REEDER, ROBERT ROY

THE IMPORTANCE OF THE SUPERIOR'S TECHNICAL COMPETENCE IN THE SUBORDINATES' WORK

The University of Arizona PH.D. 1981

THE IMPORTANCE OF THE SUPERIOR'S TECHNICAL COMPETENCE IN THE SUBORDINATES' WORK

By

Robert Roy Reeder

A Dissertation Submitted to the Faculty of the

BUSINESS ADMINISTRATION COMMITTEE

In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College

THE UNIVERSITY OF ARIZONA

1981

THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the Final Examination Committee, we certify that we have read the dissertation prepared by Robert Roy Reeder

entitled The Importance of the Superior's Technical Competence in the Subordinates' Work

and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

Edwin D Flyger — May 18, 1981
Date

David A. Tansik — May 15, 1981
Date

Gaylen W Dunnam — May 18, 1981
Date

Date

Date

Final approval and acceptance of this dissertation is contingent upon the candidate's submission of the final copy of the dissertation to the Graduate College.

I hereby certify that I have read this dissertation prepared under my direction and recommend that it be accepted as fulfilling the dissertation requirement.

Edwin D Flyger — May 18, 1981
Dissertation Director — Date

STATEMENT BY AUTHOR

This dissertation has been submitted in partial fulfillment of requirements for an advanced degree at the University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this dissertation are allowable without special permission, provided that accurate acknowledgment of source is made. Requests for permission for extended quotations from or reproduction of this manuscript in whole or in part may be granted by the head of the major department or the Dean of the Graduate College when in his judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

SIGNED 

ACKNOWLEDGEMENTS

I would like to thank each member of my dissertation committee: Dr. Edwin Flippo, Dr. George Summers, and Dr. David Tansik. Each contributed significantly toward the improvement and completion of this dissertation.

I would particularly like to thank the Chairman of my dissertation committee, Dr. Edwin Flippo. His encouragement and guidance were extremely valuable throughout the dissertation process.

Also, I wish to thank Ms. Kay Schenk, the person who handled my computer problems, and Ms. Diane Azevedo, the typist. My parents' continued support also deserves recognition.

Finally, I wish to thank my wife, Betty. Providing encouragement and help, she was through this entire process, as in my life, my best friend.

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

LIST OF ILLUSTRATIONS

LIST OF TABLES

ABSTRACT

This study assessed the importance of the first-line supervisor's knowledge of his subordinates' work. The impact of the supervisor's style of leadership served as a basis for comparatively evaluating the importance of the supervisor's knowledge. The criteria variables used were morale and productivity.

Supervisors and subordinates representing routine and nonroutine work groups were tested. The routine group was represented by postal clerks and the nonroutine group by computer programmers. All subjects were chosen as a convenience sample and were U.S. Army personnel stationed in West Germany. Test results of seventy-eight subordinates and their supervisors were used in the analysis.

The test to measure the job knowledge of postal workers was the only test which had to be specially prepared for this study. Internal consistency reliabilities indicated the test would be appropriate. Supervisors both ranked and rated their subordinates' productivity. Various other standard tests were used.

The primary hypothesis of the study was that the first-line supervisor's knowledge of his subordinates' jobs has a greater impact on productivity and morale than the supervisor's leadership style. It was hypothesized that increases in the supervisor's knowledge would have favorable effects. Path analysis was employed as the method of evaluating the hypothesis. The layout of path diagrams reflect various other hypotheses of the researcher.

The first path analysis model examined indicated additional variables should be considered. An expanded model indicated that knowledge is likely

positively related to productivity though negatively related to morale. That portion of the hypothesis specifying that knowledge would have a greater impact than leadership style could not be justified by the analysis and interpretation of the diagrams. The participative style of leadership appeared to be more positively, causally related to productivity than the supervisor's knowledge.

CHAPTER I

INTRODUCTION

Definition of Leadership

"Definitions of leadership abound."[1] Stogdill's survey of leadership research devotes an entire chapter to summarizing leadership definitions into eleven categories: a focus of group processes, personality and its effects, the art of inducing compliance, the exercise of influence, an act of behavior, a form of persuasion, a power relation, an instrument of goal achievement, an effect of interaction, a differentiated role, and the initiation of structure.[2]

Stogdill justifies this multitude of definitions by reasoning that definitions do vary with different studies, but implies that too often researchers fail to state the specifics of the leadership definitions appropriate for their studies.[3] For this study, the appropriate definition was determined to be that given by Fleishman, who has long been active in the development and refinement of two of the main variables used here. He defined leadership as "Interpersonal influence, directed through the communication process, toward the attainment of some goal or

---

[1] William R. Lassey, "Dimensions of Leadership," in Leadership and Social Change, ed. William R. Lassey and Richard R. Fernandez (La Jolla: University Associates, Inc., 1976), p. 15.

[2] Ralph M. Stogdill, Handbook of Leadership (New York: The Free Press, 1974), pp. 7-16.

[3] Ibid.

goals."[4] This includes the essential components of leadership definitions stipulated in Lassey's summarization as, "Leading toward goal achievement, involving interaction and influence, and usually resulting in some form of changed structure or behavior."[5]

In this study, the three components of Fleishman's definition are applicable. Interpersonal influence is assumed to be one way, with the leader influencing the subordinate. Variables, such as differences in job knowledge between supervisors and subordinates are hypothesized as affecting communications. The "attainment of some goal or goals" portion of the definition served as a foundation for the establishment of measurements of morale and productivity as the ultimate dependent or criteria variables.

Historical Perspectives of Leadership

During the 18th and 19th centuries, efforts to understand leadership generally were pursued from two perspectives, 1) evaluating outstanding leaders, or 2) evaluating historical occurrences which were thought to have caused people to act as great leaders. Men of letters thus debated if great men changed history, or if situations themselves caused men to be recognized as great leaders. Such men as Thomas Carlyle, Friedrich Nietzche, and William James expoused theories purporting that great men made great events and changed the course of history.[6]

---

[4] Edwin A. Fleishman, "Twenty Years of Consideration and Structure," in Current Developments in the Study of Leadership, ed. Edwin A. Fleishman and James G. Hunt (Carbondale: Southern Illinois University Press, 1973), p. 3.

[5] Lassey, "Dimensions of Leadership," p. 11.

[6] James B. Spotts, "The Problem of Leadership," in Leadership and Social Change, ed. Lassey and Fernandez, p. 45.

Hegel and Fichte developed "Zeitgeist" or situational theories, which rationalized that historical events caused great leaders, and in America, Brooks Adams, president of the American Historical Association, concluded that the events of history were determined by fixed forces.[7] This is not to say that interesting alternative philosophies did not exist. Emerson, for example, advocated the "great average man" theory.[8]

Emerson's deviation was itself characteristic of the times. The writings of such men as Adam Smith, Ricardo, Malthus, and Marx reflected efforts to explain a world which was beginning to experience rapid change brought about by industrialization and increased urbanization. The simplicity of the agrarian economies was being replaced by large cities supported by growing industries. It was not unnatural to search for explanations of how societies functioned under such visible crowding and complexity.[9] "The spirit of the age became uncongenial to leaders cut in a superhuman mold."[10] The search for basic natural economic laws that might be controlling nations went hand in hand with the situational theories.

After the turn of the century then, it was not an unnatural development to see the emphasis in leadership theory turning from reflections on great men toward the proliferating industrial working class and studies involving the common

---

7 Eugene E. Jennings, An Anatomy of Leadership (New York: Harper & Bros., 1960), pp. 9-10.

8 Ibid., p. 84.

9 Robert L. Heilbroner, The Worldly Philosophers (New York: Simon and Schuster, 1972), pp. 40-163.

10 Adam B. Ulam, "The Marxist Pattern," in Philosophers and Kings, ed. Dankwart A. Rustow (New York: George Braziller, Inc., 1970) p. 96.

leader. There developed extensive examinations of such leaders as first-level supervisors, military non-commissioned officers, high school group leaders, and day camp leaders; that is, leaders who were simply a part of the obvious, growing, urban multitude.[11]

It is not intended to say leadership theory was limited to the last three centuries. There were scholarly individuals who taught leadership principles throughout prior centuries; some of these theories are being retaught and discussed today. Socrates and Aristotle reflected upon the basic principles of leadership,[12] as did other writers dispersed around the world. Lao Tzu advocated participative management when he said, ". . . and when the best leader's work is done, the people say, 'we did it ourselves.'"[13] In fact, the very word "leadership" can be traced to the early Greek and Latin.[14]

This overview of leadership theory, abbreviated as it was, was given to describe the foundation upon which the considerable "trait" and "situational" research of this century was built. In the next chapter, trait and situational research will be discussed and those areas specifically pertaining to this study will be emphasized.

---

11 Stogdill, Handbook of Leadership, pp. 65-71 and 82-91.

12 Daniel A. Wren, The Evolution of Management Thought (New York: The Ronald Press Company, 1972), pp. 16-17.

13 Robert Townsend, Up the Organization (Greenwich: Fawcett Publications, Inc., 1970), p. 81.

14 Jennings, An Anatomy of Leadership, p. 3.

Major Areas of Concern

As we have defined "leadership," its objective is the "attainment of some goal or goals." In past leadership studies, numerous goals have been established as dependent variables, such as, satisfaction, morale, performance, grievances, turnover, absenteeism, popularity, motivation, etc.[15, 16]

In this study, we establish as our criteria variables the two most universally accepted goal variables, productivity and morale.[17, 18, 19] Note Kerr and Schriesheim's comment, "Overall, it is obvious that much more needs to be learned about the nature of cause-effect relationships between leader behavior variables and those concerning subordinate satisfaction, morale, and performance."[20]

Changes in morale and productivity are of major concern in the United States today. Productivity has been declining for some time, bringing with it

---

15 Abraham K. Korman, "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review," Personnel Psychology, Vol. 19, No. 4 (Winter, 1966), p. 357.

16 Chester A. Schriesheim, Robert J. House, and Steven Kerr, "Leader Initiating Structure: A Reconciliation of Discrepant Research Results and Some Empirical Tests," Organizational Behavior and Human Performance, Vol. 15 (1976), p. 314.

17 Korman, "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review," p. 357.

18 Stogdill, Handbook of Leadership, pp. 396-397.

19 Robert H. Miles and M. M. Petty, "Effectiveness in Small Bureaucracies," Academy of Management Journal, Vol. 20, No. 2 (1977), p. 238.

20 Steven Kerr and Chester Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," Personnel Psychology, Vol. 27 (1974), p. 564.

decreases in the potential standard of living.[21, 22] Numerous sociotechnical studies have strongly challenged the adequacy of the attention American business gives to employee satisfaction and morale. The implication often made is that lower satisfaction results in lower quality, and during the last decade, the decreasing proportion of some U.S. made products sold in America, such as automobiles, has often been linked to reasons of low quality relative to imported items.[23]

In view of the long standing controversy as to whether morale causes productivity or productivity causes morale,[24, 25, 26, 27] it was deemed inappropriate to use just one or the other of those variables in this study. Productivity and morale have, in turn, been used to account for a wide range of second order occurrences, such as, changes in turnover, accidents, and

---

21 U.S. President, Economic Report of the President, (Washington, D.C.: Government Printing Office, 1980), p. 160.

22 Bob Conrad, "The U.S. Productivity Crisis," Newsweek (Sept. 8, 1980), p. 53.

23 William G. Scott and Terence R. Mitchell, Organization Theory, A Structural and Behavioral Analysis (Homewood: Richard D. Irwin, Inc., 1972), pp. 242-251.

24 Arthur H. Brayfield and Walter H. Crockett, "Employee Attitudes and Employee Performance," Psychological Bulletin, Vol. 52, No. 5 (1955), p. 416.

25 Victor H. Vroom, Work and Motivation (New York: John Wiley & Sons, Inc., 1964), pp. 181-186.

26 Charles N. Greene, "The Satisfaction-Performance Controversy," in Motivation and Work Behavior, by Richard M. Steers and Lyman W. Porter (New York: McGraw-Hill Book Company, 1975), p. 245.

27 J. H. Kerr Inkson, "Self-Esteem as a Moderator of the Relationship Between Job Performance and Job Satisfaction," Journal of Applied Psychology, Vol. 63, No. 2 (1978), pp. 243-247.

absences.[28, 29] For several reasons then, both morale and productivity were used as criteria variables in this study.

Factors which induce the greatest changes in morale and productivity constitute the primary concern of this study. In this regard, research during the present century has concentrated on which characteristic traits, behaviors, and styles of leadership have been most responsible in causing subordinates' goal achievement. This study included variables from each of those categories.

Numerous styles have been cited in the literature, such as, accommodative, laissez faire, production-centered, developmental, and reductive.[30, 31] By far the most common method of classifying style has been in terms of the amount of subordinate participation allowed in the decision making process. As Gibb summarily explains, "The terms generally used to designate the opposing poles of this continuum are 'autocratic' and 'democratic' leadership."[32] This, of course, excludes "laissez faire" as a worthwhile extension of the democratic extreme. These two extremes are integral parts of two primary management schools, classical and behavioral. In this study, it was thus intended

---

28 Vroom, Work and Motivation, pp. 175-180.

29 Stephen J. Motowidlo and Walter C. Borman, "Relationships Between Military Morale, Motivation, Satisfaction, and Unit Effectiveness," Journal of Applied Psychology, Vol. 63, No. 1 (February, 1978), pp. 47-52.

30 James V. Clark, "Motivation in Work Groups: A Tentative View," in Organizational Behavior and Administration, by Paul R. Lawrence and John A. Seiler (Homewood: Richard D. Irwin, Inc., 1965), pp. 459-462.

31 M. Scott Myers, "Conditions for Manager Motivation," Harvard Business Review, Vol. 44, No. 1 (January-February, 1966), p. 59.

32 Cecil A. Gibb, "Leadership," in Handbook of Social Psychology, ed. Gardner Lindzey (Cambridge: Addison-Wesley Publishing Co., 1954), p. 908.

to establish two variables which could be used as approximations to autocratic and democratic styles of leadership.

The behavioral variables were "Consideration," "frequently described as supportive, socioemotional, or expressive,"[33] and "Initiating Structure," described as "highly directive and task oriented."[34] These variables were employed for two reasons. First, initially it was decided to use Consideration as an approximation of the democratic or participative style of leadership. Second, in recent decades these two behavior measurements have been among the most popular research tests in the leadership field[35] and thus provided a relationship with numerous studies which offered potential in both laying a foundation for this study and analyzing the results obtained here.

The third category of causal variables mentioned above, was that of leadership traits. During the first half of the present century, leadership research concentrated on traits which seemed intuitively to be causes of success in achieving goals. The causal variable of primary interest in this study would be classified as a trait. The overall intent of this study was to determine if the first-line supervisor's technical knowledge of his subordinates' jobs would be an even more important factor than his style of leadership in achieving organizational goals, specifically, morale and productivity. The thought that the supervisor's

---

[33] Robert J. House, Alan C. Filley, and Steven Kerr, "Relation of Leader Consideration and Initiating Structure to R and D Subordinates' Satisfaction," Administrative Science Quarterly, Vol. 16, (1971), p. 20.

[34] Ibid., p. 19.

[35] Henry P. Sims, "The Leader as a Manager of Reinforcement Contingencies: An Empirical Example and a Model," in Leadership: The Cutting Edge, ed. James G. Hunt and Lars L. Larson (Carbondale: Southern Illinois University Press, 1977), p. 133.

knowledge might be of such importance resulted from this writer's first-hand experience as a manager and a management consultant. It seemed well supported by personal experiences and observations of others. As a topic in the literature, the supervisor's knowledge of his subordinates' work has received far less attention in recent years, than that given to styles or behaviors of leaders.[36]

During the first half of this century, however, knowledge was the focus of considerable research,[37] likely because it was intuitively appealing as a means of achieving organizational goals. A few examples of the widespread intuitive belief that the supervisor's knowledge of his subordinates' jobs is an important factor in achieving goals, do seem in order. A Russian article made the point:[38]

> Ambition is a good quality, but it must be based on the ability to administer the podrazdeleniye, to drive a vehicle, or to fire a weapon, or to put it more precisely, it must be based on experience. And a lieutenant who only recently was a student in a military school has, as everyone knows, not too much experience. Consequently, it is necessary to begin with the striving to become a master of his job, to improve his work habits in educating others. Then everything will (be) up to standard--his knowledge and his job.

From the same article a quote from U.S.S.R. Minister of Defense, Marshal of the Soviet Union, D. F. Ustinov, serves as something of a harbinger of this study, approximating a call for both more job knowledge of subordinates' work and a participative style of management. He said ". . . irrespective of the specialty that you have received in the academy, each of you must constantly keep

---

36 Ibid.

37 Stogdill, Handbook of Leadership, p. 46.

38 V. Svetikov, cited by V. Petrov, "Getting Closer to People," Voyennyy Vestnik, No. 2 (Moscow: Feb., 1977), p. 28.

studying, must work painstakingly with your subordinates, must train and educate them, and show fatherly concern for them."[39]

In the United States, Fritz Roethlisberger stated that modern foreman training programs in some companies require that the foreman know "how to do the jobs he supervises better than the employees themselves."[40] Thompson stated:[41]

> In American public education, hospitals and social welfare organizations, the tendency has been to insist that competence related to the organization's technical core be an essential ingredient for the administrator; for example, in most cases, school administrators must hold teaching certificates.

This study involved an attempt to measure changes in productivity and morale, as well as whether the greatest part of the causes of those changes could be accounted for by the supervisors' leadership styles or the supervisors' technical knowledge of their subordinates' jobs.

The nature of this study mandated the final major area of concern, situational variables. A parallel to the discussions and writings of the 1800s, which contemplated if important historical events or situations caused men to act as great leaders, has been current research which considers the effectiveness of leadership in response to everyday, more mundane situations. The reasoning has been that certain traits, behaviors, or styles tend to be more or less effective, depending upon the situation. Considerable attention has been given to finding means of differentiating organizational situations and correspondingly measuring

---

[39] Petrov, "Getting Closer to People," p. 29.

[40] Fritz J. Roethlisberger, "The Foreman: Master and Victim of Double Talk," in Organizational Behavior and Administration, p. 435.

[41] James D. Thompson, Organizations in Action (New York: McGraw-Hill Book Company, 1967), p. 156.

how effectiveness varies. Research in that regard will be summarized in the next chapter. At this point it is only intended to establish the point that there is a need to include situational variables within this study.

Perrow stated, "Leadership style is a 'dependent variable' which depends upon or follows from something else. The setting or task is the 'independent variable': that which is independently determined by something else causes the variation in the dependent factor."[42] Korman, criticizing leadership studies, accused most researchers of ignoring such situational differences when he said, "Researchers have made little attempt to either conceptualize situational variables which might be relevant and/or measure them."[43] Kerr and Schriesheim stated in response, "Since the time of Korman's review, efforts have been made by many researchers to conceptualize situational variables relating to leadership behavior and to test the effects of such variables."[44]

The decision to include situational variables in this study was, however, not just a defensive determination. Intuitively one realizes that the effectiveness of leadership does change with the situation. Long before Korman's review, Stogdill, in 1948, was able to analyze 124 studies "Which indicated that patterns of leadership traits differ with the situations."[45]

---

[42] Charles Perrow, Organizational Analysis: A Sociological View (Belmont: Wadsworth Publishing Company, Inc., 1970), p. 6.

[43] Korman, "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review," p. 355.

[44] Kerr and Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," p. 40.

[45] Stogdill, Handbook of Leadership, p. 167.

Purpose of the Study

The major purpose of this study was to determine whether a first-line supervisor's knowledge of his subordinates' work is related more strongly to employee morale and productivity than is the supervisor's leadership style. It was an attempt to establish some evidence which would determine the degree of value of the supervisor's expertise in his subordinates' jobs, and to compare that value to the value of the more studied "style" variables.

It was ultimately decided to study this question using two different work groups, in order to learn how these relationships would vary in two, quite different situations.

Value of the Study

In a general sense, the value of the study could be separated into non-academic and academic categories. There were a number of important, non-academic implications. For many decades there has been an ongoing controversy regarding whether to promote first-line supervisors from among the best workers or to promote them from among those who offered the greatest management potential, on the basis of style, behavior, or traits. The practice has generally been to promote the most efficient workers.[46] This study was planned with the hope of shedding light on that controversy. If the supervisor's job knowledge were found to be the most important cause of favorable results in morale and productivity, it was believed that industrial promotion practices would have been shown to be correct.

---

[46] J. A. Patton, "Foremen: Misused, Abused, and Accused," Industry Week, Vol. 180 (1974), pp. 72-74.

From the organization's point of view, there exists the common practice of placing in different positions, management trainees who are usually inexperienced in the subordinates' work.[47] There has, also, been the common practice of rotating managers on the basis of their management skills, rather than on the basis of their technical competence in the subordinates' work.[48] If knowledge is shown to be more important in raising morale and productivity, neither of these practices would be justified. The implications would be that management training programs should involve placing management trainees in subordinate rather than supervisory positions, and too, it would be advisable to rotate managers less frequently.

For the worker attempting to move into a supervisory position, the importance of learning the specific, technical aspects of his own job would be emphasized. Rajkay and Hofstede[49] have shown that hierarchical differences interfere with a subordinate's perception, making it difficult for him to determine how much knowledge of subordinates' jobs a supervisor should have. It was believed this study would help eliminate that perception problem, and indicate the degree of importance a supervisor should attach to learning the technical aspects of his subordinates' jobs.

It was believed that, were the basic purpose of the study accomplished, some recommendations could be made involving the academic world. Trade

---

[47] Fred E. Fiedler, Martin M. Chemers, and Linda Mahar, Improving Leadership Effectiveness (New York: John Wiley & Sons, Inc., 1977), p. 194.

[48] Ibid.

[49] Laszlo I. Rajkay and Geert H. Hofstede, "Looking at the Boss and Looking at Ourselves," Management International Review, Vol. 16, (1976/2) pp. 61-71.

schools might be seen as a more important training ground for first-line supervisors. When academic institutions were called upon for training programs aimed at enhancing the abilities of first-line supervisors, the goals of those programs would appropriately involve less in the way of attempts to develop personality, attitude, and behavioral skills. The stress would shift toward developing their knowledge of their subordinates' work.

The value of the study to the university system is complicated by the university's perspective regarding where its students will be employed within organizational hierarchies. Of the 78 subordinates involved in this study, only 11 percent had completed four years of college, but 40 percent had had some college. Of 38 supervisors tested (not all were included in the statistical analysis), 63 percent had at least some college work, and 21 percent had completed college. If universities attempt to prepare their students for some higher levels in organizational hierarchies, they might well consider the reality that the ladders to those higher levels usually include first-line supervisory positions. At the same time, second-level supervisors have a responsibility to train and develop first-line supervisors, and the nature of that task might well include developing knowledge of the work performed at the bottom level of the organization. Courses involving statistics, management science, industrial engineering, and so on, would likely be beneficial to students in that regard.

It was planned to examine two groups of subjects. The major differences between the groups would be the levels of task difficulty and task variability of their work. It was planned that these dimensions, task difficulty and task variability, would establish a basis of differentiating groups in accordance with Perrow's Model. It was intended that this method of classification would allow this study to be compared against Perrow's Model and hypotheses.

Finally, as this study employed path analysis techniques, it was believed that insight would be obtained regarding the relationship among the several variables used.

Limitations of the Study

There were four major limitations involved in this study. The subjects studied were all United States Army personnel stationed in West Germany. The first limitation, then, involved the appropriateness of generalizing from such a restricted sample. The United States Army likely attracts individuals who differ somewhat from United States workers in general. One example would be that 37 percent of the subjects came from what were once the Confederate States. The average age of all subjects was 26.8 years, however, there is no comparable statistic available for the entire United States work force showing the average age of first-line supervisors and their subordinates. The average age of the entire United States work force was, however, about 29.3 years.[50] At the same time, it would not be unreasonable to expect that the United States Army would be one of the last remaining bastions with a proclivity toward the acceptance of autocracy, since personnel must be trained to follow orders without question in times of battle. This is based on the writer's military experience as well as common knowledge.

The second limitation resulted from the examination of just two different types of work. This limited the scope of the situational considerations.

The third limitation involved the generalization that the autocratic and democratic styles of leadership could be represented by the tests used here. The

---

[50] The World Almanac and Book of Facts, 1979 (New York: Newspaper Enterprise Association, Inc., 1979), p. 203.

tests used seemed the best approximations of those styles that were available at the time the study was conducted.

The fourth limitation had to do with the fact that supervisors rated their own styles of leaderships and the productivity of their employees. Though supervisors' styles were also rated by subordinates, there was no comparable cross-check for productivity.

CHAPTER II

REVIEW OF THE RELEVANT LITERATURE AND RESEARCH

Overview of Research Literature

Leadership literature is both extensive and contradictory. Bennis has stated:[1]

> The lack of consensus in this whole area of leadership and authority cannot be blamed on a reluctance by social scientists to engage in empirical research on projects related to these topics. In fact, the problem is not so much that there is little evidence, but that the mountain of evidence which is available appears to be so contradictory, and some of the theorists have radically modified their own points of view in the course of their writings on these subjects.

Likewise, Stogdill commented: "Four decades of research on leadership have produced a bewildering mass of findings."[2]

This chapter's review of the literature and research cannot involve an in-depth review of the numerous leadership topics and controversies. Instead, the attempt is made to give, first, a general review of the literature under the headings "Trait Approach," and "Barrow's Classifications." Next, the research which relates closely to this study is more thoroughly reviewed under the heading "Research Pertaining to Variables Specifically Used in this Study."

---

1 Warren G. Bennis, "Leadership Theory and Administrative Behavior: The Problem of Authority," Administrative Science Quarterly, Vol 4 (1959), p. 259.

2 Stogdill, Handbook of Leadership, p. vii.

Trait Approach

The work which the U.S. Army did during World Way I, in regard to the preparation of selection and classification tests paved the way to what was the first concentration of major efforts in leadership research, and what was to be the primary concentration of research during the first half of the present century, the examination of leadership "traits."[3] The perspective attempted to take into account, or identify, which traits made leaders more effective, and by extension, to determine which characteristics would enable the determination of those who would have leadership potential. The first half of the century reflected the formulation and completion of numerous empirical and experimental studies which attempted to evaluate numerous traits. Stogdill summarized from 124 "studies" involving over 40 different traits.[4] His studies were ones involving a minimum of three "investigators."[5] Stogdill updated his survey in 1970, adding an additional 163 studies. He summarized by dividing the trait characteristics evaluated into six categories: physical characteristics, social backgrounds, intelligence and ability, personality, task-related characteristics, and social characteristics.[6]

Though such studies are still being performed, Melcher points out the following:[7]

> The effort was largely abandoned when several review essays revealed no personality traits were common among effective or ineffective leaders;

---

3 Ibid., p. 72.

4 Ibid., pp. 74-75.

5 Ibid., p. 35.

6 Ibid., pp. 72-82.

7 Arlyn J. Melcher, "Leadership Models and Research Approaches," in Leadership: The Cutting Edge, ed., Hunt and Larson, pp. 94-95.

> variations on this theme are still receiving tangential attention by scholarly cloisterers, such as those who are trying to identify the characteristics of leaders and followers - or more obliquely - the degree leaders and followers are similar or dissimilar in terms of impressionistic characteristics or physical analogies such as hot and cold, weak or strong. These attempts are turning out to be unproductive.

Barrow attempted to explain the reduced emphasis upon studying leadership traits by saying, "It became evident that its closed system orientation could not be empirically supported, since personality traits related to leadership in one situation were not generally predictive in other situations."[8]

Barrow continued by listing and explaining his categorizations of the four "Primary leadership orientations which followed the decline of the trait approach: leader behavior investigations, situational and reciprocal causation investigations, leadership effectiveness theories, and normative leadership approaches."[9] The broad orientations of leadership research will be covered next, using Barrow's classifications.

Barrow's Classifications

Leader Behavior Investigations

This direction of research effort examines what leaders do or how they behave. Barrow lists six examples which may be included within this classification: the Ohio State Studies, the University of Michigan Survey Research Center Studies, Bales' Socio-Emotional/Task Specialists, Mann's Skill Mix, Bowers and Seashore's Four-Factor Theory, and Wofford's Managerial Behaviors.[10]

---

8 Jeffrey C. Barrow, "The Variables of Leadership: A Review and Conceptual Framework," Academy of Management Review (April, 1977), p. 232.

9 Ibid.

10 Ibid., pp. 232-233.

Of the six, the Ohio State Studies dominated the direction of leadership studies, leading Sims to conclude in 1977:[11]

> Over the past ten years, two points of focus have generally dominated leadership research. First the Ohio State leadership scales . . . have been the pre-eminent leader dimensions of interest. The second point of focus has been the attempt to construct so-called 'contingency' theories of leadership. . . .

The contingency theories will be considered later.

The Ohio State Studies led to the definitions of two types of behavior and the development of measuring instruments for them. The behaviors were defined by Fleishman as:[12]

> Consideration (C). Reflects the extent to which one's supervisor exhibits behavior indicative of friendship, mutual trust and respect, and good 'human relations' toward the members of his group. A high score on this dimension indicates a climate for good rapport and two way communication; a low score indicates that the supervisor is seen to be more impersonal in his relations with group members.
>
> Structure (S). Reflects the extent to which one's supervisor exhibits the behavior of a leader in organizing and defining the relationships between himself and the group, defining interactions among group members, establishing ways of getting the job done, scheduling, criticizing, etc. A high score on this dimension describes the supervisor who plays a very active role in directing group activities through planning, supplying information, trying out new ideas, criticizing and so forth. A low score characterizes supervisors who are likely to be relatively inactive in giving direction in these ways.

Behavior versus Traits

Since this study involved both "trait" and "behavioral" variables, a discussion of those classifications seems worthwhile at this point. Webster's defines a trait as, "A distinguishing quality or characteristic, as of

---

[11] Henry P. Sims, "The Leader as a Manager of Reinforcement Contingencies: An Empirical Example and a Model," p. 133.

[12] Edwin A. Fleishman, Manual for the Supervisory Behavior Description Questionnaire (Washington, D.C.: American Institutes for Research, 1972), p. 1.

personality."[13] In turn, the same Webster's defines personality as, "Habitual patterns and qualities of behavior . . . ."[14] A clear dichotomy of the terms seems questionable. Hilgard defines personality as incorporating both trait and behavior characteristics by saying it represents "The configuration of individual characteristics and ways of behaving which determines an individual's unique adjustment to his environment."[15] The total of these definitions seems to be the implication that a behavior constitutes a manner of acting and is resultant from a group of traits. Barrow does, in fact, make the distinction, "(The leader behavior investigations) shifted the emphasis from personality characteristics to the study of what the leader actually does."[16] One could question if it is at all practical to say that a supervisor has certain characteristics, given he never displayed them through actions. Should a supervisor be ascribed the characteristics of aggressiveness, tough-mindedness, or dominance, if he has only displayed a lack of aggression, a lack of tough-mindedness, and ascendance? There would seem little point to establishing that a person had a particular characteristic trait, if he were never to display it.

This deliberation leads strongly to the conclusion that Barrow's "behaviors" are, in fact, actions resultant from groups of traits. It appears that the dichotomy between the research emphasis in the first half versus the remainder of the present century might well have been a matter of examining

---

13 Webster's New World Dictionary, 2d ed. (1970), s.v. "trait."

14 Ibid., s.v. "personality."

15 Ernest R. Hilgard, cited by Thomas S. Robertson, Consumer Behavior (Glenview: Scott, Foresman and Company, 1970), p. 39.

