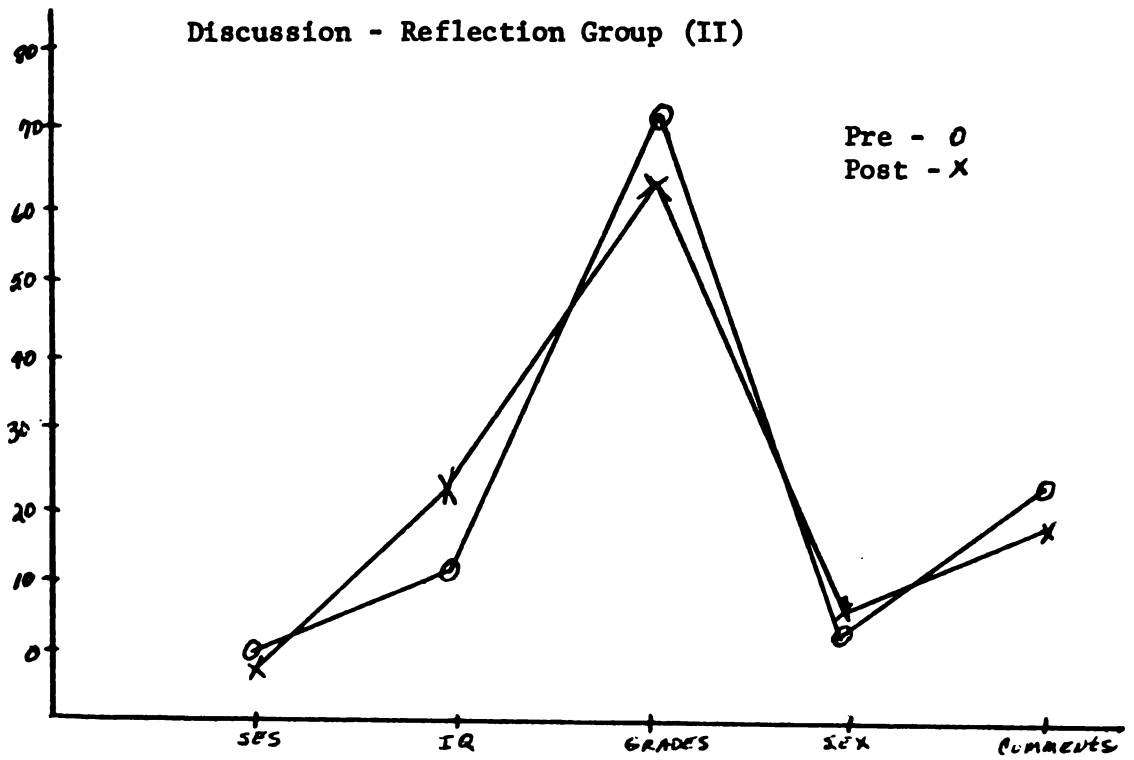

Fig. 5A Standardized weighting patterns for subject no. 18 on pre and post judgmental tasks.

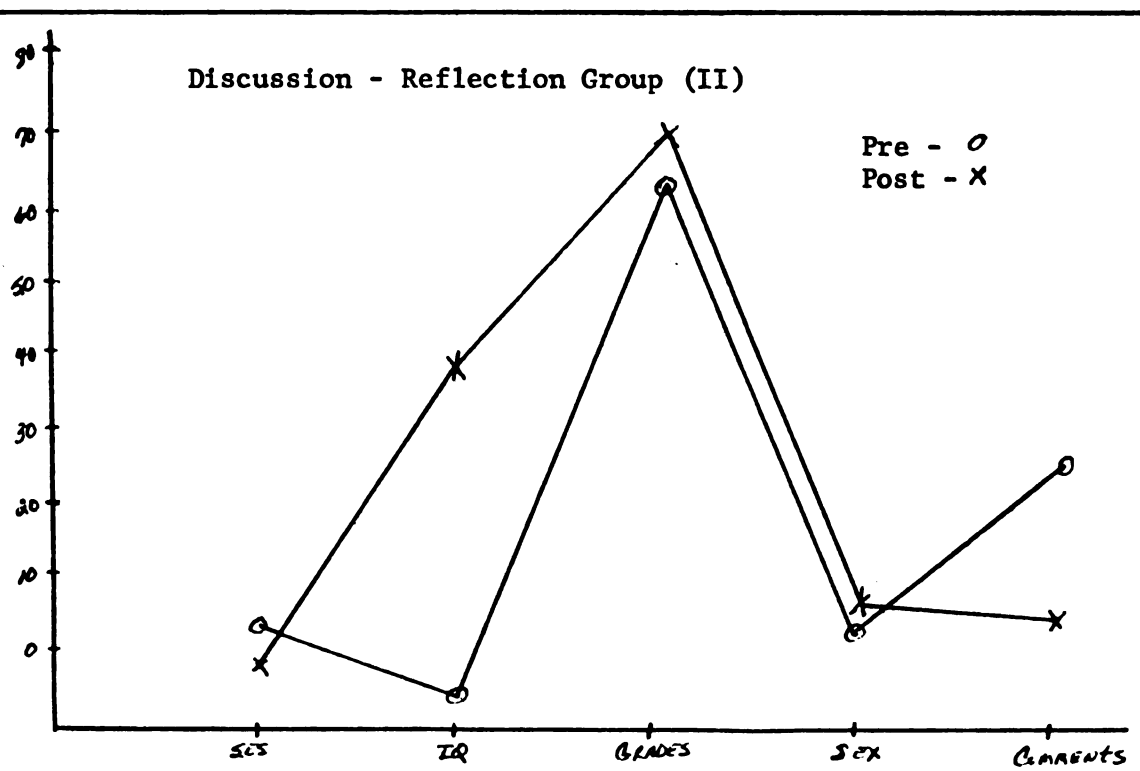

Fig. 5A Standardized weighting patterns for subject no. 26 on pre and post judgmental tasks.

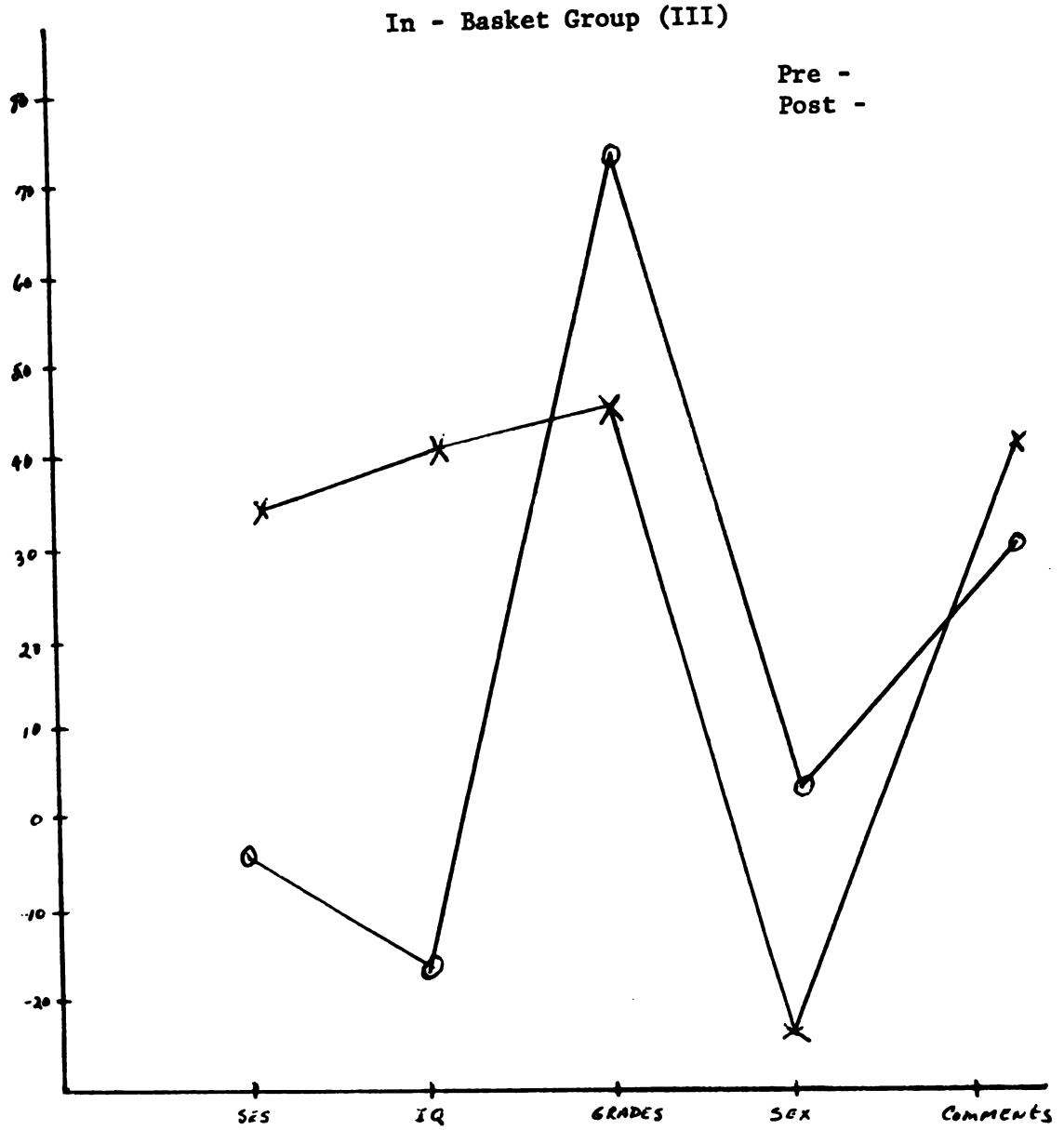

Fig. 5A Standardized weighting patterns for subject no. 33 on pre and post judgmental tasks.

