To Dale Bolton

with deep appreciation

Mike Healey

September, 1969

PRE-DECISIONAL INFORMATION PROCESSES

IN TEACHER SELECTION

by

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Abstract

PRE-DECISIONAL INFORMATION PROCESSES

IN TEACHER SELECTION

by Michael Edward Hickey

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This study examined the behavior which takes place during pre-decisional information search and processing of written information inputs to the teacher selection process. The assumption underlying the research was that this behavior was not random, but rather was relatively specific and reflected a rationalized search process on the part of the decision maker.

The experiment involved the manipulation of two variables, (a) information cost, and (b) risk, in a controlled, simulated teacher selection situation in order to examine their effects on the following dependent variables: (a) information selectivity, (b) time, (c) specificity of search pattern, (d) proportion of available information utilized, and (e) certainty. The first four of these dependent variables were postulated to be major components of the information search strategy used by decision makers.

The simulated situation used in this experiment consisted of: (a) the description of a hypothetical community school district which provided the setting for the experimental

task; (b) the presentation of information on fictitious applicants; (c) a simplified, computer-based information storage and retrieval system with which subjects interacted to obtain information on the applicants; and (d) a set of decisions to be made regarding the applicants.

The design of the study was a completely randomized 3 × 3 fixed model treatment arrangement with measures on the five dependent variables. The subjects in the study were eighty-one elementary school principals from the three county Seattle Metropolitan Area. This population was selected for sampling since it was seen as being the largest single group which is involved in the selection of teachers on a part-time basis.

Analysis of variance was used to test the significance of all main and interaction effects and post analyses of significant differences were conducted using a Newman-Keuls procedure. The data analysis indicated the following results. Cost had a significant main effect on (a) five of the six sub-measures of the information selectivity measure; (b) the proportion of available information utilized; (c) specificity of search pattern; and (d) time. For the three levels of the cost treatment, the high cost treatment group consistently contributed the major portion of the variance, except for the specificity measure. On this a significant curvilinear relationship was evidenced with the medium cost treatment contributing most of the variability.

The results of the study indicated that distinctive patterns of search behavior existed for each of the three levels of the cost treatment. The major conclusions of the study were:

1. Under these treatment conditions, subjects did evidence distinctive patterns of behavior on the four measures postulated to be key elements of information search strategies.
2. In terms of the single criterion of decision quality used in this study (certainty) decisions in teacher selection can apparently be made with substantially fewer written information inputs than are typically used without loss of decision quality. It appears that an optimum information level exists which is capable of description and measurement for a given situation.
3. Although prescriptive models of information acquisition generally reflect a direct relationship between amount of information and certainty, the results of this study substantiate that individuals stop short of acquiring all the information available, even though this could have been done at no loss to them. Subjects who tended to exceed the optimum information level for this task (fifty-eight items) did so without significant improvement to the quality of

decisions made.

The primary implication of these results is that if decisions can be made using far less information than is normally utilized--without a reduction in decision quality--then substantial savings can be realized by reducing the volume of information presented to decision makers. That is, greater concern must be evidenced for the quality of inputs, rather than for quantity. The relationship between the amount of information considered and the probability of making a "correct" decision (as defined in this study) does not appear to be an increasing monotonic function as many models have indicated. Rather, the relationship appears to be curvilinear.

Finally, if an optimum level of information exists, as this study suggests, then the range of this level should be precisely measured under varying conditions and this range should be a key determinant in the design of information systems used in making teacher selection decisions.

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

When an administrator is faced with a decision, his initial behavior usually involves the seeking of relevant information in order to reduce his uncertainty about the decision and also lessen any risks that might be involved. The research reported here is based on the assumption that this behavior is not random, but rather that it is relatively specific and reflects a rational search process on the part of the decision maker. Further this implies the predictability of such behavior.

Predictive models of information search behavior have generally followed the lines of Marschak's,[1] which prescribed a "rational" strategy for information search. However, the results of previous experimental research in this field seem to indicate that--from a behavioral standpoint at least--individual information search strategies frequently, if not always, are at variance with most prescriptive statistical models that have been developed.

It would seem that one means of developing an adequate model of the information search process would be to analyze

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[1]Jacob Marschak, "Towards an Economic Theory of Organization and Information," Decision Processes, R. M. Thrall, C. H. Coombs, and R. L. Davis, editors (New York: John Wiley and Sons, Inc., 1954), pp. 200-5.

the behavior of decision makers during that process and then attempt to classify this behavior into "strategies" of information search which are defined in behavioral terms. It is this general purpose that provides the rationale for this study.

The focus of the research reported here is upon the behavior which takes place during pre-decisional information search and processing, and upon two determinants of that behavior, namely, (a) information cost, and (b) risk involved in the decision. This experiment involved the manipulation of the cost and risk variables in a controlled, simulated teacher selection situation in order to permit conclusions regarding their effect upon certain variables postulated to be key components of pre-decisional strategies which decision makers apply--either explicitly or implicitly--in teacher selection. Since the information base underlying a decision is a key determinant of decision quality,[2] this concern with pre-decisional strategies seems both valid and valuable, if one recognizes the need for improving the quality of teacher selection decisions.

Foundation of the Problem

The prevailing concern of information and decision theory with the cost and value of information reflects the

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[2]Herbert A. Simon, Models of Man (New York: John Wiley and Sons, Inc., 1957), p. 241.

crucial nature of the role information plays in describing the environment to the decision maker. Depending upon the accuracy of this description, the decision will be similarly effective or ineffective. Most of this concern has, however, focused only on the quantity and form of information as the primary index of information quality. The implied relationship would indicate a linear trend of increased decision quality as information quantity increased. Yet substantial research indicates that this is not the case and that human information processing tends to break down under conditions of information overload.[3]

The classical economists' position is that information, like other inputs to the organization, should be acquired until marginal cost equals marginal revenue. Such a position is a tenuous one, however, for unlike manpower and material inputs--which yield measurable gain when incremental amounts are applied to a process or product--information is inextricably related to probabilistic notions of error and effectiveness. Information, then, tends to act less like an independent variable and more like a function itself, compared to the other organizational inputs.[4] The

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[3]G. A. Miller, "The Magic Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information," Psychological Review, 63:86, March, 1956.

[4]J. R. Brenner, The Cost and Value of Information, Technical Information Paper Z77-4370 (White Plains, New York: IBM Corporation, July 7, 1964), p. 8.

relationship between cost of information and quantity is generally recognized and is more amenable to the traditional marginal approach, for it is possible to assume a point of absolutely diminishing returns. Brenner summarized this relationship as follows:

> Over a range of quantity as an independent variable, we can expect to see value rise from zero worth to a peak, beyond which additional information only lessens the decision making ability of the manager, serves to confuse, and has less value than previous amounts. Less "surprise" attends additional increments of information as well, and extrapolation takes over in the decision process.[5]

Graphically, this function would resemble Figure 1.1.

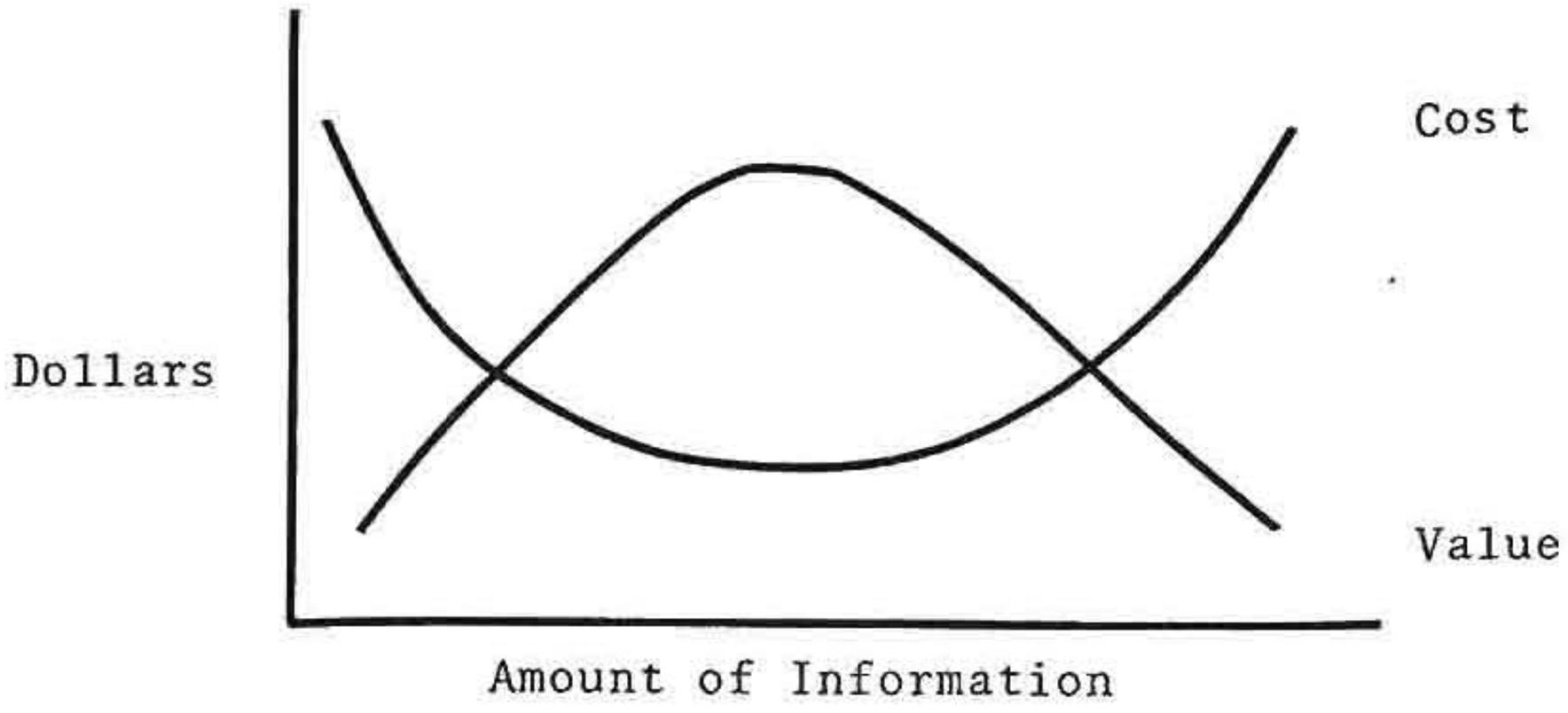

FIGURE 1.1

THE RELATIONSHIP BETWEEN AMOUNT OF INFORMATION, VALUE, AND COST

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[5]Ibid., p. 10.

The implications of this discussion for the research reported here lies principally in the development of information search strategies by individual decision makers. Of particular concern is the variability which occurs in these strategies as a result of manipulation of the cost function, with an assumed concomitant effect upon information value. Likewise the operation of a risk variable on the components of the information strategies is of concern in view of the prevalence of risk elements in most decision situations.

Rationale for the Research and Related Literature

One of the key determinants of the quality of education is the nature of the teachers who implement the educational program. Quite obviously, then, one of the means most readily available to regulate the calibre of teachers within the school system is through the selection process and the placement of teachers within the system. In 1929, Cubberly indicated this when he stated that ". . . the most important place to guard the teaching service from deterioration is at the entrance gate."[6] Yet, in spite of this admonition, the process of teacher selection has not changed appreciably over the past forty years in relation to the greatly increased sophistication of most other aspects of the educational process.

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[6]Elwood P. Cubberly, Public School Administration (Boston: Houghton-Mifflin Co., 1929), p. 304.

Bolton summarized this well. He stated:

> The decision to select a teacher from among a number of applicants is the culmination of a series of preliminary decisions which constitute the selection process. So crucial is the selection of a teacher to the quality of the educational program that it seems obvious that this decision should be made only with the utmost certainty regarding its utility. Yet, this is an anomaly of the selection process in education--and of selection in general --that such decisions are frequently intuitive and arbitrary. Contemporary administrative literature contains many theories of widely diverging complexity and quality which purport to improve the selection process. However, the fact remains that very little empirical data exists to either substantiate or disprove these theories; and consequently, the process remains, in many respects at least, a highly subjective one.[7]

The reasons for the inadequacy of the teacher selection process seem to be directly related to the lack of empirical knowledge about the decision making process involved. Descriptive knowledge of varying quality is plentiful, but empirical data about cause and effect relationships is practically nonexistent. The concerns which precipitated this study were the following:

1. The failure of much research in decision making to consider the relationship between information and subsequent decisions.
2. The nature of the theoretical models developed to describe the decision making process.

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[7]Dale L. Bolton, Variables Affecting Decision Making in the Selection of Teachers, United States Office of Education, Bureau of Research, Final Report, Project No. 6-1349, August, 1968, p. 8.

3. Certain inadequacies of research designs in the experimental study of decision making.

State of the art in decision making. In recent years a great deal of attention has been focused upon the experimental study of decision making in various contrived laboratory situations. Likewise, decision theory has been considerably refined and expanded through the use of such tools as Bayesian statistics and operations research. Psychologists have been concerned not only with the development of theoretical models, but with the behavioral components of decision making as well.

The classic model of the decision process, based as it was on the omniscient and infinitely rational (i.e., maximizing) "economic man," provided an oversimplified view of decision making which influenced both the development of theoretical models and the research which these models precipitated. In 1947, Simon rejected the "objective rationality" which characterized economic man and proposed instead an "administrative man," who incorporated a more realistic view of bounded human rationality.[8] While this approach subsequently opened up the field of decision theory to the behavioral sciences, it concomitantly provided the recognition that the act of choosing among alternatives was only

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[8]Herbert A. Simon, Administrative Behavior (New York: Macmillan Co., 1947), p. 81.

the culminating step in a chain of complex psychological processes.

The fundamental weakness of the theoretical models underlying much previous decision research is that they have taken as "given" the information base on which the decision maker operates and have focused on the processes relevant to the development and implementation of a decision strategy. However, as the preceding paragraph suggests, the processes involved in the development and application of what might be called an information search strategy are of considerable importance in the decision process. Simon[9] has indicated that a theory of decision making must, at some point, consider the activities of acquiring and processing information that precede decision. It cannot assume--and thereby leave unexplained--the informational basis for the choice itself. Similarly, March and Simon[10] stated that the concept of man as omnipotently rational, which characterized decision theory for many years, must be replaced by a concept of rationality which considered the capacities of the organism for assimilating and organizing information and the "information state" of the organism at the decision point.

Prescriptive and descriptive models. Models of

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[9]Simon, Models of Man, p. 241.

[10]James G. March and Herbert A. Simon, Organizations (New York: John Wiley and Sons, Inc., 1958.

decision making are generally of two types according to their focus: prescriptive or descriptive. As indicated previously, most attempts at theory development in decision making have involved the use of prescriptive (i.e., statistical) models. These models most successfully incorporated the conceptual basis of dynamic decision processes into their theoretical base; however, as Edwards pointed out, these models have been constructed from ". . . trivial, mathematically simple postulates . . ." with the hope of finding situations in which actual behavior resembled the resulting prediction.[11]

The descriptive (i.e., behavioral) models have, for the most part, consisted of a static decision process in which optimal, rational courses of action were described and compared to actual decision behavior to determine the degree of correspondence and of variance. Recent efforts in research have succeeded to some degree in wedding these two approaches into a meaningful relationship which has expanded considerably the theoretical basis for further study and research in decision making and has clarified to a limited extent the functioning of certain major variables within a decision situation.