16 Barrow, "The Variables of Leadership," p. 233.

individual traits versus clusters of traits. It is hard to square such a possibility with Fleishman's statements: "Twenty years ago the pendulum in leadership research took a sharp swing away from a view of leadership as a personality trait, but I believe it is time to revive interest in this view,"[17] and, "It is difficult to recall now how entrenched the trait view of leadership was up to that time (late 1940s)."[18]

In Stogdill's summary of traits, he categorized them into six groups. Perhaps due to his familiarity with the Ohio State Studies, the Consideration and Initiating Structure behaviors seem conveniently equatable with his groupings. Consideration might include some of his traits listed under "Social Characteristics," specifically: ability to enlist cooperation, cooperativeness, nurturance, sociability, interpersonal skills, social participation, tact, and diplomacy.[19] Structure can be conceived as a behavior involving traits included under his "Task-related Characteristics," such as, task orientation, responsible in pursuit of objectives, initiative, and drive for responsibility.[20]

In fact, each of the variables ultimately used in this study could be categorized in one of Stogdill's six trait classifications: "age" is specifically included under "Physical Characteristics," "education" is specifically mentioned under "Social Background," "knowledge" is specifically listed unter "Intelligence and Ability," and "autocracy" is inferred by the traits listed under

---

17 Fleishman and Hunt, Current Developments in the Study of Leadership, p. 182.

18 Ibid., p. 62.

19 Stogdill, Handbook of Leadership, p. 81.

20 Ibid., p. 80.

"Personality."[21] The logic of the inference can be seen when the descriptions of the subparts of the autocracy test which was used, the Adorno F Test, are compared with Stogdill's "Personality" traits. The descriptions of the nine subparts of the Adorno test can be reduced to: rigid adherence to middle-class values; submissive and uncritical attitude; tendency to condemn, reject, and punish; opposition to the subjective and imaginative; belief in mystical determinants of fate, and thinking in rigid categories; preoccupation with dominance-submission and identification with power figures; generalized hostility and cynicism; belief that wild and dangerous things go on; and, exaggerated concern with sexual "goings-on."[22] Those traits listed under Stogdill's "Personality" classification include: nonconformity, tough-mindedness, adjustment, normality, aggressiveness, emotional balance, ascendance, dominance, originality, and creativity.[23]

In this comparison of behaviors and traits, one final point seems in order. Tests which have been purported to measure behaviors were used in this study. Two of the tests, the Consideration and Adorno Tests, were believed to be the best available proxies for those leadership styles labeled democratic and participative. Behaviors and styles may be patterned actions resultant from certain compositions of traits.

This comparison was intended to establish a basis for the Chapter V discussion of the adequacy of existant behavioral tests; that is, the present

---

21 Ibid., p. 72-82.

22 T.W. Adorno et al., The Authoritarian Personality (New York: W.W. Norton and Co., 1969), pp. 248-250.

23 Stogdill, Handbook of Leadership, p. 79.

behavioral tests might be more predictive of goal achievement were they to include additional traits, or at least, be examined in light of additional traits.

Situational and Reciprocal Causation Investigations

In this, Barrow's second classification, the studies include those which examine situational factors and ". . . attempts to specify the interacting causal influences of leader behavior and subordinate activities."[24]

In this study, the attempt was made to evaluate situational factors by testing two work groups whose work would be differentiated in such a way that it would be classifiable under existing leadership models. Situational models which have been employed have differentiated situations on the basis of factors such as complexity, type of task, technology, size of project, organizational size, external threat and stress, organizational climate, supervisory level, span of control, supervisory level, variations in leader power, time demands, and so on.[25]

Due to the large number of studies and the wide variety of situational factors examined, Barrow did not attempt to specify certain studies which would be representative of this classification. When discussing reciprocal causation investigations, the more restricted portion of the classification, he continued to discuss the area conceptually, rather than in terms of specific studies. He stated, ". . . reciprocal causation attempts to specify the interacting causal influences of leader behavior and subordinate activities."[26]

This study was tied to the reciprocal causation concept since three of the variables ultimately used involved ratio measurements; such as those which

---

[24] Barrow, "The Variables of Leadership," p. 233.

[25] Ibid., pp. 233-234.

[26] Ibid., p. 234.

indicated how much greater a supervisor's knowledge was than that of his subordinates. For that knowledge comparison, it was believed mutual influence and expectations would differ, depending upon whether the differences between the supervisor's and subordinates' levels of knowledge were large or small.

A final situational consideration should be mentioned. It was believed that, by limiting this study to U.S. Army personnel stationed in Germany, each of the two work groups studied would have relatively homogeneous situational factors within the work groups themselves.

Leadership Effectiveness Theories

Regarding this classification, Barrow states:[27]

> Several empirically-tested theories of leadership effectivness postulate complex interactions between numerous variables. A characteristic assumption is that a particular leadership style, used in the appropriate situation, will result in greater effectiveness than other leadership styles.

Though this and Barrow's final category emphasize the appropriate style or behavior to be used in light of the situation, the stress in this category is that the models included "postulate complex interactions between numerous variables," while models included in the final category regard what a leader "should" do to be effective in any given situation.[28]

Under this classification, he discusses Fiedler's Contingency Model and House's Path-Goal Theory of Leadership Effectiveness.[29] At least three of House's 1971 hypotheses can be examined through the methods used in this study, even though House's Path-Goal Theory was presented as a method based upon

---

27 Ibid.

28 Ibid., pp. 234-235.

29 Ibid.

Evan's extension of Vroom's Expectancy Theory and involved, then, measurement tests not included here.[30]

In his third hypothesis, House stated, "Structure serves to reduce role ambiguity and clarify path-goal relationships for ambiguous tasks but is viewed as unnecessary and redundant for nonambiguous tasks."[31] In his fifth hypothesis, he stated, "Where tasks are interdependent, varied, and ambiguous, consideration will result in social support, friendliness among group members, increased cohesiveness . . . increas(ing) the net sum of positive valences . . . cooperation and team spirit."[32] In his ninth hypothesis, he stated, "Under conditions of authoritarian or punitive leadership, both leader initiating structure and leader hierarchical influence will be negatively related to subordinate satisfaction."[33]

Normative Leadership Approaches

In discussing this normative approach category, what a leader "should" do in a given situation, Barrow talked of models such as Blake and Mouton's Managerial Grid, Reddin's Tri-dimensional Model, Hersey and Blanchard's Life Cycle Theory, Likert's Continuum, and Yukl's Multiple Linkage Model.[34]

Hersey and Blanchard's Life Cycle Theory of Leadership hypothesized about the relationship between subordinates' maturity and their supervisor's style of leadership. The claim was made that as subordinates' maturity increased, their leader's behavior should change to include less Structure and more Consideration.

---

30 House, "A Path Goal Theory of Leader Effectiveness," p. 321.

31 Ibid., p. 325.

32 Ibid.

33 Ibid.

34 Barrow, "The Variables of Leadership," pp. 235-237.

With the inclusion of a variable for age in this study, it seemed possible to comment on this view.[35]

Research Pertaining to Variables Specifically Used in this Study

Due to the variety and extent of leadership research, it is appropriate to move from a general discussion to one more limited to the nature of this particular study. That will be done through the remainder of this chapter by discussing research regarding each of the variables used here.

Morale and Productivity

To discuss research conducted in regard to these two variables in general would necessitate a broad discussion of the various categories of the research previously mentioned, since these were the most used criteria variables for all categories. They will, then, be discussed in regard to the variables specifically used in this study. A few comments, however, should be made.

Motowidlo and Borman have pointed out that morale is a composite variable which might be said to include three elements; satisfaction, motivation, and group cohesiveness.[36] They further state that the morale test used in this study (Job Descriptive Index) is a measure of only satisfaction.[37] The test used in this study might, then, be thought of as a proxy variable for morale. The terms morale and satisfaction are used interchangeably in this study. That freedom was taken since it was assumed that satisfaction was the primary element constituting morale, there was considerable precedent in the literature, there was little

---

35 Ibid., p. 236.

36 Motowidlo and Borman, "Relationships Between Military Morale, Motivation, Satisfaction, and Unit Effectiveness," p. 47.

37 Ibid., p. 49.

agreement about what did exactly constitute morale, and those who would read this dissertation would be made aware of the possible inequality of the terms.[38]

Consideration and Initiating Structure

These two variables have been previously defined, and constitute the behaviors which have received the greatest amount of research attention during recent decades. Due to the extensive number of studies, only the more salient points from summaries made by others will be given here.

First, in a general sense, Consideration and Initiating Structure have served as independent variables correlated with many variables other than those criteria variables used in this study. The relationship between these two behaviors and such variables as grievances, absenteeism, accidents, turnover, technical competence, popularity, and related factors, has received extensive examination.[39] One might then, on the basis of this study, draw inferences regarding criteria variables of other studies; for example, if in this study, high Consideration is shown to be causally related to high morale, the causation might be extended to infer that the high Consideration would likely lead also to reduced grievances, absenteeism, and turnover.

Returning to an examination of the research regarding the relationships Consideration and Initiating Structure have been shown to have with morale and productivity, it can be noted that Korman summarized the Consideration relationships in 1966 by saying that behavior "Might have some relation to a 'pleasantly affective' work situation," and that it seemed to cause increased

---

[38] Ibid., p. 47.

[39] Korman, "'Consideration,' Initiating Structure,' and Organizational Criteria - A Review," pp. 356-357.

performance.[40] House, reflecting on the literature in 1971, said that increased Consideration seemed to cause increased satisfaction.[41] In his 1974 summary, Stogdill stated that increased Consideration did seem to be shown as a cause of increased satisfaction.[42] The Schriesheim et al. summary updated the reviews in 1976, giving the conclusion that increased Consideration led to both increased satisfaction and productivity.[43] It should be noted, however, among the various studies there were considerable differences in correlation strengths and significance levels. In general, the causation between Consideration and satisfaction was better substantiated than the causation between Consideration and productivity. The differences among studies caused Schriesheim et al. to say that factors that cause variation in the results of the studies "remain largely unspecified."[44] It is hoped that this study might shed some light on that problem.

Examining the same authorities' comments, regarding Initiating Structure, leads to more dubious conclusions. Korman stated that when the LOQ (Leadership Opinion Questionnaire) was used to measure Structure, the effects of Structure were "Quite inconsistent and no discernible pattern appears except for the prevalence of low correlations."[45] He continued by saying that when the LBDQ (Leader Behavior Description Questionnaire) was used to measure Structure, that

---

[40] Ibid., pp. 351 and 354.

[41] House, "A Path Goal Theory of Leader Effectiveness." p. 321.

[42] Stogdill, Handbook of Leadership, pp. 395-396.

[43] Schriesheim, House, and Kerr, "Leader Initiating Structure: A Reconciliation of Discrepant Research Results and Some Empirical Tests," p. 297.

[44] Ibid.

[45] Korman, "'Consideration,' Initiating Structure,' and Organizational Criteria - A Review," p. 354.

behavior seemed to be negatively related to performance.[46] Stodgill and House summarily concluded the preponderance of evidence indicated otherwise; that is, increased Structure seemed to cause increased productivity.[47] Finally, in 1976, Schriesheim, et al. said, the "Nature and importance of Initiating Structure is confused and uncertain," as they discussed studies which showed it was both positively and negatively related to both satisfaction and productivity.[48] They did, however, add that when the SBDQ (Supervisory Behavior Description Questionnaire) was used in regard to first-level supervisors (the level used in this study), Structure was negatively related to satisfaction and positively related to performance ratings.[49] The SBDQ was used in this study.

Assuming the emotionally unattached stance of the researcher, it is appropriate that mention be made of the criticisms leveled at those previously conducting studies in the area. Certainly the most cited critic has been Korman, who found five areas to attack in his summary of the shortcomings of studies examining the Consideration and Structure behaviors. Kerr and Schriesheim later commented on the progress, if any, which had been made in mitigating those criticisms. One of the five criticisms, that involving situational variables, will be discussed in a later portion of this chapter, but the other four will be discussed at this point.

---

[46] Ibid.

[47] Stogdill, Handbook of Leadership, p. 395; House, "A Path Goal Theory of Leader Effectiveness," p. 321.

[48] Schriesheim, House, and Kerr, "Leader Initiating Structure: A Reconciliation of Discrepant Research Results and Some Empirical Tests," pp. 297-298.

[49] Ibid., p. 301.

Korman criticized studies on the basis of generally insignificant correlations between behavioral and criteria variables.[50] In 1974, Kerr and Schriesheim stated that this was no longer the problem it had been in 1966, due to "Increased efforts by researchers to conceptualize and measure situational variables," and the "decreasing use of 'averaged' data."[51] As mentioned, situational variables will be discussed later in this chapter. Subordinate test scores were not averaged in this study. Also, in the last chapter of this dissertation, an attempt is made to establish an additional explanation regarding why insignificant correlations did tend to occur.

Korman was also critical of the construction of studies which involved "Predictor and criterion ratings being made by the same people."[52] It is possible to criticize this study on the same grounds. Due to time limitations in conducting testing used in this study and attempts to minimize work disruptions, it seemed extremely difficult to attempt to obtain such ratings in any other way. Kerr and Schriesheim acknowledge the problem and state that it is impossible to ascertain the seriousness of the results.[53]

Korman based one of his criticisms upon Vroom's work, stating, "Vroom (1964) has pointed out that a supervisor might be more considerate of a superior subordinate than one who is not an effective performer, thus reversing the causal

---

[50] Korman, "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review," p. 351.

[51] Kerr and Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," pp. 558-559.

[52] Korman, "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review," p. 351.

[53] Kerr and Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," p. 561.

relationship usually hypothesized."[54] Kerr and Schriesheim were able to find only two studies in which attempts were made to overcome this problem by ". . . inferring causality from evidence that one variable did not occur before another,"[55] and concluded Korman's criticism remained "nearly as valid" as it was in 1966.[56] Variables included within this study, however, ultimately established a means for at least partially overcoming the criticism.

Korman's final criticism dealt with the possibility that relationships between the two behavioral measures and criteria variables might be curvilinear.[57] Only certain ranges of Consideration and Structure scores might be applicable for comparison with criteria scores. Kerr and Schriesheim indicate a first step has been taken, through data accumulation, but the problem "has still not been directly confronted."[58] In this study it was planned to conduct a direct examination of residuals for all relationships between dependent and their respective independent variables.

Knowledge

Stogdill reported on 23 studies which discussed the variable "knowledge" as a trait affecting leadership.[59] Approximately half of those studies were

---

[54] Korman, "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review," p. 354.

[55] Kerr and Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," p. 561.

[56] Ibid., p. 564.

[57] Korman, "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review," p. 359.

[58] Kerr and Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," p. 564.

[59] Stogdill, Handbook of Leadership, pp. 46 and 78.

performed before 1948 and appear to have involved empirical observations and interviews as opposed to the more refined research techniques that would come later. The definition of knowledge varied among those studies. It was equated with such concepts as clear judgment, ability to make constructive and creative suggestions, originality and constructive imagination, and greater intensity of application and industry.[60] Several of the studies involved school children as subjects.[61] Specifically, the Stogdill summary did not lend to locating previous research which was comparable to this study in respect to the knowledge variable.

To locate previous studies which came nearer to evaluating the supervisors' knowledge from the perspective used here, it was necessary to look elsewhere. Due to the plethora of leadership research, it was possible to locate several studies which approached the use of the knowledge variable used here. Baumgartel used a "task relevance" variable and stated that a leader with high task relevance would "first be one who would be himself a competent" person in the work his subordinates were performing,[62] but then proceeded to examine "task relevance" as "The fit of the leader's skills and motivations with the primary goals of the organization."[63] Terborg discussed "ability" as a characteristic which "Refers to a person's currently developed power to perform some task," but then went on to state that it is ". . . considered to be a relatively stable individual

---

60 Ibid.

61 Ibid., pp. 66, 67, and 71.

62 Howard Baumgartel, "Leadership, Motivations, and Attitudes in Research Laboratories," The Journal of Social Issues, Vol. 12, No. 2 (1956), p. 25.

63 Ibid., p. 27.

characteristic."[64] Given this study's definition of knowledge as the supervisor's knowledge of his subordinates' jobs, Terborg's concept would be inconsistent with that used here. He did say, however, "Given these models are relatively straightforward and seem intuitively correct, it was somewhat surprising to find that a review of the pertinent literature offered only marginal support for the notions that ability, effort, and role perceptions influence performance."[65] The strongest positive relationships which he was able to locate in the research were between measures of ability and performance.[66] Comrey, High, and Wilson used a "job competence" variable as one of 19 variables measured through the use of Likert type scales. There were four questions used to measure job competence in the survey. The questions reflected the same "knowledge" concept as used here; for example, they asked questions such as, "When a subordinate doesn't know how to do a job, he (foreman) can show or explain how it is done," and, "When a tough job comes up, he (foreman) has the technical 'know-how' to get it done."[67] Aside from the problem of limiting the measurement of the variable through the use of only four questions, the study was inconsistent with this research in that "The unit evaluated was the department, headed by a foreman," and under him were several supervisors.[68] The conclusions involved statements indicating job competence

---

[64] James R. Terborg, "Validation and Extension of an Individual Differences Model of Work Performance," Organizational Behavior and Human Performance, Vol. 18 (1977), p. 188.

[65] Ibid., p. 189.

[66] Ibid.

[67] Andrew L. Comrey, Wallace High, and Robert C. Wilson, "Factors Influencing Organizational Effectiveness VI. A Survey of Aircraft Workers." Personnel Psychology, Vol. 8, No. 1 (Spring, 1955), p. 86.

[68] Ibid., p. 96.

was an important variable, such as, "Although the trends are not very regular, the 'high' departments have good scores and the 'low' departments poor scores on . . . Job Competence . . . ."[69] Cooper's 1966 study included one unstructured question which gave evidence of the intuitive belief on which this study was based. He measured "Task-relevant variables (i.e., intelligence, job knowledge, and motivation) on the behavior of subordinates."[70] Though the various questions did not compare well with the concept of knowledge used in this study, Cooper was so impressed by the unstructured responses to one question that he listed several of them. The question, "How important do you think it is for a work group to have confidence in the ability of the leader?" elicited responses which could readily be interpreted as indicating that subordinates attached considerable importance to their supervisors' knowledge of their (subordinates') jobs. One response, for example, was, "He must be able to do things that you can't."[71]

Though the literature indicates supervisors, subordinates, and researchers have intuitively believed the supervisors' knowledge of the subordinates' work would affect the subordinates' morale and productivity, statistical evidence substantiating the belief has been lacking. It was that same intuitive belief, based upon personal experience and observation, rather than the results of previous studies, which led to the development of this study.

---

69 Ibid., p. 95.

70 Robert Cooper, "Leader's Task Relevance and Subordinate Behaviour in Industrial Work Groups," Human Relations, Vol. 19 (1966), p. 57.

71 Ibid., p. 75.

Autocracy

As has been mentioned, autocratic and participatory styles of management are often equated with the classical and behavioral schools of management, consequently these styles have received much attention in the literature and numerous alternate labels are equated with them. Rice and Bishoprich summarized some of the terms, stating the autocratic style is comparable to Authority Concentrated, McGregor's Theory X, the Machine Model, Boss' Will, Concentrated Knowledge, Command, and Coercion. They equated the participative style with Authority Distributed, McGregor's Theory Y, Homeostatic Cooperation, Members' Will, Distributed Knowledge, Egalitarianism, Custom, and Self-Discipline.[72] Their book emphasizes a single continuum based upon the amount of subordinate participation in the decision making process.[73] Sheridan, et al. would add to their labels on the continuum by stating that the autocratic leader "rules with an iron hand" and "insists that everything be done his way."[74] The universality of acceptance of the autocratic-democratic continuum is illustrated by equating its extremes with terms used by various authorities, as well as the expressive terms of those attempting to explain the extremes through the use of more empathetic phraseology. Gibb was one of the early writers who expressed

---

[72] George H. Rice and Dean W. Bishoprich, Conceptual Models of Organization (New York: Appleton-Century-Crofts, 1971), p. 208.

[73] Ibid., p. 3.

[74] John E. Sheridan, H. Kirk Downey, and John W. Slocum, "Testing Causal Relationships of House's Path-Goal Theory of Leadership Effectiveness," in Leadership Frontiers, ed. James G. Hunt and Lars L. Larson (Kent: Comparative Administration Research Institute, 1975), p. 79.

the universality of acceptance of the continuum through his 1954 article,[75] yet he made the point that the continuum could be perceived as extending past "authoritarian leadership" to an even more extreme autocratic pole labeled "authoritarian headship."[76] Others have claimed that egalitarianism or laissez faire is the ultimate extension of the participation extreme.[77] The great majority of discussion and research is limited, however, to the autocratic and democratic extremes.[78]

Lippitt's 1940 work has been credited with early establishment of the effects of leadership styles on subordinates.[79] Since that time there have been a number of excellent summaries of the literature regarding the effects of autocratic and democratic styles of leadership. In this recap it is not intended to cover the democratic style specifically, since that style was represented by the proxy measurement Consideration. The research regarding Consideration has, however, been reviewed at length. Since the two styles are extremes of one continuum, discussions involving one style usually include references to the other. Discussing, for example, the autocratic proclivity of a leader often involves discussing how far that person has moved toward the participative extreme.

---

75 Gibb, "Leadership," p. 909.

76 Ibid., p. 908.

77 Harold J. Leavitt, "Unhuman Organizations," Harvard Business Review, Vol. 40, No. 4 (July-August, 1962), p. 98.

78 Gibb, "Leadership," p. 908.

79 Bruce J. Crowe, Stephen Bochner, and Alfred W. Clark, "The Effects of Subordinates' Behaviour on Managerial Style," Human Relations, Vol. 25, No. 3 (1972), pp. 215-237.

Lowin summarized the literature in 1968, stating that the effectiveness of style was dependent on situational variables, saying, "It is abundantly clear that any simplistic . . . hypothesis is too gross to be proven or disproven." He concluded his article with the following:[80]

> Instead of trying wastefully to 'prove or disprove' the . . . hypothesis, future research would do well to focus on these intermediate conditions (moderating situational variables) in order to ascertain the parameters of . . . effectiveness.

Tannenbaum and Schmidt, widely recognized for their model depicting seven managerial behaviors along the continuum, concluded the effects of autocratic leadership on productivity could be favorable or unfavorable, depending on the situation, and said:[81]

> The successful manager of men can be primarily characterized neither as a strong leader nor as a permissive one. Rather he is one who maintains a high batting average in accurately assessing the forces that determine what his most appropriate behavior at any given time should be and in actually being able to behave accordiingly.

Tannenbaum did, however, visualize subordinate satisfaction as increasing with the superior's distance from the autocratic pole. "While we see greater opportunity for human satisfaction," as we move away from the autocratic pole toward increased participation, "the result is not simple felicity. Whenever man is highly

---

[80] Aaron Lowin, "Participative Decision Making: A Model, Literature Critique, and Prescriptions for Research," Organizational Behavior and Human Performance, Vol. 3 (1968), p. 99.

[81] Robert Tannenbaum and Warren H. Schmidt, "How to Choose a Leadership Pattern," Harvard Business Review. Vol. 36, No. 2 (March-April, 1958), p. 101.

motivated, he may experience the pangs of failure as well as the joys of success."[82]

Stogdill, after analyzing 23 studies, provided a fine summary of "Democratic and Autocratic Patterns of Behavior,"[83] concluding it with the statement:[84]

> The . . . results clearly indicate that neither democratic nor autocratic supervision can be advocated as a method for increasing productivity, but member satisfaction is associated with a democratic style of supervision.

The Tavistock studies have indicated authoritarianism, as a definitional component of the mechanistic organization, leads to increased quantity but reduced quality.[85]

Though authorities, such as House[86] and Vroom,[87] indicate that in certain situations autocracy leads to increased subordinate satisfaction, the preponderance of research depicts reduced satisfaction as a consequence of higher levels of autocratic treatment. The conclusions regarding the effects of autocracy upon productivity are dubious and situational.

---

[82] Arnold S. Tannenbaum, Control in Organizations (New York: McGraw-Hill Book Company, 1968), p. 311.

[83] Stogdill, Handbook of Leadership, pp. 365-370.

[84] Ibid., p. 370.

[85] P. G. Herbst, Socio-Technical Design (London: Tavistock Publications, 1974), pp. 1-10.

[86] Robert J. House, "A Path Goal Theory of Leader Effectiveness," Administrative Science Quarterly, Vol. 16, No. 3 (1971), pp. 325-326.

[87] Victor H. Vroom, "Some Personality Determinants of the Effects of Participation," Journal of Abnormal Psychology, Vol. 59 (1959), p. 326.

In order to lay a foundation to justify the autocracy test used in this study, some final comments need to be made at this point. Though it has been a common practice to associate Consideration with democratic leadership[88] numerous researchers have indicated that Initiating Structure is not equatable with autocracy.[89] On that basis it was decided not to use Initiating Structure as a measurement of autocracy in this study. The measurement ultimately used here reflected agreement with Byrne's statement, "The most obvious origins of a system of attitudes and beliefs such as authoritarianism would be expected to lie in the experiences of an individual with parents and others relatively early in life."[90]

Age

Stogdill was faced with an interesting dilemma as he attempted to summarize two groups of studies involving age as a trait variable. In his summary of 19 studies performed before 1948, the results between age and effective leadership were mixed, causing him to say, "In view of these various findings chronological age cannot be regarded as a factor which is correlated with leadership in any uniform direction or degree."[91] The six post-1948 studies he reviewed all indicated that leadership effectiveness increased with age.[92] To reconcile the

---

88 S. M. Sales, cited by Gary Yukl, "Toward a Behavioral Theory of Leadership," Organizational Behavior and Human Performance, Vol. 6 (1971), p. 416.

89 Yukl, "Toward a Behavioral Theory of Leadership," p. 417.

90 Donn Byrne, "Parental Antecedents of Authoritarianism," in Contemporary Research in Social Psychology, A Book of Readings, ed. Henry Clay Lindgren (New York: John Wiley & Sons, Inc., 1969), p. 247.

91 Stogdill, Handbook of Leadership, p. 40.

92 Ibid., p. 135.

summaries, he implied there was still no positive relationship; the leadership expertise was as likely to be present at a young age but organizations did not tend to recognize it. Organizations would only recognize it via "success which comes with experience and age." He concluded with:[93]

> It would appear that the young person desiring quick recognition of his talents might consider a profession in which prestige is based on individual accomplishment rather than choose an administrative carrer involving a long climb up the status structure of an organization.

This is certainly a serious condemnation of the abilities of organizations to perform with efficiency and effectiveness, particularly as it comes from so noteworthy an authority and as part of a survey intended to summarize 74 years of effective leadership research. If this condemnation were true, it might logically be extended to other traits, behaviors, and styles of leadership.

Elton Mayo took the opposite tack when, in 1945, he said that the development of skills in human relations takes experience. He used the analogy of a good bridge player who "Does not merely conduct post mortem discussions of the play in a hand of contract; (but) he takes responsibility for playing it.[94]

Very likely, due much to the convenience of obtaining ages of individuals completing questionnaires, the age trait continues to receive attention in the literature. Brief summaries of studies are included in research articles by Glenn,

---

93 Ibid., p. 76.

94 Elton Mayo, cited by J. Sterling Livingston, "Myth of the Well-Educated Manager," Harvard Business Review, Vol. 49, No. 1 (January-February, 1971), p. 85.

et al.,[95] Weaver,[96] and James and Jones.[97] Though the reviews indicate that an employee's satisfaction tends to increase with his age, we were unable to locate studies which examined the subordinates' satisfaction in regard to the supervisor's age or in regard to the relative differences in ages between subordinates and supervisors.

Since it was not possible to locate previous studies which used a ratio age measurement, supervisor's age compared to subordinate's age, as was used in this study, the results of the previous positive effectiveness relationships may not be extendable to this research. An explanation of why the ratio was used here is necessary and will be given later under the heading "Ratio Variables."

Finally, age is a longitudinal variable. As previously specified, Korman depicted the need for more employment of such variables. Crowe cited several authorities who stated that to some degree subordinates cause their leader's behaviors.[98] It was believed that through the use of the age variable, some comment might be made in that regard; for example, if Consideration could be shown to increase or decrease as a result of age, then some portion of the change in Consideration could be attributed to age rather than subordinate actions.

---

[95] Norval D. Glenn, Patricia A. Taylor, and Charles N. Weaver, "Age and Job Satisfaction Among Males and Females: A Multivariate, Multisurvey Study," Journal of Applied Psychology, Vol. 62, No. 2 (1976), pp. 189-193.

[96] Charles N. Weaver, "Black-White Correlates of Job Satisfaction," Journal of Applied Psychology, Vol. 63, No. 2 (1978), pp. 255-258.

[97] Lawrence R. James and Allan P. Jones, "Perceived Job Characteristics and Job Satisfaction: An Examination of Reciprocal Causation," Personnel Psychology, Vol. 33 (1980), pp. 97-135.

[98] Crowe, Bochner, and Clark, "The Effects of Subordinates' Behaviour on Managerial Style," p. 216.

Education

After reviewing 41 studies involving the relationship between leadership effectiveness and education, Stogdill took a rather noncommittal stance, simply saying, leaders ". . . tend to be better educated now than formerly."[99]

Others have been known to take stronger stances, particularly when they had a cause in mind. Livingston, a Professor of Business Administration at the Harvard Business School, published a strongly opinionated article calling for a redirection in college curriculum. This was less than a year after Robert Townsend achieved national notoriety by writing his book which bluntly attacked Harvard. "Don't hire Harvard Business School graduates," Townsend said.[100] Not only did Livingston agree that Harvard graduates were inept, but lamented that college educations in general did not prepare students for management careers.[101] The article evoked so much agreement that the Harvard Business Review devoted its entire May-June, 1971, Letters to the Editor section, to the printing of letters describing the inadequate educations of college graduates. Aside from those empirical observations and confirmations, and not knowing if Dr. Livingston's curriculum changes were made, it should be said that the literature does examine the positive aspects of education; that is, the possibilities that increased education leads to increased effectiveness.

Noteworthy among those studies have been the research projects conducted as extensions of Vroom's Expectancy Theory. Such studies eventually led

---

99 Stogdill, Handbook of Leadership, p. 77.

100 Robert Townsend, Up the Organization (Greenwich: Fawcett Publications, Inc., 1970), p. 53.

101 J. Sterling Livingston, "Myth of the Well-Educated Managers," pp. 79-89.

to concentrated efforts of examining the E-P and P-O relationships; that is, effort leads to performance and performance leads to outcomes.[102, 103] Such studies postulate that both E-P and P-O strengths can be enhanced as a result of increased education. Those increased strengths are hypothesized as leading to both higher productivity and higher satisfaction.[104, 105]

To summarize the effects of education, it might be said, the literature indicates that as education increases, productivity and satisfaction increase, unless the education is poor or there is a mismatch between education and job difficulty, level, pay, or etc. Again, the literature does not consider the relative differences between supervisors' and subordinates' educations as was done with the ratio variable used in this research.

Ratio Variables

As previously mentioned, the existant literature has not examined relative (supervisor versus subordinate) knowledge, age, or education. Ratio variables describing such relationships were used, however, in this study. Despite the various causal relationships depicted by the literature, without the use of such

---

[102] Edward E. Lawler, "Expectancy Theory," in Motivation and Work Behavior, by Richard M. Steers and Lyman W. Porter (New York: McGraw-Hill Book Company, 1975), pp. 190-200.

[103] John E. Stinson and Thomas W. Johnson, "The Path-Goal Theory of Leadership: A Partial Test and Suggested Refinement," Academy of Management Journal (June, 1975), pp. 242-252.

[104] John W. Seybolt, "Work Satisfaction as a Function of the Person-Environment Interaction," Organizational Behavior and Human Performance, Vol. 17 (1976), p. 66.

[105] James and Jones, "Perceived Job Characteristics and Job Satisfaction: An Examination of Reciprocal Causation," p. 148.

variables having been made, it would have been hazardous to assume those relationships could have been extended to this study.

To explain the rationale behind the use of the ratio variables used in this study, it is necessary to review some of the theory and research regarding interpersonal influence. Burke stated the obvious when he said, "Communication, by definition, involves at least two individuals, the sender and the receiver. . . . The barrier to mutual interpersonal communication is our very tendency to judge, to evaluate, to approve or disapprove the statement or opinion of the other person or group."[106] Fleishman and Salter stated that "A critical aspect of interpersonal skill is the ability to put oneself in another's place and to predict what he will feel or do in a given situation."[107] The ability to put oneself in another's place and predict what the "other" will do or feel in a given situation is often termed "empathy." Burke cited Carl Rogers' discussion of research which indicated that "Empathetic understanding . . . is such an effective approach that it can bring about major changes in personality."[108]

On the basis of such intuitively acceptable concepts, one might conclude that there would be research which measured the same traits or characteristics in both supervisors and subordinates; that is, it would seem logical that empathetic understanding would be different when both the superior and subordinate were far apart in age, knowledge, or education, than when they were more similar in those

---

[106] W. Warner Burke, "Interpersonal Communication," in Leadership and Social Change, ed. Lassey and Fernandez, pp. 100 and 103.

[107] Edwin A. Fleishman and James A. Salter, "Relation Between the Leader's Behavior and His Empathy Toward Subordinates," Journal of Industrial Psychology, Vol. 1 (1963), p. 79.

[108] W. Warner Burke, "Interpersonal Communication," p. 104.

respects. Empathy would appear to be much more achievable between people who are similar.

