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ORGANIZATIONAL SOCIALIZATION,
MANAGEMENT TRAINING AND DEVELOPMENT,
AND THE MEASUREMENT OF CHANGE:
AN INQUIRY.

By
Gregory Dela Cruz

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GREGORY DELA CRUZ
1979

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

School of Labor and Industrial Relations

1979

1. The first part of the paper is devoted to the

study of the properties of the function

$f(x) = \sum_{n=0}^{\infty} \frac{x^n}{n!}$

for $x \in \mathbb{R}$.

2. The second part of the paper is devoted to the

study of the function

ABSTRACT

ORGANIZATIONAL SOCIALIZATION, MANAGEMENT TRAINING AND DEVELOPMENT, AND THE MEASUREMENT OF CHANGE: AN INQUIRY

By

Gregory Dela Cruz

A few empirical studies have attempted to detect, monitor, and verify the socialization process in the context of management training and development. However, the results and conclusions have been inconsistent. The issues are the measurement techniques used to detect and monitor the issue of whether the variables of socialization are regarding the efficacy of management training and development as an organizational socialization process. The study examines the variances in measurement methods.

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1979

Three research investigations on organizational socialization and management training and development are presented in the recent organization development literature. The studies were designed to examine this research question: All three studies shared the common feature of attempting to detect, monitor, and validate the process of socialization, if it occurred, among a group of public sector, military affiliated managers. The studies differing in measurement methodology.

Study I, representing the traditional approach, yielded terse and straightforward results. The dependent variables, measured at three points in time across the duration of a week long workshop, reflected no real change occurring among the managers.

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ABSTRACT

ORGANIZATIONAL SOCIALIZATION,
MANAGEMENT TRAINING AND DEVELOPMENT,
AND THE MEASUREMENT OF CHANGE:
AN INQUIRY

By

Gregory Dela Cruz

A few empirical studies have attempted to document, monitor, and verify the socialization or normative reeducation aspects of management training and development efforts. Extremely mixed results and conclusions have been obtained. Equally divergent are the measurement techniques and strategies used. This raises the issue of whether the variances in the conclusions reached regarding the efficacy of management training and development as an organizational socialization strategy are attributable to the variances in measurement methodology.

Three research investigations or studies, conducted on an exemplar management training and development effort anchored in the recent organization development-teambuilding approach, were designed to examine this research question. All three studies shared the common feature of attempting to detect, monitor, and validate the process of socialization, if it occurred, among a group of public sector, military affiliated managers. The studies differed in measurement methodology.

Study 1, representing the traditional approach, yielded terse and straightforward results. The dependent variables, measured at three points in time across the duration of a week long seminar/workshop, reflected no real change occurring among the managers.

Study 2 represented the panel approach in the analysis of change. Various change models were used to predict the structure of the results and various types of correlational and factor analyses were conducted. The results suggested that at least some modest degree of change or socialization took place as a consequence of the management training and development intervention.

Study 3 represented a metric multidimensional scaling approach. The MMDS results suggested that a rather widespread, significant change in "culture" occurred. Accordingly, on the basis of Study 3, it may be concluded that the management training and development intervention was relatively cogent as a socialization process and succeeded in inculcating new viewpoints, ideas, attitudes, perspectives, and norms.

Placing the three studies on a scale of "socialization potency," using Study 1 results, the pessimist would assert that the management training and development effort was a "dismal failure." Using Study 2, the middle-of-the-roader would point out that it was a moderate success. Using Study 3, the optimist would claim that the intervention was highly successful in altering the norms, perspectives, attitudes, and outlook among the managers in intended directions throughout the duration of the seminar/workshop.

The answer to the pivotal question raised in this research, therefore, must be in the affirmative. Quite apparently, the divergent results reflected in evaluation studies of management training and development as a socialization strategy may, in large part, be reconciled by the variances in measurement

methodology. The implications of this research finding are discussed together with some recommendations on future validation activity of this type.

ACKNOWLEDGEMENTS

There are two important things that this author would like to acknowledge. First, this author acknowledges that in all probability, this is **the** last dissertation he will ever write. Indeed, once is more than **enough**. Secondly, this author would like to acknowledge the **genuine** debt, obligation, and gratitude he owes to a number of people. Without their help, this author would still be picking up pineapples or cutting sugar cane in Hawaii. I shall begin at the beginning.