Rigby has succinctly stated the multidimensional nature of the problem facing those who attempt to apply

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[11]Ward Edwards, "Dynamic Decision Theory and Probabilistic Information Processing," Human Factors, 4:61, April, 1962.

prescriptive models to the search processes of decision makers:

> It is probably reasonable to assume that the (decision maker) can control his receipt of information from outside but that control of his internally stored information is less complete. This internally stored information can be classified in three categories: (a) "data", that is, facts or opinions or impressions, which are traceable to identifiable sources and subject to consciously controlled analysis; (b) "intuition", which for present purposes is acknowledged as built up in the (decision maker) by past learning and experience or even by inheritance in the form of instincts but which cannot be practicably analyzed as to source or quality; and (c) "bias", which may be composed of emotions or unconsciously assembled attitudes, etc., and which is not at all subject to conscious control.[12]

Nature of previous studies. Even though the focus of research in decision making has broadened since the admonitions of March and Simon, the empirical study of pre-decisional behavior has largely involved the use of simplistic decision situations (e.g., estimating the frequency of an event occurrence, deciding the mean of a deck of numbered cards, etc.). Within these relatively meaningless (to the subjects) decision situations, the influence upon search behavior of a number of variables has been examined.[13]

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[12]F. D. Rigby, "Heuristic Analysis of Decision Situations," Human Judgments and Optimality, M. W. Shelly, II, and G. L. Bryan, editors (New York: John Wiley and Sons, Inc., 1964), pp. 40-1.

[13]For example, a good cross section of the work being done in this area is reported in Predecisional Processes in Decision Making: Proceedings of a Symposium, Behavioral Science Laboratory, Air Force Systems Command (Ohio: Wright-Patterson Air Force Base, December, 1964).

However, the simplistic nature of the experimental tasks with which the subjects were confronted gives rise to two concerns about the findings of these studies:

1. The situations may not have been realistic enough to entail a commitment on the part of the decision maker to the task involved and may not, therefore, reflect the exigencies of actual decision behavior.
2. Because of the relatively simple nature of the tasks, the manner in which the independent variables were operationalized may not reflect their actual functioning in a complex decision situation.

Significance of the Study

One important function of recent research efforts and theory development in the area of pre-decisional processes has been to delineate some substantive issues as guidelines for the further development of models for empirical research. These issues include the following:

1. How much variability exists among decision makers in terms of the amount of information they require before making a decision? What determines this variability or is related to it?
2. Under what circumstances is a decision maker willing to pay a high price for information? Does

the cost of information determine the subjective value (and therefore the weight) he places on the information?

3. How do cost and the quality of information affect the information search strategy and subsequently the decision strategy?

4. How does the decision maker utilize the information acquired, that is, what effect does new information have on tentative decisions made?

The importance of the pre-decisional processes to decision making and the complex nature of the variables involved in these processes suggest the need for studies involving pertinent variables manipulated in a complex and meaningful problem situation, one designed so as to insure commitment on the part of the subject to the decision task at hand. Adequate control of other variables would seem to dictate a simulated decision situation, provided careful attention to detail in development of this situation could serve the dual purpose of achieving realism and increasing the commitment of the subjects to the task.

The research reported here is an experimental study designed to accomplish the following general purposes:

1. To examine the effects of two variables, (a) cost of information, and (b) risk involved in the decision, on the information search behavior of decision makers in a simulated teacher

selection situation.

2. To categorize these behaviors into generalized strategies for purposes of prediction and analysis of selection decision making.

Assumptions of the Study

Two assumptions underlie the rationale, development, and design of this study:

1. The behavior of decision makers in searching for, and processing, information is not random, but rather follows definite strategies which may be generalized to other similar decision situations.

2. The simulated situation and the experimental task designed for this study were sufficiently representative of a real decision situation to elicit behavior on the part of the subjects that is a reliable indicator of actual behavior in a real situation.

Summary

The administrator faced with a teacher selection decision is confronted by a myriad of information items from a variety of sources on each applicant. The manner in which he selects and processes this information ultimately determines the quality of the decision made. Unless one is willing to assume that search and processing behaviors are

random, the strategies which control them must be key components in any theory of decision making.

This experimental study was designed to examine the processes which administrators go through prior to making a simulated teacher selection decision. Specifically, the study determined the effect of two variables, (a) information cost, and (b) risk involved in the decision, on certain components of behavior assumed to constitute the information strategy of the decision maker.

Previous studies have either neglected to examine this decision-information relationship, or have dealt with simplistic models which did not adequately characterize the processes involved.

Organization of the Dissertation

This first chapter has indicated the purposes of the study, the basis for the concern with this topic, and has delineated some of the substantive issues that pervade the field of decision research. Chapter II is a summary review of pertinent research in the areas of information and decision theory, pre- and post-decisional processes, and strategies of information search. Chapter III discusses the methodology of the study, including a detailed description of the variables involved, the design, and the experimental task and simulated situation. Chapter IV reports the results of the study and discusses the search strategies of

the subjects in the experiment, while Chapter V summarizes the major findings of the study and discusses their implications for research and practice.

CHAPTER II

REVIEW OF SELECTED RELATED RESEARCH

The theoretical and research literature in the area of decision making has multiplied rapidly since 1947 and the intrusion of the behavioral sciences into the field. However, because of the lack of concern with pre-decisional processes discussed earlier, empirical data with direct relevancy is scarce. For this reason, this study spanned several areas of decision making and information theory seeking appropriate models and data that would substantiate their use. The specific areas examined were:

1. Dynamic Decision Models
2. Pre- and Post-decisional Processes
3. Information Processing Capacity
4. Information Search Models

The first two of these areas are principally theoretical in nature, while the latter two provide both a theoretical base and empirical data.

Dynamic Decision Models

As a number of writers have suggested, very few "real" examples of static decision situations exist outside the laboratory setting.[1] A basic weakness of the static model

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[1]Ward Edwards, "Dynamic Decision Theory and Probabilistic Information Processing," Human Factors, 4:61,

which, in part at least accounts for this is that it necessitates the assumption that the informational outcomes of earlier decisions are irrelevant to later decisions. Such an assumption is probably untenable in view of a complete lack of empirical substantiation.

Edwards has described the dynamic decision model as consisting of sequences in decisions.[2] Because these sequences occur many times in the resolution of a complex problem, the environment in which they occur changes, either as a function of the sequence of decisions, or independently of it, or both.

The crucial difference between the static and the dynamic models is that the dynamic model presents opinions about probabilities and payoffs as a function of available information and these change as the information changes. In the "real" situation, expected value is maximized over a sequence of decisions, rather than for a single decision considered alone. In essence, the difference lies in the changing environment which provides the context for the decision processes.

Shure and Meeker have pointed out what may be a major

April, 1962; and G. H. Shure and R. J. Meeker, Probing Behind the Human Decision, Professional Paper SP-1698/001/00 (Santa Monica, California: Systems Development Corporation, July 7, 1965).

[2]Edwards, op. cit., p. 59.

reason for the lack of empirical research dealing with a dynamic decision model and involving a complex decision task:

> Associated with extended problem duration is the question of where the problem begins and ends. In the rapidly changing tactical environment, problems do not appear labeled as such nor are they bounded with respect to time or content. This means that the point of problem definition must be determined --when enough information has been obtained--for satisfactory problem identification and action. Also unlike textbook problems, tactical situations do not progress in a discrete and orderly sequence, nor do they "stay put" while being worked on. Delays, even short ones, may result in major modifications in a problem situation as well as in the relative utility and availability of alternatives.[3]

They emphasize the importance of obtaining on-going measures of information search and processing during the course of the decision process itself. Any conceptual analysis which assumes

> . . . that decision situations will be perceived as relatively fixed, that alternative effectiveness will be perceived as being relatively stable, or that the beginning, middle, or end of a decision situation can be defined without reference to the decision maker's ongoing involvement, will provide inadequate and misleading models for decision contexts of the sort described.[4]

The constantly-changing milieu in which the teacher selection process occurs is capable of adequate description only in terms of some type of dynamic decision model.[5] It

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[3]Shure and Meeker, op. cit., p. 4. [4]Ibid., pp. 5-6.

[5]All further references to the term "decision process" will pertain to the dynamic model unless otherwise indicated.

is the changing nature of the environment (e.g., the supply of applicants, the positions available, the time of year) which this study postulated was one of the major constraints upon the information-processing behavior of the decision maker.

A unique perspective on the decision process is provided by the incremental decision model elaborated by Lindblom and further expanded by Etzioni. The fundamental concern in modeling human decision behavior should focus on the points of articulation between its rational and its non-rational elements, the fusion of which provides the milieu in which decisions are made.[6] Lindblom has pointed out that, in practice, ". . . (decision makers') prescribed functions and constraints--the politically or legally possible--restrict their attention to relatively few values and relatively few alternative policies among the countless alternatives that might be imagined."[7] This concept of information strategy, which he terms the method of successive limited comparisons,[8] would seem a viable basis for further research in the decision making process, yet in the literature of information theory, decision theory, and planning a dearth

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[6]Amitai Etzioni, The Active Society (New York: The Free Press, 1968), p. 267.

[7]C. E. Lindblom, "The Science of Muddling Through," Public Administration Review, 19:80, 1959.

[8]Ibid.

of substantive experimentation utilizing the model is evident.

The incremental model of the decision making process has further been elaborated by Etzioni and seems intuitively to provide a less stringent model of the decision making process, yet one that is adequately descriptive of actual decision making from a macroscopic perspective (i.e., national policy making within pluralistic societies). The incrementalist strategy occurs in roughly the following phases:

First, decision makers do not attempt comprehensive survey and evaluation of all alternatives. Their concern is those policies that differ incrementally (i.e., to a limited degree) from existing policies. By considering only a relatively small number of means, the scope and cost of necessary information are reduced substantially. For incrementalists, the sin of omission is much preferred to the sin of confusion which is the result of rationalistic strategies.[9]

Second, the values applied to a decision need not consist of all possible values, but rather only those which are relevant in terms of the actual policy choices. Therefore, the measure of a good decision is the decision makers' agreement about it and ". . . ends are chosen which are

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[9]Etzioni, op. cit., p. 270.

appropriate to available or nearly available means."[10]

Finally, the incremental decision maker does not attack a single clearly defined problem. Rather there is a series of attacks on issues as they present themselves and the whole process is perpetually exploratory. "Rather than attempting to foresee all the consequences of various alternative routes, one route is tried and the unforeseen consequences are left to be discovered and treated by subsequent increments."[11]

Neither Lindblom nor Etzioni is advocating the incremental model as ideal, and both are quick to acknowledge its obvious disadvantages.[12] However, it does provide a model which, intuitively at least, seems to replicate the decision process more accurately than the rational models of classical theory. Etzioni has suggested a third model which combines the elements of both the rational and the incremental models: the mixed-scanning model.

> Actors whose decision-making is based on a mixed-scanning strategy differentiate contextuating (or fundamental) decisions from bit (or item) decisions. Contextuating decisions are made through an exploration of the main alternatives seen by the actor in view of his conception of his goals, but --unlike what comprehensive rationality would indi-

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[10]C. E. Lindblom, The Intelligence of Democracy (New York: The Free Press, 1965), p. 145.

[11]Etzioni, op. cit., p. 271.

[12]See Etzioni, op. cit., pp. 271-3; or Lindblom, op. cit., p. 334.

cate--details and specifications are omitted so that overviews are feasible. Bit-decisions are made "incrementally" but within the contexts set by fundamental decisions (and reviews). Thus, each of the two elements in the mixed-scanning strategy helps to neutralize the peculiar shortcoming of the other: Bit-incrementalism overcomes the unrealistic aspects of comprehensive rationalism (by limiting it to contextuating decisions), and contextuating rationalism helps to right the conservative bias of incrementalism.[13]

Pre- and Post-decisional Processes

The distinction between a pre-decisional process and one which occurs after the decision is a very subtle and complex one, although it may seem intuitively clear. The tautological problems of using the moment of decision as the point of differentiation between the two processes is that then the only way to define the act of decision making is as the moment when a pre-decisional process becomes a post-decisional process.[14]

Toda has described the dynamic decision model as comprised of a hierarchial structure of pre- and post-decisional processes: the pre-decisional process in a higher context will consist of an alternating sequence of pre- and post-decisional processes in a lower context, and

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[13]Etzioni, op. cit., p. 283.

[14]Masanao Toda, "Pre- and Post-decisional Processes of the 'Fungus-Eater'," Predecisional Processes in Decision Making: Proceedings of a Symposium, Behavioral Science Laboratory, Air Force Systems Command (Ohio: Wright-Patterson Air Force Base, December, 1964), p. 90.

each of these lower processes will again consist of the two processes repeated in a still lower context.[15]

The complexity of this hierarchial relationship suggests the inherent difficulty in attempting to develop theory about one process without consideration of the other. Likewise, it seems implicit that the manipulation of variables within the context of the decision process itself may be influenced by variables within the domain of the pre-decisional process. Implicit in Toda's dynamic process model is the complex interrelationship of searching for information and the actual making of the decision itself, yet knowledge about the latter is substantial, while the state of knowledge about the process of information gathering and utilization--as it relates to decision making--is still in the inchoate stages. This study will aid in clarifying the pre-decisional process in selection decision making and will provide a basis for relating pre-decisional search strategies to decision strategies.

Information Processing Capacity

Berlyne has focused attention on the fact that in human information-processing not all information available to the decision maker is relevant to the decision and, conversely, that all of the information necessary for the

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[15] Ibid., p. 89.

decision may not be present in the situation. Therefore, the decision maker must not only seek some of the information needed for the decision, but he must also frequently discard much of the information in his present field which is not relevant.[16]

There are two reasons why this is necessary. First, human organisms have a limited information channel capacity. Second, much of the incoming information which enters the organism's perceptual field is "noise", that is, it is irrelevant to the optimal response being sought. This indicates that the selection of information to be discarded is as important a concern of the pre-decisional process as is the selection of information to which the decision maker will attend.

In an earlier study, Miller identified the concept of channel capacity and analyzed the effects of information overload on the organism's performance. He found that, for unidimensional stimuli, the capacity of the organism for handling information seemed to be limited to approximately seven items. From reviewing a number of similar studies conducted by him and his associates he concluded that:

> There seems to be some limitation built into us either by learning or by the design of our nervous

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[16]D. E. Berlyne, "Attention, Curiosity, and Decision," Predecisional Processes in Decision Making: Proceedings of a Symposium, Behavioral Science Laboratory, Air Force Systems Command (Ohio: Wright-Patterson Air Force Base, December, 1964), p. 103.

systems, a limit that keeps our channel capacities in this general range (of seven stimuli). On the basis of the present evidence it seems safe to say that we possess a finite and rather small capacity for making such unidimensional judgments and that this capacity does not vary a great deal from one simple sensory attribute to another.[17]

Subsequent studies, however, indicated that by increasing the dimensions (or number of variables) considered, the total information-handling capacity of the organism was increased, although accuracy for any single variable decreased.[18]

These studies suggest the necessity for selectivity and discrimination on the part of the decision maker during the pre-decisional process. The crucial nature of this selectivity is underscored by the fact that both Berlyne and Miller reported breakdowns and inefficiencies in decision making and information-processing capabilities of individuals as a result of information overload.