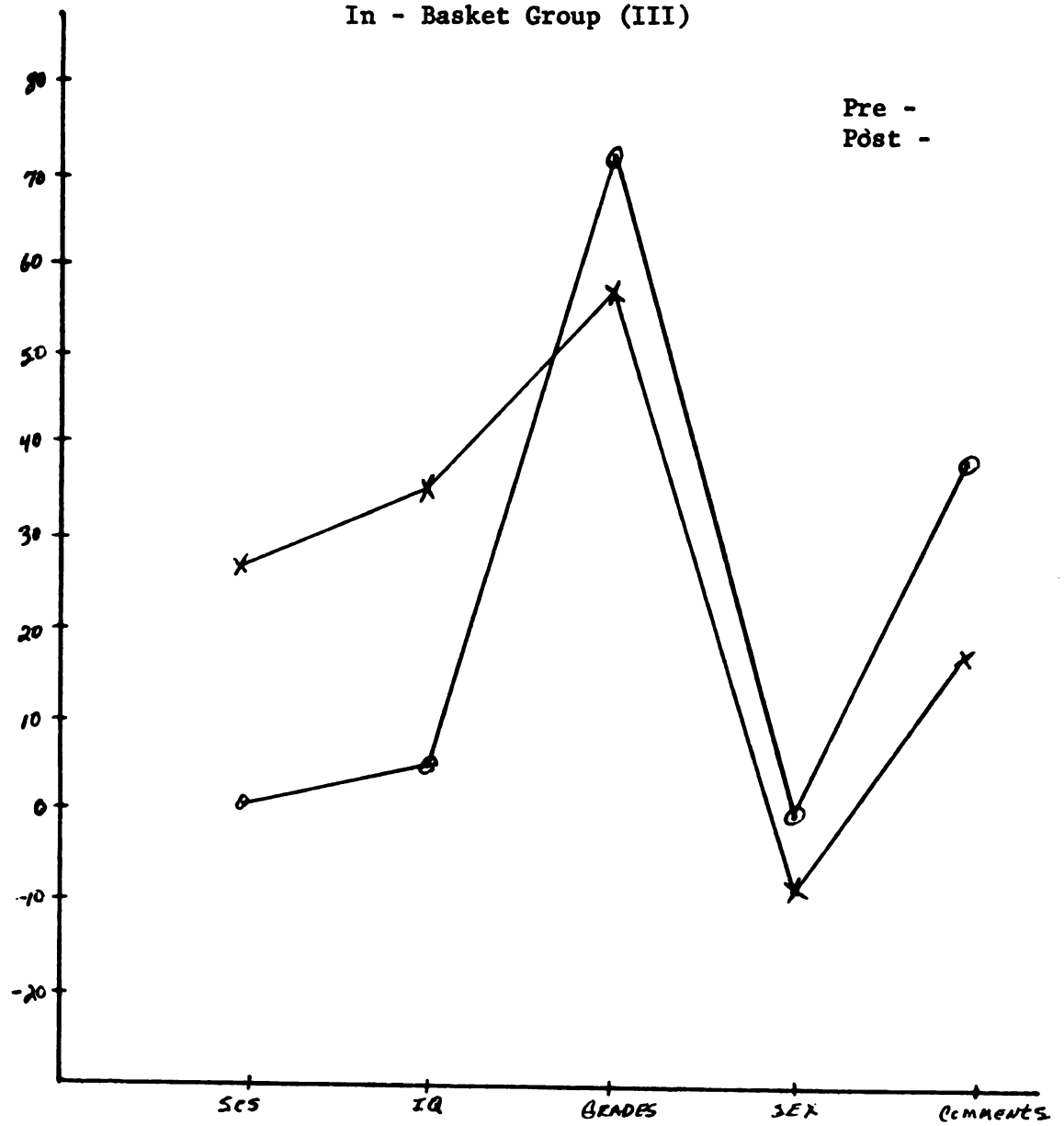

Fig. 5A Standardized weighting Patterns for subject no. 36 on pre and post judgemental tasks.

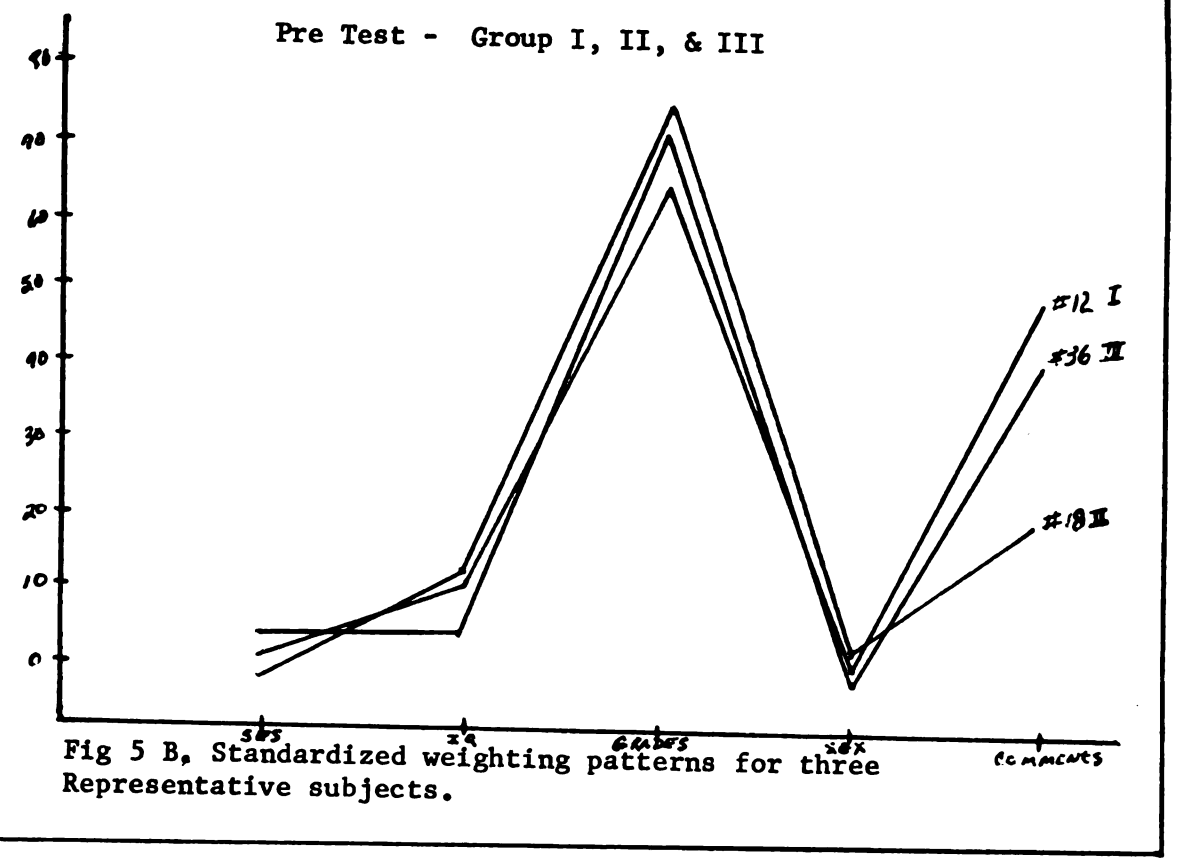

Fig 5 B. Standardized weighting patterns for three Representative subjects.

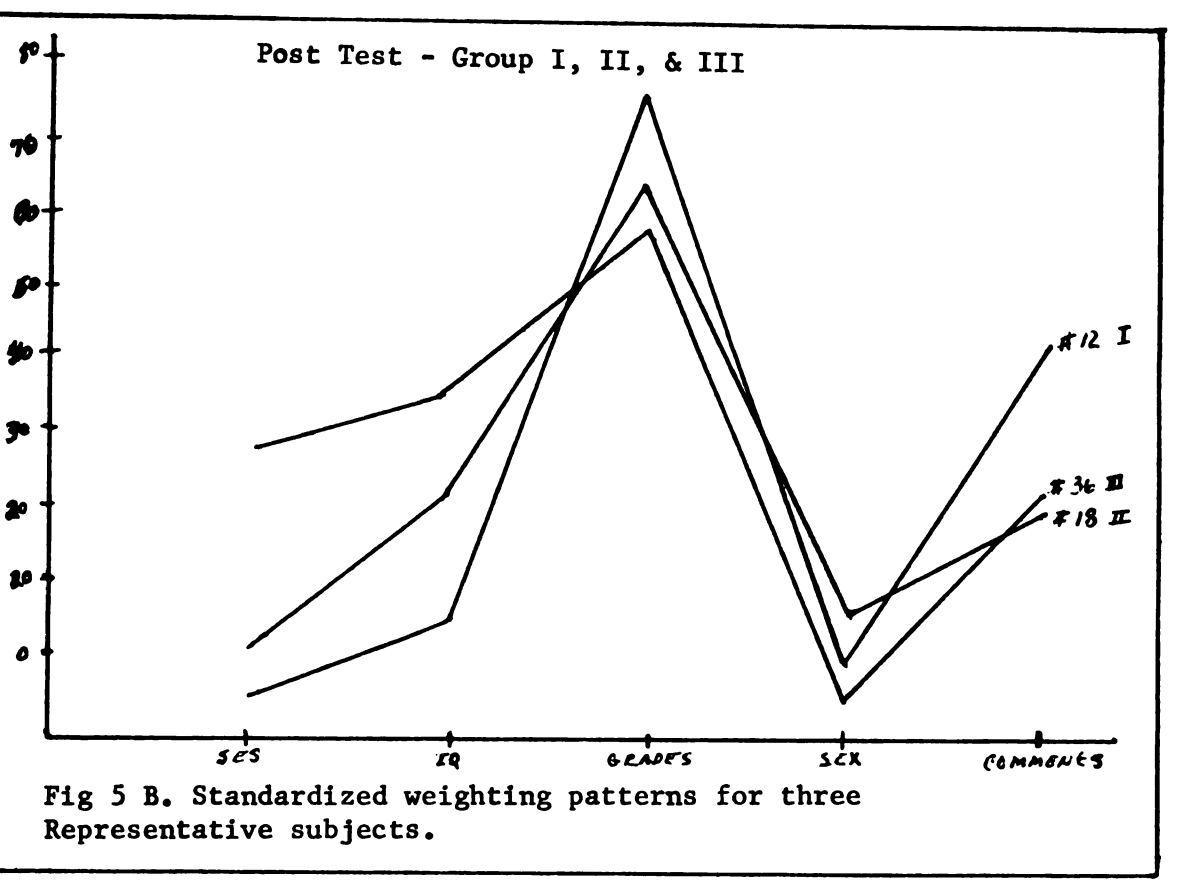

Fig 5 B. Standardized weighting patterns for three Representative subjects.