Fleishman and Salter, however, though examining the "Relation between the Leader's Behavior and His Empathy Toward Subordinates," took a one-sided perspective; that is, they measured the supervisor's ability to ". . . predict what his subordinate would do rather than whether the supervisor and subordinate had compatible characteristics.[109]

The literature is replete with such examples. Fleishman and Peters said, "Since the essence of leadership is interpersonal influence, it would seem that the kinds of leadership acts attempted would be a function of the interpersonal values of the leader,"[110] and went on to measure the leader's values and attributes and then compare them to how effective the leader was perceived to be.[111]

Vroom stated that "The general conclusion is that leadership cannot be regarded as a unitary trait and must be evaluated in terms of a number of other variables including the attitudes, needs, and expectations of the followers."[112] He conducted his study by measuring attitudes and needs of subordinates and psychological participation and effectiveness of supervisors.[113]

---

[109] Fleishman and Salter, "Relation Between the Leader's Behavior and His Empathy Toward Subordinates," pp. 80-82.

[110] Edwin A. Fleishman and David R. Peters, "Interpersonal Values, Leadership Attitudes and Managerial 'Success,'" Personnel Psychology, Vol. 18 (1965), p. 127.

[111] Ibid., pp. 129-131.

[112] Vroom, "Some Personality Determinants of the Effects of Participation," p. 322.

[113] Ibid., pp. 323-324.

Matsui, et al., cite Fleishman and Peters' statement, "Leadership has been defined as interpersonal influence directed toward the attainment of goals,"[114] and then conducted a study focusing ". . . on the extent to which the interpersonal values of supervisors are related to the consideration and structure behavior exhibited in supervisor-subordinate relationships."[115]

Overall then, the literature implies the validity of measuring similarities and dissimilarities between supervisors and subordinates, but has not followed through with such comparative measurements. The three ratio variables used in this research, age, education, and knowledge, were an attempt to do that.

Situational Variables

Stogdill credits Fiedler with advancing a "contingency theory of leadership,"[116] and Wren credits Lawrence and Lorsch with first using the term "contingency theory."[117] Though these and other terms have been used to describe situational variables, those variables have been a part of numerous studies conducted since the beginning of this century.[118]

The first criticism of Korman which Kerr and Schriesheim chose to answer was the claim that too few situational variables were being considered. They answered by citing one summary which had reviewed over 200 studies involving

---

[114] Tamao Matsui, Yoshie Ohtsuka, and Akio Kikuchi, "Consideration and Structure Behavior as Reflections of Supervisory Interpersonal Values," Journal of Applied Psychology, Vol. 63, No. 2 (1978), p. 259.

[115] Ibid.

[116] Stogdill, Handbook of Leadership, p. 21.

[117] Wren, The Evolution of Management Thought, p. 469.

[118] Stogdill, Handbook of Leadership, pp. 35-91.

situational variables.[119] Barrow's five classifications of studies, covered earlier in this chapter, are replete with examples of research conducted relative to situational variables.

Such variables examined have ranged from simple conceptions, such as group size and span of control, to extensive groupings of variables, such as, 1) "Effective organizational change is really the relationship between structure, strategy, systems, style, skills, staff, and something we call superordinate goals,"[120] 2) numerous exotic variables, such as "multiple screens"[121] and 3) some "series of intertwined 'decision points.'"[122]

In this study the situational concept was brought in through the selection of two different work groups as subjects. The selection of the groups was based upon Perrow's Model.[123] His model is intuitively appealing and sound, and appears to be universally applicable. It is based on decision making, and, as O'Reilly has

---

[119] Kerr and Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," pp. 557-558.

[120] Robert H. Waterman, Thomas J. Peters, and Julien R. Phillips, "Structure is Not Organization," in Business/Management 81/82, ed. Joseph G. Mattingly (Guilford: The Dushkin Publishing Group, Inc., 1980), p. 61.

[121] Fred E. Fiedler and Albert F. Leister, "Leader Intelligence and Task Performance: A Test of a Multiple Screen Model," Organizational Behavior and Human Performance, Vol. 20 (1977), pp. 1-14.

[122] Raymond E. Miles, Charles C. Snow, and Jeffrey Pfeffer, "Organization-Environment: Concepts and Issues," Industrial Relations, Vol. 13, No. 3 (1974), p. 246.

[123] Perrow, Organizational Analysis: A Sociological View, p. 76.

pointed out, "Perhaps one of the most fundamental and pervasive of all organizational behaviors is decision making."[124]

Perrow classifies work using two dimensions. One dimension is termed "search behavior." In the later literature this is often referred to as "task difficulty." A task has high difficulty if the worker "Must rely upon . . . experience, judgment, knack, wisdom, intuition." Written instructions, manuals, etc. are thought to suffice for handling decisions involved in jobs low in task difficulty.[125] The second dimension is "variability" or "task variability," and is evaluated in terms of the variety of problems encountered when performing a task. If unfamiliar or novel problems are frequently encountered, the work is said to be high in task variability.[126]

Using a general concept of technology which involves the way a worker performs a job, Perrow illustrates how various types of jobs or technologies fit into his model. Where jobs involve little task difficulty and little task variability, he refers to the technology as routine. Where the jobs are high in both dimensions, he refers to the technology as nonroutine.[127] He then extends the model by describing how an organization's structure should vary in accordance with its task dimensions, or whether it is in a routine or nonroutine technology. He uses the following structure variables: "The discretion of subgroups; their

---

[124] Charles A. O'Reilly, "Supervisors and Peers as Information Sources, Group Supportiveness, and Individual Decision-Making Performance," Journal of Applied Psychology, Vol. 62, No. 5 (1977), p. 632.

[125] Perrow, Organizational Analysis: A Sociological View, p. 76.

[126] Ibid., p. 77.

[127] Ibid., p. 78.

power; the basis of coordination within a group; and the interdependence of groups."[128]

Much research has been devoted to examining the two dimensions. Grimes et al.,[129] examined task variability, and Hage[130] and Hage and Aiken[131] examined task difficulty. All three studies provided support for the viability of the two dimensions, as well as that of some of the structural hypotheses. Hage and Aiken stated, for example:[132]

> Most of Perrow's implicit hypotheses about the relationships between the routineness of technology and dimensions of social structure receive considerable support. The more routine the organization, the more centralized the decision-making about organizational policies, the more likely the presence of a rules manual and job descriptions, and the more specified the job.

As this quote indicates, the structural implications, hypothesized by Perrow, have generated much research and discussion. Both Smith[133] and

---

[128] Ibid., p. 80.

[129] A. J. Grimes, S. M. Klein, and F. A. Shull, "Matrix Model: A Selective Empirical Test," Academy of Management Journal, Vol. 15, No. 1 (1972), pp. 9-31.

[130] Jerald Hage, "An Axiomatic Theory of Organizations," Administrative Science Quarterly, Vol. 10, No. 3 (1965), pp. 289-320.

[131] Jerald Hage and Michael Aiken, "Routine Technology, Social Structure, and Organization Goals," Administrative Science Quarterly, Vol. 14, No. 3 (1969), pp. 366-376.

[132] Ibid., p. 375.

[133] Clagett G. Smith, "Consultation and Decision Processes in a Research and Development Laboratory," Administrative Science Quarterly, Vol. 15, No. 2 (1970), p. 214.

Connolly[134] point out the likelihood of decentralization in nonroutine tasks, that is, more peer contact versus superior-subordinate contact. O'Reilly examined the likelihood of more formal control and direction in routine tasks.[135] Van de Ven and Delbecq concluded that "Work unit structures . . . can be empirically distinguished . . . on the basis of task difficulty and task variability."[136] Tushman concluded that task difficulty and variability have an important impact on subunit communication structure, and that the effects "are accentuated for high-performing subunits."[137]

Besides its intuitive appeal then, the model has received general support through the research it generated, and was, accordingly used as the basis for selecting subjects for this study. Postal clerks working in "finance" were used to represent Perrow's routine classification and programmers were used to represent his nonroutine classification.

Summary

The literature indicates further research is needed regarding the basic hypothesis of this study. Indicated also in the literature are several considerations which should be made in examining that hypothesis. Compared to the older

---

[134] Terry Connolly, "Information Processing and Decision Making in Organizations," in New Directions in Organizational Behavior, ed. Barry M. Staw and Gerald R. Salancik (Chicago: St. Clair Press, 1977), p. 224.

[135] Charles A. O'Reilly, "Supervisors and Peers as Information Sources, Group Supportiveness, and Individual Decision-Making Performance," pp. 632-635.

[136] Andrew H. Van de Ven and Andre L. Delbecq, "A Task Contingent Model of Work-Unit Structure," Administrative Science Quarterly, Vol. 19, No. 2 (1974), p. 194.

[137] Michael L. Tushman, "Work Characteristics and Subunit Communication Structure: A Contingency Analysis," Administrative Science Quarterly, Vol. 24, No. 1 (1979), p. 82.

"knowledge research" studies cited, whatever refinements have been made in this study have been based upon the considerable efforts of numerous researchers. The debt owed them is acknowledged.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Sample Design

A preliminary step in designing this study was the determination of the work groups from which subjects would be obtained. Perrow's Model was used as the basis of selecting the work groups. The attempt was made to select two groups: one representing "routine" and one representing "nonroutine."

Computer programmers were selected as the group which would be classifiable as nonroutine. It was believed their jobs were high in both task difficulty and variability. This was a subjective determination based on this writer's experience as a programmer, systems analyst, and consultant evaluating programmers. Computer programmers have traditionally been involved in coding programs, writing programs, and performing systems analysis work. Depending upon their level of experience and ability, they have generally moved from the first of those jobs, coding, to the second, writing programs, and ultimately to systems analysis work. A new programmer will usually perceive the job as one requiring attributes such as "skill," "knack," and "judgment;" that is, he will perceive the work as high in difficulty. That new programmer will constantly be faced with unfamiliar problems or exceptions to what he has been doing. He will thus perceive high variability in the job. After that new programmer has gained experience, he will be moved into more difficult coding areas; that is, coding tasks which tend to be more complicated and which involve more variety. After coding is mastered, he will be moved into writing programs, and ultimately, he will be

moved into performing systems analysis work. Only if a programmer were to become proficient at what he was doing and not be moved on to more difficult and variable tasks, could it be said that he should be classified in something other than the nonroutine category.

It was decided to use postal clerks working in "finance" as the group which would be classifiable as routine. Discussions with several postal supervisors confirmed the belief that those workers faced very few problems which were not specifically covered by written instructions. Little in the way of intuitive decision making, skill, or judgment was required. Their supervisors also related that those examined were placed in their jobs as a result of tests which indicated that they had relatively little ability in making sound judgments.

The subjects ultimately chosen for this research were U.S. Army personnel serving in West Germany. Two reasons led to the choice of these subjects. First, during the data collection period, the researcher was employed in West Germany. Second, it was believed that such subjects would have less variability regarding several situational variables; that is, such homogeneous subjects would tend to be relatively similar regarding variables such as: relationship with the external environment, upward influence, cultural considerations, chances for promotion, and so on.

Though it had been planned to conduct a random sample of subjects, due to several practical considerations, that plan was ultimately abandoned and replaced by a plan to conduct a convenience sample. Subjects tested were stationed at military bases which were spread across the lower half of West Germany. Usually it was necessary to make at least three trips to each base where tests were conducted. One trip was often necessary to convince management that it would be worthwhile to give personnel time away from their jobs to

take the tests. The tests sometimes took as long as four hours to complete. On the second trip the testing was conducted. After the tests had been graded, a third trip was made in order to give the results to the personnel who had been tested. Management was sometimes given information such as, the status of the morale of its personnel compared to the morale at other bases. The entire process was so time consuming that bases which were closer to where the researcher was employed were given first priority. The number of appropriate subjects at each base was usually quite small, and it seemed impractical to reduce the number even further through the use of random sampling. There were seldom more than four finance postal clerks at any one base.

The size of the sample was also determined by such realities. Sampling was begun on January 6, 1978. By late May, only 32 usable sets of programmer subordinate tests had been obtained. It was decided that the researcher would remain in Germany three weeks past his scheduled departure date, in order to test more programmers. Due to the difficulties involved in scheduling and administering tests, when the researcher departed Germany on June 21, 1978, he had obtained no additional programmer tests.

Tests were administered to 230 individuals during the entire period, however, only 46 finance postal clerks and 32 programmer subordinate test sets were usable in this study. There were several reasons for this wide divergence between total tests administered and the number which were actually usable. For a test set to be usable, both a subordinate and his supervisor had to complete an entire set of tests. Sometimes, though a group of subordinates completed their tests, their supervisor was not available for testing. Some supervisors who took the tests did not have any subordinates. Some subjects, for various reasons, refused to complete one out of the entire set of tests. Some subjects who took

the tests under the guise of being finance postal clerks, turned out to be other types of postal clerks. They were ferreted out by low split-half correlations. There were also several other reasons for the divergence, but the above reasons seem sufficient to indicate the numerous possibilities of what could and did negate the possibilities of using so many of the test results obtained.

Measuring Instruments

To Measure Satisfaction

To measure worker satisfaction, it was decided that the most appropriate test would be Patricia Smith's Job Description Index.[1] "Lengthy, extensive and competent research went into the construction of this instrument, which has been administered to workers at all organizational levels on a nationwide basis."[2] Of those satisfaction scales listed in Measures of Occupational Attitudes and Occupational Characteristics, "The instrument which appears to us (the authors) to have the best credentials is the Job Description Index."[3] "Corrected split-half internal consistency coefficients are reported to exceed .80 for each of the scales."[4] Research continues to be conducted through the use of this test.[5] This Index is contained in Appendix A.

---

1 P. C. Smith, L. M. Kendall, and C. L. Hulin, The Measurement of Satisfaction in Work and Retirement (Chicago: Rand McNally, 1969).

2 J. P. Robinson, R. Athanasiou, and K.B. Head, Measures of Occupational Characteristics (Ann Arbor: Institute for Social Research, 1973), p. 101.

3 Ibid.

4 Ibid., p. 105.

5 Robert H. Miles and M. M. Petty, "Leader Effectiveness in Small Bureaucracies," pp. 238-250.

To Measure Productivity

To measure the productivity variables of quality or quantity for either programmers or postal clerks seemed a difficult task for the person performing the research to perform alone. Programming jobs vary considerably in difficulty and variability. In this study, evaluating productivity required familiarity with the numerous programs on which 32 programmer subjects had worked. To evaluate the productivity of postal employees required a knowledge of postal instructions and manuals.

For these reasons it was decided to have the supervisors evaluate the productivity of their subordinates. Supervisors were asked to rank all their employees, from 1=best to n=worst, on quality of production and again on quantity of production. The supervisors were then asked to rate their employees on quality and quantity. To enable these ratings, they were given graphic rating scales which were designed in accordance with the rating scales presented by Chruden and Sherman.[6] The scales used are contained in Appendix A.

To Measure Knowledge

As previously discussed, it was decided to measure the job knowledge of supervisors and their respective subordinates, so that a ratio variable could be developed. That variable was to be a quantitative expression of the differences between supervisor's and subordinates' job knowledge. It was thus necessary to administer the same job knowledge tests to both supervisors and subordinates.

The Computer Programmer Aptitude Battery (CPAB) was administered to programmer supervisors and subordinates. The CPAB consists of five subtests

---

[6] Herbert J. Chruden and Arthur W. Sherman, Personnel Management (Cincinnati: South-Western Publishing Co., 1963), p. 272.

which are related to success in both computer programmer and systems analysis fields. Computer programmer and systems analyst personnel were used in the development of the test items. The ranges of the five subtest scores are sufficiently wide to provide higher validity than would seem possible for tests designed on the basis of more varied populations. A recommended use of the CPAB is in regard to the evaluation of experienced personnel.[7] Through its use in several organizations, normative data have been obtained and validation studies have been conducted on this test.[8] The CPAB was too lengthy to be included in this dissertation.

It was necessary to develop a job knowledge test for postal workers since the only existant tests located did not specifically apply to military postal workers. Two attempts to develop a postal knowledge test were made. The first attempt was made by the researcher working in conjunction with a military postal supervisor. Two other military postal supervisors stated that they believed the test was not appropriate, and the test was abandoned. The second test was prepared using a relatively uncirculated copy of a proposed military manual.[9] That test was also prepared by the researcher working in conjunction with a military postal supervisor. It was said to be appropriate by three additional supervisors before it was ultimately used.

---

7 SRA Catalog for Business (Chicago: Science Research Associates, Inc., 1974), p. 19.

8 SRA Catalog for Business (Chicago: Science Research Associates, Inc., 1978), p. 26.

9 Soldier's Manual, Administrative Specialist, Skill Levels 1/2, M.O.S. 71L, Validation Edition (Fort Benjamin Harrison: U.S. Army Administration Center, 1978).

Internal consistency reliabilities for the test were obtained by using the split-half method along with the Spearman-Brown formula.[10] The correlations ranged between .78 and .86. Aside from military postal supervisors' empirical attestations as to the validity of the job knowledge test, there was one other occurrence during the survey which was an indication of the test's validity. When this study's test battery was administered to several postal clerks in Nuremberg, the split-half correlation dropped to .64. The names of individuals whose scores appeared to lend significantly to the drop were determined and given to the officer-in-charge of the postal facilities there. He confirmed that all of those individuals named had not worked as finance postal clerks, while the others tested had worked in that capacity. With the split-half scores of the six individuals removed from the set of scores, the correlation rose to .81. A copy of the Postal Knowledge test is presented in Appendix A.

To Measure Autocracy

To measure the degree of autocracy in the supervisors' styles, it was decided to use Forms 45 and 40 of the Adorno F Scale. The publication in which the Adorno F Scale was set forth was discussed by Loye, who wrote:[11]

> Here in 990 pages was drawn together six years of work by a research team composed of seven principal investigators, with over thirty research associates and the counsel of many other leading investigators. To the task of piercing the darkness they applied the major "flashlights" of the time--Freudian personality theory and a wide array of measurement and experimental social-psychological techniques perfected during the 1930s by Rensis Likert and others. Nothing bearing on ideology comparable to the size of this effort has been attempted since then.

---

[10] Anne Anastasi, Psychological Testing (New York: Macmillan Publishing Co., Inc., 1976), p. 115.

[11] David Loye, The Leadership Passion, A Psychology of Ideology (San Francisco: Jossey-Bass, Inc., 1977), p. 30.

The reliability (split-half) of Forms 45 and 40 was .90 over all groups tested.[12] Some degree of validity was established by determining significant correlations existed between the Adorno F Scale and other tests. The F Scale correlated .73 with the E Scale (Ethnocentrism Scale) and .52 with the PEC Scale (Politico-Economic Conservatism Scale) for groups receiving Form 45. For groups taking Form 40, the F Scale correlated .77 with the E Scale and .61 with the PEC Scale.[13] A copy of the test constitutes Appendix A.

To Measure Initiating Structure and Consideration

To measure the leaders' behavior in terms of Initiating Structure and Consideration, it was planned to use the LOQ (Leadership Opinion Questionnaire) and the SBDQ (Supervisory Behavior Description Questionnaire). The LOQ measures the leader's perception of his management behavior on the Consideration/Structure dimensions. The SBDQ measures the employees' perceptions of the supervisor's behavior on the same dimensions. As previously mentioned, the measurements of Consideration were to be equated with the supervisor's "styles" of leadership. Internal consistency reliabilities were obtained by the split-half method. Because of the general familiarity with these testing instruments and their large size, they were not included in the appendices of this study.

Age and Education Measurements

Though obtaining measurements of age and education does not require explanation, it should be noted that the age and education variables used in this

---

[12] J. P. Robinson and P. R. Shaver, Measures of Social Psychological Attitudes (Ann Arbor: Institute of Social Research, 1974), p. 309.

[13] Ibid., p. 310.

study were ratios. The supervisor's age/education was divided by the subordinates' age/education. This was done in accordance with the previous discussion which described the importance of relative measurements for supervisors and subordinates.

Primary Hypothesis

The main hypothesis of this study was that the first-line supervisor's knowledge of his subordinates' jobs has a greater impact upon his subordinates' productivity and satisfaction than that supervisor's management style. It was decided to use path analysis methods to evaluate this hypothesis. The diagrams, used in path analysis, compactly depict various hypotheses which the researcher sets forth. These diagrammatic displays of hypothesized causal relationships offer the potential of considerably reducing and even clarifying the usual verbal hypotheses descriptions. The primary hypothesis along with the several secondary hypotheses of this study will, then, be presented in diagrammatic form, after path analysis has been discussed, in the next section of this chapter.

Method of Analysis

Path analysis is an extension of linear regression. Linear regression is primarily concerned with prediction, while path analysis is more concerned with causation. It is the path analysis concept of attempting to determine causation which leads to the fundamental characteristics of the method, and the most obvious of those characteristics is the path diagram. An example would be

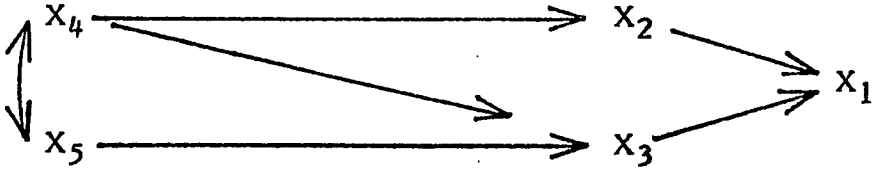


Fig. 1. Introductory Diagram

Such diagrams are a means of visually displaying believed causal relationships. In Figure 1, X_1 is believed to be directly caused by X_2 and X_3, while X_2 is believed to be directly caused by X_4, also, X_3 is believed to be directly caused by X_4 and X_5. In turn, X_1 is also seen to be indirectly caused by X_4 via X_4's effects on X_2 and X_3, and by X_5 through its effect on X_3.

Such path diagrams force the preparer to determine and specify his beliefs regarding which variables cause others. They also allow other people to view those relationships with relative ease. They thus establish consistency of perception between an originator and those who review his work.

Once a path diagram has been intuitively developed and layed out on paper, the preparer attempts to assign numbers to the paths to show quantitatively how independent variables cause changes in dependent variables in accordance with the relationships depicted. In Figure 2, an attempt would be made to estimate what percentages of the changes in X_1 are caused by X_2 and X_3 individually, as well as what percentages are caused as a result of the interactions between X_2 and X_3. Finally, it would be possible to estimate what percentage of the changes in X_1 is caused by all other variables not specified in the model. These other variables are included under the symbol U.

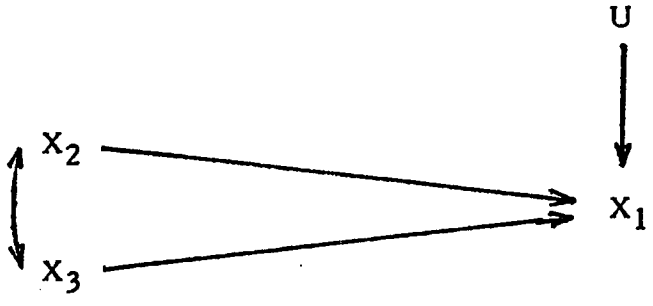


Fig. 2. Basic Diagram

These quantitative estimates of how one variable causes changes in another are called path coefficients. They are written P_{ij}: where the variable causing the change is j, and the variable being changed is i. Path coefficients are presented in quantitative figures similar to coefficients of correlation; that is, they state the amount of change in the standard deviation of an i variable that is caused by a change of one standard deviation in a j variable. A path coefficient when squared would, then, be similar to a coefficient of determination, in that it would indicate the percent of variability in an i variable which is explained by a j variable.

Determination of Path Coefficients

How path coefficients are determined is covered in various texts and articles.[14, 15, 16] The more important formulas used in developing those coefficients will be discussed briefly.

For regression analysis, the normal equations for standardized variables can be written:[17]

$$\sum X_1 Y = B_1 \sum X_2^2 + B_2 \sum X_1 X_2$$
$$\sum X_2 Y = B_1 \sum X_1 X_2 + B_2 \sum X_2^2 \qquad (1)$$

For path analysis, these equations are modified in view of covariance and correlation concepts.

---

[14] David R. Heise, Causal Analysis (New York: John Wiley & Sons, Inc., 1975).

[15] Ching Chun Li, Path Analysis (Pacific Grove: The Boxwood Press, 1975).

[16] Otis D. Duncan, "Path Analysis: Sociological Examples," in Causal Models in the Social Sciences, ed. H. M. Blalock (Chicago: Aldine-Atherton, Inc., 1971), pp. 115-138.

[17] Ching, Path Analysis, p. 110.

Covariance is obtained by multiplying deviation scores of one variable by the corresponding deviation scores of another variable and then averaging the products. It can be written:

$$\sigma_{xy} = E(xy) = \frac{\sum XY}{N} \qquad (2)$$

where X and Y are deviation scores.[18] In Equations (1) the $\sum X_1 Y$ and $\sum X_2 Y$ when divided by N would be the covariances $\sigma_{X_1 Y}$ and $\sigma_{X_2 Y}$. Additionally, the coefficient of correlation of two standardized variables is equal to their covariance. Using subscripts 1 and 2 to refer to variables X, and X_2 we have

$$r_{12} = \sigma_{12} \qquad (3)$$

because[19]

$$r_{12} = \frac{\sigma_{12}}{\sigma_1^{\,2}\sigma_2^{\,2}} = \sigma_{12} \qquad (4)$$

since $\sigma_1^{\,2} = \sigma_2^{\,2} = 1$ for standardized variables.

In Equations (1), we have

$$\frac{\sum X_1 X_2}{N} = \sigma_{X_1 X_2} = r_{X_1 X_2} \qquad (5)$$

If then in Equations (1), we divided both equations by the number of observations, then replace $\sigma_{X_1 X_2}$ by r_{12}, and $\sum XY$ by σ_{XY}, we have (referring to X_1 as 1 and X_2 as 2, for convenience)

$$\begin{aligned} B_1(1) + B_2 r_{21} &= \sigma_{Y1} \\ B_2 r_{12} + B_2(1) &= \sigma_{Y2} \end{aligned} \qquad (6)$$

---

18 Heise, Causal Analysis, p. 95.

19 Ibid., p. 98.

or, replacing σ_{YX} with r_{YX}:

$$B_1(1) + B_2r_{21} = r_{Y1}$$
$$B_1r_{12} + B_2(1) = r_{Y2} \qquad (6)$$

If we replace the B's with P's, symbolizing path coefficients, we have[20]

$$P_{Y1} + P_{Y2}r_{21} = r_{Y1} \qquad (7)$$
$$P_{Y1}r_{12} + P_{Y2} = r_{Y2}$$

These are basic path analysis equations and can readily be perceived in terms of the path diagram:

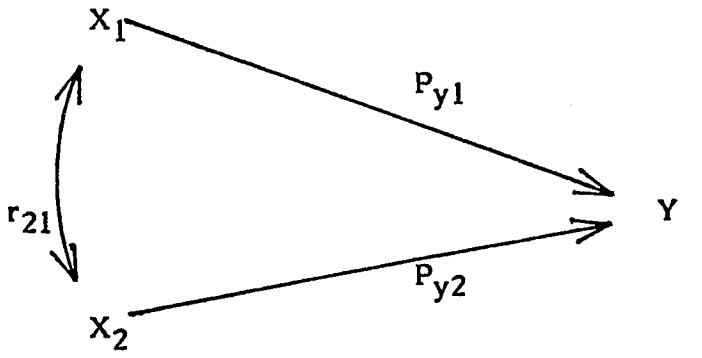


Fig. 3. Basic Diagram with Path Labels

The zero order correlation coefficient, r_{Y1}, is then diagrammatically broken into its component causal parts, as is r_{Y2}. The zero order correlation r_{Y1} represents the average amount of change in the Y standard deviation associated with a change of one standard deviation in X_1. P_{Y1} would only equal r_{Y1} if there were no correlation between X_1 and X_2. It can be observed that the changes in Y, caused by X_1 and X_2, can not be measured by P_{Y1} and P_{Y2} alone. The interaction between X_1 and X_2 must be taken into account. Also, recalling that Equations (7) were

---

20 Ching, Path Analysis, p. 105.

$$P_{Y1} + P_{Y2}r_{21} = r_{Y1}$$
$$P_{Y1}r_{12} + P_{Y2} = r_{Y2} \qquad (7)$$

we can realize that the correlation between X_1 and X_2 must be considered. Further, in examining the diagram as an entirety, it can be observed that the total effect X_1 has upon Y includes the direct effect from X_1 to Y (P_{Y1}) and the effect via the relationship (joint effect) between X_1 and X_2; that is,

$$P_{Y1}r_{21}P_{Y2}$$

The coefficient of determination for Y and the independent variables X_1 and X_2 can be written:[21]

$$r^2_{Y.12} = P^2_{Y1} + P^2_{Y2} + P_{Y1}r_{12}P_{Y2} + P_{Y2}r_{21}P_{Y1} \qquad (8)$$
$$r^2_{Y.12} = P^2_{Y1} + P^2_{Y2} + 2P_{Y1}r_{12}P_{Y2}$$

Alternatively, the proportion of determination of Y by variables not included in the model would be[22]

$$1-r^2_{Y.12} = r^2_{YU} = 1 - P^2_{Y1} - P^2_{Y2} - 2P_{Y1}r_{12}P_{Y2} \qquad (9)$$

In order to establish coefficients of determination for more complicated diagrams, Ching provides the following equation.[23]

$$r^2_{Y.12} = P_{Y1}r_{1Y} + P_{Y2}r_{2Y} + \ldots + \pi_{YK} \text{ or } \pi_{KY} \qquad (10)$$

This states that the proportion of Y variance "explained" by X_1 and X_2 can be no greater than the sum of the products of the path coefficient for each independent variable with the dependent variable.

Duncan has shown that:

$$r_{ij} = \sum_q P_{iq}r_{jq} \qquad (11)$$

---

21 Heise, Causal Analysis, p. 105.

22 Otis D. Duncan, "Path Analysis: Sociological Examples," p. 122.

23 Ching, Path Analysis, p. 117.

and states that i and j denote two variables in the system, and the index q runs over all variables from which paths lead directly to X_i.[24]

To show how Equation (11) is applied, one can use Duncan's model:[25]

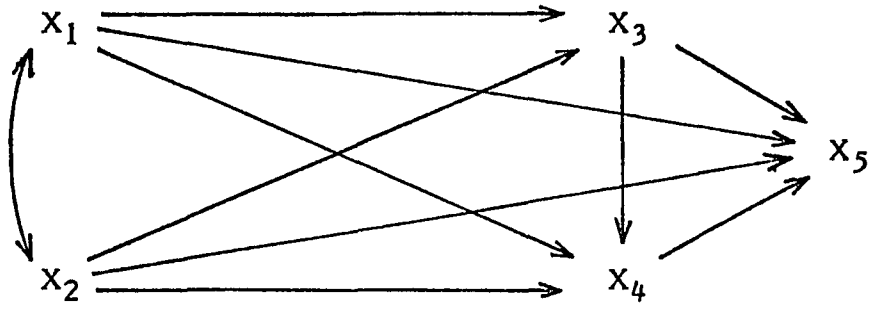


Fig. 4. Duncan's Model

A series of r_{ij} equations are developed for each variable caused by other variables. These would be

$$
\begin{aligned}
r_{51} &= P_{51} + P_{52}r_{21} + P_{53}r_{31} + P_{54}r_{41} \\
r_{52} &= P_{51}r_{12} + P_{52} + P_{53}r_{32} + P_{54}r_{42} \\
r_{53} &= P_{51}r_{13} + P_{52}r_{23} + P_{53} + P_{54}r_{43} \\
r_{54} &= P_{51}r_{14} + P_{52}r_{24} + P_{53}r_{34} + P_{54} \\
r_{41} &= P_{41} + P_{42}r_{21} + P_{43}r_{31} \\
r_{42} &= P_{41}r_{12} + P_{42} + P_{43}r_{32} \\
r_{43} &= P_{41}r_{13} + P_{42}r_{23} + P_{43} \\
r_{31} &= P_{31} + P_{32}r_{21} \\
r_{32} &= P_{31}r_{12} + P_{32}
\end{aligned}
\qquad (12)
$$

The sets are prepared only for variables which have paths leading directly to caused variables. Since X_3 partly causes X_4 but X_4 does not cause X_3, there is

---

[24] Duncan, "Path Analysis: Sociological Examples," p. 121.

[25] Ibid., p. 119.

an r_{43} equation but no r_{34} equation. The various r_{5j} path coefficients can be found by simultaneously solving the four r_{5j} equations, the r_{4j} path coefficients can be found by solving the three r_{4j} equations, and the r_{3j} path coefficients, by solving the two r_{3j} equations, but this will be covered later when Equation (14) is discussed.