Information Search Strategies

Lanzetta, elaborating on a model originally proposed by Marschak,[19] has suggested an approach to the question of

[17]G. A. Miller, "The Magic Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information," Psychological Review, 63:86, March, 1956.

[18]Ibid., p. 88.

[19]Jacob Marschak, "Towards an Economic Theory of Organization and Information," Decision Processes, R. M. Thrall, C. H. Coombs and R. L. Davis, editors (New York: John Wiley and Sons, Inc., 1954), pp. 200-5.

information search strategy. Assuming that time available for decision making is partitionable into two components--acquisition time and processing time--he states the general case as being that less time would be devoted to information acquisition as the amount of available information increases. The termination point for information seeking would then be a function of the difficulty of processing information. The expected value of an inquiry is assumed to be a function of the change in probability of selecting the correct alternative, the utility of the prize, and the utility of the cost of information.[20] This may be expressed as follows:

$$EV = U(z) \left(p_a - p_b\right) - U(c)$$

where z = prize, in dollars

$U(z)$ = utility of prize

p_a, p_b = probability of success _after_ and _before_ the new information, respectively

c = total cost of information, in dollars

$U(c)$ = utility of the cost of information (a measure of information processing difficulty)[21]

Given this equation, a "rational" strategy would be to acquire additional information when the utility of the prize is greater than the cost of acquiring the additional

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[20]John T. Lanzetta, "Information Acquisition in Decision Making," _Motivation and Social Interaction_, O. J. Harvey, editor (New York: The Ronald Press Co., 1963), p. 256.

[21]_Ibid._, pp. 256-8.

information, and to make a decision based on the present information base when the utility of the prize is less than, or equal to, the cost of obtaining the information. Assuming that information is available in discrete bits, and that a probability of payoff can be associated with each information level (i.e., as successive amounts of information are obtained), the probability of payoff becomes an increasing monotonic function of the number of information bits, assuming that information assists in the selection of a "correct" alternative.[22]

The application of these "rational" strategies to a real decision problem--especially one involving a more complex problem than those usually found in experimental situations--is difficult, in that knowledge about the precise probability of a "correct" or successful outcome at each level is usually not available to the decision maker. Lanzetta assumes that in such a circumstance the decision maker will expect the probability of success to increase with the amount of information acquired at the decision point. In all probability, this expectation will be reinforced, since in most decision situations "better" decisions are made when information is available.[23]

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[22] Ibid.

[23] For an elaboration of this idea, see Marschak, op. cit.

Whether the actual behavior of decision makers during the information-gathering process follows the rational prescriptions of those models remains to be seen. The results of Lanzetta's own research and that of other individuals suggest that a number of variables influence the strategy of information search which individuals use. That these determinants are not all extrinsic is evidenced by the results obtained by Goldstein, et al., in studying the effects of feedback on performance. They found that Ss with zero per cent extrinsic feedback maintained performance levels similar to Ss with 100 per cent extrinsic feedback,[24] implying, it would seem, a propensity on the part of decision makers to develop effective strategies utilizing some intrinsic, intuitive process.

Gerstberger and Allen[25] have reported what might be termed a strategy for information search based on Zipf's "law of least effort."[26] In studying the criteria used by research and development engineers in selecting information

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[24]I. L. Goldstein, J. T. Emanuel, and W. C. Howell, "Effect of Percentage and Specificity of Feedback on Choice Behavior in a Probabilistic Information-processing Task," Journal of Applied Psychology, 52:163-8, 1968.

[25]P. G. Gerstberger and T. J. Allen, "Criteria Used by Research and Development Engineers in the Selection of an Information Source," Journal of Applied Psychology, 52:272-9, 1968.

[26]G. K. Zipf, Human Behavior and the Law of Least Effect (Cambridge: Addison-Wesley, 1949).

sources, they concluded that the principal criterion seemed to be not the maximization of gain, but the minimization of loss (i.e., cost in terms of effort expended to gain access to the information channel).[27] Some of their other major conclusions which seem to parallel elements of the personnel selection process were:

1. Accessibility is the single most important determinant of the overall extent to which an information channel is used.
2. Both accessibility and the perceived technical quality influence the choice of the first information source.
3. Perception of access is influenced by experience. The more experience an engineer has with a channel, the more accessible he perceives it to be.[28]

A number of other variables have also been examined to determine their influence on the information-gathering and processing behavior of decision makers. Lanzetta and Kanareff examined the effects of information cost, amount of payoff, and level of aspiration of subjects' pre-decisional search behavior. The major findings of this study were:

1. In none of the experimental conditions did a majority of the subjects obtain all of the

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[27]Gerstberger and Allen, op. cit., p. 277.

[28]Ibid., p. 279.

information available to them. This result is especially surprising for the zero cost conditions.

2. The mean number of queries per trial decreased as the cost-payoff schedule increased. Subjects made their decisions on the basis of less information when information was costly even though, in terms of expected profit, the risks were the same for all cost conditions.

3. The mean number of queries per trial decreased as time pressures increased, as did the average time spent in making queries. In general, as time pressures increased, subjects accelerated information processing more than deliberation over the choice of an alternative.[29]

Miller and Lanzetta examined the effects of uncertainty and uncertainty reduction measures on information acquisition. They found that subjects appeared to have a "commitment threshold" for decision making: they acquired information until they reached their threshold, at which point they made a decision. The commitment threshold seemed to be a function of the level of initial uncertainty and the rate of uncertainty reduction.[30]

Sieber and Lanzetta examined the effects of problem (stimulus) uncertainty and importance on the amount of information search and time involved in such search. They also examined the effects of the conceptual structure of the

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[29]J. T. Lanzetta and V. T. Kanareff, "Information Cost and Level of Aspiration as Determinants of Information Seeking in Decision Making," Behavioral Science, 7:212-4, 1962.

[30]L. Miller and J. T. Lanzetta, "Choice Among Four Alternative Gambles as a Function of Monetary Level of Play," Psychological Reports Monograph Supplement, 6:893, 1962.

decision maker (e.g., concrete vs. abstract) on the decision process. The major findings were:

> 1. The amount of search and time spent processing information after each response were monotonically related to problem uncertainty and importance.
>
> 2. Abstract oriented persons engaged in more search, gave more information with their decisions (assumed to be a measure of the amount of new information generated), and more frequently qualified their decisions (assumed to be indicative of conflict over response alternatives).[31]

Edwards summarized the findings of three experiments[32] which indicate that the classical notion of expected value maximization is incorrect in predicting the information search strategies of subjects. These studies found: (a) large and consistent individual differences in strategies; (b) sensitivity of strategy to manipulations of costs, payoffs, and probabilities; and (c) a general tendency to seek too much information.[33]

The important point to be drawn from these various experiments is that--from a behavioral standpoint at least--

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[31]J. E. Sieber and J. T. Lanzetta, "Conflict and Conceptual Structure as Determinants of Decision Making Behavior," Journal of Personality, 32:641, December, 1964.

[32]Ward Edwards, "Probability Learning in 1000 Trials," Journal of Experimental Psychology, LXII (1961); Edith Niemark, "Information-Gathering in Diagnostic Problem Solving: A Preliminary Report," Psychological Record, 11:243-8, 1961; and J. T. Lanzetta, unpublished manuscript.

[33]Edwards, "Dynamic Decision Theory and Probabilistic Information Processing," op. cit., p. 63.

individual information-processing strategies frequently, if not always, are at variance with most prescriptive statistical models that have been developed.

Contributions of the Study

The study reported here builds upon these earlier studies and incorporates some of the variables and significant findings presented in them. At the same time, this study makes a unique contribution in the following areas:

First, the simulated situation which provided the setting for the experimental task was a well-developed, complex decision situation which provided a realistic representation of a selection decision situation. It was assumed that this situation enhanced the commitment of the subjects to the tasks of the experiment and therefore provided a reliable measure of their performance in an actual decision situation.

Second, the study was designed in such a manner as to permit the effective utilization of a dynamic decision situation for the experiment, rather than the static tasks frequently utilized in these studies.

Third, the development of the computer-based information storage and retrieval system and its application in a selection decision situation--which was an adjunct to the simulated situation--provided a means of handling and recording the complex information-processing behavior of

individuals as it occurred. Likewise, such an application demonstrated the feasibility of such a technique in an actual selection situation, an area of application which has lagged in the implementation of computer-based aids to complex decision making.

Finally, the study utilized variables which have been shown to be key components of search behavior, and went beyond most previous studies by analyzing the effects of varying conditions on individual search behavior and attempting to classify these behaviors into strategies. Such a classification scheme should facilitate the prediction of information-processing behavior and permit further study of the complex relationship between information processing and decision making, especially in terms of the bit-incremental process of the mixed-scanning model described above.

Summary

Review of the literature in the fields of information theory and decision making has established the following significant points:

1. From a behavioral standpoint, individual strategies of information processing frequently are at variance with prescriptive models of the decision process.
2. The incremental decision model represents, intuitively at least, a viable approach to the

descriptive and experimental study of the decision process which occurs in teacher selection, including the pre-decisional aspects related to information gathering and processing.

3. The interrelationship which exists between pre- and post-decisional processes--and the decision itself--is extremely complex and indicative of the futility of studying either element in the absence of the other.

4. Human organisms have stringent limitations upon their ability to process information. These limitations substantiate the importance of information processing and evaluation strategies to the efficacy and efficiency of the decision making process.

5. The experimental situations have frequently involved simplistic decision tasks which give rise to a concern regarding the subjects' commitment to (and therefore performance of) the task. If this concern is valid, then misgivings arise concerning the generalizability of the results of some previous studies and the fidelity of the experimental situations to actual decision tasks.

6. There are a number of variables which have been shown to affect both information processing and

decision making under a variety of experimental conditions (e.g., cost, information quality, payoff, level of uncertainty, etc.). However, no comprehensive effort has been made to relate the results of a study to the formulation of a generalizable strategy for the processes of information search and utilization.

These points provided the basis for the focus and the design of this study. The following chapter describes the methodology utilized in implementing that design.

CHAPTER III

RESEARCH METHODOLOGY

Statement of Purpose--Introduction

The purpose of this study was to make possible an improvement in the reliability and validity of the teacher selection process by clarifying the relationship between the information base of the decision maker and his decisions, especially the strategy used in the selection and processing of information. An experiment was conducted in a simulated teacher selection situation, utilizing a fully randomized 3 × 3 fixed effects factorial design.[1] It was hypothesized that two variables (a) information cost, and (b) risk involved in the decision, affected the manner in which administrators search for, and utilize, written information in making a teacher selection decision. The variables in this study are summarized in Table 3.1, page 37.

While the criterion measures were of concern in the experiment, the focus of the investigation was primarily upon the post hoc combination of these measures into a generalized pattern which could be considered a strategy for information search in making a teacher selection decision.

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[1]Allen L. Edwards, Experimental Design in Psychological Research (revised edition; New York: Holt, Rinehart and Winston, 1960), Chap. 12, pp. 175-198.

TABLE 3.1

VARIABLES IN THE STUDY

Independent Variables	Dependent Variables
1. Cost of Information a. High b. Medium c. Low	1. Average Time per Applicant
	2. Information Selectivity
	3. Proportion of Available Information Used
2. Risk Involved in Decision a. High b. Low c. Variable	4. Specificity of Search Pattern
	5. Certainty a. Tentative b. Final

Population and Sample

The population for this study was defined as the elementary school principals in the three county region comprising the Seattle Metropolitan Area for the 1968-1969 academic year. The parameters of this population were the principals of all elementary schools in districts in the region which met the following criteria:

1. The district consisted of at least five elementary schools, each one with a full time principal.
2. The district's principals did not participate in the previous teacher selection study conducted by the University of Washington.[2]

These criteria were selected (a) because it was apparent from previous surveys in this area that smaller districts seldom had occasion to utilize elementary principals in the teacher selection process; and (b) in order to preclude the possibility of a test effect, since some of the materials and simulation techniques used were similar to those in the previous experiment.

The sample of eighty-one principals was drawn at random from the population using Edwards' table of random numbers.[3] The complexity of data collection and the

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[2]Dale L. Bolton, Variables Affecting Decision Making in the Selection of Teachers, United States Office of Education, Bureau of Research, Final Report, Project No. 6-1349, August, 1968, p. 8.

[3]Edwards, op. cit., pp. 332-6.

limitations of facilities available for the task led to the decision to limit the cell size for the nine experimental treatments to nine subjects. This cell size provided an n of twenty-seven for each level of the main effects and it was considered that an n of nine would be adequate for interpretation of the one possible interaction between the two independent variables.

Once the principals were randomly selected, the district superintendent was contacted and advised of the purpose of the study and the principals from his district who had been selected at random. He was asked to allow their participation in the study. Of all the districts contacted only one did not agree to participate. Since this represented only a very few of the subjects initially contacted for the study, and since an adequate number of extra subjects had been drawn in the sample, those subjects from this district were excluded from the sample. Except for this limitation, the subjects represent a randomly selected sample from the total population of elementary principals in the three county area, subject to the two stipulations previously described.

The rationale underlying the selection of elementary school principals for sampling in this study was that, more than ever before, this group is being utilized in the process of teacher selection. Since this represents probably the largest single group which is actively involved on a part

time basis with teacher selection, the quality of their selection processes must be a concern of administrators. In addition, by utilizing subjects from this population, it was hoped to enhance their performance in the decision task, since the task was a relatively familiar and meaningful one for them, although it was a simulation of the actual situation.

Experimental Situation and Task

The simulated situation employed in this study consisted of two elements: (a) a fictitious community and school district, which provided the setting in which the experimental task took place; and (b) a computer based information storage and retrieval system containing data on five fictitious applicants for a vacant teaching position in the district.

Simulated situation. The setting for this study was a teacher selection situation in a simulated school district, which was created for a previous teacher selection experiment.[4] The materials from that study which were modified as necessary for use in the present study included the following:

1. A presentation describing the community, the district, the school and the vacancy. This

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[4]Bolton, loc. cit.

presentation consisted of an audio tape description, augmented by color slides illustrating the narration on the tape.

2. Credential information on fictitious teacher applicants, from which the data on the applicants used in this study were derived.

Details concerning the development of the original materials can be found in the final report of the project referenced above.

Information retrieval system. A unique element of this simulated decision situation was the utilization of an information retrieval system which consisted of a shared time computer system and six on-line remote terminals. The data retrieval system was programmed so that fifty items of information on each of five applicants could be stored. These items were typical of those found in teacher credentials. A complete listing of these items can be found in Appendix A, which is the Applicant Information Catalog provided the subjects. These items were accessible to the subjects through six ASR 34 teletype consoles by typing in an access catalog number corresponding to the information wanted on a given applicant. These numbers were listed and identified in an information catalog provided each subject. Immediate feedback of the desired information was printed. Appendix B is a sample of the input and output from one

subject's task. The order of listing of the fictitious applicants was randomly varied using a table of random numbers to preclude any order effect. In addition, the system was programmed to gather the measures for the dependent variables.