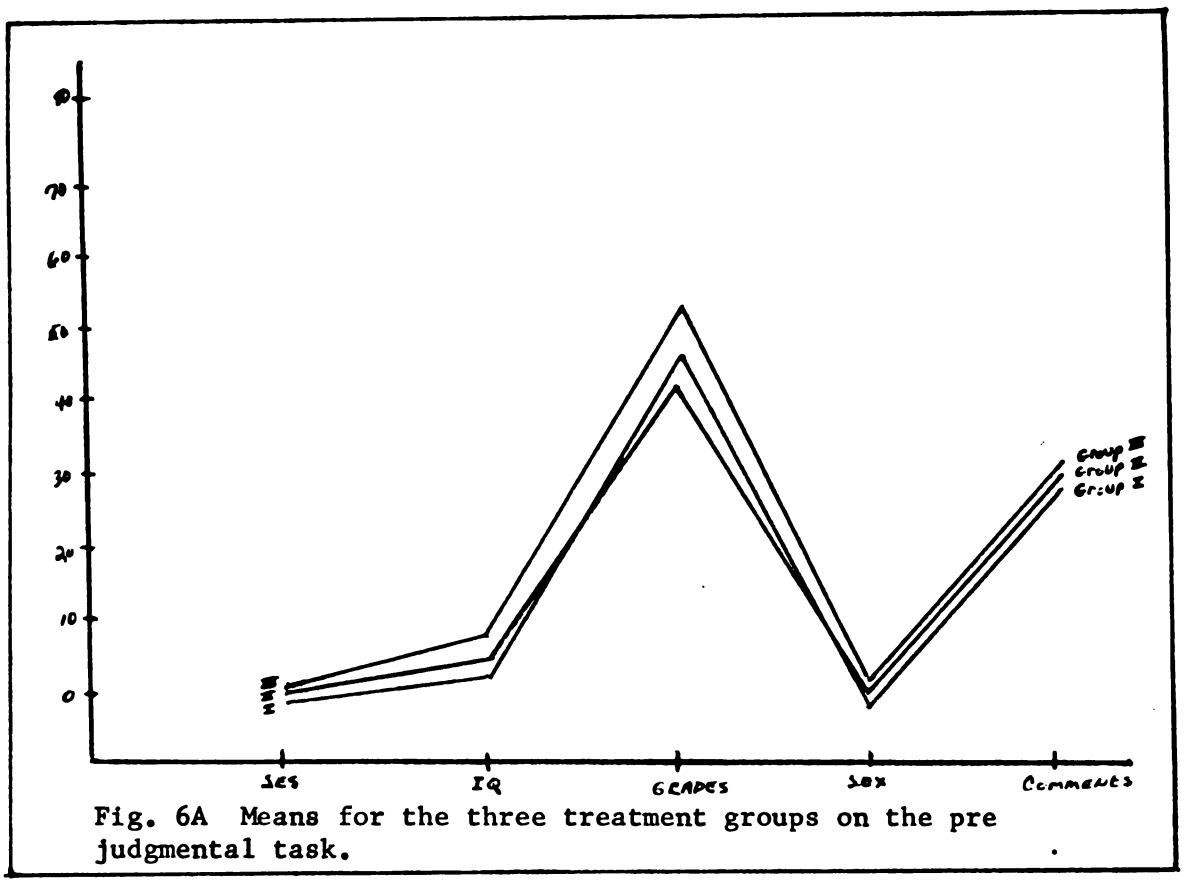

Fig. 6A Means for the three treatment groups on the pre judgmental task.

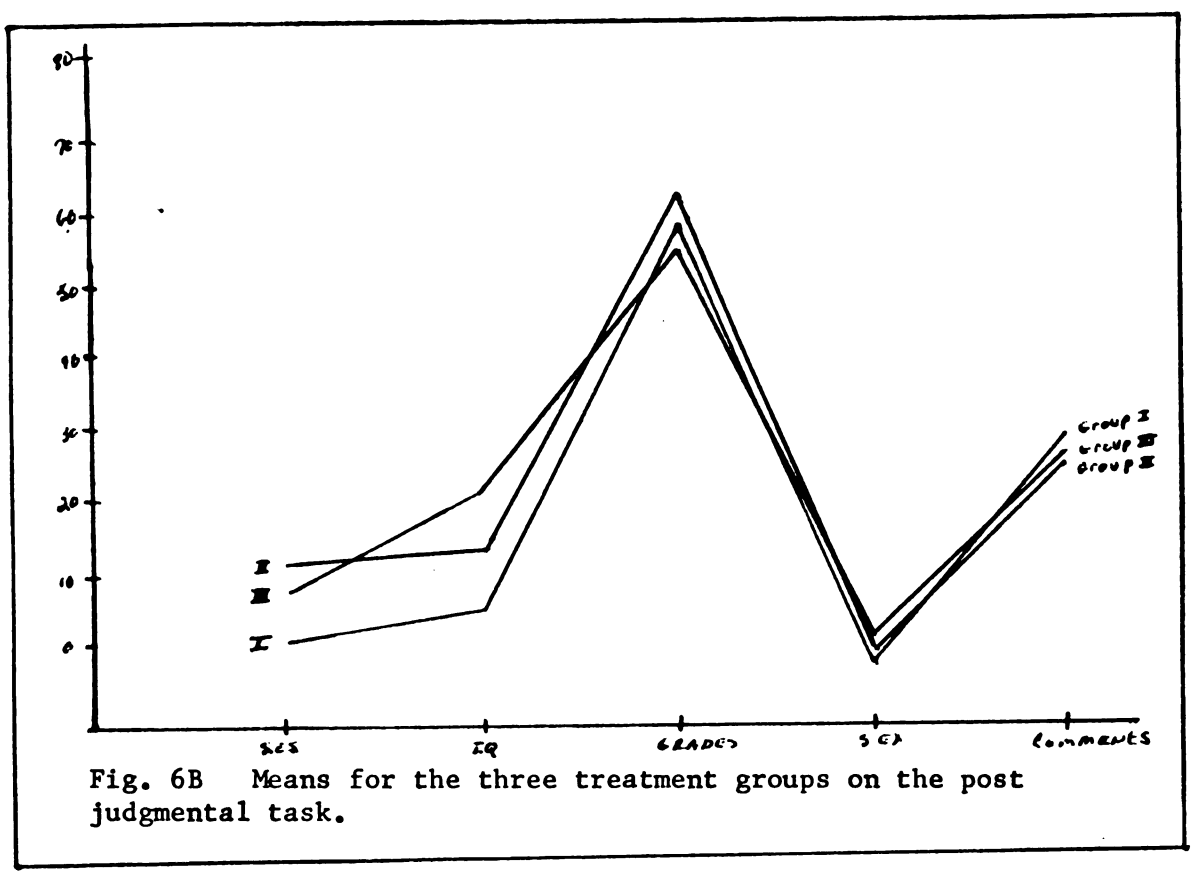

Fig. 6B Means for the three treatment groups on the post judgmental task.

It is quite apparent from the patterns of number 1 and number 12 that the subjects do not weight SES an important variable in determining the probability of a student having a problem in a classroom setting. The amount of weight given to IQ is also insignificant. Whether the student is a boy or a girl also does not seem to make a difference. However, grades are an important source of information. Comments as indicators of the child's personality is given some weight in their policy preferences. As shown in the post beta weights, the variations in the weighting policies is not significant from pre to post judgmental tasks.

In the judgmental policy preferences of the discussion-reflection training group the pre test patterns are similar to those of the control group. However, more weight is given to IQ on the post judgmental task. Grades are still given much weight although there is a drop in the weight given to comments. Subject number 26 shows a marked increase in the weight given to IQ and a marked decrease in the weight given to comments.

The in-basket group followed by discussion-reflection training showed an interesting change from pre to post judgmental tasks. SES now begins to have significance in its effect on possible problems for the hypothetical student in the classroom. IQ also shows a marked increase in the weight assigned to it. In the forthcoming chapter we shall

discuss some of the interesting aspects of these findings, and the theoretical issues raised by this study, its methods and its results.

CHAPTER V

DISCUSSION

One of the basic premises of this research was that judges have characteristic methods of weighting information in making judgments or decisions which are fairly stable over time. But since the application of knowledge or information to judgmental tasks requires learning analogous to that needed to make diagnostic judgments it was also premised that procedures could be devised to make explicit the characteristics of a person's judgmental system and relate these to the characteristics of the judgmental task. Thus, in addition to studying the degree to which a judge utilizes cues one can analyze the manner in which the judge learns the characteristics of his environment.

The main interest in this experiment was, therefore, to study how a teacher integrates information conveyed by several cues to form a judgment and whether the differential weights she assigns to the various cues can be modified by training involving discussion and reflection on her policy preference as a form of cognitive feedback, as well as a way of increasing the subject's sensitivity to the effect of these variables on the decision.

Another question of interest in this experiment was the relationship between judges policy preferences and inquiry performance. As shown in previous studies (Shulman, et al., 1968; Loupe 1969; Piper 1969) inquiry effectiveness was a function of two very different factors; commitment to inquire and skill or effectiveness. Commitment to inquire was thought to be determined by personality characteristics such as preference for the complex and need for structure, whereas effectiveness in inquiry was thought to be related to skills of information organization and problem solving. An attempt was therefore made to determine the relative contributions of personality variables and judgmental policy preferences on decision making in the in-basket situation, as well as their relative contributions to inquiry performance.

In this chapter the following areas relevant to the present research shall be discussed. First, some of the findings reported in the preceding chapter will be reviewed in order to examine possible explanations for those results that were unexpected. These shall be divided into four sections: (a) judgmental policies and training; (b) judgmental policies and inquiry; and (c) locus of control and inquiry. Second, the "regression model" presented in the introductory chapter will be reexamined in the light of the research experience and finally, the problem and findings of this research will be discussed in terms of their possible

significance for the process of education.

Judgmental Policies and Training

The present study was designed with three levels of training, and all possible comparisons among the treatment groups were of interest. The main comparisons intended however, were: discussion-reflection training vs. control training; in-basket followed by reflection and discussion training vs. discussion-reflection training alone, and in-basket followed by discussion-reflection training vs. control. The results did show pre to post differences between groups due to training.

An analysis of covariance followed by planned comparisons between the control group and the average of the two experimental groups (H_1) in addition to a comparison between the discussion-reflection training group vs. the in-basket group followed by discussion-reflection training (H_2) was done. As was reported in Chapter IV, H_1 was supported whereas H_2 was not. A possible explanation might be that the discussion-reflection training using cognitive feedback is the critical variable in modifying judgmental policies. The in-basket experience was not distinctive enough to make a significant difference.

An unexpected finding was that the control group also changed significantly from the pre to the post judgmental task. The F-ratio for multivariate test of equality of

mean vectors = 19.08, $P < .0001$. One explanation for this discrepancy could be that all the subjects including the subjects in the control group were enrolled in the Educational Psychology classes during the term in which they were exposed to discussions and lectures on the importance and influence of the variables (used in the cardexes) on student behavior in the classroom. This experience could have also served as a kind of training. Further, practice effects due to repetition of the same task could have sensitized the subjects to the nature of the variables involved, thus bringing about a change on the post test performance. Although all the three groups changed, there were, however, differences in the way the subjects' weighting policies changed in the control group and in the two experimental groups as shown by the weighting profiles of the subjects.

It was hypothesized that training with discussion and reflection would increase the sensitivity of the subjects to the effects of the variables used as categories of information sources on the cardexes which in turn would affect their judgments and would therefore have the overall effect of equalizing the amount of weight given to each variable in the judgmental policies. As was reported in Chapter IV, this hypothesis was unconfirmed. There was no difference in the variance of the beta weights from pre to post tests.

A closer examination of the different weighting policies in the post judgmental task showed that the patterns of beta weights for the three groups were different but in different ways. Group II showed an increase in SES, IQ and grades and a slight drop in comments, whereas Group III showed an increase in SES, a significant increase in IQ, no increase in grades and a slight decrease in comments. There were very few significant differences in the control group from the pre to post policies.

Explanations for these consistent patterns in weighting policies could be sought in the kinds of experiences the various training groups were exposed to during the training period. Appendix E has a complete description of the discussion-reflection training procedure. It is clearly evident from the training procedure manual that the variables SES, IQ and grades were discussed in more depth than sex and comments. This was not intentional on the part of this researcher. The amount of information on the last two variables was condensed not only in the training manual but as the training session got longer the subjects began to show signs of fatigue. Thus, less time was devoted to their discussion. Another reason for this pattern could be found in certain observations made during the training session which revealed that subjects' attitudes towards sex differences and comments by others as valid statements were quite strong. For example, a number of subjects were strong

supporters of the women's liberation movement and were of the opinion that there were no real differences in activity, aggression and interests between girls and boys and that any learned differences due to sex-typing and reinforcements were fast disappearing. Others felt that another teacher's comments would not be valid descriptions of students' personalities. They said that they preferred to get to know the child personally before forming an opinion of them from a statement that could be biased.