I extend by gratitude and thanks to my parents, Loretta and Justo De la Cruz. Through the years, they have continually supported my educational pursuits no matter what type of hardship they had to endure. I can remember my father saying "Greg, finish your education. Mom and I will support you as much as we can. I will help you even if I have to sell my last pair of pants." He almost did.

My thanks also go to the School of Labor and Industrial Relations and its faculty for accepting me into both the Master's and the Ph.D. program. Thank you, not only for the education, but also for overlooking my low GRE scores in the admissions decision.

This author is indebted to his fellow Ph.D. candidates, some of whom have completed the program, for their help, advice, encouragement, and direction. Hence, I extend my thanks to Gadi Harel, John Fossum, Dow Scott, Kent Murrman, Dave Pincus, and my office mates, Robert Madigan and Ian Miners for the help they have given me. It was fun gossiping, complaining, and competing

with them as to whom could put the more footnotes at the end of written term papers. To my friend Ian Miners, I bequeath the honor of now being the most active, senior Ph.D. candidate in SLIR.

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The secretarial support in back of this dissertation including the several rough drafts which preceeded it can only be described as

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"fantastic." God bless competent, friendly, patient, and understanding secretaries who can also edit one's work. I am convinced, even more than before, that secretaries are truly the unsung heroes of organizations. Accordingly, my heartfelt thanks go to Jo Churey, Lynn Johnson, Chris Smith, Lorelei Dyess, Heather Kailburn, Donna Sweeney, Elaina Jeddry, and my wife Lisa for the tremendous typing support and help that was generously given. To Mrs. Jo Churey especially, I extend my deepest appreciation and gratitude for her marvelous secretarial help and assistance. My thank you is also extended to Carol Crawford and Ann Wooten who provided competent secretarial help to me at Michigan State University. I would also like to thank Ms. Gail Porter, graduate student at Cornell University, for proof-reading and editing the final rough draft of this dissertation. Ms. Porter certainly taught me the value of having an outside, impartial reviewer to edit one's work.

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This author extends his full appreciation and gratitude to Dr. Thomas H. Patten Jr. for all what he has done for me not only for this dissertation alone, but more importantly, for all that he has done in helping me prepare as a professional in my major field. The idea for this dissertation gave birth in a doctoral seminar taught by Dr. Patten. Together with Lester Dorey, Dr. Patten provided the inspiration, impetus, and support which helped this dissertation proceed from an idea to full realization. I could always count on Dr. Patten for support, patience, understanding, direction, and fast feedback at every phase or step this dissertation took. Clearly, Dr. Patten exerted a major, important, and growthful impact upon my development as a Ph.D. candidate and upon the successful completion of this dissertation. I truly am indebted and grateful to the efforts invested by Dr. Patten in me as teacher, professor, dissertation committee member, advisor, and friend.

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important influence on my growth and development in the area of personnel management and organizational behavior. In terms of my own growth as a Ph.D. student, Dr. Moore helped me to acquire skills and knowledges in the areas of teaching, consulting, and research. Dr. Moore provided me with full access to his teaching material, his consulting work, unpublished papers, manuscripts, journals, books, file drawers, and any other items that I was interested in as a student. Dr. Moore also ensured, whenever possible, that I received some financial support during my Ph.D. program. In all the time I have worked under Dr. Moore, I always felt that I was a junior colleague rather than some "peon Ph.D student". I could always and unhesitatingly place my fullest confidence and trust in Dr. Moore. I could always count on Dr. Moore for advice, help, support, and direction anytime I felt a need for it. All I had to do was to ask. On numerous occasions, I did and there is just no possible way I can fully repay Dr. Moore for all of the time, effort, worry, and advice he has given me throughout the years. I sincerely thank Dr. Michael Moore and extend my deepest gratitude and appreciation for all of the help and support he has given me throughout my stay as a Ph.D. candidate in the School of Labor and Industrial Relations and for finally "seeing me through."

To my loving wife, Feliza, there are no words that can accurately describe my indebtedness, appreciation, and gratitude for all the work, sacrifice, encouragement, and support she has given me throughout the years. Had it not been for her help, support, patience, understanding, and love especially in my "rough times",

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successful completion of this dissertation, my Ph.D. program, and my Master's program would have remained "wishful thinking." I extend, to my wife Feliza, my deepest love, appreciation, and thanks for being at my side "all the way." With this comes the promise of no more leaving of my "dissertation stuff" on the bedroom floors, the living room floor, hallways, the kitchen counter, the stove, or in the bathroom.