It was recognized that, at present, a system such as this was not typical of the selection processes now in use and therefore the situation is not a totally realistic representation of a teacher selection situation. However, it was felt that the use of this system was justified on two grounds:

1. It provided a means of obtaining explicit measures of the dependent variables while the subjects' decision processes are taking place, rather than requiring subjective post hoc self analysis by the subjects, a notoriously unreliable measure.
2. Such a system will, in all probability, become a common part of selection decisions as progress continues in developing systematic approaches to complex administrative processes.

Experimental task. The subjects were scheduled in groups of six and individuals were randomly assigned to the nine treatments. The experimental procedure was as follows.

First, all Ss completed a short personal data form.

Second, the Ss were given a general orientation to the experiment and an explanation of the tasks involved.

Third, the Ss were provided instructions on the operation of the teletype system. Since they were only required to type out a maximum of five characters at a time, typing ability was not a requisite and it was felt that this was not an intervening factor in the Ss performance.

Fourth, the Ss were provided information on the hypothetical teaching position via the slide-tape presentation described above.

Fifth, Ss received printed materials detailing the treatment conditions under which they would be performing the tasks. In addition, each S received an information catalog and a printed summary of the tasks required of him.

Sixth, general questions were then answered and the Ss proceeded with their assigned tasks. The tasks each S performed involved the following activities:

1. The S gathered whatever information he desired from that available within his treatment limitations.
2. After reviewing the information on the first two applicants, (i.e., at the first possible decision point) the S made a tentative decision among the applicants considered to that point. This decision consisted of ranking the applicants in terms of their suitability for the

situation and then indicating the degree of certainty felt at that point about the "correctness" of his decision. This was repeated as each additional applicant was considered.

3. Once the task was terminated, the S made a final ranking of all five applicants and again indicated his degree of certainty, and this concluded the experiment. The task could be terminated in one of three ways: (a) when an S had utilized all information items on all five applicants; (b) when an S exhausted the budget he had to purchase information; and (c) when he indicated he wished to make a final decision, even though he had budget remaining.

The most obvious limitation of the experimental task in terms of the accuracy with which it simulated a real situation is the absence of a personal interview, which, regardless of its untested validity, is a sine qua non of the selection process for most administrators. Until some means is available of providing an interview situation that can be reliably measured across a number of observers--in the same explicit manner utilized in this study--its inclusion in the experiment seems inappropriate. It is recognized, therefore, that conclusions drawn from this study pertain only to the processing of written information in selection, and no attempt is made to generalize to the

clinical aspects of the process.

Independent Variables

The two independent variables in this study, cost and risk, were selected because they have been shown in the research literature to comprise important constraints upon the behavior of decision makers during pre-decisional information search. While there are perhaps other variables deserving of consideration (e.g., personality characteristics), these were selected because they represent external constraints upon the decision maker's behavior, rather than psychological components of that behavior.

Cost. The cost variable in this study was intended to reflect variability in the cost of information to the decision maker. It has been found in previous studies that this variable is a determinant of any information search process and it therefore seems implicit that it likewise is integral to the formulation of an information search strategy.

Dunnette[5] and others have indicated that much more than the mere dollar cost of the information gathering process is involved, although these other costs are more difficult to estimate. Most previous research utilizing a cost variable has applied differential costs per unit of information to

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[5]M. D. Dunnette, Personnel Selection and Placement (Belmont, California: Wadsworth Publishing Co., Inc., 1966), p. 71.

subjects in different treatment categories. However, in the teacher selection process information on applicants is usually available at uniform cost for all who desire it (viz., from the college placement office); consequently, such differentiation in this experiment seems unrealistic.

It is recognized that certain aspects of the selection process are more expensive than others: the personal interview and checking of references, for example, involve considerably more time than is usually spent on processing of written information. In the case of the written information used in selection, however, both the nature of the information and its cost are relatively constant from one situation to another. The focus of this study was solely upon the information search processes involved in obtaining and utilizing written information.

The cost variable was operationalized by forcing the Ss to purchase information item-by-item at a uniform cost and then manipulating the budget which each S had available to purchase information. It was recognized that no districts actually apportion funds specifically for procurement of information on teacher applicants. However, such apportionment does occur in all situations if one considers such elements as the number of individuals involved in selection, the scope of the process, and the nature of the selection ratio. For example, a district which utilized ten people full-time in selecting teachers is obviously committing more

funds to that aspect of the process than a district which involves only one or two persons on a part time basis. This variable, then, is intended as an indicator of cost variation in selection, recognizing that this variation emanates from a number of less directly measurable sources.

There were fifty items of information available on each of five applicants, or a total of 250 information items. Each item of information cost ten dollars, an arbitrary amount. The cost variable had three levels:

1. High cost: a budget amount sufficient to purchase only one-fourth of the total information items available (i.e., $630 = 63 items).
2. Medium cost: a budget amount sufficient to purchase only one-half of the total information items available (i.e., $1250 = 125 items).
3. Low cost: a budget amount sufficient to purchase all of the information items available (i.e., $2500 = 250 items).

The subjects were allowed to expend their budget in any manner they wished and were not required to expend all of it if they did not desire to do so. However no advantage was gained in saving any of the budgeted amount, so this was assumed not to operate as a constraint on the expenditure of funds. This expenditure was a "paper transaction" only and did not involve actual exchange of money. The information retrieval system kept track of the Ss budget and deducted

the appropriate amount each time he selected an item of information. The S could obtain a summary of his expenditures and remaining budget at any time merely by querying the system.

Risk. The risk variable in this study was directly related to the decision to be made, as well as to the constraints operating on information search and processing. In teacher selection, two common elements of risk are the time of year the decision is made (e.g., a decision made in June is high risk because presumably most of the "better" applicants have already obtained employment) and the nature of the supply of applicants available (e.g., the number of applicants available determines the number of alternatives the decision maker can consider). This study combines these two constraints into a single risk variable with three levels:

1. High risk: Time of year May 15th and the supply of applicants scarce.
2. Low risk: Time of year March 1st and the supply of applicants was plentiful.
3. Variable risk: As the subject began the experimental task, he was placed in the low risk condition. However, upon completion of consideration of the first two applicants he was advised that the situation had changed and

he was then placed in the high risk condition for the remainder of his task.

The manipulation of both independent variables was accomplished by means of individual written instructions provided Ss prior to beginning the task. The text of these instructions is contained in Appendix C.

Dependent Variables

The dependent variables in this study were selected because of their postulated relationship to the information search strategy of the decision maker in a teacher selection situation. The time, preference, amount of information, and changes in type of information measures described below were assumed to be the principal components of this strategy, while the certainty measure provided a basis for obtaining a measure of the subjective optimality of the strategy for the decision maker.

Time. The time variable in this study consisted of the average time required to consider an applicant. Time involved in teacher selection represents a major portion of the costs associated with the selection process. A limitation of this measure is that it fails to distinguish between time spent obtaining information, time spent considering each information item, and time spent deliberating over the total information prior to making a decision. These processes are interrelated in an extremely complex manner and the design

of the study did not permit more precise differentiation.

Information selectivity. This measure was designed to obtain information regarding the types of information that subjects selected and presumably utilized in making decisions. The fifty items of information available on each applicant were typical items available in most written credentials. These items were divided into six logical categories according to the type of information each contained (see Appendix A). The preference of Ss for each of the information categories was determined as follows:

1. An Expected Preference ratio was determined for each of the information categories as follows:

$$E = \frac{t_i}{t_a}$$

where E = expected preference

t_i = total number of information items contained in ith category

t_a = total number of information items available

Since both t_i and t_a were predetermined, E was a constant for all Ss. This ratio was seen as reflecting the number of choices a S could be expected to make from a given category through totally random selection, that is, with no preference for any given category.

2. An Actual Preference ratio was determined for each of the information categories for each S as follows:

$$A = \frac{t_{c_i}}{t_s}$$

where A = actual preference

t_{c_i} = total number of information items chosen from the ith category

t_s = total number of selections made from all categories

3. A deviation score (D), was computed for each category for each subject as follows:

$$D = A - E$$

where D = the degree of deviance from "no preference" in choosing among categories.

The interpretation of the D-scores was as follows:

1. A negative D meant the actual preference was less than expected preference
2. A positive D meant the actual preference was greater than expected preference.
3. A D-score of zero indicated actual preference was equal to expected preference.

Proportion of available information utilized. This measure consisted of the ratio of the total number of items chosen to the total number of items available for that treatment. It was anticipated that not all subjects would call for all items of information available, even if their

budget allowed it. Knowledge of the conditions under which this occurred was seen as being important to understanding information search behavior.

Specificity of search pattern. In analyzing written information on teacher applicants, two alternatives exist for decision makers as far as their pattern of information search is concerned:

1. They may consider the information in the sequence in which it occurs, regardless of the relevance and priority of the items to their decision.
2. They may be selective in considering information items and consider first those items which they consider important and/or reliable evidence upon which to base their decision.

For the first alternative, the format of the placement credentials generally determines the priority with which attention is focused on the various information items. For the latter alternative, previous experience with given items or types of information is the primary determinant of priority.

One method of measuring this specificity of search pattern is to examine the information items which a decision maker selects and observe the frequency with which his choices do not follow the format sequence. Such a measure, being indirect, does not imply any value judgment regarding

the efficiency or effectiveness of the selection process, but is merely descriptive of the process that takes place.

Because the format of information in this study had already been organized into general content categories (see Appendix A), it was assumed that the pattern of information search would already be more specific than for typical written documents. This assumption was based on the fact that (a) there was less redundancy in the fifty information categories than is found in written documents, and (b) the information was presented in a more parsimonious manner (e.g., reduction to scalar form) than in written documents. Although this was expected to be a limiting factor for this measure, it was nevertheless felt that such a measure was still a necessary component of search strategies.

The measure of specificity consisted of the number of changes between information categories made by the subject in selecting successive items of information. For example, a subject who systematically selected all the items he wanted from Category I, Educational Training, then went to Category II, Experience, and so forth through all six categories for all five applicants would have made a total of twenty-five changes in the categories of information sought. On the other hand, a subject who selected a few items from Category I, then went on to several items in Category II, back again to I, etc., would compile a much higher change score, reflective of the frequent switching behavior evidenced in

his search pattern. For purposes of this study, the higher change score reflects greater selectivity in search pattern.

Certainty. The measure of certainty consisted of asking the subject to indicate the extent to which he felt that his decisions (rankings of the applicants) were "correct" (i.e., that the applicant ranked first was the best, etc.). The Ss were required to indicate their degree of certainty after each decision made. Tentative decisions were made at three points in the task, namely, after the second, third, and fourth applicants, with the S ranking one more applicant each time. These were presented to the Ss as tentative decisions, reflecting only their preference for the applicants based on impressions to that point. After each of these tentative decisions, the Ss indicated their certainty by entering a number between one and ten (low to high) which reflected the degree of certainty they felt. After all five applicants were considered, Ss were asked to make a final ranking and a final indication of certainty.

The two certainty measures used in this study consisted of the average certainty score for the three tentative decisions and the final certainty score for the final decision. It was expected that these two measures would reflect different information, since the tentative decisions were based more upon impressions gained in the process of information gathering and were the result of little

deliberation and reflection upon the total information gathered. The final decision, on the other hand, came after opportunity to spend additional time analyzing and synthesizing the data available on all five applicants and would conceivably represent the considered judgment of the Ss.

Control Variables

Selection situation. The design of the simulated situation in which the experimental task took place was such that all aspects of the situation for which the selection was to be made were constant in all treatments. Therefore the district, the vacancy itself, the nature of supervision, etc., were not a source of variance among treatments.

Information available. The categories of information and the specific information items available on each applicant were the same, although the actual content was varied to produce five ostensibly different applicants. The design of the applicant information was carefully controlled to assure homogeneous quality among applicants so as to avoid the "obvious" exclusion of any applicant thereby requiring greater discrimination among the applicants and creating a more difficult decision task for the Ss. The details and rationale underlying the development of the fictitious applicants are contained in the research study by Bolton.[6]

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[6]See Bolton, op. cit., p. 18; and Appendix D.

Independence of decisions. All subjects responded to the decision task independently of one another and under similar environmental conditions. Ss were oriented to the situation and the task in small groups and this was done by tape recording and 35 mm slides to assure consistency of presentation.

Motivation of subjects. All subjects were advised of the role which they were to assume in the simulated situation and the importance of their commitment to that role. Every effort was made in the design of the task and the instruction of the Ss to provide an interesting and meaningful task which enhanced their performance and promoted the reliability of the results. Reactions of the Ss during subsequent debriefing sessions indicated that the experimental task was highly successful in maintaining their interest and their commitment.

Hypotheses to be Tested

Two independent variables, (a) the cost of information, and (b) the risk involved in the decision, were tested using a 3 × 3 factorial design. The hypotheses for main effects were:

Hypothesis 1: The cost of information and the risk involved in a decision have a direct effect upon: (a) information selectivity, (b) proportion of available information utilized, and (c)

specificity of information search.

Hypothesis 2: The cost of information will have a direct effect on the certainty felt by the decision maker regarding the decision made.

Hypothesis 3: The cost of information will have an inverse effect on the average time required to consider applicants.

Hypothesis 4: Risk will have a direct effect on the average time required to consider applicants.

Hypothesis 5: Risk will have an inverse effect on the certainty felt by the decision maker regarding the decision made.

Design of the Study

The design for the experiment was a completely randomized 3 × 3 fixed model treatment arrangement, with measures on five dependent variables. The subjects were randomly assigned to each of the nine treatment conditions.

The usual assumptions of higher order fixed model factorial experiments were made, including the assumption of the additivity of the factorial effects and the experimental error, and the assumption that the error term is normally distributed and independent of the treatment variables.[7] A 3 × 3 factorial analysis of variance design was chosen to

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[7]B. J. Winer, Statistical Principles in Experimental Design (New York: McGraw-Hill Book Co., 1962), Chap. 5.

best accommodate the analysis of data. For each analysis of variance all hypotheses for main effects and interactions were tested.

Since a major concern of this study was the manner in which the dependent measures combined to form strategies of information search, post analyses of treatment means were conducted to determine the source of significant variance. All post analyses were conducted using a Newman-Keuls test.[8]

Selection of Alpha Level

Harris has indicated that, in much educational and psychological research, the decision rules adopted for significance tests are usually quite arbitrary and conventional: "The typical practice clearly is to be concerned primarily with Type I errors, choosing α as .05 or .01, and to allow the probability of a Type II error to be a function of other factors in the experiment."[9]

Likewise, estimating the relative importance of either type of error in terms of a meaningful analysis is a difficult task. Winer has pointed out that in exploratory research--particularly in the behavioral sciences--both types of error may be equally important. Too much emphasis has

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[8] Ibid., pp. 80-85.