The in-basket group was affected by the in-basket experience in another way. Their heavy weights for SES and IQ on the post test point to the effect the in-basket experience had on their judgmental policies. A great many of the embedded problems in the Teacher's In-Basket are related to discrepancies between IQ and grades. An awareness of IQ as an important source of information to be utilized in making decisions about student's problems is enhanced due to this experience. A similar process regarding the effects of SES is also evident. The in-basket materials include information on SES in the map of the community and Juanita Lopez's problems. Appendix E gives samples of the embedded problems in the Teacher's In-Basket. Since the beta weight profiles are relative, the effect of raising the weight of IQ and SES had an effect of depressing the weight given to grades or comments. By using a kind of introspection during the discussion-reflection training this

researcher found that whenever information on grades and IQ both were available, subjects tended to weight grades more heavily but when grades were average or low, IQ was relied upon.

Judgmental Policies and Inquiry

A general conclusion from previous studies of inquiry (Shulman, 1963; Shulman et al., 1968) was that personality variables were more important determiners of inquiry behavior than other cognitive variables. To some extent support for this conclusion came from analyses of correlations and regression between judgmental beta weights and selected personality tests as predictors with inquiry criterion variables. However, although personality variables in this study were better predictors of inquiry than the pre beta weights, neither group of variables were potent predictors of inquiry per se.

Several predictions were made from the weighting policies on the pre judgmental task regarding inquiry performance, most of which were unconfirmed. The correlations in Table 4.9 show that problem sensitivity and bits are most highly correlated with the pre beta weights but that the correlations between beta weights and time are very low, in fact that there is a negative correlation between pre SES with time (-.21). In previous theorizing about inquiry, the concept of time spent in inquiry was important as an indicator of the subjects' willingness to inquire

which in turn was related to his liking for ambiguity and complexity (Shulman 1963; Shulman et al., 1968).

Shulman used the analogy of the operation of a camera to depict the inquiry process. "We see time as analogous to shutter speed, problem sensitivity to focal resolution of the lens and film speed to inquiry competence", (Shulman et al., 1968, pp 96-97).

Thus, time spent in inquiry was conceptualized as one of the key factors in the process. When the three functioned together in an optimal way, competent inquiry was said to result. The data up to that time indicated that a high amount of time spent in inquiry was associated with a high number of problems sensed. Correlations between the two variables ranged from .46 to .69. Piper (1969), however, found that the two factors operated independently and that the relationship between time and problem sensitivity was not automatic. In the present study this was also found to be true. In fact, the simple correlation between time and problem sensitivity was only .30.

If problem sensitivity and competence are indicators of effectiveness in inquiry and are related to skills of information organization and problem solving and if time is an indicator of commitment to inquire, then the above results are in keeping with the theory that inquiry effectiveness is a function of two very different factors.

Cognitive Shifting and Equality of Beta Weights

It was hypothesized that subjects who tended to give equal weight to all the five sources of information on the cardexes would have a high shift ratio since they would try to use information in all the categories of information sources in the in-basket situation. Although this relationship was not significant, the correlation was in the right direction, $r = -.125$. That is, higher the standard deviation of pre beta weights lower the shift ratio. The reason for this low correlation could be that shifting is not necessarily related to the amount of time spent searching for information in all the possible categories of information sources. One could easily go through all the bits within one information source before going to the next and do as thorough a job with the second source. Shulman (1968) brings out the distinction between "surveying" and "problem solving" sequences. One explanation for these results could be that this important distinction was not made in this study when scoring the shifts a subject made during inquiry.

Other hypotheses regarding the relationships between pre beta weights and inquiry processes were studied to go deeper into the relationships between the variables. Since superficial counts of shifting did not differentiate between "surveying" and "problem solving" sequences the number of problems sensed within categories of information sources

were scored and correlated with the judgmental weights for those categories in the cardexes. Table 4.13 reports significant correlations between pre IQ and problem IQ (.39), and pre grades and problem grades (.32). The others are not significant.

Contrary to these findings the number of bits attended to within categories of information sources in order to solve a problem were significantly related to the pre beta weights only for grades (r = .44). Also bits grades were related to pre sex (.48) and pre comments (.51). The weight given to grades was consistently high as shown in the subjects' weighting policy. This did indeed have the effect of using more bits of information reporting the grades of the hypothetical students in the in-basket. To explore this further, the relationships between problems and bits within information sources were sought and correlations between the two sets of variables were computed. Table 5.1 reports the correlations between problems and bits in the five categories of information sources. The correlations are fairly high which may be an artifact of the scoring procedures. That is, in order to solve a problem pertaining to a particular category, the subject had to utilize bits of information within that category before a decision could be reached. Unless a procedure could be developed to score the two variables independently, no conclusions can be drawn.

TABLE 5.1

CORRELATIONS BETWEEN PROBLEMS AND BITS OF INFORMATION ATTENDED WITHIN CORRESPONDING CATEGORIES OF INFORMATION SOURCES IN IN-BASKET

	Bits SES	Bits IQ	Bits Grades	Bits Sex	Bits Comments
Problems SES	.74	-.16	.20	00	.49
Problems IQ	.05	.85	-.08	00	.02
Problems Grades	.26	.09	.77	00	.61
Problems Sex	.00	.00	.00	00	.00
Problems Comments	.69	.07	.02	00	.30

Personality Determinants of Inquiry

A great deal of research effort has been directed toward understanding of the relationships between different personality types and the general manner in which individuals mediate the world around them cognitively. Personality constructs such as complexity, (Barron, 1967) nonstereopathy (Stern, Stein and Bloom, 1956); allocentrism (Schachtel, 1959); and open-mindedness (Rokeach, 1960) have been used to describe the different ways in which individuals

perceive themselves and their relationships to objects in the external world. Shulman (Shulman, 1963; Shulman, et al, 1968) integrated these personality types into a variable which he labels seeking style. It is a continuum, the extremes of which are either dialectical seekers or diactic seekers. Shulman (1963, 1968) has shown that this variable is highly related to success in inquiry. The underlying variable that distinguishes one type from the other seems to be need for structure or closure vs. a preference for the complex and the ambiguous. A dialectical seeker is defined as high in fluency, highly field independent, high in risk taking, and nonstereopathic. A new dimension was used in this study which was reported in the findings was the best predictor of inquiry performance. Locus of control is a personality construct which refers to a person's perceptions of the agency of control over the reinforcements he receives. A person is said to have an internal locus of control if he feels the reinforcements which he receives occur primarily because of his own purposeful behavior. Those high on internal locus of control were especially high on competence and low on time and bits. Correlation between internal locus of control and competence was (.31), with time (-.31), and bits (-.27).

In general, an individual who believes that he controls his destiny and is not dependent on the external environment for his reinforcements, is more competent in solving

problems, does not spend too much time in trying to get external sources of information, reaches decisions expeditiously and gives less weight to bits of information supplied by others. Of course, since the correlations are quite low these interpretations should be treated with caution.

Individual Decision Making Profiles, Pre and Post

One general conclusion we can draw by looking at the decision-making profiles is that training using cognitive feedback and discussion of the relevant variables does make a change in how individuals utilize information to reach a decision. But since overall judgmental policy preferences are quite stable over time, repeated training sessions might be necessary in order to bring about significant and permanent changes in one's judgmental policies. In the present study this was not possible. The fact that training was short term, and very compact, may have made its effects somewhat weaker. The delay in feedback and training might have been partly responsible for its lack of effectiveness especially in the in-basket group where the training was given after the in-basket experience towards the end of the term.

One of the purposes of using a linear regression model to represent the judgmental process is to make the judge's weighting policy explicit. It is capable of highlighting

individual differences and misuse of information as well as making explicit the causes of underlying disagreements among judges in both simple and complex tasks. One precaution however, seems to be necessary when utilizing this model. Namely, the equation is only a paramorphic representation of subjects' judgmental policies and any inferences regarding the sequence or process of information utilization might not be warranted.

Second, there is discrepancy between subjects' computed weights and subjective weights as described by subjects during the training sessions. After examining their weighting profiles, subjects reflected on why they weighted certain variables more and whether in fact they did think those variables were important in reaching a decision. Discrepancies between their subjective weights and computed weights were often noted, thus, lack of self insight might have reduced the effectiveness of training.

Third, the number of cues that can be processed by subjects' effectively in reaching a decision might be limited and must be taken into account by doing a series of pilot studies in which a different number of cues are utilized in each study.

Fourth, the reader is reminded that a completely crossed orthogonal design was used in which all possible combinations of the cue levels were presented on the cardexes. Thus, the subjects were faced with having to make

judgments on hypothetical students on the basis of combinations of cues, that were not often representative of the real world. This price had to be paid, however, in order to gain experimental control over the information supplied to the subjects.

Finally, intercorrelational structure and conflict among cues might cause subjects to focus on one of the cues or turn to other cues to resolve the conflict. The coding system used for the various cue levels did not insure complete orthogonality of the cue dimensions, hence the cues were slightly correlated. This was found in the present study with IQ and grades. Discrepancies between the two had the effect of weighting grades higher or weighting comments more.

Although the subjects sometimes did report that they processed information in a configural fashion, the linear model is powerful enough to reproduce most of their judgments with very small error as shown by the studies discussed in Chapter II. In the present study the mean R^2's were around 65.5. The reliability of the linear model was fairly high but not high enough to warrant clear-cut conclusions.

Since the mathematical description of judgment is incomplete, there is no way of knowing how accurately the underlying process has been represented. This could be one reason why some of the hypotheses concerning the relationships between judgmental policies and inquiry were not

supported. Only further research in the area in a controlled situation would enable one to predict the relationships between the input and the output; the integration process itself, and is application to real life situations.

The present writer feels that the in-basket is a reliable instrument which could be used effectively to validate certain aspects of the judgmental process; and that judgmental policies are indeed related to actual decision-making in real or simulated situations. However, due to two problems in the present study, significant results were not obtained. First, the problem of sample size which of necessity was too small to get reliable correlations was found in this study. Another problem was that the method used to equate the categories of information sources in the judgmental task and the inquiry situation were not adequately refined. It might take a considerable amount of research before these and other difficulties can be overcome.

In general, discussion-reflection training tended to change the weighting policies of the subjects by increasing the weight given to variables which were discussed in the training.

As discussed in Chapter IV, the training did have the effect of reducing the variance of the beta weights assigned to the cues from the weights of a theoretically optimal judgmental policy for the same five cues on the post

judgmental task.

If optimal weighting patterns could be developed for the judgments teachers are required to make regarding instructional problems and procedures of students in a classroom setting, training programs could be developed to facilitate effective and efficient decision making by teachers using cognitive feedback and discussion and reflection training.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The present research addressed itself to two major questions: (1) Can the judgmental policy preferences of subjects be modified by training?; and (2) Is it possible to predict how an individual will perform in an inquiry situation from her (the reader is reminded that only female subjects participated in the study) judgmental beta weights and from selected personality tests? The study of the first question involved a pre test-post test design. The second was a correlational study in which the relative contributions of judgmental beta weights and personality variables in the prediction of inquiry were researched.