The series of Equations (12) facilitates the decomposition of the r_{ij}'s, for example, r_{53} can be broken into its various parts by substituting full r_{ij} equations into the r_{53}'s r_{jq}'s. To decompose r_{53}, in the first set of equations:

$$r_{53} = P_{51}r_{13} + P_{52}r_{23} + P_{53} + P_{54}r_{43}$$

we would make the following substitutions:

$$P_{51}(P_{31} + P_{32}r_{21})$$
$$+P_{52}(P_{31}r_{12} + P_{32})$$
$$+ P_{53}$$
$$+P_{54}(P_{41}r_{13} + P_{42}r_{23} + P_{43})$$

This last portion becomes

$$P_{54} \quad P_{41}(P_{31} + P_{32}r_{21}) + P_{42}(P_{31}r_{12} + P_{32}) + P_{43}$$

Duncan presents the expanded equation, r_{53}, as:[26]

$$r_{53} + P_{53} + P_{51}P_{31} + P_{51}r_{12}P_{32} + P_{52}P_{32} + P_{52}r_{12}P_{31} + P_{54}P_{42}P_{32} +$$
$$P_{54}P_{42}r_{12}P_{31} + P_{54}P_{43} + P_{54}P_{41}P_{32}r_{12} + P_{54}P_{41}P_{31} \qquad (13)$$

Such decompositions can also be read directly from a path diagram by beginning at a caused variable, reading backward, and then forward to the caused variable. This is done with all paths which lead directly to each caused variable. Only one zero order correlation is allowed in each traverse.

---

26 Ibid., p. 121.

Complete Determination of the Extended Model

Duncan also gives a restricted form of Equation (11):[27]

$$r_{ii} = 1 = \sum_{q} P_{iq} r_{iq} \qquad (14)$$

where the range of q includes all variables, measured and unmeasured. This is a restatement of Equation (10) and does not lend to developing an appreciation of the decomposition of causality, as was just demonstrated through the use of Equation (11). However, considerable time can be saved by using this equation to determine complete causation of a dependent variable by other variables, within and outside a model.

Additional Definitions

In Figure 4, X_1 and X_2 are "exogenous variables" as their causes lie outside the model being investigated. X_3, X_4, and X_5 are "endogenous variables" as they are at least partially caused by other variables within the model. X_3 and X_4 are "intervening variables" since they are endogenous variables that mediate effects between two or more other variables in a causal model.[28]

Indirect effects can often be calculated by subtracting direct effect path coefficients from coefficients or correlation.[29] In Figure 4, the indirect effect between X_1 and X_5 would be $r_{51} - P_{51}$, that is $P_{52}r_{21} + P_{53}r_{31} + P_{54}r_{41}$, as seen in Equations (12).

The effects an exogenous variable has upon a dependent variable via the correlation of the first exogenous variable with other exogenous variables are

---

27 Ibid., p. 122.

28 Richard A. Zeller and Edward G. Carmines, Statistical Analysis of Social Data (Chicago: Rand McNally College Publishing Company, 1978), p. 339.

29 Duncan, "Path Analysis: Sociological Examples," p. 123.

called "effects shared with other exogenous variables." Referring again to Figure 4, the "effect shared with other exogenous variable(s)" portion of X_5 caused by X_1 would be[30]

$$r_{12}(P_{52} + P_{53}P_{32} + P_{54}P_{42} + P_{54}P_{43}P_{32})$$

The part of the effects termed "correlation due to common or correlated causes" is an expression of an endogenous variable's effect upon a dependent variable as a result of its correlation with exogenous variables and its correlation with other endogenous variables through their correlations with exogenous variables. Regarding Figure 4, the "correlation due to common or correlated causes" which X_3 would have with X_5 would be:[31]

$$P_{52}r_{23} + P_{51}r_{13} + P_{54}(P_{42}r_{23} + P_{41}r_{13})$$

Estimating Zero Order Correlations

Using Figure 4 and Equation (13), it was shown how zero order correlations, often called "observed" correlations in path analysis, could be decomposed. When r_{53} in Equation (13) is determined as a result of replacing the literal path coefficients and correlations with quantitative figures, the resulting r_{53} is referred to as an "estimated" zero order correlation. The estimated will always equal the observed zero order correlations, provided all variables in a path diagram are connected by paths and workable path coefficients are used.

To obtain workable path coefficients, all paths leading to a dependent variable must be simultaneously considered when each coefficient is determined. In respect to beta coefficients in conventional linear regression, variables, other than the one being calculated, must be held constant.

---

30 Ibid., p. 138.

31 Ibid., p. 137.

Einstein, discussing building models to determine universal laws, said, "There is no logical path to these laws; only intuition, resting on sympathetic understanding of experience, can reach them. . . ."[32] Sympathy and intuition often lead researchers to hypothesize that all variables in a path diagram do not connect; that is, excluding relationships between exogenous variables, not every variable in a diagram is causally related to every other variable. Researchers often tend to believe certain variables do not cause others to change. They tend to erase, or more likely, never initially include some paths on causal diagrams. For such omitted paths, they are in reality hypothesizing r = 0. Unless the correlations do equal zero and unless sampling error is small enough to show that, they will have difficulty matching observed and estimated correlations. Due to sampling error alone, those two calculations will not exactly match, even if r = 0. The more paths a researcher erases or does not connect between variables, the more disagreement he will find between observed and estimated statistics. Such disagreement serves as a basis of determining how adequately his model reflects the universe it was meant to reflect. Therefore, the more paths one erases, the greater are his chances of rejecting his diagram.[33]

Assumptions

Zeller and Carmines list the following four assumptions:

1. the system of equations defining the causal model is presumed to be recursive;

---

[32] Robert M. Pirsig, Zen and the Art of Motorcycle Maintenance, (London: Transworld Publishers Ltd., 1976) p. 106.

[33] N. Krishnan Namboodiri, Lewis F. Carter, and Hubert M. Blalock, Applied Multivariate Analysis and Experimental Design (New York: McGraw-Hill Book Company, 1975), p. 450.

2. the residual variables are presumed to be uncorrelated with each other and uncorrelated with other variables in the model;
3. the causal relations linking the variables in the model can be expressed as linear, additive equations; and
4. the causal sequence among the variables in the model is correctly specified.[34]

The first two of Zeller's assumptions deserve additional comment here. "Recursive" refers to the concept: if one variable causes a second, then the second does not cause the first. Heise does go into considerable detail explaining how this assumption, when violated, can be overcome.[35] Macdonald would overcome the problem by requiring temporal construction of path diagrams, that is, if X_1 occurred before X_2, X_2 could not be a cause of X_1, and the diagram would be constructed accordingly.[36]

The paths leading from autocracy to Consideration and Structure were inspired by the previously cited comments of Byrne,[37] as well as others,[38] who hypothesized that autocratic tendencies were learned early in life, principally from one's parents. The paths leading from knowledge to Consideration and Structure exemplify intuitive judgments of the researcher. Previous research did not examine temporal aspects of knowledge versus Consideration and Structure.

---

[34] Zeller and Carmines, Statistical Analysis of Social Data, p. 339.

[35] Heise, Causal Analysis.

[36] K. I. Macdonald, "Path Analysis," in Model Fitting, ed. C. A. O'Muircheartaigh and C. Payne (New York: John Wiley & Sons, 1978), p. 83.

[37] Byrne, "Parental Antecedents of Authoritarianism," p. 247.

[38] T. W. Adorno, et al., The Authoritarian Personality, p. 875.

The curvilinear arrow between autocracy and knowledge reflects the customary path analysis convention of placing such double-headed paths between exogenous variables. Theoretically, since those extraneous variables causing autocracy and knowledge were not examined by the model, the likelihood of mutual causation cannot be ruled out, therefore, the exogenous variables within all path analysis models are connected by such curvilinear, bi-directional paths.

Zeller's second point forms part of the basis for quantitatively analyzing a model. We cannot quantitatively pin down indirect effects nor joint effects if variables not examined in the model are related to those variables in the model. In addition to Zeller's assumptions, there are the several, usual assumptions associated with linear regression.

Applications and Advantages

By this point, examples of the primary advantages of using path analysis have been given. The first of these related to the requirement that, for any path study, an investigator must decide and set forth the most important variables and their hypothesized causal relationships. This, of course, simplifies the work of those who later review or extend a path model.

The method further provides a means of decomposing coefficients of correlation, that is, establishing chains of causation. This gives an originator a standardized method for developing considerable insight into the interrelationships of variables. It might be found, for example, that a causal variable which has a positive direct effect upon a dependent variable also has a sizeable (or perhaps even greater) negative effect upon the same dependent variable, as a result of interactions with intervening variables. The importance of indirect effects is made obvious by the visual layout of the path diagram, one can quickly determine

the importance and strength of correlations of direct effects vis-a'-vis indirect effects.

Initial Model

Having made these several points, the Initial Model used in this study can be presented. The model appears as:

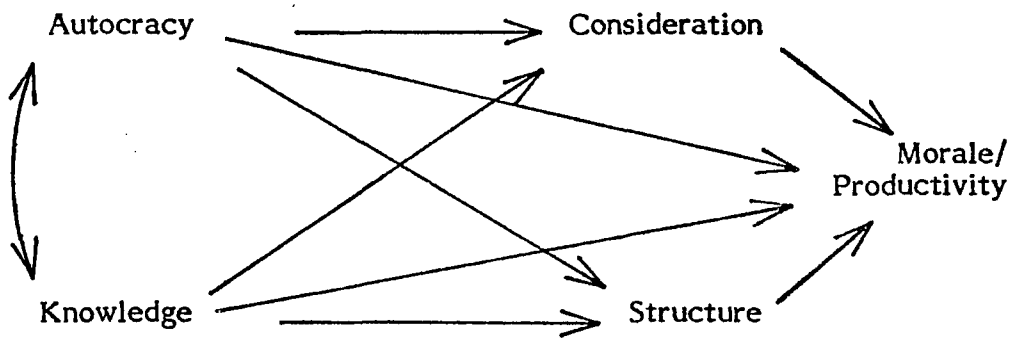


Fig. 5. Initial Model

The primary hypothesis which generated this research, that the first-line supervisor's knowledge of his subordinates' work would have a greater impact upon morale and productivity than would that supervisor's style, is reflected by the paths leading to morale and productivity from the knowledge, autocracy, and Consideration variables. It will be remembered that Consideration was to be used as a proxy variable for participative leadership. As previously discussed, those tests which measure Consideration also measure Structure, and Structure has been one of the most studied leadership behaviors in recent decades, so that, for comparative purposes, the Structure to morale/productivity path seemed to be a worthwhile addition to the diagram.

The only omitted path on the Initial Model is that between Consideration and Structure. This path was omitted because of the researcher's intuitive belief that neither of those variables caused the other to vary. The question of whether one of the variables causes the other to vary has been the subject of considerable

research. Fleishman has said, "An important research finding is the independence of these two dimensions."[39] Schriesheim, et al. have said that the relationships between the two are "Almost never statistically significant."[40] Since workable path coefficients were used in the Initial Model, the only cause for differences between observed and estimated zero order correlations will be the omission of the Consideration to Structure path.

Twelve versions of the Initial Model were analyzed. They were differentiated by whether the criteria variable was productivity or morale, whether subordinate scores (SBDQ) or supervisor scores (LOQ) were used for Structure and Consideration, and whether postal, programmer, or a combination of the two work groups were used.

Disadvantages

Linear regression is simpler operationally and more broadly understood than path analysis. This is true, even though there is a growing usage of path analysis by researchers. The assumption that extraneous variables are not correlated with variables that are located within a model is usually questionnable, since those extraneous variables are by definition unspecified.[41] There is, also, no simple way of determining sampling error for indirect effects, though Macdonald discusses a possible method of some models.[42]

---

[39] Fleishman, Manual for the Supervisory Behavior Description Questionnaire, p. 1.

[40] Schriesheim, House, and Kerr, "Leader Initiating Structure: A Reconciliation of Discrepant Research Results and Some Empirical Tests," p. 303.

[41] K. I. Macdonald, "Path Analysis," p. 84.

[42] Ibid., pp. 89-90

CHAPTER IV

ANALYSIS AND INTERPRETATION OF THE DATA

Overview

The twelve diagrams of the Initial Model will first be presented and evaluated. The evaluation will be made in accordance with customary categories for evaluating path diagrams. These include significance levels, strengths of paths, signs, and estimated versus observed zero order correlations. In this study the evaluation indicated a need for an Expanded Model. Such a model was prepared and will be presented, followed by an evaluation using the same categories of analysis. In the remainder of the chapter an attempt will be made to integrate the separate analytical methods and accomplish a more synthesized analysis and interpretation of the primary and secondary hypotheses in regard to each path diagram, as well as groups of associated diagrams.

Initial Model

The twelve versions of the Initial Model are shown in Appendix B. For ease of preparing models and writing path coefficients, the variables autocracy, knowledge, Consideration, Structure, morale, and productivity are represented on the diagrams by their respective first letters: A, K, C, S, M, and P. Table 1 shows significance levels. Table 2 gives correlations and their decompositions.

Significance Levels

Whether sample data provide sufficient evidence to indicate that beta, in this case a path coefficient, is different from zero, can be evaluated by the t test:

$$t = \frac{b_i - B_{io}}{S_{b_i}}$$

with n - k - 1 degrees of freedom, where n equals the number of observations, and k equals the number of predictor variables in the equation. If the null hypothesis that B = 0 can be rejected, it is concluded that beta is not equal to zero, but instead, there is a relevant linear slope relationship between the two variables in question. Since the t test is two-tailed, an alpha level of 10 percent would indicate a 5 percent significance level in each tail. Both 5 and 10 percent alpha levels were used in the preparation of Table 1, but it is not unheard of to use alpha levels of 20 percent in path analysis.[1]

Both supervisory and subordinate measures of Structure as a cause of morale and productivity, as reflected in the Table, are nowhere significant at the 5 or 10 percent alpha levels. At the 20 percent alpha level, Structure would be significant on only two of the twelve diagrams.

Though supervisor Consideration is significant on only two of six diagrams, the implications of those two significant paths are important. They indicate a negative relationship exists between supervisor Consideration and productivity. The subordinate measure of Consideration to productivity is, however, positive. Supervisors see increased Consideration resulting in lower productivity, while subordinates perceive more Consideration leading to greater productivity.

Originally, only separate diagrams were prepared for programmers and postal workers. This resulted in just four morale diagrams. On three of those the knowledge to morale path was significant at only 20 percent. As this might have

---

[1] Namboodiri, Carter, and Blalock, Applied Multivariate Analysis and Experimental Designs, p. 459.

Table 1. Initial Model

Number of Individual Significant Paths
at 5 Percent and 10 Percent Alpha Levels

Independent Variable	Subordinate Consideration 5%	10%	Supervisor Consideration 5%	10%	Subordinate Structure 5%	10%	Supervisor Structure 5%	10%	Morale 5%	10%	Productivity 5%	10%	Total # Models on which signif. 10%
Autocracy	4/6	4/6	2/6	6/6	0/6	2/6	0/6	2/6	2/6	3/6	3/6	3/6	10 of 12
Knowledge	0/6	0/6	0/6	0/6	2/6	4/6	4/6	4/6	1/6	3/6	0/6	0/6	9 of 12
Subordinate													
Consideration									3/3	3/3	1/3	1/3	4 of 6
Supervisor													
Consideration									0/3	0/3	1/3	2/3	2 of 6
Subordinate													
Structure									0/3	0/3	0/3	0/6	0 of 6
Supervisor													
Structure									0/3	0/3	0/3	0/3	0 of 6

/ = of

been the result of small sample sizes, the two job categories were pooled and the new, combined diagrams do reflect paths with significance at 5 percent and 10 percent. This lends to establishing the validity of the postal test which was specially prepared for this study. This is an interesting contrast with knowledge to productivity paths, where only one of six paths is significant at the 20 percent level. Also, the knowledge to productivity path is negative for programmer subordinates and positive for postal subordinates, so that the combined model yielded a path with no improvement in significance. Knowledge, however, does not appear to be related to either measurement of Consideration, neither the supervisors' nor the subordinates'.

Overall, the significance tests indicate that no damage would be incurred if, in the interest of parsimony, both the supervisor and subordinate measurements of Structure were dropped from the diagrams.

Strengths of Paths

The strongest path coefficients occur when subordinates evaluate their supervisors on Consideration and that variable is related to morale. This involves three diagrams. The strong positive coefficient turns negative when morale is regressed on programmer supervisor's self-ratings on Consideration, and the path coefficients are mixed between positive and negative where productivity is the ultimate dependent variable.

The next highest grouping of path coefficients occurs between autocracy and the variables Consideration and productivity. It is interesting that the average direct effect between autocracy and productivity is greater than that between autocracy and morale. It is even more interesting that in all models, the relationship is negative; that is, the more autocracy, the less productivity and morale.

For all paths leading to morale and productivity, the weakest group of relationships runs from the Structure variable. The Structure to morale average path coefficient is .08 and the Structure to productivity average is .16. The knowledge to Structure coefficients are quite high, but since the Structure to productivity and morale coefficients are so low, knowledge does not have a great deal of effect on morale and productivity through the indirect path involving Structure. Knowledge to morale coefficients are high; while knowledge to productivity coefficients are low.

All of this indicated it might be worthwhile to retest the model with Structure removed. The low significance levels of paths leading from Structure, discussed in the previous section, strengthened the conviction that this might be a worthwhile possibility. Next, the path between knowledge and Consideration might be removed and the model retested. Such removals of paths would be performed only in the interests of parsimony. Only one path at a time should be removed from a diagram before retesting, so that the results of removals are not confounded.

Signs

Analyzing negative and positive correlations and coefficients is best done in terms of the hypotheses of the original theory. The possibilities of this type of analysis appeared to be extensive in view of the large number of coefficients and correlations; the fact that they could be examined in groups of indirect, shared, and common cause effects; and that all of this could be studied in regard to individual diagrams, as well as the 12 diagrams divided into various groups and taken in total. However, before such an extensive analysis was undertaken, it was decided to determine if the Initial Model was the appropriate model, deserving

such time consuming attention. The Initial Model will then be examined at this point in regard to only a few of the most important hypothesized views.

In terms of the primary hypothesis, one's attention is drawn to the negative coefficients on paths between knowledge and morale, and knowledge and productivity. The coefficient is positive on only three of the productivity diagrams and none of the morale diagrams. It had been originally believed that the greater a supervisor's knowledge, the greater would be his subordinates' morale, as well as productivity. One explanation of this inconsistency might be that the signs relating knowledge to morale and productivity indicate some variable or variables, not considered in the present model, are causing morale and productivity to vary opposite the hypothesized direction.

Differences Between Observed and Estimated Correlations

In view of previous discussion, it will be recalled that any differences between observed and estimated zero order correlations were the result of not placing a path between Consideration and Structure. It should first be mentioned that there would be no differences between estimated and observed correlations regarding the variables autocracy and knowledge. Only Consideration and Structure would show differences. This was so since both autocracy and knowledge had an indirect relationship with morale/productivity via Consideration and Structure. Appendix C indicates the average magnitudes of those differences, .016 overall for Consideration and .046 overall for Structure, and these were not unduly large.

One could come very near to reconstructing the Consideration zero order correlations by summing direct effects and those components of correlations due to correlated causes, even though the $P_{SC}P_{MS}$ indirect effect was missing. This is because the P_{MS} coefficient was generally small. On the other hand, P_{MC} was

generally quite strong, so that when it was omitted from estimating the Structure to morale zero order correlation, that is, when $P_{MC}P_{SC}$ was not included, the average differences were relatively larger.

This comparison of differences between observed and estimated zero order correlations again served to draw attention to the weaknesses in the Structure to criteria variable relationships.

Initial Model Evaluation Conclusions

Each portion of the previous analysis indicated that the Structure variable might be eliminated from the diagrams without adverse results. In the interest of parsimony, 12 diagrams omitting that variable were prepared. Those diagrams, not presented in this dissertation, showed that the removal of the Structure variable did weaken the remainder of the path diagrams. Weaker strengths and significance levels were obtained for many of the paths which were not eliminated. There was no change in signs. Generally, that attempt at parsimony was accompanied by losses in worthwhile information and interpretive value.

Two more important questions raised by the Initial Model ultimately led to the development of an Expanded Model. First, on only three of the 12 diagrams was knowledge positively related to the ultimate dependent variable, morale or productivity. This, of course, was in direct opposition to the basic hypothesis of the study. Also, the three positive relationships were quite weak. It was reasoned that since the negative coefficients seemed intuitively incorrect, some unconsidered extraneous variables might be affecting morale or both morale and knowledge so as to cause morale to appear to vary negatively in relation to knowledge. It was reasoned, such variables might also be affecting the knowledge to productivity path coefficients.

The second question involved a concern for the high autocracy to Consideration path coefficients. The strengths of those relationships evoked curiosity regarding whether other variables might be found which could help account for those strengths. Reflection on these questions eventually led to the development of the Expanded Model.

Expanded Model

The search for extraneous variables which might provide answers to the questions raised by the analysis of the Initial Model led to a review of the several variables for which data had earlier been obtained. In the data collection stage of the study, data had been gathered on 31 different variables. The eight variables used in the Initial Model were chosen because of their approximations to hypothesized variables and their relative levels of significance, as indicated by chi-square tests which had been run early in the study. Only two of the 31 variables had not been examined via the chi-square tests. These were the age and education variables. It was thus decided that since these variables had not previously been examined and since they did intuitively seem to offer possibilities for providing answers to the questions raised in the analysis of the Initial Model, they would be incorporated into the diagrams of an Expanded Model.

In view of the unproductive deletion of Structure, indicated by the trial run previously discussed, it was decided Structure should remain in the new model. Since the knowledge to Consideration path had proven to be low in strengths and significance levels in the Initial Model, it was decided to omit that path when the model was enlarged. The absence of the Consideration to Structure path in the Initial Model accounted for little difference between observed and estimated zero order correlations. The magnitudes of those differences having

averaged .016 for Consideration and .046 for Structure, as regarded their relationships with criteria variables, it was decided to continue omitting that path. Finally, since the autocracy to knowledge zero order correlations were low in strengths, varied from positive to negative and approached zero on the "combined" diagrams, it was decided to omit that path.

Of the two primary questions raised by the analysis of the Initial Model, the question regarding why the coefficients between autocracy and Consideration were so strong led to the decision to relate the two new variables to autocracy and Consideration; that is, paths were ultimately drawn from education and age to both autocracy and Consideration. The relationships which the age and education variables might have with the knowledge variable were not hypothesized, but it was hoped that as exogenous variables, their zero order correlations with knowledge might shed light on the negative relationships found to exist between knowledge and the criteria variables. The Expanded Model then appeared as follows:

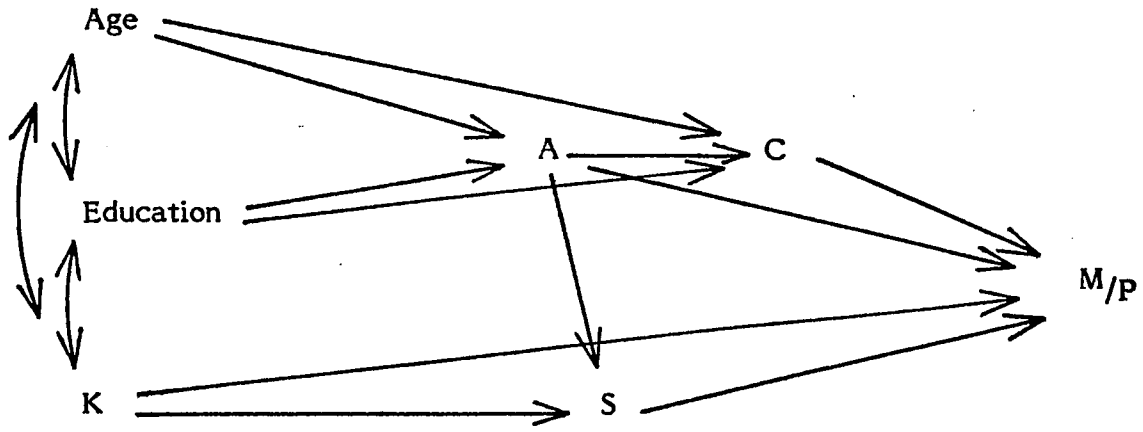


Fig. 6. Expanded Model

The Expanded Model diagrams are contained in Appendix B. Table 2 summarizes the significance levels of the various paths. Appendix C gives the components of correlations and differences between observed and estimated correlations. It will be noted that since the two new variables were connected directly to only autocracy and Consideration, there were no changes in coefficients, signs, or significance levels for paths leading directly to criteria variables. The following discussion of significance levels, strengths, etc., will not focus on those items which remained the same in the new model, but will concentrate on the salient differences of the Expanded from the Initial Model.

Significance Levels

It will be recalled that in the Initial Model, autocracy was shown to be significant, at the 10 percent level, with Consideration on 10 of 12 diagrams. Table 2 indicates the addition of the age and education variables reduced the number of those significant paths to only four of 12. What had been perceived as changes in Consideration being brought about by reductions in autocracy, now appear, in large part, to be changes caused by age and education. This possibility will be discussed in more detail under "Strengths of Paths."

Very strong significance levels were shown on paths which led from age and education to other variables. The significance levels of the correlations between exogenous variables, age, education, and knowledge, were also generally quite good. A plot of the residuals from the regression of education on age revealed possible heteroscedasticity. The well educated subjects tended to be of average subject age, while the poorly educated subjects tended to be relatively young and old. This divergence from homoscedasticity did not appear to be large, and since the study's only concern with the relationship between the two variables was in the form of a zero order correlation between exogenous variables, not

Table 2. Expanded Model

Number of Individual Significant Paths
at 5 Percent and 10 Percent Alpha Levels

Independent Variable	Autocracy		Consideration		Structure		Morale		Productivity		Total diagrams on which significance is shown	
	5%	10%	5%	10%	5%	10%	5%	10%	5%	10%	10%	20%
Autocracy			4/12	4/12	0/12	4/12	2/6	3/6	3/6	3/6	8 of 12	8 of 12
Knowledge					6/12	8/12	1/6	3/6	0/6	0/6	9 of 12	9 of 12
Consideration							3/6	3/6	2/6	3/6	6 of 12	7 of 12
Structure							0/6	0/6	0/6	0/6	0 of 12	2 of 12
Age	4/12	8/12	4/12	612							10 of 12	12 of 12
Education	8/12	8/12	4/12	4/12							10 of 12	12 of 12

/ = of

directly related to criteria variables, and since there was no intent of making precise predictions based upon the relationship, the problem was not considered to be major. Heteroscedasticity does not imply that structural estimates or forecasts will be biased.[2]

Strengths of Paths

It will be recalled that in the Initial Model the second strongest grouping of path coefficient strengths occurred between autocracy and the variables Consideration and productivity. Concern for locating other possible causes of those high coefficients from autocracy to Consideration, resulted in the preparation of the Expanded Model. The Expanded Model diagrams reveal the autocracy to Consideration group of coefficients are now surpassed in strength by the following groups of paths: age to Consideration, education to Consideration, education to autocracy, and age to autocracy. The Expanded Model diagrams, when compared to the Initial Model diagrams show a slight increase in subordinate autocracy to Consideration path strengths, from -.28 to -.29. The more interesting and sizeable change in strengths, however, occurred on the supervisor diagrams. There, strengths dropped considerably, from -.29 to -.17. On the Initial Model diagrams, P_{CA} equalled $B_{CA.K}$, while on the Expanded Model diagrams it is equal to $B_{CA.AgeEduc.}$. On supervisor diagrams, when age and education are held constant, Consideration does not appear to be so greatly changed by autocracy as previously indicated. The new variables, age and education, strongly correlate with other variables and explain much of the relationship between autocracy and Consideration.

---

[2] David A. Aaker, Multivariate Analysis in Marketing: Theory and Application (Belmont: Wadsworth Publishing Company, Inc., 1971), p. 28.

The strongest zero order correlation, -.70, appears on the programmer diagrams between the exogenous variables age and education. The remaining exogenous variable correlations on the programmer diagrams are also strong and make an interesting contrast with the correlations between those variables on the postal diagrams.

Signs

As mentioned, analyzing negative and positive correlations and coefficients is best done in terms of the hypotheses of the original theory. In view of the considerable amount of information available at this point, evaluating those hypotheses can best be done from a synthesized approach which considers not only signs, but strengths, significance levels, etc. Since that involves a lengthy discussion which should focus on individual diagrams as well as relevant groupings of diagrams, that analysis will be delayed until the "Integrated Consideration of Hypotheses" section of this chapter. At this point, however, it should be mentioned, the Expanded Model effected no changes in the negative signs of coefficients on paths leading from knowledge to criteria variables, as reflected in the Initial Model. The Expanded Model does, though, pave the way to a possible explanation of those signs, at least in the case of coefficients on paths leading to productivity.

Differences Between Observed and Estimated Correlations

In view of previous discussion, it will be recalled that any differences between observed and estimated zero order correlations will be the result of omitting paths between variables. On the Initial Model, the only omitted path was between Consideration and Structure. The Expanded Model, however, does not include seven possible direct paths. However, even in view of that large number of omissions, Appendix C indicates the differences between observed and

estimated zero order correlations are not sizeable enough to necessitate adding those paths to the diagrams. The lack of causality hypothesized by the omissions has not been disproven by comparing observed and estimated zero order correlations in the Expanded Model.

Integrated Consideration of Hypotheses

The primary hypothesis of the study is that a first-line supervisor's knowledge of his subordinates' work is a stronger determinant of morale and productivity than that supervisor's leadership style. It was believed that knowledge would be a favorable versus unfavorable determinant. That hypothesis, as well as the pertinent secondary hypotheses reflected in the Expanded Model will, through the remainder of this chapter, be discussed from a synthesized perspective. Here it is intended to integrate the previous specific information, signs, strengths, etc., and examine the hypotheses in regard to individual diagrams, as well as groups of diagrams.

Morale Diagrams

Morale/Subordinate/Postal Diagram

Here knowledge is shown as negatively related to morale, -.20, significant at alpha equals .20. The indirect path from knowledge to morale via Structure is weak, .15 X .05 = .0075. The zero order correlations between knowledge and the variables age and education are also weak. The strongest component through those variables is from knowledge to age to Consideration and finally to morale, but the strength of the joint effect of that route is only .012. The diagram then, depicts the effects of knowledge to morale almost as if knowledge were not related to any other independent variables. The knowledge to morale direct effect, almost alone, is viewed as accountable for the way in which knowledge

affects morale. The path coefficient, -.198, well expresses the zero order correlation, -.172.

The evidence then indicates the primary hypothesis to be incorrect in this diagram; that is, increased knowledge does not seem to raise morale. Also, Consideration, viewed as a style of leadership, does have a strong positive path coefficient leading to morale, .52. As Consideration increases, so does morale.

Morale/Subordinate/Programmer Diagram

Knowledge is again negatively related to morale, -.29, significant at alpha equals .10. The indirect path via Structure is again weak, .0037. The most interesting aspects of this diagram are the implications of the very strong zero order correlations between the exogenous variables. If we contemplate those exogenous variables a moment, we might say, in view of temporal realities, it would be easier to hypothesize causal relationships running from age to education and knowledge than in the opposite direction.

Age is positively directly related to Consideration, .06, that is; as age increases, so does Consideration. The .53 coefficient from Consideration to morale, in turn, indicates that as Consideration is increasing with age, so is morale increasing. Other indirect paths leading from age to morale indicate the same relationship. As age increases, autocracy decreases, -.45; as autocracy decreases, Consideration increases, -.16; and as Consideration increases, so does morale increase, .53. The age-education-Consideration-morale path also indicates that as age increases, morale increases. In the upper portion of the diagram, the only path which indicates otherwise is the age-education-autocracy-Consideration -morale path. The education to autocracy portion of that path has a zero order correlation of -.05, which is the weakest zero order correlation on the entire diagram. The general conclusion to this point is that as age increases, so does

morale. This conclusion is not without precedent in the literature.[3] In conjunction with this conclusion, it can be seen that as age increases, knowledge decreases, as shown by the zero order correlation of -.48. However, morale increases as knowledge decreases, the coefficient is -.29. There is the possibility that increased age causes morale to rise and, at the same time, knowledge to drop. One might then wonder if decreased knowledge causes higher morale, or if the higher morale is not really the result of increased age. Knowledge might not be so important a factor in causing changes in morale as age happens to be. Age may be of such importance in that it might represent supervisory learning as a result of experiences over time, or stated more formally, it might be a proxy variable representing several variables which tend to affect individuals over time, tending to change their behaviors in various ways. Ultimately this train of logic leads to the question, "If morale were regressed on knowledge while age and education were held constant, would the effect of knowledge on morale be shown to be positive?" The possible value of holding the education variable constant, along with the age variable, was determined in accordance with the same line of reasoning followed when the age variable was discussed.