[9] C. W. Harris, "Statistical Methods," Encyclopedia of Educational Research, R. L. Ebel, editor (fourth edition; New York: The Macmillan Co., 1969), p. 1312.

been placed upon the level of significance of a test and far too little emphasis upon the power of the test.[10]

The decision to be made in selecting the alpha level is one of how much weight one places on errors of the two types. Guilford has stated:

> The overly cautious scientist abhors the error of type I more than that of type II. He wants to be very sure that his finding is not due to chance. The conventional choice of alpha as small as .05 and .01 is evidence of the caution exercised by most investigators against making a type I error. Such decisions on choice of alpha are almost always made without consideration for beta. The result of too much caution, and very small alphas, is that relatively few nonchance conclusions are drawn and few differences and relationships are accepted as "established".[11]

If the situation for this experiment were ideal, the design would provide adequate power for any predetermined level of significance. However, since this experiment was both exploratory in nature and conducted in a simulated, but not an ideal, situation, it was decided that type I and type II errors were of equal significance. To provide a more sensitive test of the hypotheses, the level of significance was set at .10.

The limitations of these decisions with reference to freedom from error are acknowledged. However, Winer has

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[10]Winer, op. cit., pp. 12-13.

[11]J. P. Guilford, Fundamental Statistics in Psychology and Education (fourth edition; New York: McGraw-Hill Book Company, 1965), pp. 206-7.

stated the rationale upon which these decisions were predicated:

> The evidence provided by a single experiment with respect to the truth or falsity of a statistical hypothesis is seldom complete enough to arrive at a decision which is free of all possible error. The potential risks in decisions based upon experimental evidence may in most cases be evaluated. What the magnitude of the risks should be before one takes a specified action in each case will depend upon existing conditions. The data from the statistical test will provide likelihoods associated with various actions.[12]

Limitations of the Study

There are a number of limitations in the design of this study which are alluded to in the course of this report. To preclude the possibility that they be overlooked and to make them explicit to the reader, they are summarized here:

First, the study is a simulation of a real decision situation and as such is a behavioral model of the constraints operating in a real decision situation. This fact has implications for two elements of this experiment, (a) the simulated situation in which the task takes place, and (b) the decision task itself.

The simulated situation consisted of a hypothetical town, school district, and a school in which a vacancy exists for a fourth grade teaching position. By providing subjects with detailed information about this situation and requiring

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[12]Winer, op. cit., p. 13.

them to make their selection decisions in terms of this fictitious situation, it was intended to control the variance due to situational differences in the subjects' backgrounds. Obviously, the strength of the subjects' identification with this situation becomes a factor in the quality of their performance, but this was not measured in this study and was assumed to be controlled by randomization.

The decision task involved was designed to re-create variables operating on the decision processes of elementary school principals in a teacher selection situation. The extent to which this was accomplished would influence performance on the decision task. The basis for design of the independent variables was threefold: (a) review of the pertinent research; (b) discussions with personnel administrators and others involved in the selection process; and (c) intuitive judgments on the part of the experimenter regarding the operation of these elements in an actual decision situation.

Second, the focus of the experiment was upon the processing of written information only and it may be that separating this aspect from the clinical elements may artifically bias the process in some manner. However, the multidimensionality of the total process of teacher selection would seem to necessitate--initially at least--an analysis of the discrete processes involved before designing studies

to examine the details of their interaction, especially if one considers the relative imprecision of knowledge about the interview process as it operates in teacher selection.

Third, the format of the information used in this study was unique in two respects. First, the information was taken from that developed in a previous study[13] and was in a single document format, as opposed to the typical multiple document format now in general use. Second, the information was presented to subjects via a computer based information storage and retrieval system. The experience of utilizing this system was a unique one for all subjects. No attempt was made to assess differential effects of these two novel elements upon subjects, as it was assumed that the novelty would effect all participants randomly.

Fourth, there was no constraint upon the use of budgeted funds for information search which either promoted or discouraged utilization of those funds. It may be that, since there was no reward for conserving funds (i.e., they were not returned to subjects), the subjects may have been more liberal in obtaining information than would actually be the case. This situation may be atypical of an actual situation, since usually budgeted funds not used may be used subsequently. Whether this promoted increased spending by

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[13]Bolton, loc. cit.

the subjects is not known, but its effect was assumed to be negligible, since it was counterbalanced by a lack of incentive for spending funds.

Finally, the nature of the computer executive program which operated the information system imposed one major constraint upon the search pattern of the subjects. Although he could select any information item at random for any applicant, once he began gathering information on a given applicant he had to obtain all the information he wanted before moving on to the next one. Once he moved on, the system would not permit him to go back and gather additional information on the previous applicants. This precluded a subject from employing the strategy of taking a given item of information--grade point average, for example--and comparing it on all applicants, then taking the next item, comparing it, etc. However, such a strategy is probably extremely rare in actual practice (but not necessarily without merit, if one is looking for specific criteria) according to interviews with personnel directors conducted by the researcher. It was decided that the scope of this limitation was not sufficient to justify the substantial increases in both program and equipment necessary to circumvent this limitation.

While it is considered that none of these limitations is a major detriment to either the design of the study or

its results, readers should be aware of them and the implications they have for interpretation and generalization of the results beyond the scope of this study.

Summary

A multiple classification analysis of variance design was used for treatment of the data on the dependent variables. Since a major concern of the study was the combination of the dependent measures into strategies of information search, post hoc analyses were made utilizing Newman-Keuls tests to isolate sources of variation among treatment groups.

The independent variables manipulated in the simulated situation for this experiment were (a) cost of information, and (b) risk involved in the decision. Dependent measures consisted of (a) time, (b) information selectivity, (c) proportion of available information utilized, (d) specificity of search pattern, and (e) certainty. Hypotheses were tested for all main and interaction effects on the five dependent measures.

The data for this experiment, which were collected in April and May, 1969, are presented in Chapter IV.

CHAPTER IV

RESULTS AND FINDINGS

This section of the manuscript reports the results of this study in two parts. The initial section reports the results of testing the hypotheses for main and interaction effects and the application of the Newman-Keuls procedure to test the differences between means where significant main or interaction effects were found. The second section reports the results in terms of the relationships evidenced between the four dependent variables postulated to comprise the information strategies of the decision makers, namely, (a) time, (b) selectivity, (c) proportion of information utilized, and (d) specificity of search.

Hypotheses Tested

A 3 × 3 factorial design of the study provided for testing hypotheses for all main effects and interactions between the two independent variables, cost and risk. However, five specific alternative hypotheses were of particular concern in this experiment (see Chapter III, pp. 56-57). Summaries of the F tests employed for testing the five hypotheses are presented in tables in the following subsections. The hypotheses presented as questions to be answered in the study are discussed in terms of the analysis of data and subsequent statistical tests applied to determine

significant differences. Treatment group means for all measures will be found in Appendix C.

Direct Effects of the Cost and Risk Variables: Hypothesis 1

The hypothesis tested in this section was:

> The cost of information and the risk involved in a a decision have a direct effect upon: (a) information selectivity, (b) proportion of available information utilized, and (c) specificity of information search.

Because of the diversity of the dependent measures, separate analyses are reported in the following sub-sections. The analyses are then discussed in reference to the testing of that portion of the research hypothesis.

Information selectivity. This measure was designed to reflect subjects' preference for certain types of written information regarding teacher applicants. The information items available were divided into six broad categories which reflected the typical content of written credentials (see Appendix A). Although it would have been possible in this study to obtain measures on the specific items preferred, this was not done since, in the opinion of the investigator, this would have implied a value judgment regarding the worth of the items used, and thus would be outside the scope of this study. The information items used in the study were merely typical, and in no way ideal examples of information

items necessary to sound teacher selection.

The results of this measure are reported in terms of the extent to which subjects' actual preference for each of the six information categories compared to the expected random frequency of choice from that category, which was based on the probability of an item being selected in relation to the frequency with which that type of item appeared among the total fifty items available. The results are reported as deviance scores (D scores) which are interpreted as follows:

1. A negative D score indicates that actual frequency of choice from the information category was less than expected random frequency.
2. A positive D score indicates deviation in excess of expected frequency.
3. A D-score of zero indicates the actual and expected random frequencies of choice were equal.

The results of the analysis of the D-scores on the six sub-measures are summarized in Table 4.1.

The cost treatment variable was found to have a significant main effect upon the selectivity of subjects with regard to the following information categories: (a) Category I, Educational Training, (b) Category II, Professional Information, (c) Category III, Background Information, (d) Category IV, Personal Information, and (c) Category VI, References. The level of significance for Category V, Personality and

TABLE 4.1

SUMMARY OF ANALYSIS OF VARIANCE OF COST AND RISK ON THE INFORMATION SELECTIVITY MEASURE FOR SIX INFORMATION CATEGORIES

Source of Variation	Sum of Squares	d.f.	Mean[a] Square	F Ratio[b]
I Educational Training				
Cost	.048	2	.024	5.165***
Risk	.002	2	.001	
C X R	.025	4	.006	1.335
ERROR	.337	72	.005	
II Professional Information				
Cost	.009	2	.004	2.415*
Risk	.002	2	.001	
C X R	.015	4	.004	2.015
ERROR	.138	72	.002	
III Background Information				
Cost	.045	2	.022	5.327***
Risk	.003	2	.001	
C X R	.019	4	.003	
ERROR	.302	72	.004	
IV Personal Information				
Cost	.046	2	.023	7.010***
Risk	.005	2	.003	
C X R	.005	4	.001	
ERROR	.236	72	.003	
V Personality and Behavioral Characteristics				
Cost	.002	2	.001	
Risk	.001	2	.001	
C X R	.003	4	.001	
ERROR	.322	72	.005	
VI References				
Cost	.017	2	.009	5.472***
Risk	.001	2	.001	
C X R	.003	4	.001	
ERROR	.114	72	.002	

*significant at .10
**significant at .05
***significant at .01

[a]values are rounded to three decimal places

[b]F ratios less than 1.0 are not presented

Behavioral Characteristics, was insufficient to accept the alternative hypothesis with regard to that dependent sub-measure at the .10 level. A Newman-Keuls procedure was used to test the significance of differences between treatment means for the five significant analyses of variance and substantiated the source of variation as the high cost treatment category in all five categories.

The application of the F test and the subsequent analyses of treatment means by Newman-Keuls procedure led to the decision to accept the alternative hypothesis for Categories I, II, III, IV, and VI. The alternative hypothesis was rejected with regard to Category V with alpha equal to .10. These results indicate that population means differed significantly for subjects in the three treatment levels on selectivity among five of the six information categories and that the direction of the differences was in direct proportion to the cost of information.

The main effects of the risk treatment variable on all six information categories comprising the sub-measures on this criterion were not significant with alpha equal to .10. The appropriate decision dictated by the F tests was to reject the alternative hypothesis for the effect of risk on information selectivity. Subjects in this study seemed to be unaffected in their preference for certain types of information by the operation of a risk variable as designed in this experiment.

The interaction between the two treatment variables was not significant for any of the six sub-measures with alpha equal to .10.

Proportion of available information utilized. This measure was designed to assess the proportion of information available to each of the treatment groups which that group utilized in making the selection decision. Since all items were potentially available to every subject regardless of the treatment (the variability was in the number of items the subject could select), the unit of measurement was the proportion of the available information used to that available for the treatment. The analysis of variance summary is reported in Table 4.2

TABLE 4.2

ANALYSIS OF VARIANCE FOR THE EFFECT OF COST AND RISK ON PROPORTION OF AVAILABLE INFORMATION UTILIZED

Source of Variation	d.f.	Sums of Squares	Mean Square	F
Cost	2	1.15142	.57571	18.63509*
Risk	2	.03995	.01997	
C X R	4	.15767	.03942	1.27592
Within Cells (error)	72	2.22435	.03089	
Total	80	3.57338		

*significant at .01

The cost treatment variable had a significant main effect upon the proportion of information used. Post-analysis of the treatment means by Newman-Keuls procedure revealed that a significant difference existed between the low cost treatment and both of the higher cost treatment groups. Based on these analyses, the decision was made to accept the alternative hypothesis with respect to this measure. The results indicate that the subjects utilized differential proportions of available information under the differing levels of the cost treatment.

The main effects of the risk variable were negligible for this measure with alpha equal to .10, leading to the decision to reject the alternative hypothesis as far as the main effects of risk on proportion of information were concerned. The interaction between the two independent variables was not significant with alpha equal to .10.

Specificity of search. Cost was hypothesized to have a direct effect upon this measure. The results of the analysis of variance are reported in Table 4.3, page 72, and reflect a significant main effect for cost.

The Newman-Keuls procedure was applied to treatment means for the cost variable and indicated no significant difference between the high cost and the low cost treatments, but a significant difference ($q_{.99}$) between these two means and the medium cost treatment. Since this relationship

TABLE 4.3

ANALYSIS OF VARIANCE FOR THE EFFECT OF COST AND RISK ON SPECIFICITY OF SEARCH PATTERN

Source of Variation	d.f.	Sums of Squares	Mean Square	F
Cost	2	613.80225	306.90112	2.75576*
Risk	2	339.65430	169.82715	1.52493
C X R	4	198.49382	49.62344	
Within Cells (error)	72	8018.43359	111.36713	
Total	80	9170.38281		

*significant at .10

appeared curvilinear, a trend analysis was conducted and revealed that the quadratic trend of the means was significant at the .05 level. Since cost did not evidence the predicted relationship, the alternative hypothesis was rejected in regard to the main effect of cost on specificity of search pattern. However, the results are of considerable interest, since they lend support to evidence that an optimum information level exists. Beyond the optimum point, additional information appears to impede the individual's information processing capacity with a resultant detrimental effect upon his decision making ability.

The main effect of the risk variable on the criterion was not significant. This led to the decision to reject the alternative hypothesis of the direct effect of risk on the specificity of subjects' search patterns. The interaction of the two variables was not significant with alpha equal to .10.

In summary, the alternative hypothesis of the direct effects of the independent variables was substantiated for the case of cost on (a) five of the six selectivity sub-measures, (b) the proportion of available information utilized, and (c) the specificity of search pattern; it was not substantiated for the case of risk. Alpha level for all tests of significance was set at a maximum probability of .10.

Direct Effect of Cost on Certainty: Hypothesis 2

The hypothesis tested in this section was:

The cost of information will have a direct effect on the certainty felt by the decision maker regarding the decision made.

Two measures were obtained of the subjects certainty regarding the decisions: (a) a measure of certainty regarding their tentative decisions (i.e., those made after considering the second, third, and fourth applicants), and (b) a measure of certainty regarding their final decision regarding all five applicants. The hypothesis stated a direct effect for cost on these two measures.

Table 4.4, page 75, summarizes the analyses of variance for these two measures.

According to Table 4.4, neither the cost nor the risk treatments had a significant main effect for either of the certainty measures with alpha equal to .10.

Inverse Effect of Cost on Time: Hypothesis 3

The hypothesis tested in this section was:

The cost of information will have an inverse effect on the average time required to consider applicants.

The analysis of variance summary for this measure is reported in Table 4.5.