The pre test phase consisted of a group of selected tests as well as the pre judgmental task. In this task subjects were presented with 108 cardexes which had information about 108 hypothetical students regarding SES, IQ, grades, sex and personality factors. The cardexes were to be rated on a seven-point scale on the following question: "What is the likelihood that this student will be an instructional problem in a classroom setting?"

Since the cardexes were developed so that there were all possible combinations of the information categories presented, it was possible to capture reliable judgmental

policies for all subjects using a regression analysis.

The subjects were randomly assigned to three experimental treatments. One of the treatments was the discussion-reflection training; the second treatment was the administration of the in-basket followed by discussion-reflection training; and the third treatment was essentially a control.

Following the training period all the subjects were presented with the cardexes again to rate the same hypothetical students on the same question. Thus, a pre test-post test measure on each subject on the judgmental task was obtained.

The basic rationale for this experiment was derived from previous research on judgment by Goldberg (1968), Hoffman (1968), Dawes (1970) and Hammond (1971). They found that the linear model did a good job of predicting judgments based on specific information or cues. Hammond (1972), contended that specific feedback derived from the lens model (i.e., feedback about the weight the subject gives to each cue, and the weight the environment gives to those cues) is more effective than non-specific or outcome feedback. He employed computer graphics to provide these kinds of information for the learner and got significant results due to training.

The present research aimed at modifying the judgmental policies of teachers by providing cognitive feedback on the

pre judgmental task and through discussion and reflection training in which subjects were sensitized to the influence of the cues on their judgments or decisions.

The rationale for the second question was derived from Shulman's (1963) theory of inquiry. The in-basket was designed by Shulman (1963) and used by Shulman, Loupe and Piper (1968), Piper (1969) and Loupe (1969), to determine the characteristics which affect one's competence as an inquirer, and to describe the behavioral processes of the inquiring individual. According to their research personality variables were more important determiners of inquiry behavior than other cognitive variables. In this research an attempt was made to study the relative contributions of judgmental beta weights and personality variables to the prediction of inquiry performance.

The general results were as follows: (1) Judgmental policy preferences are quite stable over time since the skill with which information is utilized to reach a judgment is acquired over a long period of practice and experience. It was found that teachers characteristically weight grades more than any other variable. Comments as indicators of personality are weighted second in importance in judging the likelihood of students having instructional problems in a classroom setting. (2) Changes in weighting patterns were affected by the training. The two training groups together were different from the control group in

their overall post judgmental policies. Post IQ and post SES were significantly different for the groups. Pattern analyses of the judgmental profiles revealed changes between the discussion-reflection training group and the in-basket followed by discussion-reflection training group, reflecting the types of experiences the subjects were subject to during the training sessions. (3) Neither pre judgmental weights nor personality variables were potent determinants of inquiry. No relationships were found between shifting and equality of beta weights. Neither was there a relationship between problems info and beta weights, nor bits info and beta weights. Internal locus of control was the best predictor of inquiry among the personality variables. A combination of all the nine predictor variables predicted the five dependent measures significantly. Bits, competence and problem sensitivity were most highly predicted.

Conclusions and Implications

This research has attempted to investigate the relationships between two theories: (1) a theory of judgment and (2) a theory of inquiry. The diagnosis and identification of students' problems can be considered to be a specific instance of the more general process of judgment or decision making. Since the cognitive processes underlying judgment and inquiry both involve the utilization of information in reaching a decision certain relationships

were hypothesized between the two sets of variables. The results of this study suggest, however, that the judgmental process is not fully represented by the linear regression equation. Unless further research is done to describe other important characteristics of the process, the relationships between the two theories cannot be studied adequately.

The results pertaining to the judgmental policies and the modifiability of policy preferences, however, suggest some promising avenues for further research.

The first direction lies in the development of optimal weighting policies for teachers in various situations dealing with students' instructional problems. A study of problems or decisions a teacher is faced with in a classroom now have to be identified. A study of the information available to teachers would have to be made. Criterion information would have to be gathered in order to develop optimal policies under each situation.

One criteria or "good" policy preferences have been characterized training programs could be developed to improve the accuracy and effectiveness of teacher decision making. The need is for experimental studies that would examine the effects of various conditions and procedures on the judgments teachers make. What kinds of experiences are most appropriate for effecting particular changes in individuals with different weighting patterns? Can

sensitivity to the importance of a certain source of information enhance the amount of weight given to that variable? Would discussion and reflection training have been more powerful if the duration of the session had been extended? Would a greater number of sessions spaced out over a longer period of time brought about a greater change in the policy preferences? If feedback could have been made more prompt would it have made a difference in learning? These are all questions that need to be researched in order to develop effective teacher training programs.

Another area of possible research involves the investigation of the integration process itself. Questions regarding the utilization of information in reaching a judgment need to be studied further. Is there a limit on the number of cues a judge can process at one time? What should the cut off point be to assess whether a certain cue has indeed influenced a certain decision or not? Is there a method by which the sequence of information utilization can be observed? In the absence of certain important cues what strategies does a judge rely on? What kinds of specific knowledge underlie the integration process of judgment? Does the level of cognitive development of the individual affect the judgmental process?

These and other questions would need to be answered before questions pertaining to training can be dealt with in an effective manner.

Finally, although this experiment endeavored to study the relationships between judgmental policies and inquiry and the relationships between personality variables and inquiry, no attempt has yet been made to study the relationships between personality variables and judgment. Hoffman (1960) found great disparities in the degree of agreement of relative and subjective weights among subjects. In one case there was a high degree of agreement between the two weights, whereas great discrepancies were found for another. Is it possible that certain types of persons have a certain degree of insight into their own judgmental process, and if this is so, what is the characteristic that makes them different? Do certain personality types tend to make use of only certain categories of information versus utilizing all the information available to them by giving equal weight to all of the cues? These and other questions could be asked in order to reach a better understanding of why different judges have different weighting patterns and different degrees of awareness into their own cognitive processes.

Since judgments or decisions require choices which control and affect the lives of people it is our responsibility as educators and psychologists to study and identify those variables that facilitate effective decision making by teachers regarding students' instructional problems. Research would help to sift out hose variables that highly

predict teacher effectiveness from those that do not. Screening devices can be developed to select promising students into teacher training programs.

Finally, since there is evidence to suggest that judgmental policies can be changed due to training, it would be possible to train teachers in decision making which would hopefully transfer to actual situations where this ability is utilized.

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APPENDIX A

Pilot Tests To Develop The Categories of Information Sources.

DIRECTIONS: Place each of the values of the following variables listed below in a high, medium or low category by writing the appropriate word (high, medium or low) in the adjacent blanks provided in each of the three columns.

IQ SCORES		GRADES		OCCUPATIONS (as indicators of socio-economic status)	
111	_____	B-	_____	Teacher	_____
75	_____	C	_____	Physician	_____
128	_____	B	_____	Baker	_____
106	_____	D+	_____	Pharmacist	_____
87	_____	A	_____	Farmer	_____
125	_____	E	_____	Lawyer	_____
93	_____	A-	_____	Plumber	_____
103	_____	D-	_____	Social Worker	_____
79	_____	B+	_____	Car Salesman	_____
121	_____	C-	_____	Building Contractor	_____
110	_____	C+	_____		
118	_____	A+	_____	Minister	_____
105	_____	D	_____	Barber	_____
82	_____			School Administrator	_____
98	_____				
114	_____			Policeman	_____
90	_____			Sanitation Engineer	_____
130	_____				
108	_____			Clerk	_____
92	_____			Dentist	_____
85	_____			Gas station Operator	_____
101	_____				
124	_____			Accountant	_____
96	_____			Building Custodian	_____
78	_____				
94	_____				

Rate the following comments about student progress and growth in school as being favorable or unfavorable by writing the appropriate abbreviation (F for favorable, U for unfavorable) in the blanks provided after each of them:

1. Memorizes where reasoning should be used _____
2. Very fine student _____
3. Not always dependable _____
4. Does work neatly _____
5. Low score on tests _____
6. Should develop power to concentrate _____
7. Shows interest and eagerness to improve _____
8. Lacks persistence _____
9. Listens carefully _____
10. Finds worthwhile things to do _____
11. Wastes time _____
12. Irregular attendance _____
13. Hard worker _____
14. Capable of doing better work _____
15. Follows directions and responds promptly _____
16. Prepares only part of work _____
17. Too many outside activities _____
18. Good attitude towards private and public property _____
19. Able to meet new situations _____
20. Lacks foundation _____
21. Thoroughly reliable _____
22. Fails to do home assignments _____
23. Works independently _____

24. Careless or inaccurate work _____

25. Required work late or incomplete _____

26. Uses time and materials wisely _____

27. Fails to follow directions _____

28. Completes work on time _____

29. Subject is difficult for student _____

30. Poor attitude _____

APPENDIX B

Selected Personality Tests

Student Opinion Survey

Attitude Inventory

Political Position

STUDENT OPINION SURVEY

Name _____ Age _____ Date _____

Education_____

Instructions

Below are a number of statements about various topics. They have been collected from different groups of people and represent a variety of opinions. There are no right or wrong answers to this questionnaire: for every statement there are large numbers of people who agree and disagree. Please indicate whether you agree or disagree by circling the statement to which you agree.

Please read each item carefully and be sure that you indicate the response which most closely corresponds to the way which you personally feel.

1. A. Children get into trouble because their parents punish them too much.

   B. The trouble with most children nowadays is that their parents are too easy with them.

2. A. Many of the unhappy things in people's lives are partly due to bad luck.

   B. People's misfortunes result from the mistakes they make.

3. A. One of the major reasons why we have wars is because people don't take enough interest in politics.

   B. There will always be wars, no matter how hard people try to prevent them.

4. A. In the long run, people get the respect they deserve in this world.

   B. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. A. The idea that teachers are unfair to students is nonsense.

   B. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. A. Without the right breaks one cannot be an effective leader.

   B. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. A. No matter how hard you try some people just don't like you.

   B. People who can't get others to like them don't understand how to get along with others.

8. A. Heredity plays the major role in determining one's personality.

   B. It is one's experiences in life which determine what they're like.

9. A. I have often found that what is going to happen will happen.

   B. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. A. In the case of the well prepared student, there is rarely if ever such a thing as an unfair test.

    B. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. A. Becoming a success is a matter of hard work, luck has little or nothing to do with it.

    B. Getting a good job depends mainly on being in the right place at the right time.

12. A. The average citizen can have an influence on government decisions.

    B. This world is run by the few people in power, and there is not much the little guy can do about it.

13. A. When I make plans, I am almost certain that I can make them work.

    B. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. A. There are certain people who are just no good.