In accordance with this rationale, programs were run holding age and education constant and finally, holding all other independent variables constant. The results of those programs were that the knowledge to morale path coefficient, which was -.29, dropped to -.20 when age and education were held constant and -.25 when age, education, autocracy, Consideration, and Structure were held constant. There would seem to be two possible conclusions. First, none of those

---

[3] U.S. Department of Labor, Manpower Administration, "Job Satisfaction: Is There a Trend?" Manpower Research Monograph No. 30, 1974, p. 12.

variables held constant were responsible for the negative relationship between knowledge and morale. Second, as the negative knowledge to morale relationship was reduced, there might be other extraneous variables that could be located to further reduce it, and perhaps, when a sufficient number of those variables were held constant, an underlying positive relationship might appear.

As they stand, however, the postal and programmer subordinate diagrams strongly indicate the morale portion of the primary hypothesis is incorrect. In both cases a style of leadership, Consideration, has a strong positive effect upon morale.

Morale/Subordinate/Combined Diagram

When postal and programmer subordinates are combined into one diagram, the results are much the same as those discussed for the groups individually. The negative relationship between knowledge and morale is -.203, significant at alpha equals .05. The -.203 very closely approximates the zero order correlation of -.195. The indirect effect of knowledge through the Structure variable is .009. The correlations between exogenous variables are stronger than those on the postal diagram but weaker than those on the programmer diagram. The negative relationship between age and education, as reflected on the programmer diagram, does, however, predominate, the combined correlation being -.38.

The attempt was made to determine if knowledge would be positively related to morale if age and education were held constant. $B_{MK.AgeEduc.}$ equalled -.16 and $B_{MK.ACSAgeEduc.}$ equalled -.20. The primary hypothesis was again signified to be incorrect. Consideration again had a strong positive relation with morale, or in terms of the primary hypothesis, a style of leadership had more of a favorable impact upon morale than did increased knowledge.

Morale/Supervisor/Postal Diagram

Many of the statements made regarding the Morale/Subordinate/Postal Diagram apply here. The strong negative knowledge to morale path coefficient is significant at the .20 level. The indirect path from knowledge through Structure is a bit stronger, .048. The same correlations between exogenous variables apply again. Signs on all paths are the same as they were on the subordinates' diagram.

Of all the morale diagrams, the strongest zero order correlation between age and consideration occurs on this one, .48. The scenario regarding age as a highly important variable, or proxy variable, positively related to morale, is again supported. There is, however, a considerable drop in the strength of the Consideration to morale path coefficients, as compared to previous diagrams. Here it falls to .13. Postal supervisors perceive some improvement in morale as a result of being more Considerate, but not nearly as much as their subordinates perceive. These supervisors also see increased Structure resulting in as much improvement in morale, .13, as increased Consideration. Subordinates were less sure, .05, of the value of Structure.

Though the supervisor with more knowledge sees himself as more Structured and the relationship of Structure to morale indicates knowledge has a positive effect upon morale via that indirect effect, the $P_{SK}P_{MS}$ strength is small, .048, and the strong, -.25, direct effect overcomes it. Thus, disagreement with the primary hypothesis is again indicated.

Morale/Supervisor/Programmer Diagram

Here the knowledge to Morale path coefficient is still negative but the lowest which has occurred so far, -.19. Much of the explanation for the low coefficient can be viewed as accounted for by the indirect path from knowledge through Structure. For the first time, knowledge is negatively related to

Structure, -.43. Programmer supervisors project that the more knowledge they have, the less Structured they become. Why more knowledgeable supervisors are less structured offers much opportunity for rationalization. Perhaps the supervisor who is not well acquainted with what his people are doing can do little more than set out goals and deadlines, whereas the knowledgeable supervisor can evaluate performance on a short term basis by examining what his subordinates are doing. This is also the strongest knowledge to Structure path coefficient which has so far occurred. The negative coefficient when multiplied by the positive Structure to morale coefficient yields a -.079, the strongest strength this indirect path has reached on any of the diagrams. If the -.079 is added to the knowledge to morale path coefficient a -.27 is obtained. This approximates the zero order correlation between knowledge and morale, -.29; that is, this indirect plus the direct path effect accounts for almost the entirety of the knowledge to morale correlation. The bottom portion of the diagram is differentiated from the upper portion in this respect.

The exogenous correlations are strong between age, education, and knowledge and lead again to an examination of the possibility that, if other variables are held constant, the knowledge to morale path might become positive. Again though, it is determined that knowledge, with some help from Structure this time, still accounts for the knowledge effect upon morale, $B_{MK.ACSAgeEduc.}$ is -.15, versus the -.19 path coefficient.

A worthwhile avenue of examination indicated by this diagram involves how age and education relate to knowledge. Though decreased knowledge may cause morale to rise, whatever the supervisor's age or education, there remains the possibility that knowledge may rise or fall as a result of age or education. The exceedingly strong zero order correlations between the variables certainly

indicate this is possible. Those strong correlations were not present on the postal diagrams. The two groups are quite different. Computer advancements are being made quickly; technology and programming techniques are rapidly changing. The programmer supervisor can quickly become outdated regarding what his subordinates are doing. The -.48 correlation is intuitively appealing. The postal -.11 correlation is far less severe and probably indicates the older supervisor has simply been away from his subordinates' detailed work for a longer period of time, and become less familiar with the intricacies than the newly promoted supervisor. The -.70 age to education correlation illustrates the increased amounts of formal education which computer programmers are being required to obtain. The younger supervisors are better educated, and in turn, those better educated supervisors are more knowledgeable about their subordinates' work, .35 being the zero order correlation. Though the diagram does not call for a causal ordering of exogenous variables, it is not difficult to contemplate such an ordering.

The postal supervisors represent a much different group. They show an increase in education with age, the correlation being .24. The increased education has much to do with the military's emphasis on education as a partial requirement for promotion, and the reality that the military places personnel in postal work if those personnel have very low scores on military entrance examinations. Very likely, the personnel who obtain the lower scores on the entrance examinations are those who have lesser amounts of education. By the time they are in the process of being promoted to higher ranks, they are taking advantage of the military's support of higher education in Europe, as they are well aware of the promotional advantages.

Finally, this diagram reflects, for the first time, Consideration is negatively related to morale, -.106. The zero order correlation is -.14. The implication could be the supervisor believes that the more Considerate he is, the lower morale becomes. This is an extreme contrast with the strong .53 relationship the subordinate sees.

For this diagram, neither the Consideration, nor autocracy, nor knowledge paths indicate the way to success for a supervisor. The diagram indicates that the more Structured the supervisor is, the higher morale will be. The primary hypothesis might be viewed from the perspective of which of the variables knowledge, Consideration, or autocracy might cause the least amount of damage to morale, or, on the other hand, all three of these variables might be viewed as subordinate in importance to the behavior of Structure.

Morale/Supervisor/Combined Diagram

Differences in signs between postal and programmer supervisors result in a combined knowledge to Structure path coefficient showing little causal effect, .03. This gives the indirect path from knowledge through Structure a total effect of only .003. That, coupled with the exogenous zero order correlations reduced from what they were on the programmer diagram, leaves the knowledge to morale direct path virtually standing alone. Its -.21 coefficient when compared to morale regressed on knowledge while all other diagram variables are held constant, -.20, is relatively unchanged.

Though only .10, Structure again reflects the strongest positive coefficient leading to morale. Consideration has only a .03 path coefficient to the criterion variable. The significant -.20 coefficient from knowledge, however, again indicates the primary hypothesis is incorrect in the case of morale.

Summary Of Morale Diagrams

Primary Hypothesis

The morale diagrams as a group indicate the first-line supervisor who is one standard deviation above average in knowledge, ceteris paribus, will by that knowledge directly cause approximatley a 5 percent drop in his subordinates' morale, the average -.2233 path coefficient squared. Effects of knowledge through other variables will do very little to mitigate this adverse effect of knowledge.

Postal versus Programmer Groups

The most interesting difference between the two groups involves the implications that may be drawn from the differences and values of the correlations between age, education, and knowledge. The older programmer supervisor has much less formal education, -.70, the older postal supervisor has a little more education, .24. The older programmer supervisor has less knowledge of his subordinates' jobs, the older postal supervisor a little less.

Finally, the effects of autocracy upon morale, though negative in all cases, do appear to be stronger in the case of postal than programmer workers.

Subordinate versus Supervisor Diagrams

The most sizeable difference between these two groups appears to be their perceptions of the effects of Consideration upon morale. For subordinates, Consideration is seen as causing 25 percent of the changes in morale. For supervisors, the effect is negligible and is even overshadowed by the effect of Structure, as weak as that variable's effects seem to be.

In the Initial Model the average path coefficient between autocracy and Consideration was -.28 for subordinates and -.29 for supervisors. On the Expanded Model the average became -.29 for subordinates and -.17 for supervisors. A plot

of residuals of supervisors' scores indicated a slight curvilinear relationship. It could be interpreted as indicating when a supervisor is low in autocratic tendencies, he sees himself as less Considerate; as he becomes increasingly autocratic in nature, he sees himself becoming more Considerate; and after a point, as he becomes even more autocratic, he perceives himself as becoming less and less Considerate. The diagrams indicate that supervisors perceive Consideration changing with age and education. With the exception of one insignificant path, Supervisors indicate they become more Considerate with increases in both age and education. Subordinates perceive some of the positive change in Consideration as coming from increased ages of their supervisors, but they do not perceive a positive relationship between supervisors with higher educations and morale. The supervisors also see Consideration changing more as a function of age and education than as a function of decreases in autocracy. Subordinates see Consideration as being changed more by autocracy than age or education. Finally, though supervisors and subordinates both see Structure as positively related to morale, the supervisors' perceptions are stronger.

Productivity Diagrams

Productivity/Subordinate/Postal Diagram

For the first time, Knowledge is found to be positively related to the criterion variable. The .13 coefficient is, however, not significant, even at the 20 percent level. The positive zero order correlation between knowledge and productivity was .15, and that slightly stronger correlation was achieved even though the indirect path, from knowledge through Structure and on to productivity, yielded a -.03 effect. This would indicate that there is a stronger connection between knowledge and the upper part of the diagram than was indicated by the

Morale/Subordinate/Postal Diagram.

Consideration as a cause of the criterion variable is much weaker than when morale was the criterion on the Subordinate/Postal Diagram. Subordinates do not perceive Consideration as so great a cause of productivity.

Despite the low, .13, coefficient from knowledge to productivity, that coefficient rivaled the .15 Consideration to productivity coefficient in terms of evaluating the primary hypothesis.

Productivity/Subordinate/Programmer Diagram

Knowledge is again negatively related to the final dependent variable, but very weakly, -.05. Knowledge's strong positive coefficient to Structure is changed in sign and reduced to a total indirect effect of -.037 by the Structure coefficient. The strong zero order correlations among exogenous variables again cause one to ponder about the possibility of age, or both age and education being more causally related to the criterion variable than is knowledge. Again it was reasoned, if age, education and those variables which they affected were held constant, knowledge might have a positive direct effect upon the criterion variable. A program was again run to evaluate the possibility. The direct coefficient turned from -.05 to positive .09. This .15 change provided the first indication that this line of reasoning might actually lead to positive coefficients.

The Consideration to productivity coefficient of .25 is the strongest positive coefficient for that path on all six productivity diagrams. It was significant at only the 20 percent level. Programmers also see reduced value in Consideration leading to productivity, but in terms of the primary hypothesis, the .25 Consideration to productivity coefficient indicates Consideration is more strongly causal of productivity, even if productivity is regressed on knowledge with all other variables held constant.

Productivity/Subordinate/Combined Diagram

This diagram already reflects a positive, though insignificant path coefficient leading from knowledge to productivity, .05. In keeping with the previous line of thought, productivity was regressed on knowledge, holding all other variables constant, and the result was a direct effect of positive .09. Though this was still insignificant, it lent support to the rationale that other variables might be acting upon productivity or both productivity and knowledge, in such a way as to reduce what could otherwise be a positive effect from knowledge to productivity.

The Consideration to productivity direct effect is, however, stronger than the knowledge to productivity effect, thus indicating that for this diagram, the primary hypothesis is incorrect. Knowledge might be a positive cause of productivity, but here, Consideration, as a style is a stronger positive cause.

Productivity/Supervisor/Postal Diagram

The knowledge to productivity coefficient is -.02. However, when all independent variables except knowledge are held constant, the coefficient becomes -.03. This indicates the primary hypothesis might be incorrect. It might be said, in defense of that hypothesis, $B_{PK.ACAgeEduc.}$ equalled .05 and $B_{PK.AgeEduc.}$ equalled .15, and additionally, the primary indicators of "style" on this diagram, autocracy and Consideration, have direct coefficients of -.53 and -.30 respectively for their paths leading to productivity. Needless to say, the -.30 coefficient from Consideration to productivity is a dramatic reversal from all diagrams examined to this point.

Evaluating the primary hypothesis in terms of this diagram would be difficult since both variables representing styles of leadership and knowledge are negatively related to productivity. Only Structure is positively and directly

related to productivity and that variable approaches a "behavior" rather than a "style" in its conception.

Productivity/Supervisor/Programmer Diagram

Here, it appears the supervisor can do no right. Should there be increases in any of the hypothesized variables with arrows leading to productivity, the result will be less productivity. Consideration has the strongest, -.25, and knowledge the weakest, -.10, path coefficient.

The strong exogenous variable correlations again led to examination of the possibility that by holding age, education and other independent variables constant, the knowledge to productivity coefficient might become positive. When all other variables in the diagram are held constant as productivity is regressed on knowledge, that coefficient changes from -.10 to a positive .134. This .23 change, of course, constituted evidence that the primary hypothesis might not be disproved where productivity is concerned.

Productivity/Supervisor/Combined

Though the path coefficient from knowledge to productivity had been negative on the individual postal and programmer models, the combined model indicates a positive, though very weak coefficient of .01. When all other variables in the model are held constant and productivity is regressed on knowledge, the strength increases from .01 to .09.

The path coefficient of .01, though positive, and in agreement with the primary hypothesis of the study, represents something of an averaging of the no change for postal supervisors and the considerable change for programmers, when the same regression is run.

The indirect path from knowledge through Structure added little to the strength of the causation by knowledge, due to the weak, .03, coefficient from

knowledge to Structure. That weak coefficient was, in turn, the result of combining the strong negative postal and positive programmer coefficients.

The correlations between exogenous variables again represent something of a compromise between postal and programmer groups. The combined programmer and postal negative coefficients, on the path leading from Consideration to productivity, yielded a -.23 coefficient on this diagram.

The weak Structure coefficient, .12, represents the strongest positive correlation with productivity directly, and one can easily interpret from it that supervisors perceive Structure versus Consideration to be the better way to increase productivity.

Regarding the primary hypothesis, though the style to criteria coefficients are negative, strong, and significant, the positive knowledge to productivity coefficient is a weak and insignificant .01, though it does rise slightly to .09 when productivity is regressed on knowledge while all other variables within the model are held constant.

Summary of Productivity Diagrams

Primary Hypothesis

As they are, the diagrams reflect knowledge to be directly related to productivity positively three times and negatively three times. When all other variables are held constant and productivity is regressed on knowledge, five of the six diagrams reflect a positive path coefficient leading from knowledge to productivity.

The two variables intended to represent styles of leadership are Consideration and autocracy. Autocracy is negatively related to productivity on all models. Consideration is positively related to productivity on three of the six

models and on those models, the subordinate diagrams, it is stronger in its positive causal relationship than is the knowledge to productivity coefficient. This is true even when productivity is regressed on knowledge with all other model variables held constant. The three supervisor models could be said to favor the primary hypothesis, particularly when the $B_{PK,ACSAgeEduc.}$ coefficient is used.

Postal versus Programmer Groups

The strongest comparisons between these groups involve the age and education variables. The relationships are the same as appeared on the morale diagrams. They represent age and education as being more strongly tied to knowledge for programmers than postal workers, and more strongly tied to reductions in autocracy for the programmers than for the postal group. It was the strong autocracy to Consideration coefficients which ultimately led to the attempts to determine if relationships between productivity and knowledge might have been misinterpreted on the Initial Model diagrams, and as indicated, that seems to be a possibility.

Implications of the very strong, -.70, correlation between age and education for programmers versus the weaker, positive relationship, .24, for postal workers will be discussed in the next chapter, but it should be mentioned here, they indicate important differences exist between these two groups of workers: one group representing a rather bureaucratic, little changing technological organization, and the other representing a rapidly changing technological group, requiring the flexibility which accompanies such changes. The hard line autocrat seems to weaken with age and education in the changing technological group, and Consideration becomes more important.

Subordinate versus Supervisor Diagrams

Here, as in the morale diagrams, there are important differences in perceptions of how Consideration affects the ultimate dependent variable, in this case, productivity. Subordinates see a positive relationship while supervisors see a negative relationship.

Comments regarding the autocracy to Consideration path coefficient, as well as direct path coefficients and zero order correlations from age and education to other variables remain the same as they were on the morale diagrams and will not be repeated at this point.

Assumptions

The analysis and interpretation of the diagrams indicate some comments might be made regarding Zeller and Carmines' path analysis assumptions, as discussed in Chapter III. Their second assumption stipulated that "Residual variables are presumed to be uncorrelated with each other and uncorrelated with other variables in the model."[4] This assumption seems the most in question at this point. Two variables which were extraneous to the Initial Model were added to develop the Expanded Model. These variables are shown to be correlated with various independent variables in the new model. Furthermore the likelihood of finding other similarly correlated extraneous variables has not been ruled out.

Zeller and Carmines' third assumption stipulated the "Causal relations linking the variables in the model can be expressed as linear . . ."[5] The indication of a possible nonlinear relationship was discussed. Residual plots did not reveal other indications of nonlinearity. The only indication of a possible

---

[4] Zeller and Carmines, Statistical Analysis of Social Data, p. 339.

[5] Ibid.

violation of homoscedasticity was discussed, that regarding the relationship between age and education. Indications of nonlinearity and heteroscedasticity were not strong, and in contemplating the variables involved, those possible violations do not appear to be serious.

CHAPTER V

SUMMARY AND CONCLUSIONS

Leadership has been extensively researched since the early 1900's. Three of the primary areas studied have been traits, behaviors, and styles of leaders. This study reflects an attempt to synthesize those categories of leadership research.

Summary

The subjects tested were chosen as a convenience sample and were U.S. Army personnel stationed in West Germany. A total of 78 sets of subordinate tests were obtained, 46 for postal workers and 32 for programmers. These job categories were chosen in accordance with Perrow's Model which allows for differentiating tasks on the basis of difficulty and variability.

With one exception, previously prepared tests were used to obtain the data. The postal knowledge test had to be specially prepared for this study. The data obtained were analyzed using path analysis. The first path analysis model employed left two primary questions unanswered. Those questions led to the conclusion that extraneous variables might help to explain the results. An Expanded Model was then prepared by employing two additional variables for which data had been obtained during the data gathering phase of the study. The resulting diagrams provided insight into both of the questions raised by the first model.

The primary hypothesis of the study, that the first-line supervisor's knowledge of his subordinates' tasks will have more impact upon his subordinates' morale and productivity than his leadership style, was indicated to be incorrect in the case of morale, however, there were indications that it is still worthy of consideration where productivity is concerned. Also, the analysis and interpretation of the data indicated the direction which future research should take regarding the primary hypothesis, as well as the general areas of traits, behaviors, and styles of leadership.

Conclusions and Implications

Implications regarding the primary hypothesis will be discussed where they are relative in the following sections. After a number of pertinent points regarding that hypothesis have been made, the implications will be brought together in the later section "Primary Hypothesis."

Behavior Tests and Definitions

In Chapter II the extensive research involving the Consideration and Initiating Structure behaviors was discussed. In this section it is intended to establish implications regarding possible inadequacies of the tests and definitions pertaining to those behaviors.

Comments regarding the culmination of a half century of trait research can be recalled. Melcher has been cited as saying, "Several review essays revealed no personality traits were common among effective or ineffective leaders."[1] Barrow commented, "Personality traits related to leadership in one

---

[1] Melcher, "Leadership Models and Research Approaches," p. 94.

situation were not generally predictive in other situations."[2] An implication of this dissertation, based upon the findings of Chapter IV and prior research, is that not a great deal more can be said of the predictability of the Consideration and Initiating Structure behaviors. Their indications of effectiveness as reflected by correlations and coefficients between those behaviors and criteria variables, such as morale and productivity, have not shown sufficient improvement over trait variable correlations to have justified the considerable research effort involving them.

The factor analysis which led to the development of the definitions and tests of these behaviors was performed in regard to simply determining how leaders behaved, not the more important concern, what differentiated effective from ineffective leaders. Regarding the development of the definitions and tests, Fleishman has stated, "The decision was made to study the patterns of behavior of people in so-called leadership positions. . . . For quite a long period, no attempt was made to say what pattern was effective and what was not. This remained an empirical question to be determined through subsequent research."[3]

It is possible, of course, that some behaviors of leaders cause changes in the morale and productivity of their subordinates, while other behaviors do not. As the factor analysis research which led to the development of the Ohio State Tests was not directed at finding leader behaviors which resulted in improving the morale or productivity of their subordinates, it remained the task of those performing subsequent research to hypothesize and study the possible causality.

---

[2] Barrow, "The Variables of Leadership: A Review and Conceptual Framework," p. 232.

[3] Fleishman, "Twenty Years of Consideration and Structure," p. 5.

Some of the subsequent research summaries can be recalled. Korman's summary led to his criticizing the Ohio State Tests on the basis of extremely low correlations between the behaviors and criteria variables.[4] His summary table indicated they were not only low but varied between negative and positive.[5] Though Kerr and Schriesheim answered Korman by saying that considerable improvement had been made as of 1974, they failed to produce a listing of correlations as Korman had done.[6] Furthermore, current lists of correlations continue to show little, if any, more adequacy than those related by Korman.[7, 8]

The Chapter IV analysis and interpretation of this study provides several indications of the inadequate causality of these behaviors. The overall indication of causality for all variables leading to morale and productivity is the residual path, U_d, coefficient. The U_d coefficients are the same for both the Initial and Expanded Model diagrams and indicate how much of the variability of a dependent variable is not explained by its causal independent variables. In Chapter IV the models were presented showing U_d, the residual path leading to morale and productivity to have an average coefficient of .875. This means that the average diagram with <u>all</u> its causally connected independent variables explains only 23

---

4 Korman, "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review," p. 351.

5 <u>Ibid.</u>, pp. 352-353.

6 Kerr and Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," pp. 558-560.

7 Gary Johns, "Task Moderators of the Relationship Between Leadership Style and Subordinate Responses," <u>Academy of Management Journal</u>, Vol. 21, No. 2 (1978), pp. 319-325.

8 James and Jones, "Perceived Job Characteristics and Job Satisfaction: An Examination of Reciprocal Causation," pp. 97-135.

percent of the variability in morale and productivity. The lowest U_d path coefficient is .78 and indicates that the model on which it appears explains only 39 percent of the variability in morale. These models then indicate that much of the variability in criteria variables is not accounted for by variables used in the diagrams. Other variables are causing greater changes in morale and productivity than those used in this study, and those used in this study include Consideration and Initiating Structure.

The inadequate causality of the behaviors was also observed for the individual behaviors by examining the weak and insignificant coefficients on paths leading from those behaviors. The Consideration coefficients are generally stronger and higher in significance than the Structure coefficients.

The comparative weaker relationships between Structure and effectiveness measurements have been revealed by previous research. Schriesheim et al. stated that as a predictor variable the "Nature and importance of Initiating Structure seems to remain confused and uncertain."[9] In Chapter IV, it was shown that the Structure to criteria variable paths were not significant at the 5 or 10 percent levels on a single diagram. Those weak correlations resulted in the generation of an entire set of diagrams intended to evaluate the possibility of completely omitting that behavior from further examination in this study.

An additional indication of the low correlations between these two behaviors and criteria variables were the comparisons of observed and estimated correlations. The finding resultant from those comparisons was that there seemed to be no great loss in predictability when the two behaviors were not joined by a

---

[9] Schriesheim, House, and Kerr, "Leader Initiating Structure: A Reconciliation of Discrepant Research Results and Some Empirical Tests," pp. 297-298.

path on the diagrams. The great amount of debate[10] regarding whether the two behaviors are correlated appears to be something of a tempest in a teapot if the behaviors are in fact inadequate explanations of changes in criteria variables.

Some of the strongest evidence of behaviors being inadequately defined in terms of subordinate effectiveness comes from the implications of research in which intuitively obvious conclusions were shown to be incorrect.[11] In Chapter II of this study several examples of what seemed intuitively obvious statements regarding the value of knowledge were given as well as the indications that they could not be substantiated by research. Terborg's statement can be recalled, "Given these models are relatively straightforward and seem intuitively correct, it was somewhat surprising to find that a review of the pertinent literature offered only marginal support. . . ."[12]

In this study, when all the variables in the Initial Model, including Consideration and Initiating Structure, were examined, knowledge was depicted as negatively related to both morale and productivity. This seemed intuitively incorrect so that two hopefully explanatory variables were added and the Expanded Model was produced and analyzed. When all the variables in the Expanded Model were held constant as productivity was regressed on knowledge, in five of the six diagrams the relationship became positive. The addition of the trait variables, age and education, to the analysis produced results which finally seemed intuitively correct. A possible explanation could be that these additional

---

[10] Ibid., pp. 303-305.

[11] Bobby J. Calder, "An Attribution Theory of Leadership," in New Directions in Organizational Behavior, pp. 179-181.

[12] Terborg, "Validation and Extension of an Individual Differences Model of Work Performance," p. 188.

variables or others which they reflect, strongly relate causally to productivity, directly or indirectly, so that they tend to change productivity more than knowledge changes productivity. If knowledge varied inversely with these variables, as the diagrams showed to be the case with the age variable, then knowledge would appear to be negatively related to the criterion variable. By holding Consideration and Structure constant in the Initial Model, the more causal variables may have been missed. The implication is that by holding age, education, and those behaviors constant in the Expanded Model, the variables which were more causal as well as those which tended to vary randomly were held constant so that the effects of knowledge acting alone could more nearly be measured. It might then be said that Consideration and Structure, as behaviors representing groups of traits, do not include some of the stronger traits causally related to criteria variables.

Even were the traits causing the greatest changes in productivity and morale included within the Ohio State Tests, those traits might not be weighted in accordance with their causality since the factors and their loadings were not established in regard to effectiveness relationships when the tests were prepared.[13]

The implication here is that the factors and their loadings which resulted in the Ohio State Tests and behavior definitions seem poorly related to criteria variables as indicated by prior research and as indicated in this study by 1) the large residual, U_d, coefficients, 2) weak and insignificant coefficients on paths leading from the two behaviors, 3) the slight differences between estimated and observed zero order correlations, 4) the achievement of positive knowledge

---

[13] Fleishman, "Twenty Years of Consideration and Structure," p. 5.

coefficients when age and education, as well as other independent variables, are held constant, and 5) the findings which seemed to be opposed to common sense.

House's Theory

The designation of programmers as workers classifiable in the nonroutine category and postal workers in the routine category establishes a basis for commenting on this study vis-a'-vis House's hypotheses discussed in Chapter II. Those hypotheses were based upon four propositions which House set forth. The four propositions provide a basis for establishing further inferences for hypothesizing relative to the knowledge variable in this study. In this section House's hypotheses will first be discussed. The inferences relating to our knowledge variable, based upon his propositions, will be developed and discussed.

House's Hypotheses

His third hypothesis stated, "Structure serves to reduce role ambiguity and clarify path-goal relationships for ambiguous tasks but is viewed as unnecessary and redundant for nonambiguous tasks."[14] In terms of this study, programmers would be expected to find Structure satisfying and productive while postal workers would not. It should first be mentioned that all Structure to criteria coefficients are insignificant. As previously discussed, Structure in definition and measurement may lack some traits which would lend to establishing supervisory causation of subordinate behavior. Second, we take the position that the subordinate perceptions are those deserving primary attention at this point. This position is based upon the concept that it is inappropriate to view a supervisor's behavior as identical for all his subordinates. Kerr and Schriesheim indicated that one of the reasons for low correlations between Ohio State behavior measurements and

---

[14] House, "A Path Goal Theory of Leader Effectivness," p. 325.

criteria variables could have been the result of determining supervisor ratings by averaging subordinate scores.[15] They, as well as others, indicated that supervisors tend to treat effective subordinates differently than inferior subordinates.[16, 17] In this light, the subordinate diagrams seem more reflective of actual supervisory behavior than do the supervisor diagrams.

If then with these thoughts in mind, House's third hypothesis is examined, we find both support and non-support in the diagrams of this study. The non-support is reflected in the morale diagrams. The Structure to criterion coefficients are simply too near zero to be worthy of providing support. Some support is provided by the productivity diagrams. Though the negative sign on the Programmer/Subordinate Diagram indicates programmers see Structure resulting in less productivity, the coefficient, -.10, is smaller than the -.23 coefficient on the Postal/Subordinate Diagram. This indicates that postal workers view Structure as more unnecessary and redunant than do programmers.

Before leaving House's third hypothesis it should be mentioned that programmer subordinates are not as adversely affected by autocracy as postal subordinates. All subordinate diagrams indicate this to be true. It is possible that autocratic leadership ". . . serves to reduce role ambiguity and clarify path-goal relationships for ambiguous tasks," and at the same time autocratic leadership

---

15 Kerr and Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," p. 559.

16 Ibid.

17 Korman, "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review," p. 354.

might be viewed as "unnecessary and redundant for nonambiguous tasks."[18] Such an extension of House's third hypothesis is not unreasonable and is well supported by the diagrams generated in this study. The zero order correlations on the Initial Model diagrams indicate knowledge is positively related to autocracy for programmers, .18, and negatively related for postal workers, -.15. More knowledgeable programmer supervisors are more autocratic while more knowledgeable postal supervisors are less autocractic.

In his fifth hypothesis House stated, where tasks are ". . . ambiguous, consideration will result in social support, friendliness among group members, increased cohesiveness, and team effort," so that there will be increases in "cooperation and team spirit."[19] This could be interpreted as indicating that this study's programmer diagrams should show a strong positive relationship between Consideration and morale. Those diagrams do reflect such a relationship, so that support of the hypothesis is indicated. However, the postal diagrams show virtually the same strong positive relationship.

In his ninth hypothesis House said, "Under conditions of authoritarian or punitive leadaership, leader initiating structure will be negatively related to subordinate satisfaction."[20] Perrow's Model indicates that postal workers should be the ones more likely operating under conditions of authoritarian or punitive leadership,[21] so that by extension, they should see Structure as negatively related to their satisfaction. The morale diagrams indicate that the differences between

---

18 House, "A Path Goal Theory of Leader Effectiveness," p. 325.

19 Ibid.

20 Ibid.

21 Perrow, Organizational Analysis: A Sociological View, p. 83.

routine and nonroutine, postal and programmer, subordinates are insignificant. The Structure to morale path coefficients are very near zero in both cases, .05 and .01.

Regarding these of House's hypotheses then, the diagrams of this study reflect both support and non-support.

House's Propositions

The three hypotheses discussed above were based upon four propositions which House set forth.[22] Inferences specifically pertaining to the knowledge variable used in this study can be drawn from two of those propositions. In one proposition House stated that a motivation function of a leader is to ". . . increase the subordinate's path instrumentality with respect to work-goal attainment . . . ."[23] "Stated less formally, the motivational functions of the leader consist of . . . making the path to . . . pay-offs easier to travel by clarifying it, reducing road blocks and pitfalls, and increasing the opportunities for personal satisfaction en route."[24] Extending this proposition one could hypothesize that a supervisor with increased knowledge of his subordinates' jobs would more likely make their paths to goals easier to travel. This would seem important in the case of programmers as their tasks are both difficult and variable. An inference from the proposition would then be that programmers with knowledgeable supervisors would have higher productivity and higher morale. Those subordinates' paths to achieving goals would be easier to travel. This possibility should be discussed in

---

22 House, "A Path Goal Theory of Leader Effectiveness," pp. 323-324.

23 Ibid., p. 323.

24 Ibid., p. 324.

conjunction with an inference relating to how postal workers might be affected by knowledgeable supervisors.