The cost treatment had a significant main effect upon the average time required by subjects to consider an

TABLE 4.4

SUMMARY OF ANALYSIS OF VARIANCE FOR THE EFFECT OF COST AND RISK ON TENTATIVE AND FINAL CERTAINTY MEASURES

Source of Variation	Sums of Squares	d.f.	Mean Square	F Ratio
Tentative Certainty				
Cost	.109	2	.054	
Risk	3.5	2	1.75	
C X R	1.52	4	.379	
ERROR	146.275	72	2.032	
Final Certainty				
Cost	11.43	2	5.716	1.857
Risk	6.02	2	3.012	
C X R	1.23	4	.31	
ERROR	221.56	72	3.08	

TABLE 4.5

ANALYSIS OF VARIANCE FOR THE EFFECT OF COST AND RISK ON AVERAGE TIME PER APPLICANT

Source of Variation	d.f.	Sums of Squares	Mean Square	F
Cost	2	365.53	182.77	13.596*
Risk	2	5.12	2.56	
C X R	4	46.65	11.66	
Within Cells (error)	72	967.84	13.44	
Total	80	1385.15		

*significant at .01

applicant. The Newman-Keuls test indicated a significant difference among the treatment groups ($q_{.99}$) with low cost greater than medium cost which was greater than high cost. These results led to acceptance of the alternative hypothesis.

Direct Effect of the Risk Measure: Hypothesis 4

The hypothesis tested in this section was:

Risk will have a direct effect on the average time required by subjects to consider applicants.

The analysis summary for this measure is reported in Table 4.5 above. The effect of the treatment variable, risk, was not significant with an alpha level equal to .10. Application of the F test indicated the appropriate decision was to reject the alternative hypothesis since no significant difference attributable to the various risk treatments was evident on the time measure. There appeared to be no effect of a risk factor on the time administrators spend considering applicants in making a teacher selection decision.

Inverse Effect of the Risk Measure on Certainty: Hypothesis 5

The hypothesis tested in this section was:

Risk will have an inverse effect on certainty felt by the subjects regarding the decision made.

Table 4.4 above summarized the results of the analyses on this measure. The main effects for the risk variable were not significant on either the tentative certainty or the final certainty measures with alpha equal to .10. The

application of the F test in both cases indicated the rejection of the alternative hypothesis at the .10 level. Certainty regarding either tentative or final decisions appears to be unaffected by a risk factor as operationalized in this study.

Table 4.6, page 79, presents a summary of the results of the tests of the hypotheses for all of the dependent measures.

The results of the study and the analyses discussed to this point have concerned the specific research hypotheses of concern in this study. The subsequent section will examine these combined results in terms of their implications for the strategies used by the decision makers in searching for and utilizing information in making the simulated teacher selection decisions.

Information Strategies of Decision Makers

While the preceding section has reported the results of this study, it has done so by describing the discrete effects of the independent variables upon the criterion variables. Although such knowledge is important to understanding the behavior comprising pre-decisional processes, greater insight into this behavior could be gained from observation of how these variables work in concert for a given decision maker. The dependent measures in this study, with the exception of certainty, were postulated a priori

TABLE 4.6

SUMMARY OF TESTS OF HYPOTHESES FOR THE EFFECT OF COST AND RISK ON ALL DEPENDENT MEASURES

	ANOVA		
	Cost	Risk	Newman-Keuls
Hypothesis 1			
Information Selectivity			
Category I	.01	NS	$C_1 > C_2 > C_3$
Category II	.10	NS	$C_1 > C_2 = C_3$
Category III	.01	NS	$C_1 > C_2 = C_3$
Category IV	.01	NS	$C_1 > C_2 = C_3$
Category V	NS	NS	$\underline{C_1} \quad \underline{C_2} \quad \underline{C_3}$
Category VI	.01	NS	$C_1 > C_2 = C_3$
Proportion of Information	.01	NS	$C_1 = C_2 > C_3$
Specificity	.10		$C_1 > C_2 \geq C_3$*
Hypothesis 2			
Tentative Certainty	NS	--	----------
Final Certainty	NS	--	----------
Hypothesis 3			
Time	.01	--	$C_1 < C_2 < C_3$
Hypothesis 4			
Time	--	NS	----------
Hypothesis 5			
Tentative Certainty	--	NS	----------
Final Certainty	--	NS	----------

*Quadratic trend significant at .05 level

C_1 = high cost

C_2 = medium cost

C_3 = low cost

to be key components of the pre-decisional strategies employed by administrators in gathering and evaluating information prior to making a teacher selection decision. Additional components of these strategies may exist, but the present study limited its focus to these four because of their obvious relationship to what decision makers "do" with information. The certainty variable in this study was included because it was assumed to be one criterion of the quality of a decision, in that if an administrator feels confident that his decision was a good one, he will be less apt to vacillate and be concerned over its outcomes.

This discussion presents the results of this experiment in a different perspective, namely, in terms of the strategies employed. In so doing, some implications and interpretations of results needed to be made. However, it should be noted that care has been taken to objectively state this perspective, although it is, by nature, less precise than the results presented in the preceding section.

Strategy Results in Terms of the Dependent Measures

Time. The results of the analysis indicated a significant direct effect of cost on the time required to consider applicants. In other words, as the amount of information increased, the time required to consider an applicant also increased. Such an effect would be expected, since even a cursory scanning of information requires time. This measure

unfortunately did not permit finer discrimination of the time to determine the amount allocated for such distinct purposes as obtaining the information, reading it, weighing its value, etc. However, since time is a major element of cost in teacher selection, knowledge of the significant effect of information cost is of interest. Likewise, time may be a qualitative factor in decisions, since timing of when the decision is made frequently has a profound effect on its outcome.

Specificity of search. The analysis for this measure revealed a significant effect for the cost variable. Subjects in both the high cost and the low cost treatments exhibited low specificity in searching among the available information items and seemed more content to proceed in the sequence predetermined by the experimenter. The effect of low specificity for the high cost treatment probably occurred because the amount of information available was so limited that subjects carefully decided in advance which items from among the fifty available they wanted and then selected these sequentially. Similarly, subjects in the low cost treatment who had potentially all of the fifty items available apparently saw no reason to be selective since adequate information was readily available. It was only in the medium cost treatment that subjects seemed to feel they had enough information available to require them to be specific, but not such an

excess that indiscriminate selection was possible.

Selectivity is not viewed--at this point--as being either valuable or not valuable. While it is important to know the conditions under which the significant difference in the direction of more selectivity occurred, it appears possible in some circumstances to control this factor by regulating the sequence in which information is presented. In many decision situations, however, the process of information search is highly individualized and heuristic in nature, and awareness of variability in the selectivity component of the information strategy must be a consideration in either the prediction or the control of these processes.

Proportion of available information utilized. Analysis of the results for this measure revealed that, in the two higher cost treatments, subjects used a significantly higher proportion of the information available to their treatment group than did subjects in the low cost category. It must be recognized that as the cost of information increased, the amount of information which the subjects could select decreased. The results seem to reflect a minimum level of information necessary for the subject before he was willing to make a decision, and once this level was reached the subject was able to make the decision with a high degree of confidence in its correctness. Further, these results indicate that subjects require far less information to make a decision than

is typically presented to them in a teacher selection situation. If an excess of information is available, the subjects will continue to gather information beyond the necessary amount, although they will stop short of utilizing all that is available.

If the certainty measure in this study can be construed as one indicator of decision quality, subjects in the experiment exhibited a relatively high measure of certainty regarding their decisions, although neither cost nor risk produced significant variability in either certainty measure.

The strategic implications seem to be that decision makers, if constrained to operate with a quantitatively--but not necessarily qualitatively--smaller information base can do so effectively insofar as their own confidence in the decision is concerned. Without such constraints, decision makers will select excess information beyond the necessary amount, with no apparent improvement in their perceived certainty regarding their decision. The threshold level of information required to make a decision under these conditions would appear to be about fifty-eight items of information for the subjects in this experiment. This value is the mean number of information items utilized by the subjects in the low cost treatment.

Information selectivity. The results on the six sub-measures for this variable indicated that increased cost of

information tended to produce significant preferences, both positive and negative, on the part of the decision makers for five of the six information categories. These categories were intended to be typical of information found on teacher placement credentials. However, there was one category which was atypical of credentials commonly in use, and that was Category V, Personality and Behavioral Characteristics, the one category which did not achieve significance under the cost treatments. This category was included because the fictitious applicants used in the simulation were designed using these characteristics as the basis.[1] This fact (i.e., the unfamiliarity of the subjects with the information category) may account for the lack of significance for this submeasure.

Of the significant measures, Category I (Educational Training) and Category III (Background Information) varied in a negative direction, indicating that subjects tended to choose fewer information items from these categories than chance expectancy would indicate. It appears, then, that increasing cost of information causes subjects to consider these two categories of lower marginal value and therefore to select fewer items in proportion to increased cost.

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[1]Dale L. Bolton, Variables Affecting Decision Making in the Selection of Teachers, United States Office of Education, Bureau of Research, Final Report, Project No. 6-1349, August, 1968, p. 18; and Appendix D.

The remaining significant sub-measures (Experience, Personal Information, and References) tended to vary in a positive direction, reflecting subjects' choice of these categories in excess of the chance expectancy level in proportion to increased information cost. It would appear that subjects seem to rely more on these categories for information that will permit greater discrimination among applicants and thus facilitate the decision when information is extremely limited.

The preceding analysis has focused on the dependent variables in this study and has considered them in relation to each other, rather than as totally discrete measures. The following section attempts to describe the "package" of behaviors that--for purposes of this study--comprised the information strategy of the subjects. These are examined in terms of the independent variables, cost and risk.

Strategy Results in Terms of the Independent Measures

Cost. The importance of the information cost variable in determining the strategies administrators use in searching for and obtaining information is evidenced by the fact that it had a significant effect on all but three of the total eleven criterion measures.

High cost of information was the primary source of variability on all of the criterion measures except one, Specificity of Search. In that case it was the medium cost

treatment which produced significance. It appears that under the high cost treatment, where information was extremely limited, subjects tended to employ a strategy which consisted of:

1. utilization of a high proportion of available information;
2. selectivity towards information items regarding professional information, personal information, and references, and away from items regarding educational training and background information;
3. a tendency to select and consider information items in the sequence in which they appeared; (Since the items were not presented in any sequence of rank according to importance, this appears to indicate that, under these conditions, the priority with which an item is received is of relatively little importance to decision makers, as long as they are assured of obtaining it.)
4. a tendency to use less time in considering applicants than that required by the other two cost treatments.

The medium cost treatment group's strategy consisted of:

1. utilization of a high proportion of available information;
2. selectivity towards information items regarding

experience, personal information, and references, and away from items of educational training and background information, although these tendencies were less pronounced than for the high cost treatment;

3. a tendency to be significantly more specific in selecting items of information without concern for the sequence in which they appear; (This may be indicative of the importance of item priority to subjects in this treatment.)
4. a tendency to use more time considering applicants than subjects in the low cost treatment.

The low cost treatment group's strategy consisted of:

1. utilization of a significantly lower proportion of available information than the other two treatment groups;
2. a similar pattern of selectivity to that of the high cost group, except that this treatment group was less inclined to avoid information items in the Educational Training category;
3. a tendency to select items in the sequence in which they appeared, similar to the pattern of the high cost treatment;
4. utilization of significantly more time to consider applicants than either of the other two treatment groups.

Risk. The risk variable as designed in this study appeared to have little effect upon the information strategies of decision makers. It would appear that risk, as defined and operationalized in this study, does not affect the strategies of information search used by the subjects of this experiment.

Summary

This chapter has presented the results of the analysis of data from the experiment in two forms. First the effects of the independent variables on the dependent variables as discrete entities were presented. The cost of information had a significant effect on the following measures: (a) information selectivity (five of the six-sub-measures); (b) proportion of available information utilized; (c) specificity of search pattern; and (d) time. Risk had no significant main effects and there were no interactions between the cost and risk variables.

Second, the criterion measures were then examined in relation to one another in terms of their implications for patterns or strategies of information search and utilization. The subjects in this study did evidence definite patterns of behavior on the four dependent variables postulated to be key components of the strategies and these patterns varied under the different levels of the cost treatment, although risk had no significant effect.

The following chapter reports the conclusions drawn from this study, their implications for research and practice, and the recommendations evolving from the study.

CHAPTER V

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The preceding chapters have presented the background and purposes of this study, the procedures used, and the results and findings. This chapter will present the major conclusions of the study, their implications for research and administrative practice, and some recommendations emerging from these conclusions.

Conclusions

1. Of the independent variables in this study, (a) information cost, and (b) risk, only cost affected the information processing of administrators in making teacher selection decisions, achieving statistical significance on eight of the eleven criterion measures. Risk did not have a significant effect on any of the measures.

2. For the three levels of the cost treatment, the high cost group was the one which principally contributed to the variability on seven of the eight significant measures. The significant variance on the remaining measure was caused by the medium cost treatment group.

3. The analysis of the data indicated the following results. The cost independent variable had a significant main effect on (a) five of the six selectivity sub-measures,

(b) proportion of information utilized, (c) specificity of search, and (d) time. The risk independent variable had no significant main effects nor were there any significant interactions between cost and risk.

4. The subjects in this study did evidence definite patterns of behavior on the four dependent variables postulated to be key components of information processing strategies. However, any conclusions regarding the stability of these patterns are highly tentative and (because of the weakness of the risk variable) based primarily on behavior resulting from manipulation of the cost variable.

5. The components of information strategies which--under conditions of this experiment--displayed variability as a result of manipulation of the independent variables were: (a) time required to consider applicants; (b) selectivity in the type of information chosen; (c) proportion of information used; and (d) specificity of search pattern.

6. The strategies of the decision makers in this experiment seemed to be consistent with the prescriptions of the incremental model of decision making described by Etzioni.[1]

7. The results indicated that, in terms of the single indicator of decision quality used in this study (certainty),

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[1]Amitai Etzioni, The Active Society (New York: The Free Press, 1968).

decisions regarding teacher selection can apparently be made with substantially fewer information inputs (for written information) than are typically used without significant loss of decision quality. It appears that an optimum information level may exist which is capable of definition and measurement in a given situation. The results of this study were not concerned with the validity of decisions made, since it was considered that the importance of situational variables necessitates local validation of selection decisions.

8. Although prescriptive models of information acquisition generally reflect a direct relationship between the amount of information and the certainty regarding the decision, the results of this study substantiate that subjects stop short of acquiring all the information available even though this could have been done at no loss to them. Even those subjects in the high cost treatment who had a very small amount of information available still failed to utilize all that was available. Subjects who tended to acquire information beyond the minimum level (sixty-three items) identified in this study did so without significant improvement in the quality of decisions made and with substantial increase in marginal cost (i.e., time required).

9. The results indicated that, under the conditions of this experiment, when a decision maker is able to select among the information items he considers in making a teacher selection decision he is able to make that decision with a

high degree of confidence in its correctness.