    B. There is some good in everybody.

15. A. In my case getting what I want has little or nothing to do with luck.

    B. Many times we might just as well decide what to do by flipping a coin.

16. A. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

    B. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. A. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

    B. By taking an active part in political and social affairs the people can control world events.

18. A. Most people don't realize the extent to which their lives are controlled by accidental happenings.

    B. There really is no such thing as "luck".

19. A. One should always be willing to admit mistakes.

    B. It is usually best to cover up one's mistakes.

20. A. It is hard to know whether or not a person really likes you.

    B. How many friends you have depends upon how nice a person you are.

21. A. In the long run, the bad things that happen to us are balanced by the good ones.

    B. Most misfortunes are the result of lack of ability ignorance, laziness, or all three.

22. A. With enough effort, we can wipe out political corruption.

    B. It is difficult for people to have much control over the things politicians do in office.

23. A. Sometimes I can't understand how teachers arrive at the grades they give.

    B. There is a direct connection between how hard I study and the grades I get.

24. A. A good leader expects people to decide for themselves what they should do.

    B. A good leader makes it clear to everybody what their jobs are.

25. A. Many times I feel that I have little influence over the things that happen to me.

    B. It is impossible for me to believe that chance or luck plays an important role in my life.

26. A. People are lonely because they don't try to be friendly.

    B. There is not much use in trying too hard to please people, if they like you, they like you.

27. A. There is too much emphasis on athletics in high school.

    B. Team sports are an excellent way to build character.

28. A. What happens to me is my own doing.

    B. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. A. Most of the time I can't understand why politicians behave the way they do.

    B. In the long run, the people are responsible for bad government on a national as well as on a local level.

ATTITUDE INVENTORY

This questionnaire is composed of 36 statements with which you will be asked to agree or disagree. For each statement, respond according to the following key:

(1) True

(2) False

Please proceed through the inventory quickly, and respond to every item.

1. I like to have a place for everything and everything in its place.
2. Some of my friends think that my ideas are impractical, if not a bit wild.
3. I don't like to undertake any project unless I have a pretty good idea how it will turn out.
4. For most questions there is just one right answer, once a person is able to get all the facts.
5. Politically I am probably something of a radical.
6. Perfect balance is the essence of all good composition.
7. I prefer to engage in activities from which I can see definite results rather than those from which no tangible or objective results are apparent.
8. I find that a well-ordered mode of life with regular hours is not congenial to my temperament.
9. The unfinished and the imperfect often have greater appeal for me than the completed and the polished.
10. I like to listen to primitive music.
11. I have always had goals and ambitions that were impractical or that seemed impossible for me to realize.
12. When a teacher lectures on something other than what he originally announced, I feel uneasy.

13. Trends toward abstractionism and the distortion of reality have corrupted much art of recent years.

14. It bothers me to have different news commentators give different interpretations of the news.

15. The sign of a good teacher is the ability to teach a class spontaneously, without careful preparation.

16. I like to fool around with new ideas, even if they turn out later to have been a total waste of time.

17. I don't like to work on a problem unless there is a possibility of coming out with a clear-cut unambiguous answer.

18. I have always hated regulations.

19. The give-and-take of a class discussion is usually much more rewarding than a lecture.

20. Many of my friends would probably be considered unconventional by other people.

21. I like classes in which notes can be easily taken.

22. It doesn't bother me when things are uncertain and unpredictable.

23. Nothing is more infuriating than an instructor who jumps around among topics and never sticks to the point.

24. My way of doing things is apt to be misunderstood by others.

25. I value courses that provide an abundance of meaningful factual material.

26. Facts appeal to me more than ideas.

27. Small discussion groups often leave me with a feeling of dissatisfaction concerning the way time was spent.

28. I have had strange and peculiar thoughts.

29. I don't like things to be uncertain and unpredictable.

30. The worst thing an instructor can do is to make very specific plans for each lesson.

31. It is a good rule to accept nothing as certain or proved.

32. I dislike following a set schedule.

33. Usually, I prefer known ways of doing things rather than trying out new ways.

34. I like to go alone to visit new and strange places.

35. I much prefer friends who are pleasant to have around to those who are always involved in some difficult problem.

36. I have had very peculiar and strange experiences.

POLITICAL POSITION

1. To the best of your knowledge, what are (were) the predominant political leanings of your parents? Please circle the letter corresponding to your answer.

   a. Democratic
   b. Republican
   c. Independent
   d. Other (specify) _____

2. Politically speaking, would you consider yourself: (circle)

   a. Quite conservative
   b. Somewhat conservative
   c. Middle-of-the-road
   d. Somewhat liberal
   e. Quite liberal

3. Rank your own personal preference for the following political figures, were they all to be candidates for the presidency in the same election. Rank from 1 - 4.

   George McGovern _____
   Hubert Humphrey _____
   Richard Nixon _____
   Barry Goldwater _____

APPENDIX C

Cardex - Rating Scale

DIRECTIONS

Please read the instructions carefully. If you have any questions ask them before you start. Once you have begun no questions can be answered. Check the yellow cards with the booklet to make sure the numbers correspond. Once you have made your choice and marked the rating scale on the first page of the booklet turn both the card and the page over. Do not look back at what you have done, but continue to progress forward.

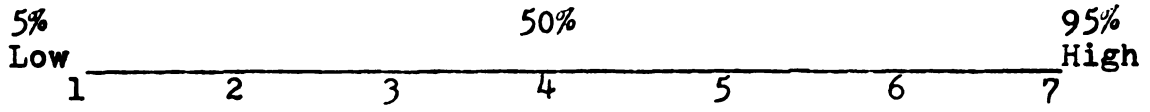
PLEASE DO NOT MARK ON YELLOW CARDS

CARDEX RATING SCALE

From the information provided on the Cardexes, using a seven point scale, rate each of the students on the following question:

"What is the chance that this student will be an instructional problem in a classroom setting"?

SAMPLE SCALE



If you feel that the student shows a 95% or greater chance of becoming an instructional problem, place a checkmark at 7. If you feel that the student has a 50% chance of becoming an instructional problem, place the checkmark at 4. If you feel that the student will have 5% or less chance of developing instructional problems, place the checkmark at 1.

APPENDIX D

Sample Cardexes

PERMANENT ELEMENTARY SCHOOL RECORD

Guardian Mongo Brown

Name Percy Brown

Sex Male

Average Grade C

Father's Occupation Dentist

IQ 103

Comments Prepares only part time

PERMANENT ELEMENTARY SCHOOL RECORD

Guardian Harry Ruckle

Name Beatrice Ruckle

IQ 77

Sex Female

Average Grade A

Father's Occupation Physician

Comment Wastes time

PERMANENT ELEMENTARY SCHOOL RECORD

Guardian Daniel Parker

Name Bob Parker

Sex Male

Average Grade C-

Father's Occupation Mechanic

IQ 121

Comments Listens carefully

PERMANENT ELEMENTARY SCHOOL RECORD

Guardian Arnold Allen

IQ 103

Name Ann Allen

Sex Female

Average Grade A-

Father's Occupation Janitor

Comment Not always reliable

APPENDIX E

Discussion - Reflection Training

DISCUSSION-REFLECTION TRAINING

Name _____ Date _____

The purpose of this training is to increase our understanding of the sources of information that can help teachers to recognize or solve student-problems in the classroom.

Can anyone tell why it is important to understand what such factors as SES, IQ, Grades, Sex of the child and Comments by teachers mean on student's records? (Ask individuals).

Are these bits of information about students necessary in order to understand students' problems? Why? (Ask individuals).

Before we begin the formal training I'd like you to look at your regression equation which tells you how you actually weighted these sources of information when you made judgments regarding the likelihood that the students, presented to you on the yellow cardexes, would have problems in a classroom setting.

(Pass out sheets with S's beta weights).

You weighted SES _____, IQ _____, Grades _____, Sex _____, and Comments _____.

I. First let us see what SES means:

Socioeconomic status and social class are closely related. The lower the income the lower the social class. Other factors contributing to the definition of social class would be the educational level and the occupation of the individual. Although SES can be divided into several divisions, for our purposes three categories would be sufficient. That is, children in schools might come from high, medium or low socioeconomic status families.

There is evidence to show that opportunities and rewards in life are unequally distributed - more good things go to the children of higher - status families. A child who is from a low socio-economic status has many barriers to hurdle in order to achieve happiness and progress in school. The plight of the child who has both low academic ability and low SES is extreme. Children from low SES families usually:

have 1. Poor and unsafe housing.

2. Lack of books, magazines and educational materials at home.

live in 3. Poor neighborhoods - no opportunities for recreational and creative activities.

have 4. Poor attitudes in the home towards education.

5. Lack distinct and complex verbal stimulation and good models.

6. Peer group pressures encouraging delinquency.

go to 7. Unresponsive schools. The child learns he is a social outcast. Text books and instruction in general lack meaning and relevance.

and faces 8. Discrimination

These environmental factors contribute to the various characteristics of the low SES child in the cognitive, affective and psychomotor domains which are as follows: They have:

1. Perceptual and language deficit. Their speech and thought processes are restricted, simple repetitive and disconnected. They have poor vocabularies.

2. Depressed intellectual development as represented by IQ scores.

3. Low achievement scores.

4. Inadequately developed prosocial values.

5. Poor self concept.

6. Emotional problems due to neglect and broken homes.

7. Lack of saleable skills.

(Discuss each point with group)

II. Second, let us see what IQ means:

Scholars do not agree on the nature of intelligence, however, IQ scores as measured by tests of general intelligence have been used for years in schools to predict academic achievement, that is, levels of achievement in Mathematics, English and other academic subjects. An IQ can therefore be referred to as academic aptitude.

In the standardization of the Revised Stanford-Binet Scale, one of the two individual intellignece tests most widely used in America, a range in IQ from 35 to 170 was reported. The majority of the standardization group had IQ's between 84 and 116 (approximately 68 percent). About 14 percent had IQs between 116 and 132, and approximately 14 percent had IQs between 84 and 68, 2 percent above 132 and 2 percent below 68.

At the top end of the scale, 145 and higher, we expect superior performance in all types of academic work. Those in the 130 to 145 range also are predicted to do very well. Occasionally, however, students in this 130-145 group do produce relatively mediocre performances. Among the 68 percent in the range of 84 to 116, we expect much variation in achievement; for example, those with IQs of 100 would vary widely in the level of reading and arithmetic achievement. We would expect children with IQs below 70 who come from enriched homes and neighborhood environments not to perform well in the academic subjects. Further, those below 55 will probably not do well in any school tasks

including those heavily based on psychomotor abilities. We would anticipate that children with IQs of 35 and below would require help throughout life with the simplest tasks of eating, dressing, keeping clean and the like.

Children showing a high need for achievement, competitive striving and curiousity have shown gains in IQ scores.

Limitations of IQ scores in Organizing Instructional Programs.

1. IQ scores will not be useful in assessing readiness of individuals for typing, art, music and physical education.

2. Predictions made from IQ scores do not apply to children from impoverished environments. IQ scores are not equally accurate and valid for measuring intelligence of students from all types of homes and neighborhood backgrounds.

3. IQ scores are not fixed. They can change 15 points or more for more than half the students.

4. Children having the same IQ may vary widely in levels of achievement in academic subjects.

5. Different IQ tests result in somewhat different IQ scores for the same individuals.

6. IQ scores do not correlate highly enough with achievement in various school subjects, therefore should not be used as the sole basis for predicting or categorizing children as slow learners, disadvantaged, or unsuited for later college work.