To all the kind and generous people who have helped this author over the years, I thank you sincerely. In future years, when I peek into this dissertation again, it will certainly bring smiles and laughter that those who were uninvolved with this effort will never understand. Again, to those who helped me, I extend my appreciation. That I will have completed this dissertation and the Ph.D. program is all your fault. Also if this dissertation contains any errors, and if I could place the blame on all of those who helped, I would. And now, on with the Hawaiian luau.

DEDICATED TO:

My Loving Wife

FELIZA B. DELA CRUZ

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	
LIST OF FIGURES.....	
CHAPTER 1. INTRODUCTION.....	1
The Primacy of Organizational Survival.....	1
Competent Management: A Decisive Resource.....	2
Competent Management: A Scarce Resource.....	3
The Management Development Boom.....	4
Organizational Socialization and Management Development...	6
The Training Approach to Organization Management Development.....	8
Organizational Development and the Teamwork Approach to Management Development.....	10
The Character of Team Development/Building Interventions..	11
Organizational Socialization, Organizational Development, and Normative Reeducation.....	16
Dissertation Thrust and Organization.....	18
CHAPTER 2. A LITERATURE OVERVIEW AND RESEARCH DIRECTIONAL AVENUES.....	21
Introduction.....	21
Symbolic Processes and Managerial Learning: A Theoretical Overview.....	21
Some Assumptions and Theoretical Biases.....	25
A Literature Overview.....	27
An Assessment of the Literature.....	41
Salient Theoretical and Research Needs.....	48
Theoretical Concerns.....	48
Content Concerns.....	50
Measurement Concerns.....	54
Summary.....	60
CHAPTER 3. RESEARCH CONTEXT, METHODOLOGY, AND ANALYTICAL PROCEDURES.....	62
Introduction and Statement of the Problem.....	62
Organization.....	63
Research Setting.....	64
The U.S. Army Communications Command (USACC).....	66
Organization Development Through Teambuilding (ODTTB): A Series of Seminar/Workshops.....	69

TABLE OF CONTENTS (Continued)

	Page
ODTTB: Its Goals.....	70
ODTTB: Its Design.....	72
Summation.....	79
Research: Origination, Strategy, and Design.....	80
Participant Sample Characteristics.....	82
Data Gathering Procedures and Measures.....	86
Study 1. Theoretical Considerations, Predictions, and	
Data Analytic Strategy.....	88
Introduction and Theoretical Considerations.....	88
Research and Domain and Predictions.....	91
Measures and Analytical Procedures.....	93
Summation.....	94
Study 2. Theoretical Considerations, Predictions, and	
Data Analytic Strategy.....	95
Introduction.....	95
Some Theoretical and Measurement Considerations.....	96
Analytical Procedures and Predictions.....	101
Error of Measurement Model.....	104
"Mood for the Day" Model.....	104
Endogenous Real Change Model.....	108
Exogenous Real Change Model.....	109
"Gamma" Change Model.....	110
Summation.....	111
Study 3. Theoretical Considerations, Predictions, and	
Data Analytic Strategy.....	112
Introduction.....	112
Cultural Innoculation Theory: A General Perspective..	114
Cultural Innoculation Theory: An Illustration.....	127
Cultural Innoculation Theory: A Summation.....	134
Multidimensional Scaling: A Brief Description and	
Introduction.....	134
MMDS: A Procedural Overview.....	135
MMDS: Some Methodological Advantages.....	138
MMDS: Summation.....	140
Cultural Innoculation Theory Deductions and Implica-	
tions for MMDS.....	141
Predictions, Rationale, and Testing Procedures.....	147
Summation.....	152
Summary.....	153
CHAPTER 4. RESEARCH RESULTS AND DISCUSSION.....	154
Introduction.....	154
Study 1. The Traditional Approach: The Empirical	
Findings.....	154
Study 2. The Panel Approach: The Empirical Findings.....	155
Study 3. The Metric Multidimensional Scaling Approach:	
The Empirical Results.....	208
Discussion of the Results.....	225

TABLE OF CONTENTS (Continued)