10. The simulated situation in this experiment facilitated the study of selection decision making by allowing manipulation of the independent variables in a carefully controlled situation while obtaining measures of the subjects' ongoing information processing in a relatively unobtrusive manner. The simulated situation consisted of: (a) the description of a hypothetical community school district which provided the setting for the experimental task; (b) the presentation of information on fictitious applicants, based on written documents developed in a previous study;[2] (c) a simplified, computer based information storage and retrieval system with which subjects interacted to obtain information on the applicants; and (d) a set of decisions to be made regarding the applicants.

Implications

Several direct implications arise from this research for practice in the selection of teachers.

1. If principals and others involved in the selection of teachers are similar in nature to the subjects of this experiment, their decisions will be influenced by the cost

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[2]Dale L. Bolton, Variables Affecting Decision Making in the Selection of Teachers, United States Office of Education, Bureau of Research, Final Report, Project No. 6-1349, August, 1968.

of information.

2. If decisions can be made using far less information than is normally utilized--without a concomitant loss of quality--then substantial savings can be realized by reducing the volume of information presented to decision makers. The critical implication of this finding is that greater concern must be evidenced for the quality of informational inputs, rather than to the quantity. The relationship between the amount of information considered and the probability of making a "correct" decision (as defined in this study) does not appear to be an increasing monotonic function as suggested by many prescriptive models.

3. If an optimum information level exists, as this study has suggested, then the range of this optimum level should be precisely measured under varying situations and this range should be a key determinant in the design of information systems used in making teacher selection decisions.

4. If the format of information does influence decisions in the direction indicated by previous studies, then it appears that a retrieval system similar in principle to the one designed for this experiment may facilitate the processing of information in the decision making process. Such a system, which permits subjects to choose among information items to consider and does not confront them with unwanted information seems to allow for a high degree of

certainty in decision making, even at low information levels.

It should be noted that this experiment dealt only with subjects' processing of written information and no interview information was provided. It is assumed that the comparatively high certainty scores for all subjects do not imply a willingness on the part of subjects to make selection decisions using only written information. Subjects were advised beforehand that they were expected to do the best they could with only written information and this probably reduced the risk they perceived in making decisions based on such limited information without benefit of the personal interview. However, if variability in the use of written information can be reduced substantially by regulation of the amount presented, then the clinical portions of the selection process may be designed to assess only very specific elements for which that process is best suited.

5. The failure of the risk variable in this experiment implies either that risk does not function as a potent force in teacher selection decisions, or that the manner in which it was operationally defined in this study negated its effect on the decision situation. While the former alternative is a possibility, it is more probable that the latter condition existed in this study. The two risk elements in this study, time of year and supply of teachers available, although operating in practically every situation, are probably more macroscopic in their impact and therefore more

indirect as influences upon the decision maker, especially if he is a building principal, as were the subjects in this study.

6. This experiment has demonstrated that the subjects utilized strategies--either explicitly or implicitly--in gathering and processing information prior to making teacher selection decisions. Since these strategies lead to development of the information base for making the decision, the crucial nature of their relation to the decision strategy is evident. By making the information strategy an explicit function of the total decision process, more conscious control can be exerted on the quality of that process with a concomitant improvement in the decision itself.

The implications of the results of this study in terms of further research are:

1. The incremental strategy model described by Etzioni appears to be a viable model of the process which occurs in gathering and evaluating information for use in making teacher selection decisions at the building principal level. However, more research is needed to determine the stability of the behavior patterns described in this study as they relate to the incremental approach.

2. The effect of the cost variable under these experimental conditions seems fairly well established. However, the risk variable--long ascribed to be a major influence on decision making--needs to be re-evaluated and operationalized

in different terms to more fully evaluate its impact on strategies of information search.

3. Further research needs to be conducted to determine other components of information strategies not examined by this study. It may be that alternative components exist which have a more integral relationship to the strategies defined in this study.

4. A closer examination of the concept of information value seems indicated by the results of this study. The interrelationship between amount, cost, and value of information described in Chapter I suggests the necessity of implementing the concept of information value in future research in this area.

Recommendations

1. The concept of information processing strategy central to this experiment represents a potentially valuable perspective for further research in the decision making process. What is now needed is research to replicate this design and determine the stability of the patterns delineated here. In addition, other potential elements of the strategies need to be examined for relevance.

2. Because of the insignificant effect of risk as a variable in this experiment, it is recommended that the variable be redesigned in order to more fully determine its effect upon strategies of information search.

3. For the teacher selection process, it is recommended that substantial effort be made to determine locally which information items are relevant to selection decision making and that substantial reductions be made in the amount of information with which decision makers are confronted. By examining both the concept of information quality and that of optimum information level, it seems possible that significant improvement can be made in some major aspects of the selection process.

4. The prevailing trends towards computer based aids to decision making suggest the viability of an information retrieval system for use in making selection decisions. The value of permitting decision makers to choose only items they consider relevant,--at least on the criteria assessed in this experiment--seems justified in terms of the subjective certainty of subjects regarding the decisions made.

5. A more precise delineation needs to be made among the different phases of the information processing and the decision making strategies of individuals. Because of the complex interrelationship between the two processes, they cannot be viewed as discrete entities and this interaction must be a recognized constraint on the design of man-machine systems for making teacher selection decisions.

6. The relationship between the clinical aspects of the selection process (i.e., personal interview) and the information strategy was not examined in this experiment.

The difficulty of obtaining the sort of measures used on the written information in this study suggest the problems involved in obtaining similar unobtrusive measures on the clinical process involved. However, the findings of this study in no way negate the value of the personal interview as a tool in teacher selection. Much more needs to be done--both in the practice of interviewing and the design of research--to examine the impact of clinical stimuli on the strategies used to obtain and evaluate information on applicants.

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APPENDIX A

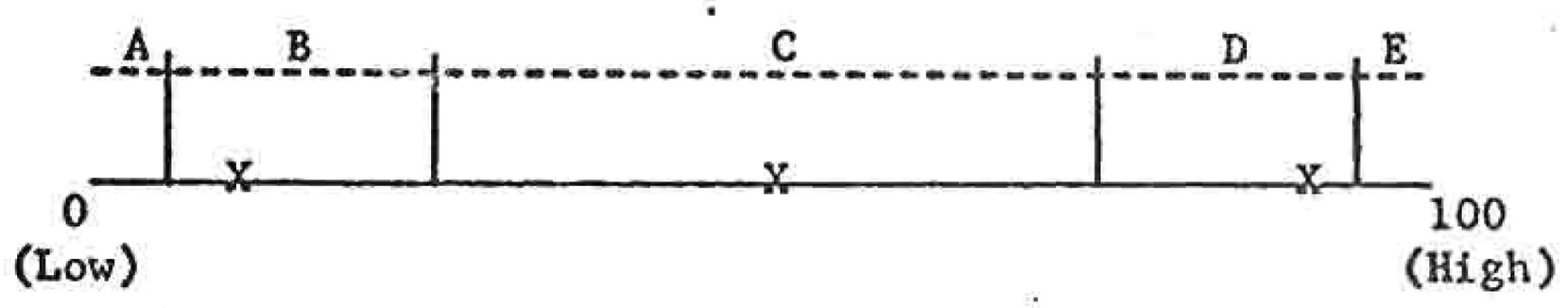
APPLICANT INFORMATION CATALOG

This catalog contains a complete listing of all the written information available on each of five applicants. Each item is referenced with a catalog number so that it may be retrieved from the computer where it is stored. To obtain a given item of information, just type in that catalog number when the teletype prints "Selection?"

The first digit of each catalog number is the applicant number. This number has no significance except as a means of differentiating among the applicants. For your reference, the applicant numbers are as follows:

Applicant No.	Name
1	Carol Brown
2	Teresa Collins
3	Nina Taylor
4	Jean Miller
5	Judy Olson

The format of the information on the applicants is reduced to a scaled form wherever possible, so that you will receive a rating on a given characteristic for that particular applicant. For example, on the factor of "intelligence" a given applicant might have a rating of "above average." You are not to be concerned with how the rating was derived, but are to assume that it was validly determined. It might be of assistance to consider the terms utilized in these ratings as follows:



A rating of "exceptional" or "outstanding" would mean that, in comparison with the general population of teacher applicants, the person fell in the area indicated by E on the scale. A rating of "above average" would refer to the area indicated by D. An "average" rating would fall in area C. A "below average" rating would refer to area B on the scale, and a rating of "poor" or "low" would fall in area A. Sometimes the term "good" is used to refer to "above average" (area D), and the term "fair" is used in reference to "below average" (area B).

CAROL BROWN
Applicant

Category Number	Item	Item Catalog No.
I.	EDUCATIONAL TRAINING	
	High schools attended	1101
	College(s) attended	1102
	Degree(s)	1103
	Major and minor field(s)	1104
	Certification	1105
	Total grade point average	1106
	Major field grade point average	1107
	Minor field grade point average	1108
	Courses taken in major field	1109
	Courses taken in minor field	1110
	Courses taken in education	1111
II.	EXPERIENCE	
	Subjects taught	1201
	Student teaching experience	1202
	Nature of pupils taught	1203
	Years of experience	1204
	Activities directed or assisted	1205
	Reason for leaving last position	1206
III.	BACKGROUND INFORMATION	
	Youth activities involvement	1301
	Extra curricular activities participation	1302
	Hobbies, travel	1303
	Honors, awards	1304
	Special knowledge, skills	1305
	Marital status	1306
	General health	1307
	Criminal record	1308
	Habits, peculiarities	1309
	Work absenteeism	1310
	Work experience other than teaching	1311
	Number of children and ages	1312
	Husband's occupation	1313
IV.	PROFESSIONAL INFORMATION	
	Position desired	1401
	Future professional plans	1402
	Professional membership	1403
	Periodicals subscribed to	1404
	Knowledge of professional matters	1405
	Knowledge of teaching methods	1406
	Knowledge and background in subject	1407
	Overall teaching ability	1408
	Classroom control	1409
	Ability to work with others	1410
V.	PERSONALITY AND BEHAVIORAL CHARACTERISTICS	
	Originality	1501
	Organization	1502
	Empathy	1503
	Sociability	1504
	Buoyancy	1505
VI.	CONSENSUS OF WRITTEN RECOMMENDATIONS	
	Personal references	1601
	College professors	1602
	University supervisor (practice teaching)	1603
	Cooperating teacher	1604
	Principal	1605

TERESA COLLINS
Applicant

Category Number	Item	Item Catalog No.
I.	EDUCATIONAL TRAINING	
	High schools attended	2101
	College(s) attended	2102
	Degree(s)	2103
	Major and minor field(s)	2104
	Certification	2105
	Total grade point average	2106
	Major field grade point average	2107
	Minor field grade point average	2108
	Courses taken in major field	2109
	Courses taken in minor field	2110
	Courses taken in education	2111
II.	EXPERIENCE	
	Subjects taught	2201
	Student teaching experience	2202
	Nature of pupils taught	2203
	Years of experience	2204
	Activities directed or assisted	2205
	Reason for leaving last position	2206
III.	BACKGROUND INFORMATION	
	Youth activities involvement	2301
	Extra curricular activities participation	2302
	Hobbies, travel	2303
	Honors, awards	2304
	Special knowledge, skills	2305
	Marital status	2306
	General health	2307
	Criminal record	2308
	Habits, peculiarities	2309
	Work absenteeism	2310
	Work experience other than teaching	2311
	Number of children and ages	2312
	Husband's occupation	2313
IV.	PROFESSIONAL INFORMATION	
	Position desired	2401
	Future professional plans	2402
	Professional membership	2403
	Periodicals subscribed to	2404
	Knowledge of professional matters	2405
	Knowledge of teaching methods	2406
	Knowledge and background in subject	2407
	Overall teaching ability	2408
	Classroom control	2409
	Ability to work with others	2410
V.	PERSONALITY AND BEHAVIORAL CHARACTERISTICS	
	Originality	2501
	Organization	2502
	Empathy	2503
	Sociability	2504
	Buoyancy	2505
VI.	CONSENSUS OF WRITTEN RECOMMENDATIONS	
	Personal references	2601
	College professors	2602
	University supervisor (practice teaching)	2603
	Cooperating teacher	2604
	Principal	2605

NINA TAYLOR
Applicant

Category Number	Item	Item Catalog No.
I.	EDUCATIONAL TRAINING	
	High schools attended	3101
	College(s) attended	3102
	Degree(s)	3103
	Major and minor field(s)	3104
	Certification	3105
	Total grade point average	3106
	Major field grade point average	3107
	Minor field grade point average	3108
	Courses taken in major field	3109
	Courses taken in minor field	3110
	Courses taken in education	3111
II.	EXPERIENCE	
	Subjects taught	3201
	Student teaching experience	3202
	Nature of pupils taught	3203
	Years of experience	3204
	Activities directed or assisted	3205
	Reason for leaving last position	3206
III.	BACKGROUND INFORMATION	
	Youth activities involvement	3301
	Extra curricular activities participation	3302
	Hobbies, travel	3303
	Honors, awards	3304
	Special knowledge, skills	3305
	Marital status	3306
	General health	3307
	Criminal record	3308
	Habits, peculiarities	3309
	Work absenteeism	3310
	Work experience other than teaching	3311
	Number of children and ages	3312
IV.	PROFESSIONAL INFORMATION	
	Position desired	3401
	Future professional plans	3402
	Professional membership	3403
	Periodicals subscribed to	3404
	Knowledge of professional matters	3405
	Knowledge of teaching methods	3406
	Knowledge and background in subject	3407
	Overall teaching ability	3408
	Classroom control	3409
	Ability to work with others	3410
V.	PERSONALITY AND BEHAVIORAL CHARACTERISTICS	
	Originality	3501
	Organization	3502
	Empathy	3503
	Sociability	3504
	Buoyancy	3505
VI.	CONSENSUS OF WRITTEN RECOMMENDATIONS	
	Personal references	3601
	College professors	3602
	University supervisor (practice teaching)	3603
	Cooperating teacher	3604
	Principal	3605

JEAN MILLER
Applicant

Category Number	Item	Item Catalog No.
I.	EDUCATIONAL TRAINING	
	High schools attended	4101
	College(s) attended	4102
	Degree(s)	4103
	Major and minor field(s)	4104
	Certification	4105
	Total grade point average	4106
	Major field grade point average	4107
	Minor field grade point average	4108
	Courses taken in major field	4109
	Courses taken in minor field	4110
	Courses taken in education	4111
II.	EXPERIENCE	
	Subjects taught	4201
	Student teaching experience	4202
	Nature of pupils taught	4203
	Years of experience	4204
	Activities directed or assisted	4205
	Reason for leaving last position	4206
III.	BACKGROUND INFORMATION	
	Youth activities involvement	4301
	Extra curricular activities participation	4302
	Hobbies, travel	4303
	Honors, awards	4304
	Special knowledge, skills	4305
	Marital status	4306
	General health	4307
	Criminal record	4308
	Habits, peculiarities	4309
	Work absenteeism	4310
	Work experience other than teaching	4311
	Number of children and ages	4312
IV.	PROFESSIONAL INFORMATION	
	Position desired	4401
	Future professional plans	4402
	Professional membership	4403
	Periodicals subscribed to	4404
	Knowledge of professional matters	4405
	Knowledge of teaching methods	4406
	Knowledge and background in subject	4407
	Overall teaching ability	4408
	Classroom control	4409
	Ability to work with others	4410
V.	PERSONALITY AND BEHAVIORAL CHARACTERISTICS	
	Originality	4501
	Organization	4502
	Empathy	4503
	Sociability	4504
	Buoyancy	4505
VI.	CONSENSUS OF WRITTEN RECOMMENDATIONS	
	Personal references	4601
	College professors	4602
	University supervisor (practice teaching)	4603
	Cooperating teacher	4604
	Principal	4605