III. Third, let us see what grades mean:

Accurate information about a student's present level of achievement in any curriculum area, for example, in reading or science, is useful in predicting how he will do in the future in the same curriculum area. It is more useful actually than an IQ score. Increasingly, instructional programs are being organized for particular students, not on the basis of IQ scores or other specific ability tests, but on the basis of the student's present level of achievement. The two main sources of information about level of achievement that are available to teachers are results of standardized educational achievement tests and teacher-made tests or other teacher-developed procedures.

Precautions:

1. Achievement for one student varies widely from one subject to another.

2. Grades vary from one test to another and depend on the difficulty level of the tests.

3. Grades are not always reliable measures of a student's achievement. Unreliability can result from physical and motivational conditions of the student. Unreliability can also result from subjectivity in scoring on the part of the teacher.

4. Grades are not always valid. They are a measure of something other than what the teacher says they measure.

5. Grades of Ds and Es produce a sense of failure and frustration in the student that may result in maladaptive behavior in the classroom.

IV. Fourth, let us see how the sex of the child can affect his performance in the classroom.

Although sex roles of males and females in American society are not crystallized certain sex differences are observed. Some differences are due to biological differences in physical growth and maturation. Other sex differences are due to sex-typing and the identification of children with adults of the same sex. Further, the reinforcement of behaviors that are acceptable within a culture such as aggression in males and dependency in females might encourage the differences between the two sexes.

Some sex differences:

1. Girls mature faster than boys in physical growth, however, the average height and weight of boys is greater than girls except at ages 11 to 15.

2. Girls typically score higher on verbal items and boys on quantitative and spatial items in both intelligence and achievement tests.

3. Sex differences in preference for play, games and other activities become apparent in early childhood and increase with successive age levels. Girls prefer to read where as boys engage in active games.

4. Males show a higher degree of aggressive and dominant behavior than females. Delinquency is higher in boys. Females are more co-operative than males. Girls comply with the teachers wishes more frequently than boys.

   Precaution: There are large individual differences among individuals of the same sex.

V. Fifth, let us see what comments on students' records mean:

Comments about students, are written by the teacher to describe the affective characteristics and work habits of the students. Comments are usually descriptions of the motives, attitudes, interests and values of the student.

Many studies and firsthand reports of teachers could be cited to show wide variability among students of the same age in affective characteristics.

1. Individuals vary widely in the need to achieve success and related need to avoid failure. This variability markedly influences their tendency to undertake or avoid activities. Other motives are the need for love and belonging, for self esteem and for self-actualization.

2. Honesty is one of the prosocial values that students differ in. Others are punctuality, dependability, sincerity, orderliness, conformity to group norms, inhibition of aggressive impulses, enjoyment of study, interest, respect and desire for freedom of self and others.

   Other differences are:

3. Attitudes towards school, towards others and themselves.

4. Identification with values and practices of the older generation.

5. Interest in work and study.

Positive affective characteristics greatly influence the intellectual development of students.

APPENDIX F

Scoring Sheet for IN-Basket

Subject____ Experimenter ________ Major Problems	Time	Report Card	Cardex	Attendance Book	Anecdote	CTP	CTP Sub-Scales	Sociogram	Permanent File	Medical Record	Secretary	References	Map	In-Basket	Total	Date________ Comment

APPENDIX G

Competence Scoring Key

COMPETENCE SCORING KEY

Cooper

1. Birthday, only 3 signed up.
2. Won games day, RC A's in Physical Education, Sociogram: isolate.
3. Youngest in class, Sociogram and CTP discrepant, ill Fridays, has all brothers.
4. Misses dancing regularly, not popular, socially immature, not too feminine in her role.

Fagen

1. Low RC, low achievement scores, low CTP, not popular. To psychologist or remediation.
2. Absent and tardy, dissatisfied with school, transferred from Detroit.
3. Unstable family, divorce, remarriage.
4. Stepsister in same class.
5. Frustrated can't compete with stepsister, emotional and family problems.

Hoffman

1. Poor RC, low CTP and low subscore.
2. Grades discrepant with IQ (underachiever), sociogram isolate.
3. Emotional problems, low CTP, isolate, sister coming.
4. Stuttering, connected with emotional problems.
5. Sister is a star, can't compete. Home pressure getting worse because of sister's visit.

Lopez

1. Low RC, low cardex, low CTP (to psychologist), almost isolate.

2. Migrant, transfer student, absent and tardy.

3. Intelligent, IQ 151 but an underachiever, may have language problem.

4. Illiterate parents, she's so smart, low educated parents.

5. School not valued in her home so lacks motivation.

Maloney

1. Low RC, except reading, same for achievement, reading high, low CTP, overweight.

2. Overweight, low CTP, D in Phys. Ed., Sociogram dyad.

3. Emotional problems connected with overweight. High reading grade, maybe reads a lot alone.

Moore

1. Give extra help in math from anecdote about math.

2. Other grades o.k., "D" in math.

3. Band meets same time as math.

Rosen

1. RC excellent, CTP high, President of class.

2. Bored, causes disorder, Sociogram: popular, enrichment needed.

3. Excellent in everything, not accelerated, strange, small, thin boy.

Sieminsky

1. Low RC, absent for CTP, no field trip slip in, popular.

2. Behavior problem and yet popular, disrupts class.

3. Unstable family, father deserted and returned, parents quarrel.

4. Discrepancy between parent's education. Home problems in relation to RC and good art grade.

5. Parents compete, father aggressive with Stu. Stu identifies with mother, fears father, beaten by father.

Fagen-Moore

1. Either one because other isn't seen. Negro in class, "crossburned, Nigger lover".

2. Two William's.

3. Graves and Fagen are brother and sister (either result o.k.).

4. Lives in integrated neighborhood, Moore is Negro, has lived here a longer time.

APPENDIX H

Analysis of Covariance

ANALYSIS OF COVARIANCE

DIFFERENCES IN POST JUDGMENTAL TASKS IN THE THREE TREATMENT GROUPS DUE TO TRAINING

F-RATIO FOR MULTIVARIATE TEST OF EQUALITY OF MEAN VECTORS = 19.079 D.F = 5 and 41.00 P 0.0001

	Variable	Univariate F	P
1.	Post SES	20.01	0.0001
2.	Post IQ	12.46	0.0010
3.	Post Grades	68.51	0.0001
4.	Post Sex	0.74	0.3956
5.	Post Comment	22.09	0.0001

APPENDIX I

Sample Imbedded Problems In Teacher's IN-Basket.

SAMPLE OF IMBEDDED PROBLEMS

VI. Juanita Lopez

0. General
   a. Lives in migrant cottages
   b. Remedial?
   c. Psychologist?

1. R.C.
   a. Poor student with varied grades
   *b. Often absent and tardy
   c. Poor attitudes toward school
   d. D in phys. ed.
   *e. 12 yrs. old -- oldest in class
   f. Underachiever (high IQ)

2. Cardex
   a. IQ is 151 (mistake)
   b. WISC is different test than other kids had
   *c. Overaged
   d. Transferred from El Paso
   e. Low achievement scores
   f. Father born in Mexico

3. Cum File
   a. WISC should be 121
   b. Social promotion in 3rd grade
   c. Flunked 4th grade
   d. K.A. in grade 4 is discrepant with WISC
   e. Did better in 5th grade
   f. Large family
   *g. Parents are migrants
   h. Parents are illiterate
   i. Possibly trouble with English language

4. Rec. Book
   *a. Many absences

5. CTP
   a. Scored 80
   b. Subscored are low

6. Sociogram
   a. Mutual choice with Maloney
   b. Picks boy for second choice

7. Medical
   a. First immunization shots when she entered school

William Fagen

0. General
   a. Related to Mary Beth
   *b. Is he a Negro?
   c. Stepsister doing well by comparison
   d. Remedial?
   e. Psychologist?

1. R.C.
   a. Very poor grades
   b. Unsatisfactory deportment
   c. Signed by Graves
   *d. Absent and tardy a great deal

2. Cardex
   a. CTMM test given in 6/54
   b. He transferred from Detroit
   c. Both parents work
   d. Achievement scores are low
   e. Mother remarried
   f. Low IQ (85)

3. Cum File
   a. Never been a good student
   b. Good attendance in the past

4. Rec. Book
   a. Numerous absences and tardies

5. CTP
   a. Scored 82
   b. Low subscores

6. Sociogram
   *a. Mutual choice with Terry
   *b. Chosen by Mary Beth

7. Medical
   a. Underweight and short
   b. No big weight gain since 1961

8. Anecdotes
   *a. Who is B.H.
   b. Misspelled his name
   *c. William beat up Terry--who is his best friend
   d. Neither would say why it happened
   e. What happened at principal's office

APPENDIX J

Judgmental Policy Summary Sheets.

JUDGMENTAL POLICY PROFILES FOR INDIVIDUAL SUBJECTS
USING STANDARDIZED BETA WEIGHTS

Judgmental Tasks			Judgmental Tasks		
Subject Number 1			Subject Number 2		
	Pre	Post		Pre	Post
SES	-.02	.03	SES	-.02	-.08
IQ	-.01	-.05	IQ	-.14	0
Grades	-.40	-.76	Grades	-.65	-.68
Sex	-.06	-.03	Sex	.02	.02
Comments	-.57	-.35	Comments	-.52	-.25
Subject Number 3			Subject Number 4		
	Pre	Post		Pre	Post
SES	.08	-.05	SES	.02	-.04
IQ	.02	0	IQ	.03	-.30
Grades	-.77	-.82	Grades	-.64	-.75
Sex	.05	-.06	Sex	-.04	0
Comments	-.28	-.30	Comments	-.49	-.15
Subject Number 5			Subject Number 6		
	Pre	Post		Pre	Post
SES	-.03	-.08	SES	-.03	0
IQ	-.08	-.06	IQ	.10	.24
Grades	-.81	-.69	Grades	-.34	-.40
Sex	-.03	-.06	Sex	-.13	-.05
Comments	-.09	-.02	Comments	-.61	-.62

Judgmental Tasks

Subject Number 7

	Pre	Post
SES	-.05	-.03
IQ	.29	.09
Grades	-.76	-.83
Sex	-.08	-.05
Comments	-.23	-.25

Judgmental Tasks

Subject Number 8

	Pre	Post
SES	0	-.05
IQ	-.21	-.19
Grades	-.89	-.90
Sex	-.06	-.05
Comments	-.06	.01

Subject Number 9

	Pre	Post
SES	.21	.16
IQ	-.27	-.03
Grades	-.43	-.16
Sex	.18	.42
Comments	-.36	-.41

Subject Number 10

	Pre	Post
SES	.01	0
IQ	.05	.26
Grades	-.03	-.48
Sex	-.05	-.04
Comments	-.21	-.54

Subject Number 11

	Pre	Post
SES	.01	-.10
IQ	.21	-.22
Grades	.73	-.73
Sex	.10	-.02
Comments	.10	-.30

Subject Number 12

	Pre	Post
SES	-.01	.05
IQ	-.11	-.06
Grades	-.67	-.75
Sex	-.01	.01
Comments	-.48	-.44