Another of House's propositions stated:[25]

> Where leader attempts to clarify path-goal relationships are redundant with existing conditions, that is, where path-goal relationships are apparent because of the routine of the tasks or objective system-fixed controls, attempts by the leader to clarify path-goal relationships will result in increased externally imposed control and will be seen by subordinates as redundant. Although such control may increase performance, it will also result in decreased satisfaction.

An inference from this proposition would be that postal workers would perceive knowledgeable supervisors of no more value than unknowledgeable supervisors. If knowledgeable supervisors attempted to use their knowledge to clarify path-goal relationships, lower morale would likely be the result. Performance, however, might increase.

First, regarding morale, the Postal/Subordinate diagrams do indicate knowledge is negatively related to morale, -.20. The rationalization can be made that more knowledgeable postal supervisors do tend to use their higher knowledge to attempt to clarify what are already clear path-goal relationships. Postal subordinates may be viewing these supervisory attempts as redundant. On the other hand, programmer subordinates reflect a significant -.29 coefficient between knowledge and morale. This indicates programmers view the more knowledgeable supervisor's attempts at clarifying path-goal relationships even more unfavorably than postal subordinates. The morale diagrams reflect mixed support for these inferences drawn from House's propositions.

---

25 Ibid.

Regarding productivity, these inferences indicate that both programmers and postal workers should have greater productivity if they have more knowledgeable supervisors. In the case of programmers the more knowledgeable supervisor should "reduce roadblocks and pitfalls" along the way to achieving productivity.[26] In the case of postal workers the "increased externally imposed control of the knowledgeable supervisor" might be viewed as prodding the subordinate to "increase performance."[27]

The knowledge to productivity coefficients were examined from two perspectives in Chapter IV. The path coefficients appearing on the diagrams were first discussed. The postal coefficient was positive, .13, and the programmer coefficient was negative, -.05. Though the postal coefficient is insignificant, its direction does indicate support of the inference being discussed.

In Chapter IV, discussion of knowledge to productivity coefficients also examined the possibility that productivity might be found to be positively related to knowledge if all independent variables were held constant when productivity was regressed on knowledge. When this was done the +.13 postal coefficient remained the same, +.13, and the -.05 programmer coefficient became +.09. Though the +.09 remained insignificant, the .14 change moved the coefficient from negative to positive so that the positve directions of both the postal and programmer coefficients indicated support for the knowledge to productivity inferences drawn from House's propositions. Those coefficients differ very little, however, so that the value of a knowledgeable supervisor cannot be said to be greater in one job category than the other, postal or programmer. It cannot be

---

26 Ibid.

27 Ibid.

said whether the knowledgeable supervisor achieves more productivity because he removes road blocks and pitfalls, as in the case of programmers, or because he prods, as in the case of postal workers.

House's propositions can also be used to draw a final inference relative to knowledge. The more knowledgeable supervisor may be able to provide more Structure relative to the ambiguous tasks of programmers and that increased Structure could be beneficial in reducing the ambiguity programmers face. The suborindate diagrams do indicate knowledgeable supervisors provide more Structure. The programmer path coefficient is a significant .37, while the postal coefficient is an insignificant .15. However, as has been previously mentioned under the discussion of House's hypotheses, the Structure to criteria coefficients indicate increased programmer supervisor Structure is of no value in contributing to morale (.01) and perhaps even harmful to productivity (-.10).

Age

The two variables added to develop the Expanded Model, age and education, offer considerable potential for developing worthwhile implications. The age variable is given emphasis in this section.

Some implications regarding age have already been made. It has been implied that as age changes, both Consideration and knowledge change. Consideration increases with age, especially as perceived by supervisors, and knowledge drops with age, especially in the case of programmers. It has been implied that age or age viewed as a proxy variable may be causally stronger than knowledge in effecting changes in criteria variables, so that when age and education are held constant, effects of knowledge acting alone are more likely revealed. This method of analysis indicated knowledge caused higher productivity

for both postal workers and programmers, though it did not show knowledge causing higher morale.

Additionally, the strengths of the age to Consideration paths and the effects of knowledge on productivity when age and other variables were held constant, have led to discussion implying possible inadequacies in the Ohio State measurements as predictors of changes in criteria variables. If age and education have such strong relationships, the implication is, it might be possible to locate other variables which can likewise be more predictive of improving morale, satisfaction, productivity, and other criteria variables, than Consideration and Structure have been.

Two remaining implications regarding the age variable need to be made. First, the strengths of the zero order correlations between age, education, and knowledge are much stronger for programmers, viewed as classifiable in Perrow's nonroutine category. At this period when technological changes are increasing rapidly,[28] the implications of these zero order correlations offer considerable potential for exploitation. Younger supervisors are obtaining more formal education than their older counterparts already in the work force in such organizations. The educations of working supervisors need updating. The lower formal education levels of those older working supervisors result in lower knowledge levels, particularly in this nonroutine classification. Continuing education of working supervisors seems a necessity.

Finally, age may be viewed as a longitudinal variable. Kerr and Schriesheim stated that only two studies were discovered which attempted to

---

[28] Jeremy Main, "The Battle for Quality Begins," Fortune (Dec. 29, 1980), pp. 28-33.

show that one way causality could be inferred because one variable occurred temporally before another.[29] The question under consideration here is whether a supervisor causes his subordinates to change or whether subordinates cause their supervisors' styles to change.[30] An implication of the analysis utilizing the diagrams of the Expanded Model, which include age, is that Consideration is shown to increase with age, so that at least that portion of the increase in Consideration cannot be attributed to responses of a supervisor to his subordinates' actions.

Primary Hypothesis

The diagrams as presented indicate the primary hypothesis finds some support in the implications which can be drawn from the three Productivity/ Supervisor Diagrams. When, though, all independent variables are held constant as productivity is regressed on knowledge, five of the six productivity diagrams yield positive path coefficients on arrows from knowledge to productivity, and even the strong negative knowledge to morale path coefficients weaken. The previous discussion which cited the propriety of using subordinate versus supervisory ratings of supervisors' Consideration and Initiating Structure can be recalled. It can be noted that when all independent variables are held constant as productivity is regressed on knowledge, both postal and programmer subordinates indicate increased knowledge leads to increased productivity. The coefficients are however insignificant and indicate the favorable relationship only by their positive directions. They do not indicate any differences in effects between the two work classifications. All of this then indicates that knowledge is likely positively

---

[29] Kerr and Schriesheim, "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Review," p. 561.

[30] Crowe, Bochner, and Clark, "The Effects of Subordinates' Behaviour on Managerial Style," p. 216.

related to productivity though negatively related to morale. The analysis and interpretation of the data indicate that the primary hypothesis of this study was correct in the case of the direction of the relationship between knowledge and productivity. However, it was incorrect in the direction of the relationshp between knowledge and morale. Morale appears to be negatively related to supervisory knowledge.

It will be recalled however, that the primary hypothesis of this study also specified that knowledge would have more of a favorable impact upon performance and satisfaction that the supervisor's style of leadership. That portion of the hypothesis specifying that knowledge would have a greater impact than style cannot be justified in terms of the analysis and interpretation of the data. The participative style of leadership, represented here by the proxy variable Consideration, appears to be as, or more positively, causually related to productivity than the supervisor's knowledge.

Recommendations

Given that this study can be replicated with the same results, the primary recommendation is that if productivity is of more import than morale to an organization, then workers with greater amounts of knowledge of their subordinates' taks should be developed, promoted, or hired for first-line supervisory positions. Increased supervisory knowledge appears to be of equal benefit to productivity in both routine and nonroutine work. For purposes of staffing, the complexity of the job should not have any effect in differentiating between the knowledge levels of supervisors. Highly knowledgeable supervisors should be used to staff both routine and nonroutine supervisory positions. In this regard, practices of frequently rotating managers among various jobs should be discontinued. It should be

recognized that lower morale may be one of the consequences of making such knowledgeable individuals first-line supervisors.

Older supervisors in nonroutine organizations appear to be much less knowledgeable about their subordinates' jobs. Older employees in such organizations should, then, not be given preferential treatment because of their ages when first-line supervisory positions become vacant.

Autocratic tendencies of supervisors should be minimized in organizations, particularly those classifiable within Perrow's routine category. Such organizations should consider sponsoring training, formalized education, or perhaps therapy programs which will help first-line supervisors reduce their autocratic tendencies.

Subordinates who desire to become first-line supervisors should devote effort to learning the specifics of the tasks which they and their peers or future subordinates perform. They should not neglect their participative leadership skills.

Educational institutions should offer courses which will enable first-line supervisors to more easily comprehend the basic tasks with which their subordinates will be involved. Educational institutions should also continue to offer those courses which provide guidance in the development and use of leadership styles.

Suggestions For Further Research

Of primary importance in the area of further research are suggestions regarding the Ohio State Tests. In view of the evidence of this study as well as that of the considerable earlier research that depicted a relative lack of causality between the Ohio State behaviors and criteria variables, some research should be conducted to determine reasons for those shortcomings as well as possible adjustments which might be made. Perhaps additional factors reflective of traits

not presently included or loadings of existent factors need adjustment in regard to the tests and the definitions.

From two perspectives, different organizations should be used to replicate this study. First, the study should be replicated in civilian organizations. Of particular interest in this regard are the findings relative to autocracy. The military subjects involved in this study indicated reduced morale and productivity resulted from increases in autocracy even though the nature of military training includes some emphasis on accepting orders without question, so as to minimize delays during crucial military situations.[31] It would be of value to learn if civilian subjects are more adversely affected by autocracy. Next, since a good many implications of this study were based upon Perrow's Model, other groups classifiable under the same categories of his model should be used to replicate the findings.

Finally, it would be of value to replicate this study using a measure of productivity other than the supervisors' perceptions of the productivity of their subordinates.

---

[31] U.S., Bureau of Naval Personnel, Principles and Problems of Naval Leadership (Washington, D.C.: GPO, 1959), p. 69.

APPENDIX A

INSTRUMENTS

JOB DESCRIPTION INDEX

Think of your present work. What is it like most of the time? In the blank beside each word given below, write:

Y for "Yes" if it describes your work
N for "No" if it does NOT describe it
? if you cannot decide

WORK ON PRESENT JOB

___ Fascinating
___ Routine
___ Satisfying
___ Boring
___ Good
___ Creative
___ Respected
___ Hot
___ Useful
___ Tiresome
___ Healthful
___ Challenging
___ On your feet
___ Frustrating
___ Simple
___ Endless
___ Gives sense of accomplishment

Think of the pay you get now. How well does each of the following words describe your present pay? In the blank beside each word, put

Y if it describes your pay
N if it does NOT describe it
? if you cannot decide

PRESENT PAY

___ Income adequate for normal expenses
___ Satisfactory profit sharing
___ Barely live on income
___ Bad
___ Income provides luxuries
___ Insecure
___ Less than I deserve
___ Highly paid
___ Underpaid

OPPORTUNITIES FOR PROMOTION

___ Good opportunities for promotion
___ Opportunity somewhat limited
___ Promotion on ability
___ Dead-end job
___ Good chance for promotion
___ Unfair promotion policy
___ Infrequent promotions
___ Regular promotions
___ Fairly good chance for promotion

Think of the majority of the people that you work with now or the people you meet in connection with your work. How well does each of the following words describe these people in the blank beside each word below, put

Y	if it describes the people you work with
N	if it does NOT describe them
?	if you cannot decide

.....

PEOPLE ON YOUR PRESENT JOB

___ Stimulating
___ Boring
___ Slow
___ Ambitious
___ Stupid
___ Responsible
___ Fast
___ Intelligent
___ Easy to make enemies
___ Talk too much
___ Smart
___ Lazy
___ Unpleasant
___ No privacy
___ Active
___ Narrow interests
___ Loyal
___ Hard to meet

Think of the kind of supervision that you get on your job. How well does each of the following words describe this supervision? In the blank beside each word below, put

Y	if it describes the supervision you get on your job
N	if it does NOT describe it
?	if you cannot decide

.....

SUPERVISION ON PRESENT JOB

___ Asks my advice
___ Hard to please
___ Impolite
___ Praises good work
___ Tactful
___ Influential
___ Up-to-date
___ Doesn't supervise enough
___ Quick tempered
___ Tells me where I stand
___ Annoying
___ Stubborn
___ Knows job well
___ Bad
___ Intelligent
___ Leaves me on my own
___ Around when needed
___ Lazy

PRODUCTIVITY RATING

REGARDING _____, PLEASE:

1. RATE BY PLACING "X" IN SPACE ABOVE DESCRIPTION WHICH MOST NEARLY EXPRESSES YOUR JUDGMENT.
2. CONSIDER ONLY ONE TRAIT AT A TIME. CONSIDER ONLY QUALITY, THEN CONSIDER ONLY QUANTITY.
3. CONSIDER THE INDIVIDUAL'S ENTIRE WORK PERFORMANCE ON EACH TRAIT. DON'T BASE YOUR JUDGMENT ON ONLY ONE OR TWO OCCURRENCES.

QUALITY
CONSIDER THE THOROUGHNESS OF HIS WORK AND ABILITY TO PERFORM WORK OF HIGH GRADE CONSISTENTLY.

1	2	3	4	5	6	7	8	9	10
WORK ALMOST WORTHLESS	RATHER CARELESS BELOW STANDARD	JUST SATISFAC-TORY		GOOD QUALITY			HIGHEST QUALITY		

QUANTITY
CONSIDER THE VOLUME OF WORK ACCOMPLISHED UNDER NORMAL CONDITIONS AND THE PROMPTNESS WITH WHICH IT IS COMPLETED.

1	2	3	4	5	6	7	8	9	10
VERY SLOW WORKER LITTLE OUTPUT	BARELY MEETS REQUIRE-MENTS	AVERAGE		TURNS OUT GOOD VOLUME			RAPID WORKER USUALLY BIG PRODUCER		

PRODUCTIVITY RATING

REGARDING _____, PLEASE:

1. RATE BY PLACING "X" IN SPACE ABOVE DESCRIPTION WHICH MOST NEARLY EXPRESSES YOUR JUDGMENT.
2. CONSIDER ONLY ONE TRAIT AT A TIME. CONSIDER ONLY QUALITY, THEN CONSIDER ONLY QUANTITY.
3. CONSIDER THE INDIVIDUAL'S ENTIRE WORK PERFORMANCE ON EACH TRAIT. DON'T BASE YOUR JUDGMENT ON ONLY ONE OR TWO OCCURRENCES.

QUALITY
CONSIDER THE THOROUGHNESS OF HIS WORK AND ABILITY TO PERFORM WORK OF HIGH GRADE CONSISTENTLY.

1	2	3	4	5	6	7	8	9	10
WORK ALMOST WORTHLESS	RATHER CARELESS BELOW STANDARD	JUST SATISFAC-TORY		GOOD QUALITY			HIGHEST QUALITY		

QUANTITY
CONSIDER THE VOLUME OF WORK ACCOMPLISHED UNDER NORMAL CONDITIONS AND THE PROMPTNESS WITH WHICH IT IS COMPLETED.

1	2	3	4	5	6	7	8	9	10
VERY SLOW WORKER LITTLE OUTPUT	BARELY MEETS REQUIRE-MENTS	AVERAGE		TURNS OUT GOOD VOLUME			RAPID WORKER USUALLY BIG PRODUCER		

PRODUCTIVITY RANKING

PLEASE RANK EACH OF THE PEOPLE WHO REPORT TO YOU. PLEASE RANK THEM WHILE CONSIDERING ONLY ONE TRAIT AT A TIME. RANK THEM CONSIDERING ONLY QUALITY, THEN RANK THEM CONSIDERING ONLY QUANTITY.

QUALITY
THOROUGHNESS OF THEIR WORK AND ABILITY TO PERFORM WORK OF HIGH GRADE CONSISTENTLY.

QUANTITY
VOLUME OF THEIR WORK ACCOMPLISHED UNDER NORMAL CONDITIONS AND THE PROMPTNESS WITH WHICH IT IS COMPLETED

HIGHEST QUALITY	GREATEST QUANTITY
1. _____	1. _____
2. _____	2. _____
3. _____	3. _____
4. _____	4. _____
5. _____	5. _____
6. _____	6. _____
7. _____	7. _____
8. _____	8. _____
9. _____	9. _____
10. _____	10. _____
11. _____	11. _____
12. _____	12. _____
13. _____	13. _____
14. _____	14. _____
15. _____	15. _____

POSTAL KNOWLEDGE TEST

For each question place a "T" for true or an "F" for false on the answer sheet.

1. If a first class mail article weighs less than 15 pounds but is more than 84 inches in length and girth combined, the postage will be computed for a full 15 pounds.
2. If a first class mail article weighs more than 10 ounces, compute the postage at the priority rate of postage.
3. For an article of second class mail, compute the postage at the transient second class and fourth class rates and apply the cheaper of the two rates.
4. For a second class mail article, if no postage meter is available the clerk will affix the necessary stamps to the article.
5. For any class of mail, affixed postage meter tape(s) (if used) should be in the upper right corner of the article or overlapping the address label (if used).
6. In our overseas post offices, on articles containing merchandise being mailed by other than the actual sender, the person mailing the article must place his/her name, grade and signature below the return address.
7. For any third class mail, verify that the parcel does not weigh 16 ounces or more or measure less than 3 inches in width or four and one-quarter inches in length.
8. If a third class article weighs less than one ounce, the first class rate of postage will apply but if it weighs one ounce, the third class rate will apply.
9. A fourth class mail parcel cannot weigh more than 70 pounds.
10. For a fourth class mail article, the maximum Parcel Air Lift (PAL) service weight is 20 pounds.
11. For a fourth class article which qualifies for PAL service, the fee of $1.00 will be added to the postage. The parcel weighs 5 pounds.
12. Say a patron requests Special Handling service for a fourth class mail article. If the article is to be sent at the priority rate (Airmail), the service is not available.
13. Certified Mail applies only to domestic mail and must be prepaid at the first class or priority rate of postage.
14. If a certified mail article weighs 12 ounces or less, the postage must be computed at the first class rate.
15. If a certified mail article is addressed to a firm or organization and the patron requests that the article be restricted in delivery, the service is provided.
16. If a certified mail article weighs more than 12 ounces, it will be endorsed "Priority Mail" or "Air Mail."
17. If the patron desires to send an insured article the cheapest way and the article weighs between one ounce and 12 ounces, postage will be computed at the third class rate.
18. If the patron desires to send an insured article the cheapest way and the article weighs 18 ounces, the postage should be computed for both the third and fourth class rates and the cheaper of the two rates should be used.

19. If an insured article is more than 84 inches in length and girth combined and weighs 10 pounds, the postage will be computed for a full 15 pounds.
20. If an article is insured for $10 and the patron requests restricted delivery, it will not be provided.

21. If the patron requests Special Handling, the service is provided only to insured articles sent at the first or second class surface rate of postage.
22. All classes of mail are acceptable as registered mail.
23. When second, third, or fourth class articles are sent as registered mail, postage must be prepaid at the first class or priority rate of postage.
24. All registered mail articles will be endorsed "FIRST CLASS" unless they weight 12 ounces or less and are large envelopes or small parcels.
25. All registered mail endorsements are to be made in red ink.
26. If a patron does not want the contents of an international package listed on the outside of the article, a Customs Declaration can be enclosed inside the article.
27. When endorsing an international package, if it is valued at less than $400, the letter "X" will be entered after the registry number.
28. If a patron requests Special Handling for international printed matter, the service is provided for articles sent at the surface rate and is available only from the office of mailing to the U.S. Exchange Office.

29. International printed matter may not be sealed when it is registered.
30. Small packets are not acceptable to Cambodia.
31. Small packets going to Australia can weigh two pounds.
32. International parcel post does not include those items accepted as small packets.
33. International parcel post may contain current personal correspondence.
34. The maximum length of an international parcel post article may not exceed three and one-half feet.
35. Canada does not permit return receipts on international parcel post.
36. A single money order may not exceed $400.

37. A postal money order which is 12 years old must not be cashed.
38. If the money order designated more than one payee and no conjunction is used or if the word "AND" is used to connect payees, all listed payees must endorse the money order.
39. Mutilated money orders may be cashed provided all entries are clear, legible and properly completed.

ADORNO F SCALE

PLEASE FILL IN THE BLANK IN FRONT OF EACH QUESTION BY MARKING:

+3	+2	+1	-1	-2	-3
Strong Agreement	Moderate Agreement	Slight Agreement	Slight Disagreement	Moderate Disagreement	Strong Disagreement

If you are unable to decide, have no opinion, or would prefer not to answer a question, simply leave that question unmarked.

___ 1. Obedience and respect for authority are the most important virtues children should learn.

___ 12. A person who has bad manners, habits, and breeding can hardly expect to get along with decent people.

___ 37. If people would talk less and work more, everybody would be better off.

___ 41. The businessman and the manufacturer are much more important to society than the artist and the professor.

___ 4. Science has its place, but there are many important things that can never possibly be understood by the human mind.

___ 8. Every person should have complete faith in some supernatural power whose decisions he obeys without question.

___ 21. Young people sometimes get rebellious ideas, but as they grow up they ought to get over them and settle down.

___ 23. What this country needs most, more than laws and political programs, is a few courageous, tireless, devoted leaders in whom the people can put their faith.

___ 42. No sane, normal decent person could ever think of hurting a close friend or relative.

___ 44. Nobody ever learned anything really important except through suffering.

___ 13. What youth nneds most is strict discipline, rugged determination, and the will to work and fight for family and country.

___ 19. An insult to our honor should always be punished.

___ 25. Sex crimes, such as rape and attacks on children, deserve mor than mere imprisonment; such criminals ought to be publicly whipped, or worse.

___ 27. There is hardly anything lower than a person who does not feet a great love, gratitude, and respect for his parents.

___ 34. Most of our social problems would be solved if we could somehow get rid of the immoral, crooked, and feebleminded people.

___ 39. Homosexuals are hardly better than criminals and ought to be severely punished.

___ 9. When a person has a problem or worry, it is best for him not to think about it, but to keep busy with more cheerful things.

___ 31. Nowadays more and more people are prying into matters that should remain personal and private.

___ 16. Some people are born with an urge to jump from high places.

___ 26. People can be divided into two distinct classes: The weak and the strong.

___ 29. Some day it will probably be shown that astrology can explain a lot of things.

___ 33. Wars and social trouble may someday be ended by an earthquake or flood that will destroy the whole world.

___ 2. No weakness or difficulty can hold us back if we have enough will power.

___ 22. It is best to use some prewar authorities in Germany to keep order and prevent chaos.

___ 58. Most people don't realize how much our lives are controlled by plots hatched in secret places.

___ 6. Human nature being what it is, there will always be war and conflict.

___ 43. Familiarity breeds contempt.

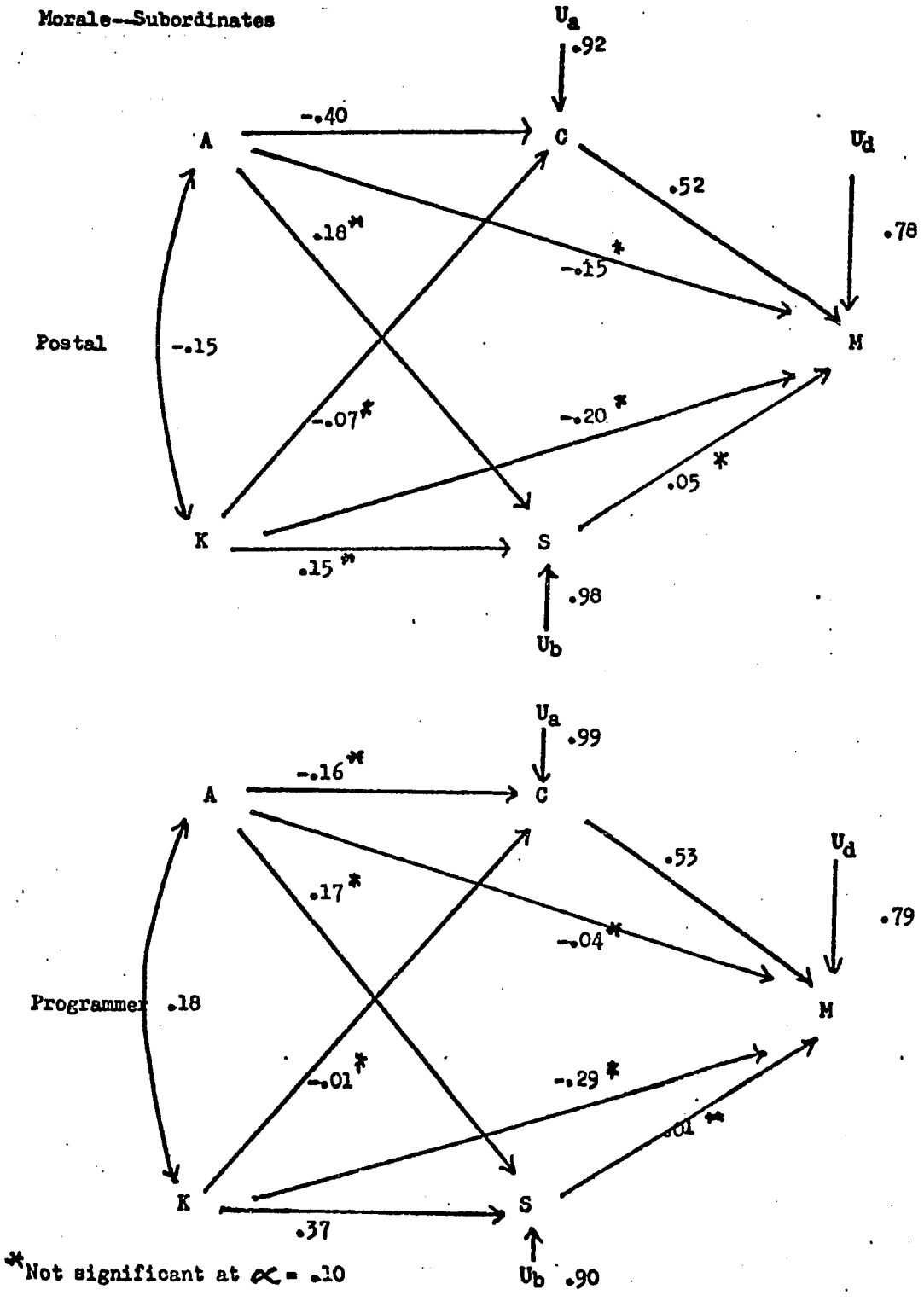
___ 18. Nowadays when so many different kinds of people move around and mix together so much, a person has to protect himself especially carefully against catching an infection or disease from them.

___ 35. The wild sex life of the old Greeks and Romans was tame compared to some of the goings-on among Americans, even in places where people might least expect it.