JUDY OLSON
Applicant

Category Number	Item	Item Catalog No.
I.	EDUCATIONAL TRAINING	
	High schools attended	5101
	College(s) attended	5102
	Degree(s)	5103
	Major and minor field(s)	5104
	Certification	5105
	Total grade point average	5106
	Major field grade point average	5107
	Minor field grade point average	5108
	Courses taken in major field	5109
	Courses taken in minor field	5110
	Courses taken in education	5111
II.	EXPERIENCE	
	Subjects taught	5201
	Student teaching experience	5202
	Nature of pupils taught	5203
	Years of experience	5204
	Activities directed or assisted	5205
	Reason for leaving last position	5206
III.	BACKGROUND INFORMATION	
	Youth activities involvement	5301
	Extra curricular activities participation	5302
	Hobbies, travel	5303
	Honors, awards	5304
	Special knowledge, skills	5305
	Marital status	5306
	General health	5307
	Criminal record	5308
	Habits, peculiarities	5309
	Work absenteeism	5310
	Work experience other than teaching	5311
	Number of children and ages	5312
IV.	PROFESSIONAL INFORMATION	
	Position desired	5401
	Future professional plans	5402
	Professional membership	5403
	Periodicals subscribed to	5404
	Knowledge of professional matters	5405
	Knowledge of teaching methods	5406
	Knowledge and background in subject	5407
	Overall teaching ability	5408
	Classroom control	5409
	Ability to work with others	5410
V.	PERSONALITY AND BEHAVIORAL CHARACTERISTICS	
	Originality	5501
	Organization	5502
	Empathy	5503
	Sociability	5504
	Buoyancy	5505
VI.	CONSENSUS OF WRITTEN RECOMMENDATIONS	
	Personal references	5601
	College professors	5602
	University supervisor (practice teaching)	5603
	Cooperating teacher	5604
	Principal	5605

APPENDIX B

SAMPLE INPUT AND OUTPUT FROM ONE SUBJECT'S TASK

```
RUN

COLLECT1     09:26    04/17/69  THURSDAY    SFO

ENTER ID? 01379
SELECTION? 5503

TIME? 928
AVERAGE

SELECTION? 5502
AVERAGE

SELECTION? 5106
3.24

SELECTION? 5604
ABOVE AVERAGE

SELECTION? 5605
EXCEPTIONAL

SELECTION? 5410
ABOVE AVERAGE

SELECTION? 5409
ABOVE AVERAGE

SELECTION? 5204
1

SELECTION? 5311
SALES CLERK, PART TIME

SELECTION? 5107
3.38

SELECTION? 5511
SELECTION? 5111
DIRECTED TEACHING    ED 374E
PHILOSOPHY IN EDUC    ED488
INT EDUC PSYCH    ED 309
INT EVAL IN EDUCED 308
INT CHILD STUDY & DEV    ED 302
INTRO TEACHING    ED 288
SPEECH FOR TEACH    SP 101

SELECTION? 5504
ABOVE AVERAGE

SELECTION? 4605
```

```
TIME? 937
ABOVE AVERAGE

SELECTION? 4604
ABOVE AVERAGE

SELECTION? 4503
ABOVE AVERAGE

SELECTION? 4106
3.29

SELECTION? 4502
ABOVE AVERAGE

SELECTION? 4504
AVERAGE

SELECTION? 4204
2

SELECTION? 4206
RAISE FAMILY TOSCHOOL AGE

SELECTION? 4410
ABOVE AVERAGE

SELECTION? 4406
AVERAGE

SELECTION? 3407

TIME? 946
ENTER YOUR RANKING OF PRECEDING 2    APPLICANTS
? 5.4
ENTER DEGREE OF CONFIDENCE IN ABOVE PREFERENCE? 8


PLEASE ASK FOR ASSISTANCE BEFORE CONTINUING

  PAUSE AT LINE  10040

AVERAGE

SELECTION?
    INVALID INPUT DATA ... RETYPE IT
3604
ABOVE AVERAGE

SELECTION? 3605
ABOVE AVERAGE
```

```
SELECTION? 3603
ABOVE AVERAGE

SELECTION? 3502
AVERAGE

SELECTION? 3503
EXCEPTIONAL

SELECTION? 3504
ABOVE AVERAGE

SELECTION? 3107
3.0

SELECTION? 3106
2.9

SELECTION? 3204
NONE

SELECTION? 3311
BOOK STORE SALES CLERK, 2 YR PT TIME

SELECTION? 3307
GOOD

SELECTION? 3406
GOOD

SELECTION? 3408
ABOVE AVERAGE

SELECTION? 3409
AVERAGE

SELECTION?
 INVALID INPUT DATA ... RETYPE IT
1
 26   ANSWERS REMAINING
SELECTION? 2604

TIME? 1002
ENTER YOUR RANKING OF PRECEDING 3    APPLICANTS
? 5,3,4
ENTER DEGREE OF CONFIDENCE IN ABOVE PREFERENCE? 7

ABOVE AVERAGE
```

```
SELECTION? 2604
SELECTION?
INVALID INPUT DATA ... RETYPE IT
2604
SELECTION? 2605
ABOVE AVERAGE

SELECTION? 2604
SELECTION? 2603
ABOVE AVERAGE

SELECTION? 2503
ABOVE AVERAGE

SELECTION? 2502
EXCEPTIONAL

SELECTION? 2504
ABOVE AVERAGE

SELECTION? 2601
EXCEPTIONAL

SELECTION? 2410
ABOVE AVERAGE

SELECTION? 2409
EXCEPTIONAL

SELECTION? 2408
ABOVE AVERAGE

SELECTION? 2302
SORORITY;STUDENT TEACHING ASS'N
STUDENT SENATE

SELECTION? 2106
3.26

SELECTION? 2107
3.30

SELECTION? 2204
NONE

SELECTION? 1
 12   ANSWERS REMAINING
SELECTION? 1604

TIME? 1023
ENTER YOUR RANKING OF PRECEDING 4    APPLICANTS
? 2,5,3,4
ENTER DEGREE OF CONFIDENCE IN ABOVE PREFERENCE? 7
```

```
ABOVE AVERAGE

SELECTION? 1605
ABOVE AVERAGE

SELECTION? 1603
ABOVE AVERAGE

SELECTION? 1502
ABOVE AVERAGE

SELECTION? 1410
EXCEPTIONAL

SELECTION? 1
 7    ANSWERS REMAINING
SELECTION? 1503
AVERAGE

SELECTION? 1504
EXCEPTIONAL

SELECTION? 1409
ABOVE AVERAGE

SELECTION? 1106
3.28

SELECTION? 1406
ABOVE AVG.

SELECTION? 1204
5

SELECTION? 1601
EXCEPTIONAL

LIMIT OF INFORMATION REACHED

FINAL RANKING? 1,2,5,4,3

ENTER DEGREE OF CONFIDENCE? 7


ENTER ID? 01379

TIME     0 MINS.   8 SECS.
```

APPENDIX C1

WRITTEN INSTRUCTIONS FOR COST VARIABLE, LEVEL 1 (HIGH)

The amount of budget available to you for purchasing information on applicants is $630.00. Since each information item costs $10.00, this means you may purchase a maximum of 63 items of the total 250 available.

You may allocate this money in any manner you desire; however, when the budget is exhausted you must make your final decision based on the information you have available at that point. You are not required to use all of your budget, however none of it is returned to you.

APPENDIX C2

WRITTEN INSTRUCTIONS FOR COST VARIABLE, LEVEL 2 (MEDIUM)

The amount of budget available to you for purchasing information on applicants is $1250.00. Since each information item costs $10.00, this means you may purchase a maximum of 125 items of the total 250 available.

You may allocate this money in any manner you desire; however, when the budget is exhausted you must make your final decision based on the information you have available at that point. You are not required to use all of your budget, however none of it is returned to you.

APPENDIX C3

WRITTEN INSTRUCTIONS FOR COST VARIABLE, LEVEL 3 (LOW)

The amount of budget available to you for purchasing information on applicants is $2500.00. Since each information item costs $10.00, this means you may purchase a maximum of 250 items of the total 250 available.

You may allocate this money in any manner you desire; however, when the budget is exhausted you must make your final decision based on the information you have available at that point. You are not required to use all of your budget, however none of it is returned to you.

APPENDIX C4

WRITTEN INSTRUCTIONS FOR RISK VARIABLE, LEVEL 1 (HIGH)

You are to assume that the vacancy for which you are selecting occurred suddenly. Consequently today's date is May 15th, and you have not yet considered anyone for the position.

Past experience has indicated that you will probably receive few, if any, applications beyond this point. In past years an average of 1.8 applications per month has been received after June 1st.

APPENDIX C5

WRITTEN INSTRUCTIONS FOR RISK VARIABLE, LEVEL 2 (LOW)

You are to assume that you are making your selection decision on March 1st, near the beginning of the normal recruitment period.

Past experience has indicated that you will probably receive a number of other applicants for positions in the district, since the peak month in terms of applications received is usually April.

APPENDIX C6

WRITTEN INSTRUCTIONS FOR RISK VARIABLE, LEVEL 3 (VARIABLE)

(Note: Subjects in this treatment were first given the instructions for the low risk group [see Appendix C5]. After they had considered their first two applicants, they received the instructions below.)

You are now to assume that the situation has altered considerably. It was initially thought the fourth grade position was filled by an applicant recommended by another member of the selection team. However, due to illness, that applicant is no longer available and you are to recommend a new candidate.

The time of year is now May 15th. Past experience has indicated that you will probably receive few, if any, applications beyond this point. In past years an average of 1.8 applications per month has been received after June 1st.

You are to further assume that, as far as you know, all of the previous applicants you interviewed are still available.

APPENDIX D

TREATMENT GROUP MEANS FOR ALL DEPENDENT MEASURES

1. Treatment Group Means for Information Selectivity Measure

(Category I)

	C_1	C_2	C_3	$\overline{X}_r$
R_1	-.0580	-.0421	-.0261	-.042
R_2	-.0999	+.0017	-.0356	-.0446
R_3	-.0852	-.0581	-.0171	-.0535
$\overline{X}_C$	-.081	-.0328	-.026	

2. Treatment Group Means for Information Selectivity Measure

(Category II)

	C_1	C_2	C_3	$\overline{X}_r$
R_1	.0131	.0461	.0122	.0238
R_2	.0499	.0172	.0110	.0260
R_3	.0627	.0193	.0239	.0353
$\overline{X}_C$	.04188	.02755	.0157	

3. Treatment Group Means for Information Selectivity Measure (Category III)

	C_1	C_2	C_3	$\bar{X}_r$
R_1	-.1243	-.0758	-.0311	-.077
R_2	-.0852	-.0617	-.0410	-.0626
R_3	-.0968	-.0550	-.0651	-.0723
$\bar{X}_C$	-.1021	-.0641	-.0457	

4. Treatment Group Means for Information Selectivity Measure (Category IV)

	C_1	C_2	C_3	$\bar{X}_r$
R_1	.0862	.0201	.0219	.0427
R_2	.0560	-.0022	.0157	.0231
R_3	.0551	.0249	.0111	.0304
$\bar{X}_C$	.0658	.0143	.0162	

5. Treatment Group Means for Information Selectivity Measure (Category V)

	C_1	C_2	C_3	$\bar{X}_r$
R_1	.0180	.0290	.0052	.0174
R_2	.0314	.0242	.0246	.0267
R_3	.0117	.0351	.0196	.0221
$\bar{X}_C$	.02037	.02944	.01644	

6. Treatment Group Means for Information Selectivity Measure (Category VI)

	C_1	C_2	C_3	$\overline{X}_r$
R_1	.0648	.0229	.0174	.035
R_2	.0518	.0210	.0242	.0323
R_3	.0526	.0403	.0278	.0402
$\overline{X}_C$	.0564	.0281	.0231	

7. Treatment Group Means for Proportion of Available Information Utilized

	C_1	C_2	C_3	$\overline{X}_r$
R_1	.90	.86	.65	.80
R_2	.80	.83	.65	.76
R_3	.99	.85	.58	.81
$\overline{X}_C$	.90	.85	.62	

8. Treatment Group Means for Specificity of Search Pattern

	C_1	C_2	C_3	$\overline{X}_r$
R_1	33.11	40.11	37.11	36.78
R_2	30.11	32.44	32.89	31.81
R_3	28.78	39.67	32.55	33.67
$\overline{X}_C$	30.67	37.407	34.185	

9. Treatment Group Means for Tentative Certainty Measure

	C_1	C_2	C_3	$\bar{X}_r$
R_1	7.09	6.88	6.87	6.94
R_2	6.71	6.66	6.97	6.78
R_3	7.06	7.49	7.29	7.28
$\bar{X}_C$	6.95	7.00	7.04	

10. Treatment Group Means for Final Certainty Measure

	C_1	C_2	C_3	$\bar{X}_r$
R_1	6.78	7.67	7.11	7.19
R_2	7.33	8.11	7.0	7.48
R_3	7.56	8.33	7.67	7.85
$\bar{X}_C$	7.22	8.04	7.26	

11. Treatment Group Means for Measure of Average Time per Applicant

	C_1	C_2	C_3	$\bar{X}_r$
R_1	11.80	16.27	18.27	15.40
R_2	13.96	15.02	19.11	16.03
R_3	13.47	16.84	17.40	15.90
$\bar{X}_C$	13.07	16.04	18.26	

VITA

Michael Edward Hickey, the son of Edward J., and Jeanette Hickey, was born May 30, 1938, in Iron Mountain, Michigan. He was graduated from St. Patrick's High School, Walla Walla, Washington, in 1956, and attended Whitman College prior to entering the United States Marine Corps in September, 1958. Upon discharge from the service in May, 1962, he entered the University of Washington, graduating in August, 1964, with a Bachelor of Arts degree in English. He returned to the University in June, 1966, as a Research Associate and subsequently as a National Defense Education Act Fellow. He completed his Master of Arts degree in Educational Administration in December, 1967, and continued into the doctoral program. While completing his doctoral work, he was the recipient of a research grant under the Regional Research Program of the United States Office of Education, Bureau of Research.

In September, 1964, he began his career in education as an English teacher at Bothell Senior High School, Bothell, Washington. He is presently employed as Administrative Assistant to the Superintendent of Seattle Public Schools, Seattle, Washington.

He is a member of the Washington Education Association, National Education Association, Phi Delta Kappa, and

American Educational Research Association.

Members of his family include his wife, Karen, and four sons, Michael, Kevin, Timothy, and Sean.

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