Subject Number 13

	Pre	Post
SES	-.08	-.02
IQ	-.27	.23
Grades	-.34	-.50
Sex	.25	0
Comments	-.35	-.30

Subject Number 14

	Pre	Post
SES	-.01	-.01
IQ	0	-.24
Grades	-.61	-.54
Sex	-.02	-.11
Comments	-.44	-.35

Judgmental Tasks

Subject Number 15

	Pre	Post
SES	-.06	-.21
IQ	-.28	-.30
Grades	-.66	-.60
Sex	-.04	.08
Comments	-.32	-.27

Judgmental Tasks

Subject Number 16

	Pre	Post
SES	.01	-.17
IQ	-.13	-.23
Grades	-.77	-.81
Sex	-.03	.07
Comments	-.35	-.23

Subject Number 17

	Pre	Post
SES	.03	-.03
IQ	-.07	-.07
Grades	-.65	-.82
Sex	.04	-.01
Comments	-.47	-.28

Subject Number 18

	Pre	Post
SES	.01	0
IQ	-.12	-.23
Grades	-.75	-.65
Sex	-.03	-.07
Comments	-.25	-.18

Subject Number 19

	Pre	Post
SES	.07	-.08
IQ	.03	.05
Grades	-.65	-.82
Sex	-.08	0
Comments	-.39	-.24

Subject Number 20

	Pre	Post
SES	-.11	-.03
IQ	-.02	-.05
Grades	-.10	-.45
Sex	.04	.11
Comments	.02	-.53

Subject Number 21

	Pre	Post
SES	-.03	.12
IQ	.30	-.15
Grades	-.47	-.72
Sex	-.02	-.07
Comments	-.38	-.30

Subject Number 22

	Pre	Post
SES	.06	-.33
IQ	-.07	.04
Grades	-.08	-.29
Sex	0	-.03
Comments	-.62	-.53

Judgmental Tasks

Subject Number 23

	Pre	Post
SES	-.01	-.16
IQ	.08	.02
Grades	-.61	-.57
Sex	-.03	-.13
Comments	-.36	-.23

Judgmental Tasks

Subject Number 24

	Pre	Post
SES	-.01	.07
IQ	-.07	-.30
Grades	-.67	-.57
Sex	-.07	-.03
Comments	-.45	-.31

Subject Number 25

	Pre	Post
SES	-.02	.04
IQ	-.02	-.05
Grades	-.11	-.81
Sex	0	-.14
Comments	-.80	-.10

Subject Number 26

	Pre	Post
SES	-.04	.01
IQ	.04	-.40
Grades	-.67	-.72
Sex	-.09	-.05
Comments	-.29	-.07

Subject Number 27

	Pre	Post
SES	.13	-.29
IQ	-.12	-.16
Grades	-.06	-.52
Sex	.09	.19
Comments	-.59	-.58

Subject Number 28

	Pre	Post
SES	0	-.60
IQ	-.11	-.04
Grades	.71	-.55
Sex	.04	.01
Comments	.30	-.06

Subject Number 29

	Pre	Post
SES	0	.02
IQ	-.16	-.27
Grades	-.82	-.82
Sex	-.12	-.07
Comments	-.01	-.05

Subject Number 30

	Pre	Post
SES	.03	-.07
IQ	-.11	-.09
Grades	-.70	-.47
Sex	-.09	-.09
Comments	-.52	-.44

Judgmental Tasks

Subject Number 31

	Pre	Post
SES	.02	-.30
IQ	-.63	-.43
Grades	-.35	-.59
Sex	-.09	.01
Comments	-.18	-.12

Judgmental Tasks

Subject Number 32

	Pre	Post
SES	.03	-.01
IQ	.25	.22
Grades	-.50	-.83
Sex	-.18	-.11
Comments	-.28	-.17

Subject Number 33

	Pre	Post
SES	.04	-.33
IQ	.17	-.40
Grades	-.74	-.45
Sex	.03	.23
Comments	-.31	-.42

Subject Number 34

	Pre	Post
SES	.07	.03
IQ	.02	.03
Grades	-.28	-.88
Sex	-.05	-.01
Comments	-.68	-.05

Subject Number 35

	Pre	Post
SES	-.08	-.08
IQ	-.11	-.48
Grades	-.65	-.68
Sex	-.02	-.01
Comments	-.42	-.13

Subject Number 36

	Pre	Post
SES	-.02	-.28
IQ	-.06	-.37
Grades	-.73	-.59
Sex	0	.06
Comments	-.40	-.20

Subject Number 37

	Pre	Post
SES	0	-.10
IQ	-.11	-.18
Grades	-.58	-.63
Sex	-.06	-.11
Comments	-.53	-.41

Subject Number 38

	Pre	Post
SES	-.09	-.03
IQ	-.15	-.33
Grades	-.80	-.82
Sex	-.06	.03
Comments	-.24	.05

Judgmental Tasks

Subject Number 39

	Pre	Post
SES	.09	.05
IQ	.21	.03
Grades	-.39	-.38
Sex	-.02	-.15
Comment	-.46	-.54

Judgmental Tasks

Subject Number 40

	Pre	Post
SES	.12	-.21
IQ	.15	-.43
Grades	.66	-.60
Sex	.07	-.03
Comments	.48	-.33

Subject Number 41

	Pre	Post
SES	.07	-.27
IQ	.02	-.44
Grades	-.23	-.42
Sex	.16	-.03
Comments	-.62	-.46

Subject Number 42

	Pre	Post
SES	.0	.02
IQ	-.09	-.29
Grades	-.63	-.44
Sex	-.08	-.03
Comments	-.55	-.61

Subject Number 43

	Pre	Post
SES	.0	-.06
IQ	-.05	-.10
Grades	-.70	-.53
Sex	0	-.06
Comments	-.51	-.40

Subject Number 44

	Pre	Post
SES	-.05	-.23
IQ	-.44	-.31
Grades	-.74	-.80
Sex	-.04	.05
Comments	-.13	-.16

Subject Number 45

	Pre	Post
SES	-.18	0
IQ	.05	-.29
Grades	-.27	-.29
Sex	0	-.01
Comments	-.39	-.47

Subject Number 46

	Pre	Post
SES	-.09	-.18
IQ	-.10	-.16
Grades	-.80	-.86
Sex	.04	.03
Comments	-.16	-.09

Judgmental Tasks

Subject Number 47

	Pre	Post
SES	.07	.05
IQ	.06	.05
Grades	-.66	-.51
Sex	-.12	-.01
Comments	-.39	-.66

Judgmental Tasks

Subject Number 48

	Pre	Post
SES	.01	.04
IQ	-.13	-.26
Grades	-.85	-.88
Sex	-.06	-.01
Comments	.07	.04

Subject Number 49

	Pre	Post
SES	0	-.02
IQ	-.06	-.02
Grades	-.89	-.84
Sex	-.09	-.14
Comments	-.14	-.23

Subject Number 50

	Pre	Post
SES	.03	.02
IQ	-.14	-.37
Grades	-.61	-.39
Sex	-.03	0
Comments	-.49	-.46

Subject Number 51

	Pre	Post
SES	.03	-.06
IQ	.04	-.13
Grades	-.80	-.56
Sex	-.02	-.01
Comments	-.23	-.54

Subject Number 52

	Pre	Post
SES	.06	0
IQ	-.49	-.59
Grades	-.49	-.50
Sex	-.04	-.02
Comments	-.28	-.20

Subject Number 53

	Pre	Post
SES	-.12	0
IQ	-.27	-.40
Grades	-.58	-.53
Sex	-.03	-.09
Comments	-.34	-.37

APPENDIX K

Raw Data

TABLE -1

Corrected Shift Ratio	Problem Sensitivity	Time	Bit	Mean Sources	Mean Competence
.17	63	110	48	2.0	0.2
.64	53	115	82	4.7	0.7
.66	87	130	130	6.5	4.8
.62	152	95	142	6.5	2.0
.91	22	67	64	1.3	1.0
.80	40	100	113	3.5	0.1
.41	68	120	92	5.4	2.1
.27	29	133	61	3.1	0.4
.58	81	120	157	4.4	0.4
.70	69	105	164	2.0	1.3
.84	44	70	62	4.1	0.4
.65	14	37	25	2.3	0.0
.37	14	125	77	1.8	0.5
.71	91	100	192	7.0	1.4
.91	29	60	45	3.0	0.1
.29	32	130	97	2.1	0.2
.55	19	65	80	1.5	0.8
.79	108	105	150	9.1	2.0
.55	139	115	96	5.2	5.0
.90	54	85	96	3.3	2.0
.91	35	115	114	4.1	0.4

TABLE -2

Subject Number	/D/from Ideal Policy On Pre Test	/D/from Ideal Policy On Post Test	R^2 for Pre Judgment Task	R^2 for Post Judgment Task
1	88	106	.51	.72
2	99	87	.73	.54
3	110	81	.68	.79
4	114	76	.67	.69
5	78	67	.67	.50
6	107	121	.53	.61
7	115	109	.73	.76
8	78	80	.87	.85
9	85	160	.46	.38
10	99	124	.05	.61
11	63	73	.61	.71
12	102	119	.71	.77
13	65	101	.37	.39
14	122	63	.59	.52
15	76	66	.65	.58
16	97	77	.75	.82
17	112	99	.66	.78
18	86	59	.65	.53
19	106	103	.59	.75
20	83	101	.02	.50
21	110	92	.45	.66
22	113	90	.41	.48
23	101	59	.52	.43
24	97	88	.68	.53
25	145	84	.65	.70
26	87	81	.56	.71
27	143	82	.39	.75
28	114	86	.63	.68
29	77	79	.72	.76
30	105	66	.81	.46
31	79	65	.58	.66
32	104	114	.43	.78

TABLE -2

Subject Number	/D/from Ideal Policy On Pre Test	/D/from Ideal Policy On Post Test	R^2 for Pre Judgment Task	R^2 for Post Judgment Task
33	129	83	.67	.70
34	124	104	.55	.79
35	76	80	.64	.75
36	105	70	.72	.63
37	94	67	.66	.64
38	74	100	.76	.80
39	115	99	.43	.48
40	248	74	.74	.73
41	124	76	.46	.68
42	101	93	.75	.67
43	116	71	.78	.47
44	82	75	.79	.84
45	79	86	.26	.40
46	81	66	.70	.83
47	110	126	.63	.72
48	94	101	.75	.85
49	91	97	.83	.79
50	96	86	.65	.52
51	108	90	.70	.64
52	88	87	.58	.66
53	64	81	.56	.62

TABLE -3

Subject Number	Internal Focus of Control	Complexity	Lecture Discussion	Politics
30	9	6	1	9
31	9	24	1	13
32	17	20	4	8
33	16	11	2	7
34	18	18	3	9
35	8	11	2	8
36	15	9	2	9
37	13	13	2	8
38	10	8	3	10
39	16	18	4	6
40	13	6	3	3
41	18	21	4	11
42	13	22	2	11
43	15	12	4	7
44	15	9	3	7
45	16	12	1	11
46	5	7	2	7
47	18	12	0	7
48	6	15	0	4
49	11	6	0	8
50	9	12	2	10
51	17	15	3	8
52	17	19	5	10
53	9	16	3	9