APPENDIX B

DIAGRAMS

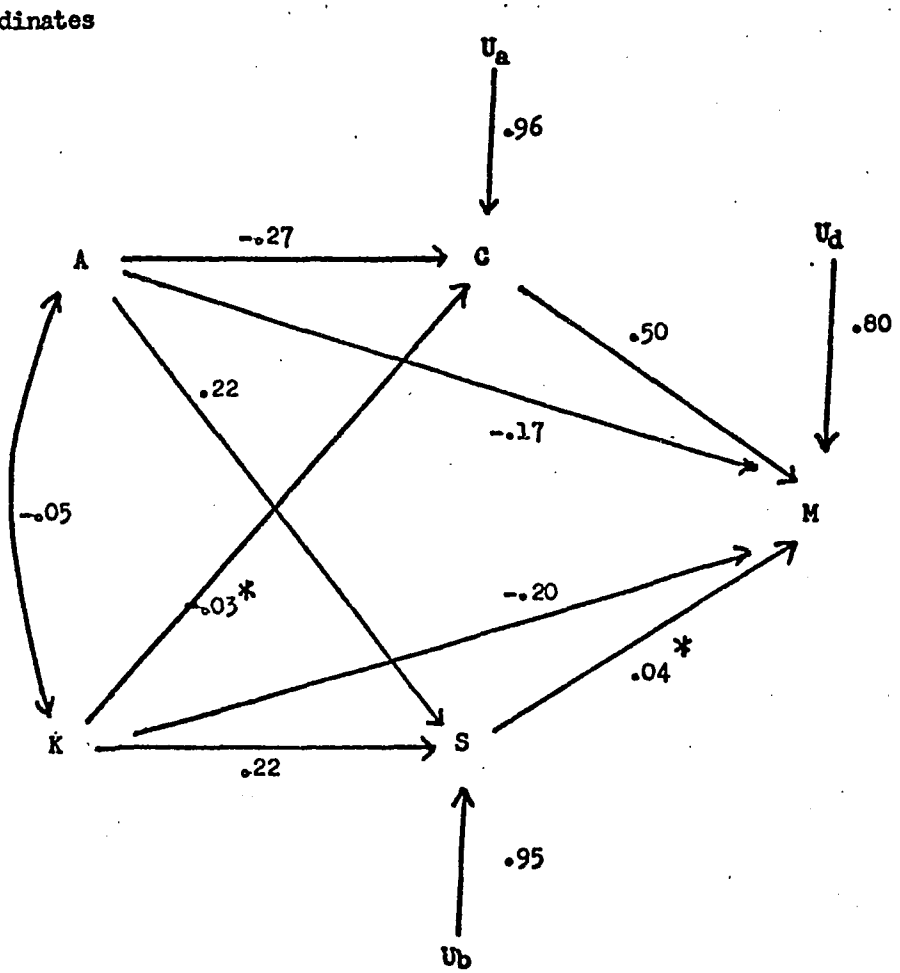
Initial Model



*Not significant at $\alpha = .10$

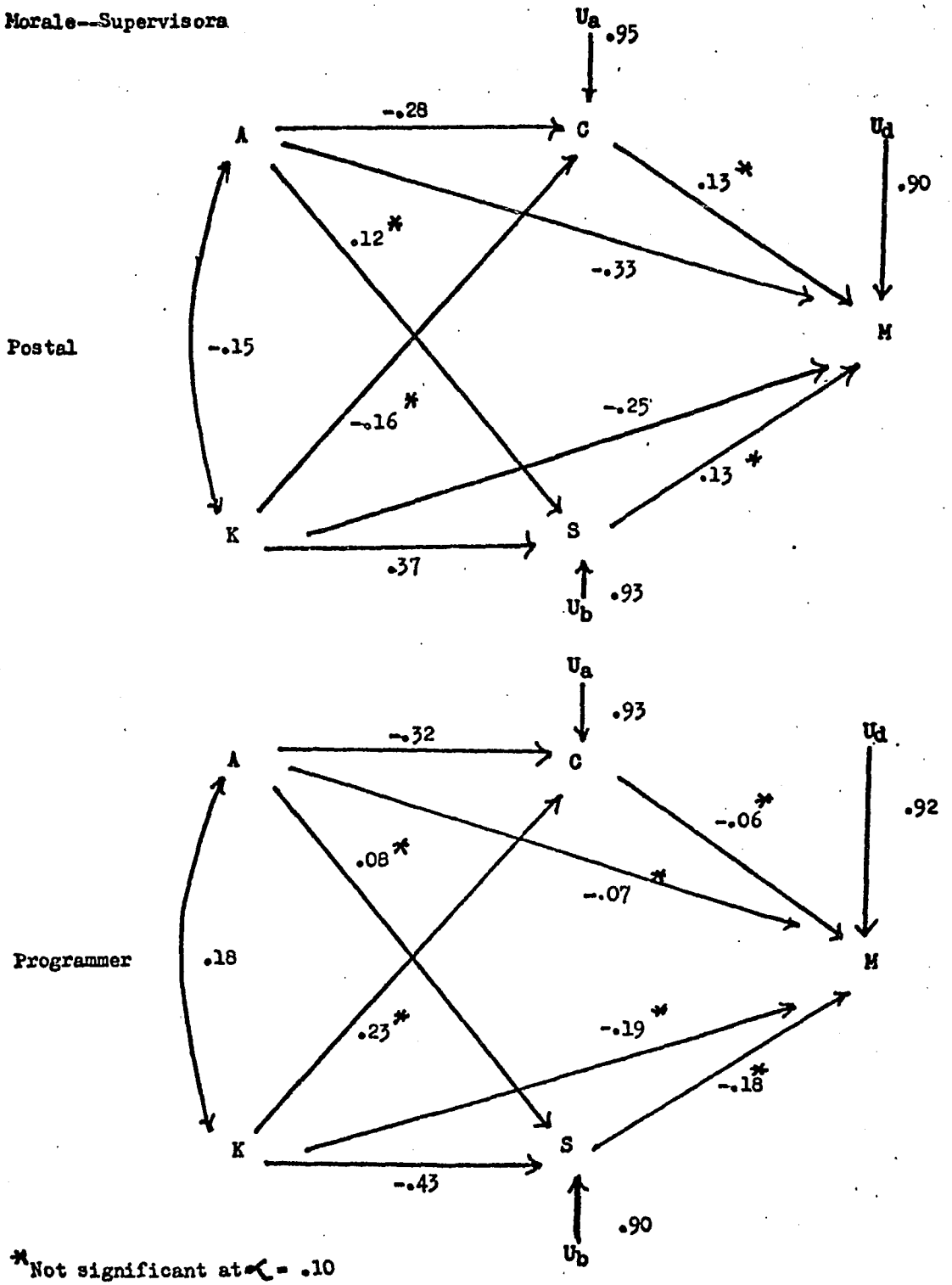
Initial Model

Morale—Subordinates



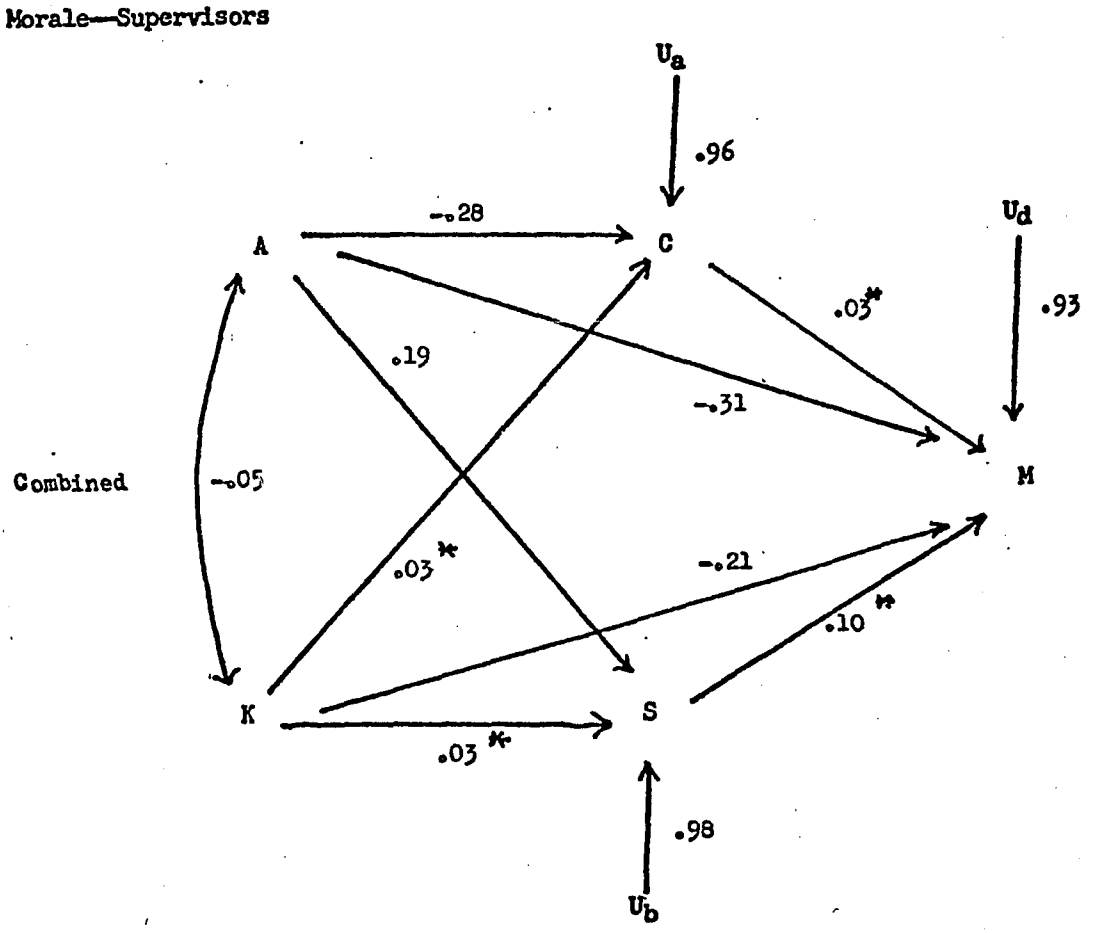
*Not significant at α = .10

Initial Model



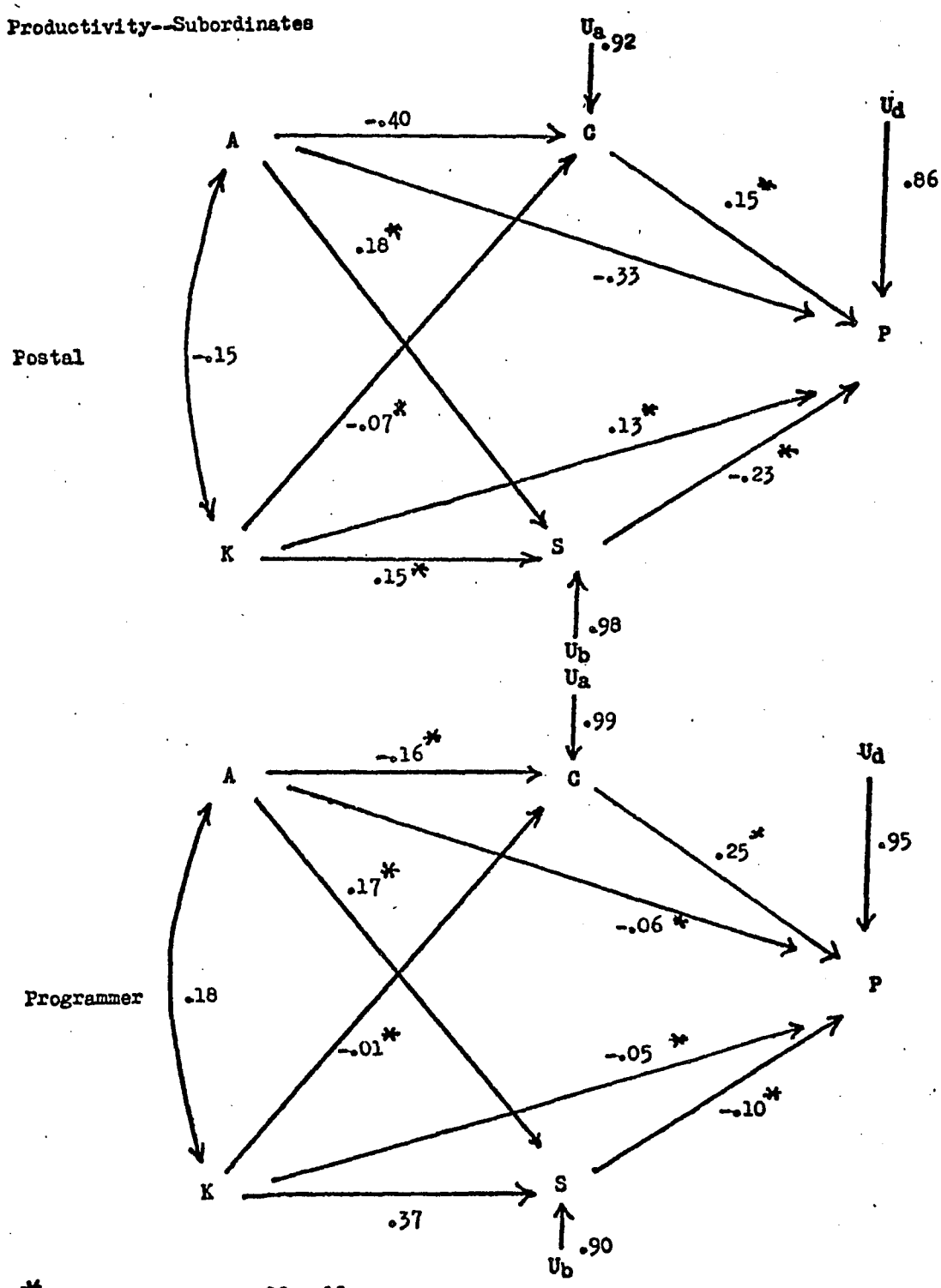
*Not significant at α = .10

Initial Model



* Not significant at α = .10

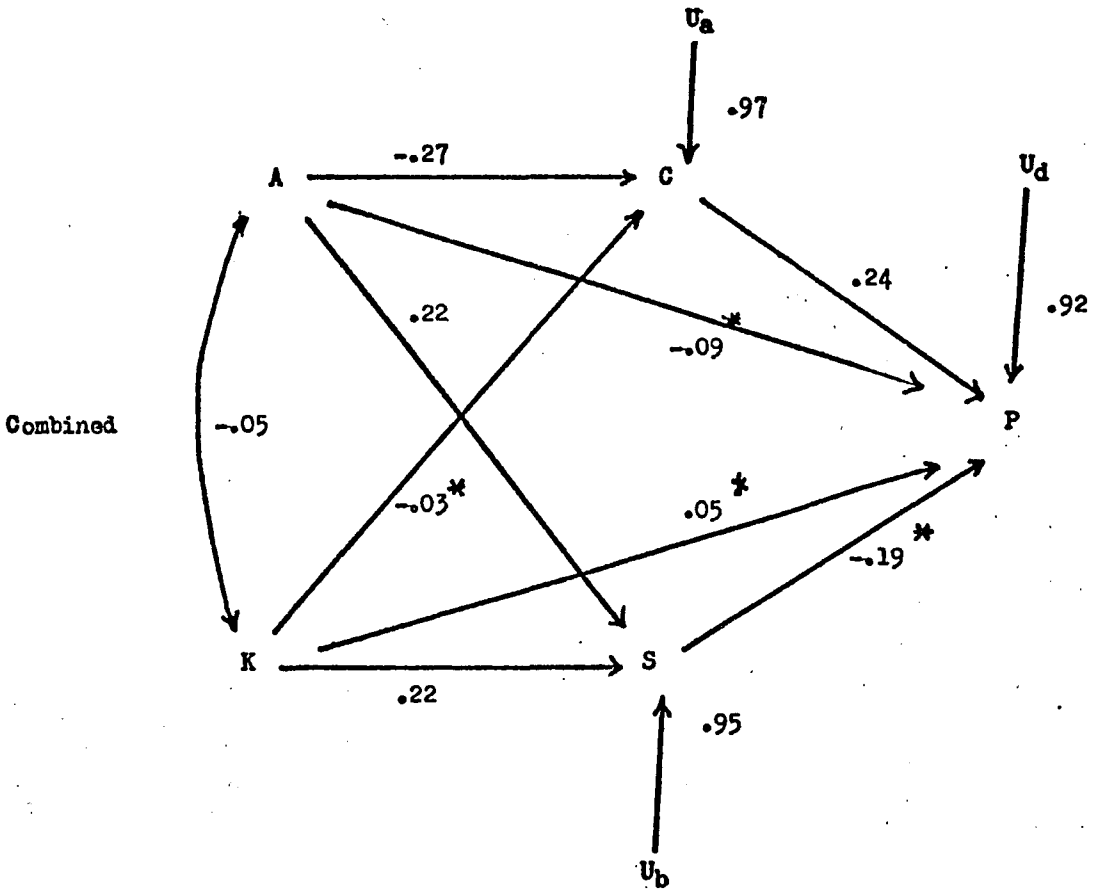
Initial Model



*Not significant at α = .10

Initial Model

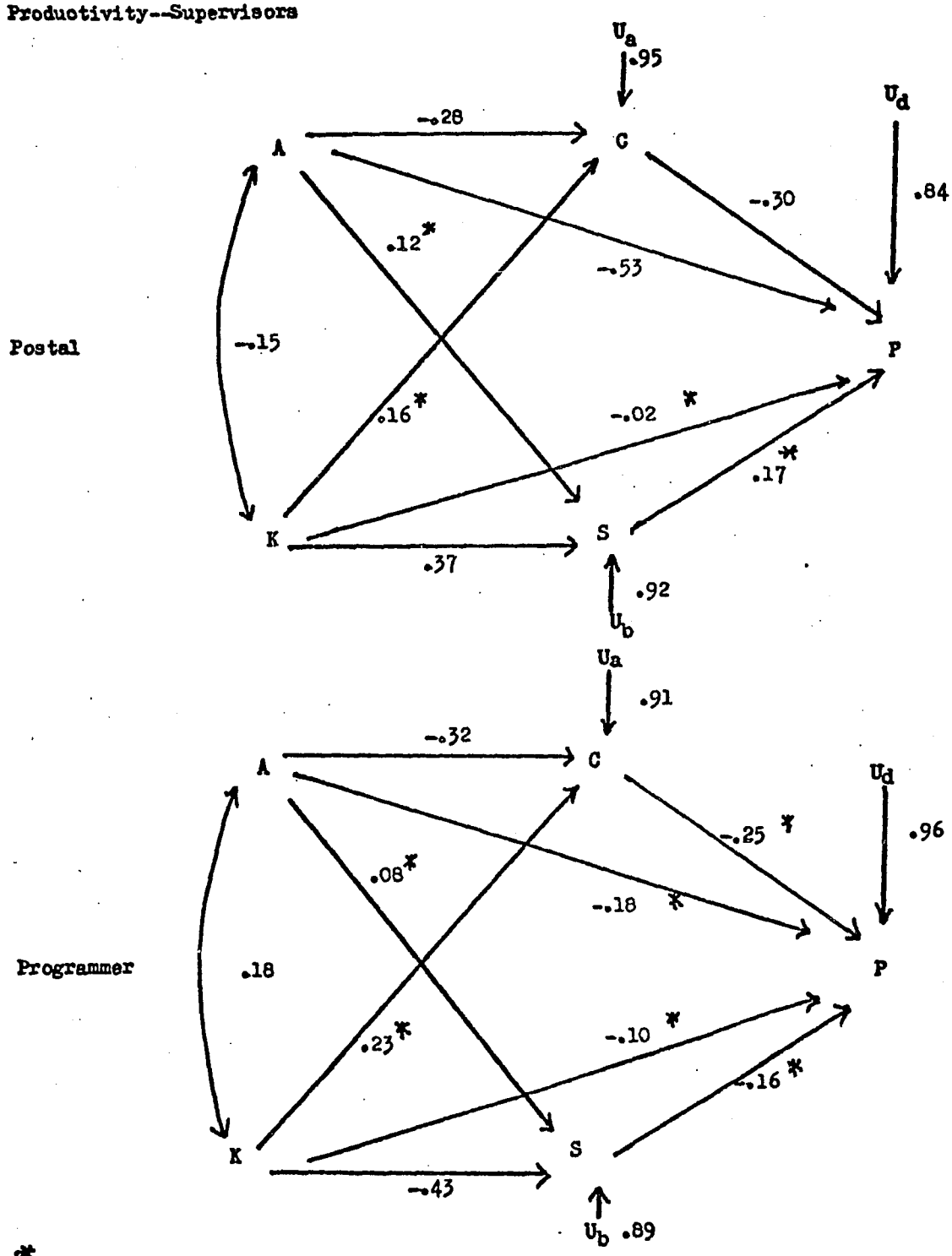
Productivity—Subordinates



*Not significant at α = .10

Initial Model

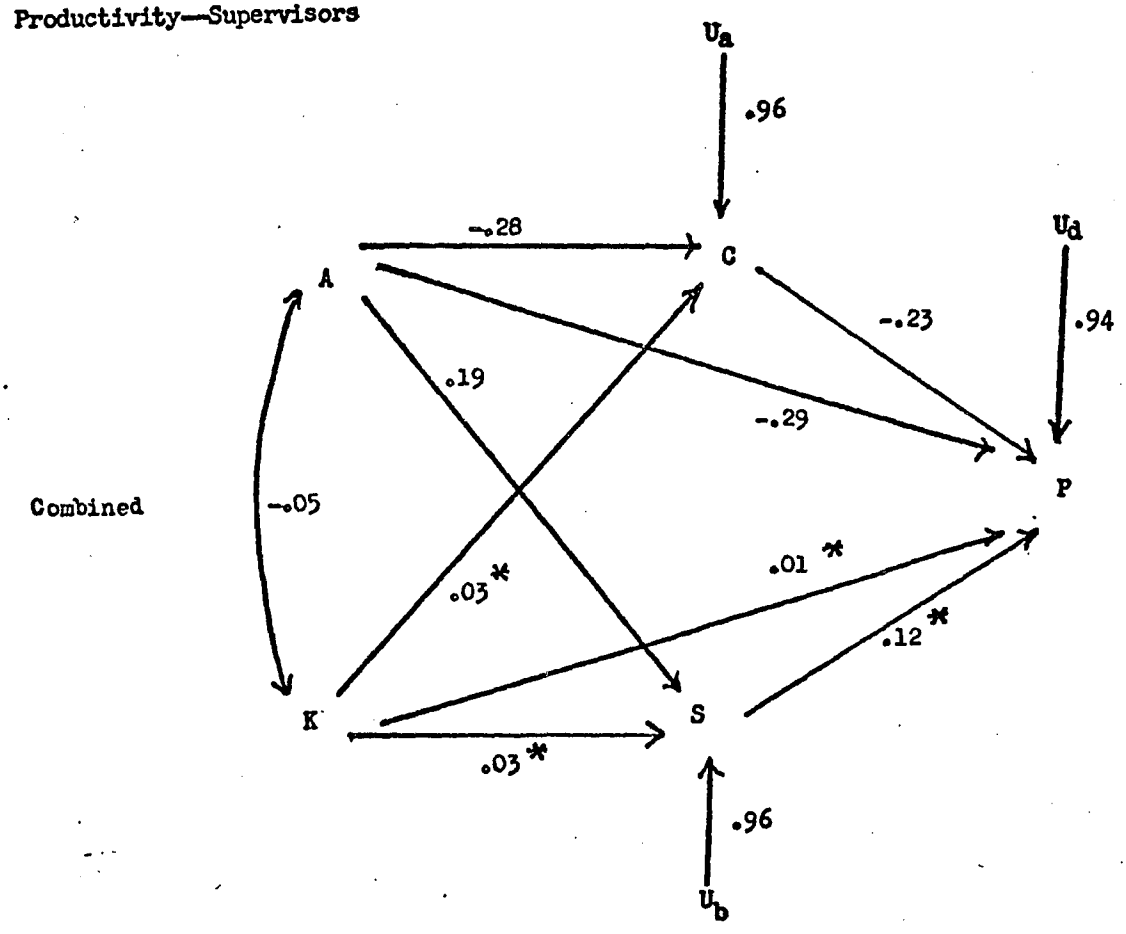
Productivity--Supervisors



*Not significant at α = .10

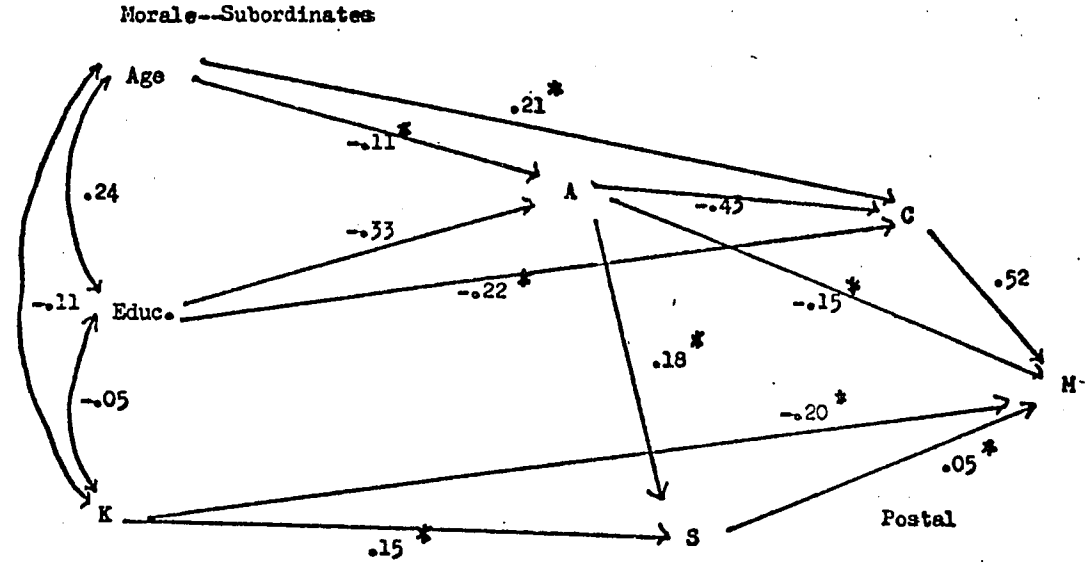
Initial Model

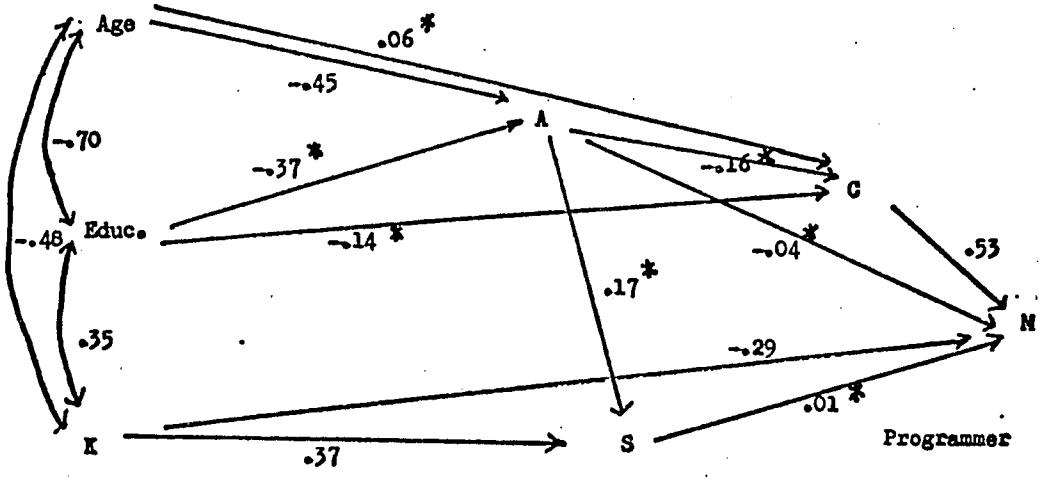
Productivity—Supervisors



*Not significant at α = .10

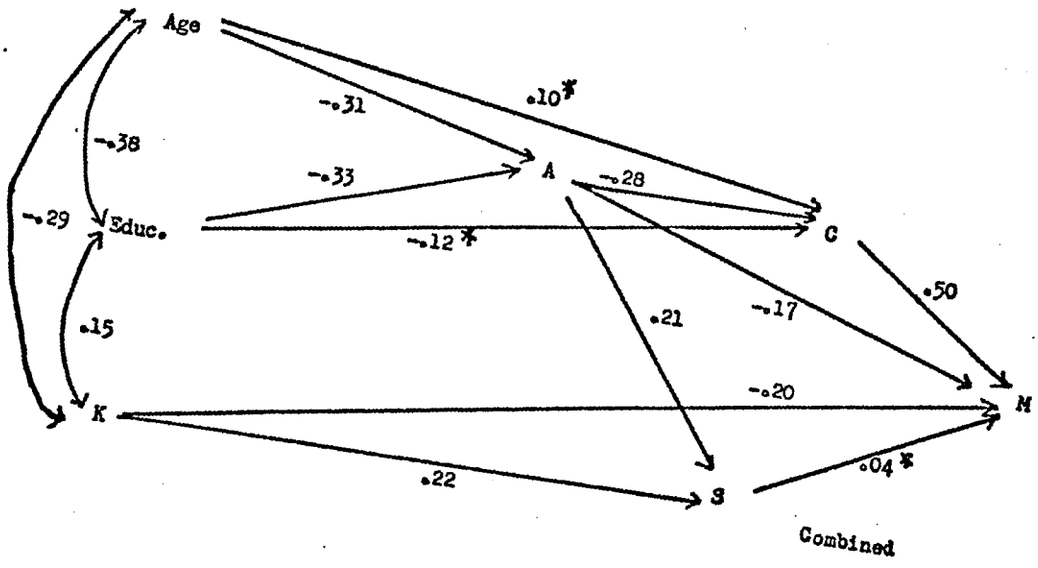
Expanded Model





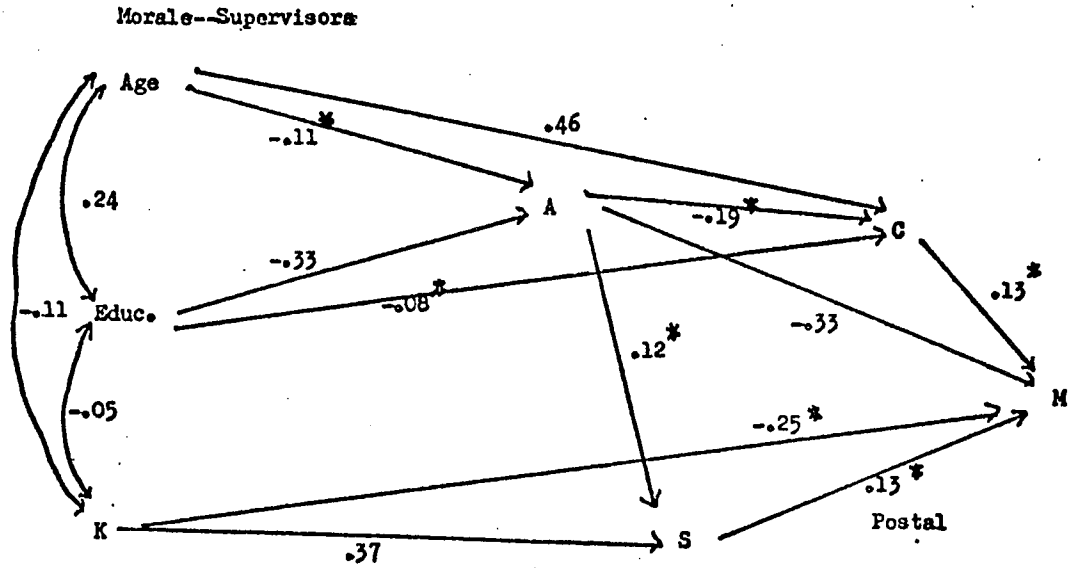
*Not significant at α = .10

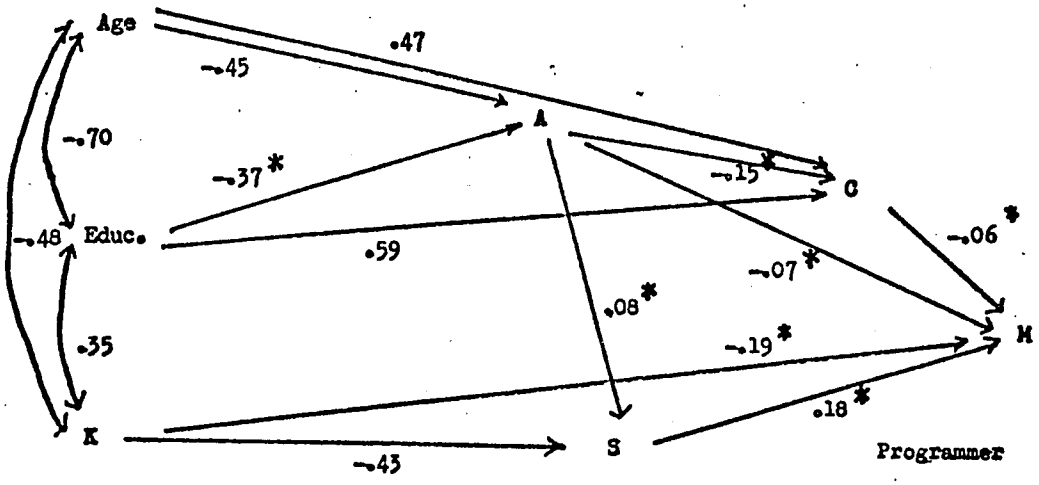
Morale—Subordinates



*Not significant at α = .10

Expanded Model

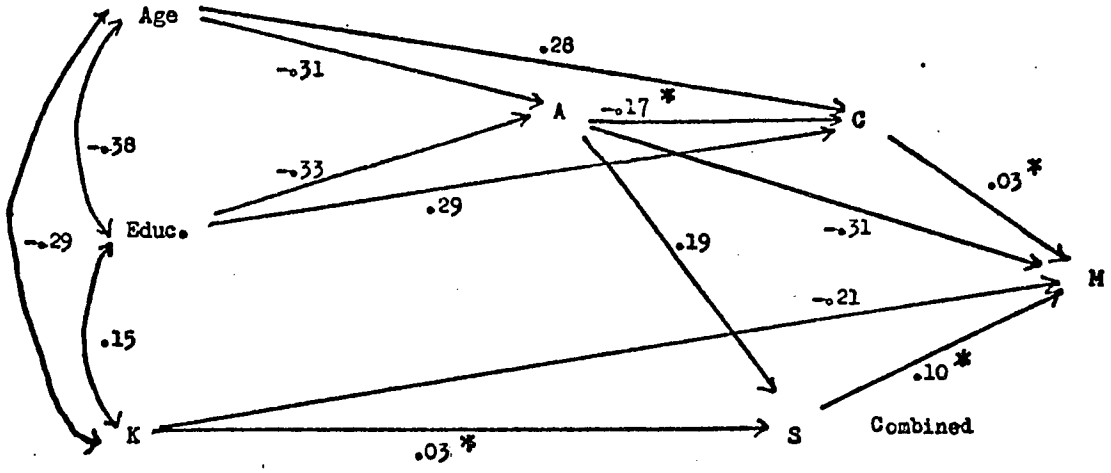




*Not significant at α = .10

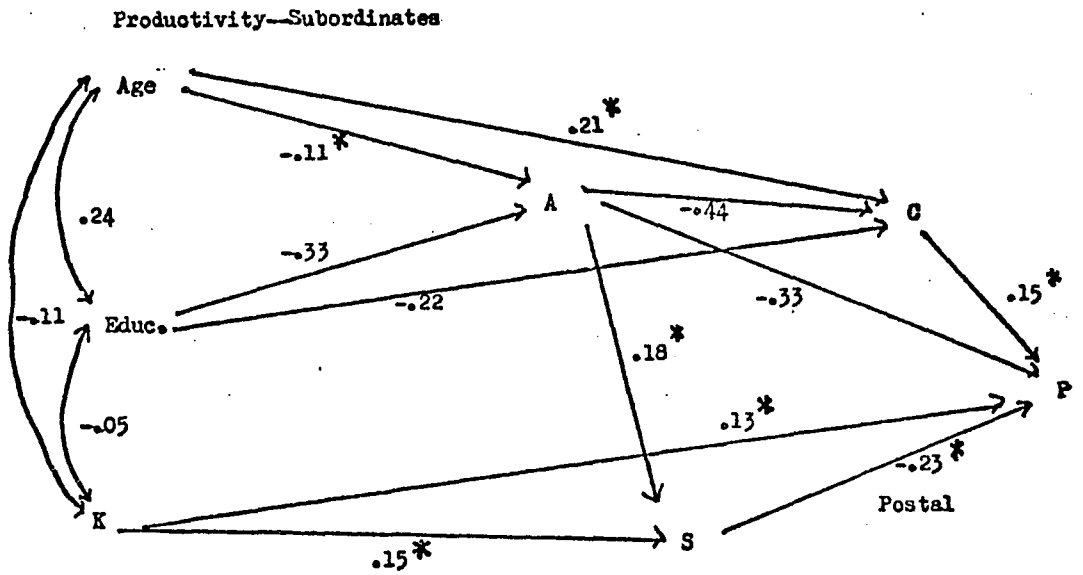
Expanded Model

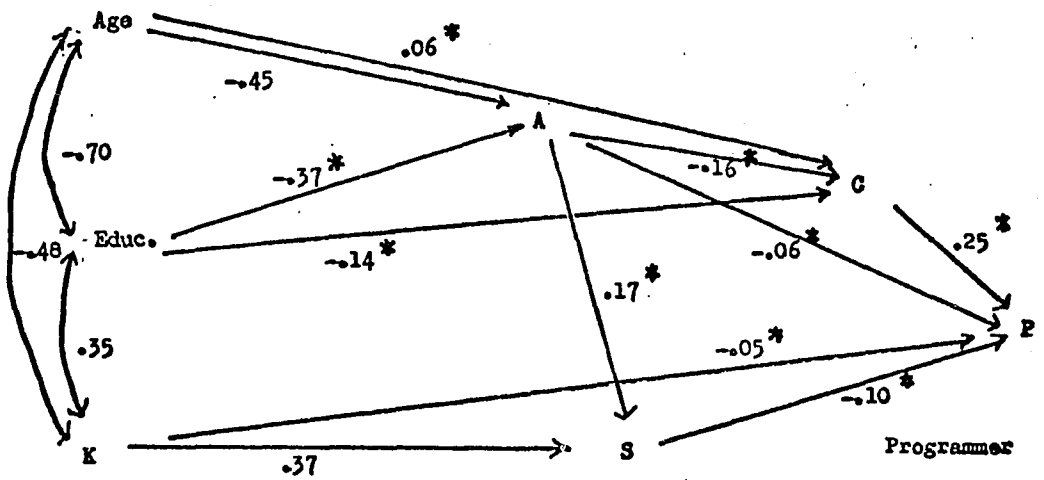
Morale—Supervisors



*Not significant at α = .10

Expanded Model

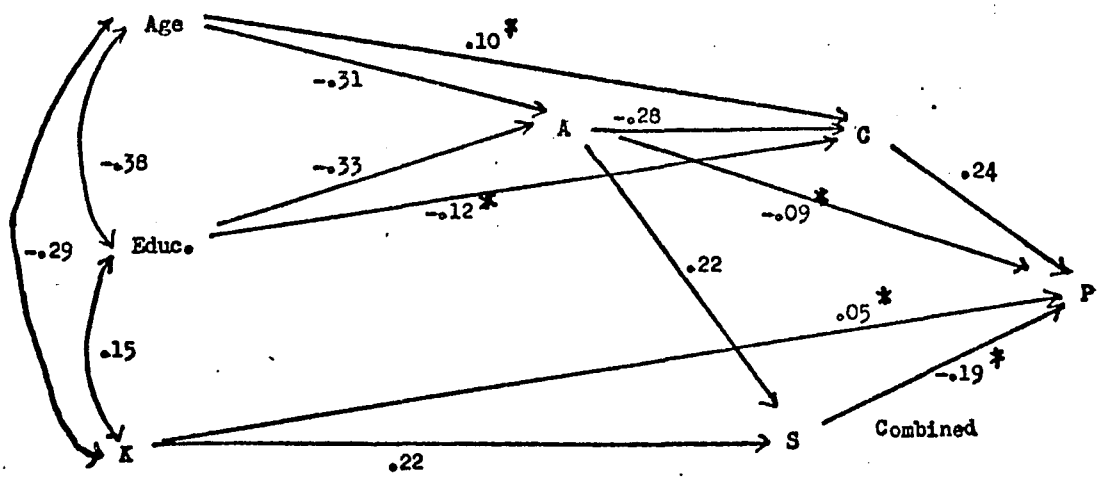




* Not significant at $\alpha = .10$

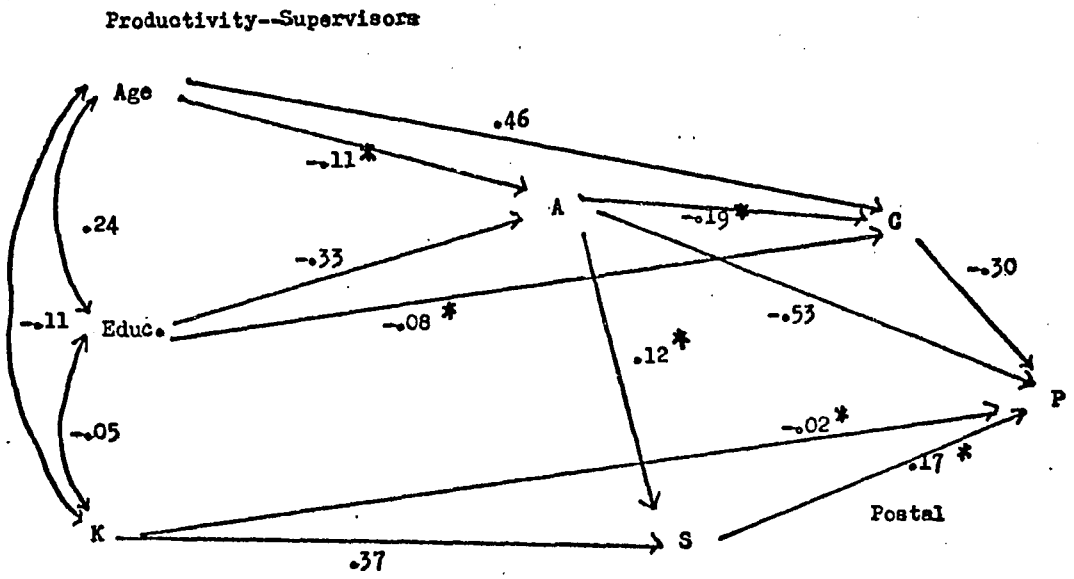
Expanded Model

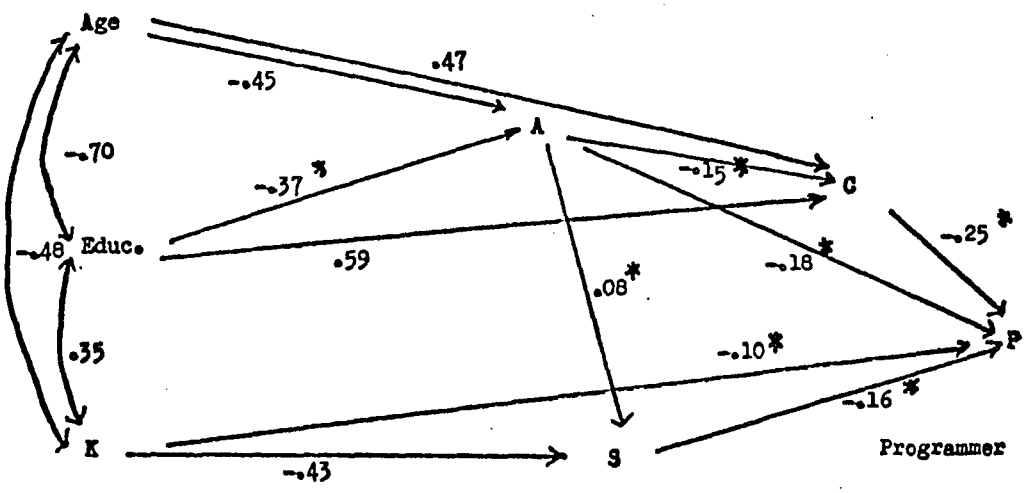
Productivity—Subordinates



*Not significant at α = .10

Expanded Model

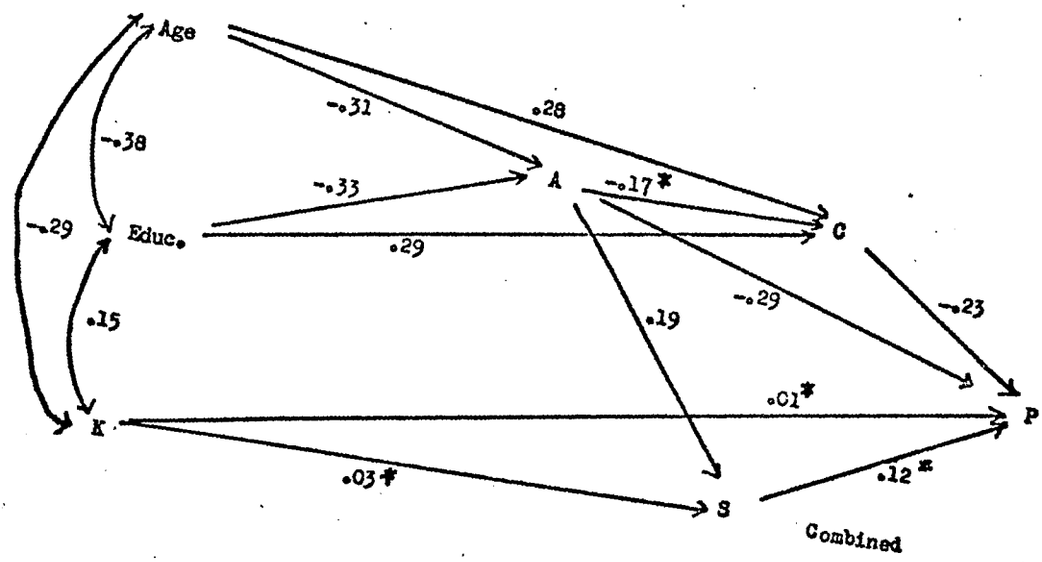




* Not significant at α = .10

Expanded Model

Productivity—Supervisors



*Not significant at $\alpha = .10$

APPENDIX C

CORRELATIONS AND THEIR COMPONENTS

Initial Model
Correlations and Components of Correlations Between Independent Variables and Morale--Subordinates

Postal

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	-.172			-.198	-.027	.053	
Autocracy	-.320			-.154	-.200	.034	
Consideration	.588	.576	.012	.518			.058
Structure	.092	-.037	.129	.050			-.087
Programmer							
Knowledge	-.292			-.286	-.003	-.003	
Autocracy	-.092			.044	-.084	-.053	
Consideration	.536	.535	.001	.533			.002
Structure	-.104	-.125	.021	.012			-.136

Initial Model
Correlations and Components of Correlations Between Independent Variables and Morale--Combined Subordinates

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	-.195			-.203	-.007	.015	
Autocracy	-.290			-.174	-.127	.011	
Consideration	.551	.545	.006	.495			.050
Structure	.021	-.066	.087	.043			-.109

Initial Model
Correlations and Components of Correlations Between Independent Variables and Morale--Supervisors

Postal

Variable	Correlation zero order		Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
	Observed	Estimated					
Knowledge	-.172			-.251	.026	.053	
Autocracy	-.320			-.333	-.020	.033	
Consideration	.267	.235	.032	.130			.105
Structure	.040	.008	.032	.128			-.120
			Programmer				
Knowledge	-.292			-.192	-.093	.0869	
Autocracy	-.092			.073	.0047	-.141	
Consideration	-.144	-.139	.005	-.060			-.079
Structure	.286	.308	.022	.182			.126

Initial Model
Correlations and Components of Correlations Between Independent Variables and Morale--Combined Supervisors

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	-.195			-.214	.004	.015	
Autocracy	-.290			-.312	.011	.011	
Consideration	.091	.111	.020	.030			.081
Structure	.033	.037	.004	.103			-.066

Initial Model
Correlations and Components of Correlations Between Independent Variables and Productivity--Subordinates

Postal

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	.151			.132	-.044	.063	
Autocracy	-.441			-.326	-.102	-.013	
Consideration	.233	.275	.042	.147			.128
Structure	-.245	-.281	.036	-.234			-.047
Programmer							
Knowledge	-.111			-.050	-.039	-.022	
Autocracy	-.134			-.061	-.058	-.015	
Consideration	.265	.265	.000	.251			.014
Structure	-.142	-.147	.005	-.102			-.045

Initial Model
Correlations and Components of Correlations Between Independent Variables and Productivity--Combined Subordinates

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shares with other exongenous variables	Correlation due to correlated causes
Knowledge	.012			.051	-.049	.010	
Autocracy	-.200			-.090	-.108	-.002	
Consideration	.247	.260	.013	.244			.016
Structure	-.169	-.212	.043	-.188			-.024

Initial Model
Correlations and Components of Correlations Between Independent Variables and Productivity--Supervisors

Postal

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	.151			-.024	.122	.063	
Autocracy	-.441			-.533	.105	-.013	
Consideration	-.130	-.173	.043	-.299			.126
Structure	.077	.151	.074	.173			-.022
Programmer							
Knowledge	-.111			-.101	.012	-.022	
Autocracy	-.134			-.184	.066	-.016	
Consideration	.154	-.155	.001	-.249			.094
Structure	-.022	-.094	.072	-.161			.067

Initial Model
Correlations and Components of Correlations Between Independent Variables and Productivity--Combined Supervisors

	Correlation zero order						
Variable	Observed	Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	.012			.006	-.003	.009	
Autocracy	-.198			-.286	.088	-.028	
Consideration	-.170	-.155	.015	-.230			.075
Structure	.106	.077	.023	.119			-.042

Expanded Model
Correlations and Components of Correlations Between Independent Variables and Morale--Subordinates

Postal

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	-.172	-.192	.02	-.198	.007	-.001	
Autocracy	-.320	-.350	.03	-.154	-.216	-.020	
Consideration	.588	.578	.01	.518			.060
Structure	.092	.001	.09	.050			-.049
Programmer							
Knowledge	-.292	-.281	.01	-.286	.004	.000	
Autocracy	-.092	-.039	.05	.044	-.082	-.001	
Consideration	.536	.526	.01	.533			-.007
Structure	-.104	-.092	.01	.012			-.104

Expanded Model
Correlations and Components of Correlations Between Independent Variables and Morale--Combined Subordinates

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	-.195	-.194	.00	-.203	.009	-.000	
Autocracy	-.290	-.300	.01	-.174	-.130	.004	
Consideration	.551	.542	.01	.495			.048
Structure	.021	-.034	.06	.043			-.078

Expanded Model
Correlations and Components of Correlations Between Independent Variables and Morale--Supervisors

Postal

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	-.172	-.206	.03	-.251	.047	-.002	
Autocracy	-.320	-.357	.04	-.333	-.009	-.015	
Consideration	.267	.215	.05	.130			.085
Structure	.040	.018	.02	.128			-.111
Programmer							
Knowledge	-.292	-.268	.02	-.192	-.079	.003	
Autocracy	-.092	-.058	.03	-.073	-.023	-.009	
Consideration	-.144	-.040	.10	-.060			.020
Structure	.286	.262	.02	.182			.081

Expanded Model
Correlations and Components of Correlations Between Independent Variables and Morale--Combined Supervisors

	Correlation zero order						
Variable	Observed	Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	-.195	-.212	.02	-.214	.003	-.001	
Autocracy	-.290	-.301	.01	-.312	.015	-.004	
Consideration	.091	.119	.03	.030			.089
Structure	.033	.039	.01	.103			-.065

Expanded Model
Correlations and Components of Correlations Between Independent Variables and Productivity--Subordinates

Postal

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	.151	.103	.05	.132	-.035	.006	
Autocracy	-.441	-.422	.02	-.326	-.102	.006	
Consideration	.233	.275	.04	.147			.128
Structure	-.245	-.271	.03	-.234			-.037
Programmer							
Knowledge	-.111	-.091	.02	-.050	-.038	-.003	
Autocracy	-.134	-.125	.01	-.060	-.057	-.008	
Consideration	.265	.261	.00	.251			.010
Structure	-.142	-.137	.01	-.102			-.035

Expanded Model
Correlations and Components of Correlations Between Independent Variables and Productivity--Combined Subordinates

Variable	Correlation zero order		Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
	Observed	Estimated					
Knowledge	.012	.013	.00	.051	-.041	.002	
Autocracy	-.198	-.223	.02	-.090	-.110	-.023	
Consideration	.247	.266	.02	.244			.022
Structure	-.169	-.196	.03	-.188			-.008

Expanded Model
Correlations and Components of Correlations Between Independent Variables and Productivity--Supervisors

Postal

Variable	Correlation zero order: Observed	Correlation zero order: Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	.151	.036	.11	-.024	.064	-.003	
Autocracy	-.441	-.445	.00	-.533	.079	.008	
Consideration	-.130	-.163	.03	-.299			.135
Structure	.077	.128	.05	.173			-.045
Programmer							
Knowledge	-.111	-.034	.08	-.101	.070	.002	
Autocracy	-.134	-.116	.02	-.184	.035	.043	
Consideration	-.154	-.198	.04	-.249			.050
Structure	-.022	-.118	.10	-.161			.043

Expanded Model
Correlations and Components of Correlations Between Independent Variables and Productivity--Combined Supervisors

	Correlation zero order						
Variable	Observed	Estimated	Difference	Direct Effect	Indirect Effect	Effect Shared with other exongenous variables	Correlation due to correlated causes
Knowledge	.012	.003	.01	.006	.004	-.007	
Autocracy	-.198	-.198	.00	-.286	.062	.026	
Consideration	-.170	-.149	.02	-.230			.081
Structure	.106	.065	.04	.119			-.054

LIST OF REFERENCES

Aaker, David A. Multivariate Analysis in Marketing: Theory and Application. Belmont: Wadsworth Publishing Company, Inc., 1971.

Adorno, T.W., et al., The Authoritarian Personality. New York: W.W. Norton and Co., 1969.

Anastasi, Anne. Psychological Testing. New York: Macmillan Publishing Co., Inc., 1976.

Barrow, Jeffrey C. "The Variables of Leadership: A Review and Conceptual Framework." Academy of Management Review (April, 1977), 232-251.

Baumgartel, Howard. "Leadership, Motivations, and Attitudes in Research Laboratories." The Journal of Social Issues, Vol. 12, No. 2 (1956), 24-31.

Bennis, Warren G. "Leadership Theory and Administrative Behavior: The Problem of Authority." Administrative Science Quarterly, Vol 4 (1959), 259-260.

Brayfield, Arthur H., and Crockett, Walter H. "Employee Attitudes and Employee Performance." Psychological Bulletin, Vol. 52, No. 5 (1955), 396-416+.

Burke, W. Warner. "Interpersonal Communication." Leadership and Social Change. Edited by William R. Lassey and Richard R. Fernandez. La Jolla: University Associates, Inc., 1976.

Byrne, Donn. "Parental Antecedents of Authoritarianism." Contemporary Research in Social Psychology, A Book of Readings. Edited by Henry Clay Lindgren. New York: John Wiley & Sons, Inc., 1969.

Calder, Bobby J. "An Attribution Theory of Leadership." New Directions in Organizational Behavior. Edited by Barry M. Staw and Gerald R. Salancik. Chicago: St. Clair Press, 1977.

Ching Chun Li. Path Analysis. Pacific Grove: The Boxwood Press, 1975.

Chruden, Herbert J. and Sherman, Arthur W. Personnel Management. Cincinnati: South-Western Publishing Co., 1963.

Clark, James V. "Motivation in Work Groups: A Tentative View." Organizational Behavior and Administration. By Paul R. Lawrence and John A. Seiler. Homewood: Richard D. Irwin, Inc., 1965

Comrey, Andrew L., High, Wallace and Wilson, Robert C. "Factors Influencing Organizational Effectiveness VI. A Survey of Aircraft Workers." Personnel Psychology, Vol. 8, No. 1 (Spring, 1955), 79-99.

Connolly, Terry. "Information Processing and Decision Making in Organizations," in New Directions in Organizational Behavior. Edited by Barry M. Staw and Gerald R. Salancik. Chicago: St. Clair Press, 1977.

Conrad, Bob "The U.S. Productivity Crisis." Newsweek (Sept. 8, 1980), 53-54+.

Cooper, Robert. "Leader's Task Relevance and Subordinate Behaviour in Industrial Work Groups." Human Relations, Vol. 19 (1966), 57-84.

Crowe, Bruce J., Bochner, Stephen and Clark, Alfred W. "The Effects of Subordinates' Behaviour on Managerial Style." Human Relations, Vol. 25, No. 3 (1972), 215-237.

Duncan, Otis D. "Path Analysis: Sociological Examples." Causal Models in the Social Sciences. Edited by H. M. Blalock. Chicago: Aldine-Atherton, Inc., 1971.

Fiedler Fred E. and Leister, Albert F. "Leader Intelligence and Task Performance: A Test of a Multiple Screen Model." Organizational Behavior and Human Performance, Vol. 20 (1977), 1-14.

Fiedler, Fred E., Chemers, Martin M. and Mahar, Linda. Improving Leadership Effectiveness. New York: John Wiley & Sons, Inc., 1977.

Fleishman, Edwin A. Manual for the Supervisory Behavior Description Questionnaire. Washington, D.C.: American Institutes for Research, 1972.

_____ "Twenty Years of Consideration and Structure." Current Developments in the Study of Leadership. Edited by Edwin A. Fleishman and James G. Hunt. Carbondale: Southern Illinois University Press, 1973.

Fleishman, Edwin A. and Peters, David R. "Interpersonal Values, Leadership Attitudes and Managerial 'Success.'" Personnel Psychology, Vol. 18 (1965), 127-143.

Fleishman, Edwin A. and Salter, James A. "Relation Between the Leader's Behavior and His Empathy Toward Subordinates." Journal of industrial Psychology, Vol. 1 (1963), 79-84.

Gibb, Cecil A. "Leadership." Handbook of Social Psychology. Edited by Gardner Lindzey Cambridge: Addison-Wesley Publishing Co., 1954.

Glenn, Norval D., Taylor, Patricia A. and Weaver, Charles N. "Age and Job Satisfaction Among Males and Females: A Multivariate, Multisurvey Study." Journal of Applied Psychology, Vol. 62, No. 2 (1976), 189-193.

Greene, Charles N. "The Satisfaction-Performance Controversy." Motivation and Work Behavior. By Richard M. Steers and Lyman W. Porter. New York: McGraw-Hill Book Company, 1975.

Grimes, A. J., Klein, S. M. and Shull, F. A. "Matrix Model: A Selective Empirical Test." Academy of Management Journal, Vol. 15, No. 1 (1972), 9-31.

Hage, Jerald. "An Axiomatic Theory of Organizations." Administrative Science Quarterly, Vol. 10, No. 3 (1965), 289-320.

Hage, Jerald and Aiken, Michael. "Routine Technology, Social Structure, and Organization Goals," Administrative Science Quarterly, Vol. 14, No. 3 (1969), 366-376.

Heise, David R. Causal Analysis. New York: John Wiley & Sons, Inc., 1975.

Herbst, P. G. Socio-Technical Design. London: Tavistock Publications, 1974.

Heilbroner, Robert L. The Worldly Philosophers. New York: Simon and Schuster, 1972).

Hilgard, Ernest R. Cited by Thomas S. Robertson. Consumer Behavior. Glenview: Scott, Foresman and Company, 1970.

House, Robert J. "A Path Goal Theory of Leader Effectiveness." Administrative Science Quarterly, Vol. 16, No. 3 (1971), 321-338.

House, Robert J., Filley, Alan C. and Kerr, Steven. "Relation of Leader Consideration and Initiating Structure to R and D Subordinates' Satisfaction." Administrative Science Quarterly, Vol. 16, (1971), 19-30.

Inkson, J. H. Kerr. "Self-Esteem as a Moderator of the Relationship Between Job Performance and Job Satisfaction." Journal of Applied Psychology, Vol. 63, No. 2 (1978), 243-247.

James, Lawrence R. and Jones, Allan P. "Perceived Job Characteristics and Job Satisfaction: An Examination of Reciprocal Causation." Personnel Psychology, Vol. 33 (1980), 74-135.

Jennings, Eugene E. An Anatomy of Leadership. New York: Harper & Bros., 1960.

Johns, Gary. "Task Moderators of the Relationship Between Leadership Style and Subordinate Responses." Academy of Management Journal, Vol. 21, No. 2 (1978), 319-325.

Kerr, Steven, and Schriesheim, Chester. "Consideration, Initiating Structure, and Organizational Criteria--An Update of Korman's 1966 Reivew." Personnel Psychology, Vol. 27 (1974), 555-565.

Korman, Abraham K. "'Consideration,' 'Initiating Structure,' and Organizational Criteria--A Review." Personnel Psychology, Vol. 19, No. 4 (Winter, 1966), 349-361.

Lassey, William R. "Dimensions of Leadership." Leadership and Social Change. Edited William R. Lassey and Richard R. Fernandez. La Jolla: University Associates, Inc., 1976.

Lawler, Edward E. "Expectancy Theory." Motivation and Work Behavior. By Richard M. Steers and Lyman W. Porter. New York: McGraw-Hill Book Company, 1975.

Leavitt, Harold J. "Unhuman Organizations." Harvard Business Review, Vol. 40, No. 4 (July-August, 1962), 90-98.

Livingston, J. Sterling. "Myth of the Well-Educated Manager." Harvard Business Review, Vol. 49, No. 1 (January-February, 1971), 79-89

Lowin, Aaron. "Participative Decision Making: A Model, Literature Critique, and Prescriptions for Research." Organizational Behavior and Human Performance, Vol. 3 (1968), 68-106.

Loye, David. The Leadership Passion, A Psychology of Ideology. San Francisco: Jossey-Bass, Inc., 1977.

Macdonald, K. I. "Path Analysis." Model Fitting. Edited by C. A. O'Muircheartaigh and C. Payne. New York: John Wiley & Sons, 1978.

Main, Jeremy. "The Battle for Quality Begins." Fortune (Dec. 29, 1980), 28-33.

Matsui, Tamao, Ohtsuka, Yoshie and Kikuchi, Akio. "Consideration and Structure Behavior as Reflections of Supervisory Interpersonal Values." Journal of Applied Psychology, Vol. 63, No. 2 (1978), 259-262.

Melcher, Arlyn J. "Leadership Models and Research Approaches." Leadership: The Cutting Edge. Edited by James G. Hunt and Lars L. Larson. Carbondale: Southern Illinois University Press, 1977.

Miles, Raymond E., Snow, Charles C. and Pfeffer, Jeffrey. "Organization-Environment: Concepts and Issues." Industrial Relations, Vol. 13, No. 3 (1974), 244-246.

Miles, Robert H. and Petty, M. M. "Effectiveness in Small Bureaucracies." Academy of Management Journal, Vol. 20, No. 2 (1977), 238-249.

Motowidlo, Stephen J. and Borman, Walter C. "Relationships Between Military Morale, Motivation, Satisfaction, and Unit Effectiveness." Journal of Applied Psychology, Vol. 63, No. 1 (February, 1978), 47-52.

Myers, M. Scott. "Conditions for Manager Motivation." Harvard Business Review, Vol. 44, No. 1 (January-February, 1966), 58-71.

Namboodiri, N. Krishnan, Carter, Lewis F. and Blalock, Hubert M. Applied Multivariate Analysis and Experimental Design. New York: McGraw-Hill Book Company, 1975.

O'Reilly, Charles A. "Supervisors and Peers as Information Sources, Group Supportiveness, and Individual Decision-Making Performance." Journal of Applied Psychology, Vol. 62, No. 5 (1977), 632-635.

Patton, J. A. "Foremen: Misused, Abused, and Accused." Industry Week, Vol. 180 (1974), 72-74.

Petrov, V. "Getting Closer to People." Voyennyy Vestnick, No. 2 (Moscow: Feb., 1977), 26-33.

Perrow, Charles. Organizational Analysis: A Sociological View. Belmont: Wadsworth Publishing Company, Inc., 1970.

Pirsig, Robert M. Zen and the Art of Motorcycle Maintenance. London: Transworld Publishers Ltd., 1976.

Rajkay, Laszlo I. and Hofstede, Geert H. "Looking at the Boss and Looking at Ourselves." Management International Review, Vol. 16, (1976/2), 61-71.

Rice, George H. and Bishoprich, Dean W. Conceptual Models of Organization. New York: Appleton-Century-Crofts, 1971.

Robinson, J. P. and Shaver, P. R. Measures of Social Psychological Attitudes. Ann Arbor: Institute of Social Research, 1974.

Robinson, J. P., Athanasiou, R. and Head, K. B. Measures of Occupational Characteristics. Ann Arbor: Institute for Social Research, 1973.

Roethlisberger, Fritz J. "The Foreman: Master and Victim of Double Talk." Organizational Behavior and Administration. By Paul R. Lawrence and John A. Seiler. Homewood: Richard D. Irwin, Inc., 1965.

Schriesheim, Chester A., House, Robert J. and Kerr, Steven. "Leader Initiating Structure: A Reconciliation of Discrepant Research Results and Some Empirical Tests." Organizational Behavior and Human Performance, Vol. 15 (1976), 297-321.

Scott, William G., and Mitchell, Terence R. Organization Theory, A Structural and Behavioral Analysis. Homewood: Richard D. Irwin, Inc., 1972.

Seybolt, John W. "Work Satisfaction as a Function of the Person-Environment Interaction." Organizational Behavior and Human Performance, Vol. 17 (1976), 66-75.

Sheridan, John E., Downey, H. Kirk and Slocum, John W. "Testing Causal Relationships of House's Path-Goal Theory of Leadership Effectiveness." Leadership Frontiers. Edited by James G. Hunt and Lars L. Larson. Kent: Comparative Administration Research Institute, 1975.

Sims, Henry P. "The Leader as a Manager of Reinforcement Contingencies: An Empirical Example and a Model." Leadership: The Cutting Edge. Edited by James G. Hunt and Lars L. Larson. Carbondale: Southern Illinois University Press, 1977.

Smith, Clagett G. "Consultation and Decision Processes in a Research and Development Laboratory." Administrative Science Quarterly, Vol. 15, No. 2 (1970), 203-215.

Smith, P. C., Kendall, L. M. and Hulin, C. L. The Measurement of Satisfaction in Work and Retirement. Chicago: Rand McNally, 1969.

Soldier's Manual, Administrative Specialist, Skill Levels 1/2, M.O.S. 71L, Validation Edition. Fort Benjamin Harrison: U.S. Army Administration Center, 1978.

Spotts, James B. "The Problem of Leadership." Leadership and Social Change. Edited by William R. Lassey and Richard R. Fernandez. La Jolla: University Associates, Inc., 1976

SRA Catalog for Business. Chicago: Science Research Associates, Inc., 1974.

SRA Catalog for Business. Chicago: Science Research Associates, Inc., 1978.

Stinson, John E. and Johnson, Thomas W. "The Path-Goal Theory of Leadership: A Partial Test and Suggested Refinement." Academy of Management Journal (June, 1975), 242-252.

Stogdill, Ralph M. Handbook of Leadership. New York: The Free Press, 1974.

Svetikov, V. Cited by V. Petrov, "Getting Closer to People." Voyennyy Vestnik, No. 2 (Moscow: Feb., 1977), 26-33.

Tannenbaum, Arnold S. Control in Organizations. New York: McGraw-Hill Book Company, 1968.

Tannenbaum, Robert and Schmidt, Warren H. "How to Choose a Leadership Pattern." Harvard Business Review. Vol. 36, No. 2 (March-April, 1958), 95-101.

Terborg, James R. "Validation and Extension of an Individual Differences Model of Work Performance." Organizational Behavior and Human Performance, Vol. 18 (1977), 188-216.

The World Almanac and Book of Facts, 1979. New York: Newspaper Enterprise Association, Inc., 1979.

Thompson, James D. Organizations in Action. New York: McGraw-Hill Book Company, 1967.

Townsend, Robert. Up the Organization. Greenwich: Fawcett Publications, Inc., 1970.

Tushman, Michael L. "Work Characteristics and Subunit Communication Structure: A Contingency Analysis." Administrative Science Quarterly, Vol. 24, No. 1 (1979), 82-97.

Ulam, Adam B. "The Marxist Pattern." Philosophers and Kings. Edited by Dankwart A. Rustow. New York: George Braziller, Inc., 1970.

U.S., Bureau of Naval Personnel. Principles and Problems of Naval Leadership. Washington, D.C.: GPO, 1959.

U.S. Department of Labor, Manpower Administration. "Job Satisfaction: Is There a Trend?" Manpower Research Monograph No. 30, 1974.

U.S. President. Economic Report of the President. Washington, D.C.: Government Printing Office, 1980.

Van de Ven, Andrew H. and Delbecq, Andre L. "A Task Contingent Model of Work-Unit Structure." Administrative Science Quarterly, Vol. 19, No. 2 (1974), 183-197.

Vroom, Victor H. "Some Personality Determinants of the Effects of Participation." Journal of Abnormal Psychology, Vol. 59 (1959), 322-327.

_____ Work and Motivation. New York: John Wiley & Sons, Inc., 1964.

Waterman, Robert H., Peters, Thomas J. and Phillips, Julien R. "Structure is Not Organization." Business/Management 81/82. Edited by Joseph G. Mattingly. Guilford: The Dushkin Publishing Group, Inc., 1980.

Weaver, Charles N. "Black-White Correlates of Job Satisfaction." Journal of Applied Psychology, Vol. 63, No. 2 (1978), 255-258.

Webster's New World Dictionary, 2d ed. (1970), s.v. "trait."

Wren, Daniel A. The Evolution of Management Thought. New York: The Ronald Press Company, 1972.

Yukl, Gary. "Toward a Behavioral Theory of Leadership." Organizational Behavior and Human Performance, Vol. 6 (1971), 414-439.

Zeller, Richard A. and Carmines, Edward G. Statistical Analysis of Social Data. Chicago: Rand McNally College Publishing Company, 1978.