	Page
Study 1. The Traditional Approach: Discussion.....	226
Study 2. The Panel Approach: Discussion.....	226
Study 3. The Metric Multidimensional Scaling Approach: A Discussion.....	258
Some Theoretical and Empirical Contradictions and a Comparison Across Studies.....	266
A Cautionary Note on the Correlation Coefficient.....	278
Summary.....	283
 CHAPTER 5. SUMMARY, LIMITATIONS, IMPLICATIONS AND CONCLUSIONS.....	 285
Introduction.....	285
General Overall Findings.....	286
Limitations.....	291
Implications of this Research Project.....	294
Future Research Suggestions.....	295
Practical Implications.....	298
Summary and Conclusions.....	301
 APPENDICES	
APPENDIX A: MMDS QUESTIONNAIRE.....	305
APPENDIX B: QUESTIONNAIRE ITEMS, SCALE INTERCORRELA- TIONS, AND FINAL SCALE RELIABILITIES.....	316
APPENDIX C: PAIRWISE SAMPLE SIZES: TIME 1.....	334
APPENDIX D: PAIRWISE SAMPLE SIZES: TIME 2.....	335
APPENDIX E: PAIRWISE SAMPLE SIZES: TIME 3.....	336
APPENDIX F: DESCRIPTIVE STATISTICS FOR PAIRWISE COMPARISONS, TIME 1.....	337
APPENDIX G: DESCRIPTIVE STATISTICS FOR PAIRWISE COMPARISONS, TIME 2.....	339
APPENDIX H: DESCRIPTIVE STATISTICS FOR PAIRWISE COMPARISONS, TIME 3.....	341
APPENDIX I: COMMUNALITY ESTIMATES FOR DIFFERENT TYPES OF FACTOR ANALYSIS PROCEDURES--TIME 1.....	343
APPENDIX J: COMMUNALITY ESTIMATES FOR DIFFERENT TYPES OF FACTOR ANALYSIS PROCEDURES--TIME 2.....	344

TABLE OF CONTENTS (Continued)

	Page
APPENDIX K: COMMUNALITY ESTIMATES FOR DIFFERENT TYPES OF FACTOR ANALYSIS PROCEDURES--TIME 3.....	345
APPENDIX L: CROSS-LAGGED CORRELATION ANALYSIS DIAGRAMS FOR TIME 1 AND TIME 2.....	346
APPENDIX M: CROSS-LAGGED CORRELATION ANALYSIS DIAGRAMS FOR TIME 2 AND TIME 3.....	353
APPENDIX N: CROSS-LAGGED CORRELATION ANALYSIS DIAGRAMS FOR TIME 1 AND TIME 3.....	360
BIBLIOGRAPHY.....	367

LIST OF TABLES

Table	Page(s)
3.1 Background Characteristics, Maryland One Managers.....	83
3.2 Background Characteristics, Maryland Two Managers.....	84
3.3 Background Characteristics, Arizona Managers.....	85
4.1A Means and Standard Deviations For The First, Second, and Third Administration Scores.....	156-157
4.2A Means, Standard Deviations, and Test-Retest Relia- bilities for the First, Second and Third Adminis- tration Scores.....	159
4.2B Static Correlation Matrix For The First Adminis- tration Scores.....	161-162
4.2C Static Correlation Matrix For The Second Administration Scores.....	163-164
4.2D Static Correlation Matrix For The Third Adminis- tration Scores.....	165-166
4.2E Cross-Lag Correlation Matrix For The Time 1 and Time 2 Administration Scores.....	167-168
4.2F Cross-Lag Correlation Matrix For The Time 2 and Time 3 Administration Scores.....	169-170
4.2G Cross-Lag Correlation Matrix For The Time 1 and Time 3 Administration Scores.....	171-172
4.2H Impact and Self-Impact Correlation Matrix For Time 2 - Time 1 and Time 1 Administration Scores.....	173-174
4.2I Impact and Self-Impact Correlation Matrix For Time 3 - Time 2 and Time 2 Administration Scores.....	175-176
4.2J Impact and Self-Impact Correlation Matrix For Time 3 - Time 2 and Time 1 Administration Scores.....	177-178
4.2K Impact and Self-Impact Correlation Matrix For Time 3 - Time 1 and Time 2 Administration Scores.....	179-180
4.2L Dynamic Correlation Matrix For The First and Second Administration Scores.....	181-182
4.2M Dynamic Correlation Matrix For the Second and Third Administration Scores.....	183-184

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

LIST OF TABLES (Continued)

Table	Page(s)
4.2N Dynamic Correlation Matrix For The First and Third Administration Scores.....	185-186
4.2O Varimax Rotated Factor Matrices For Time 1 To Time 3.....	205
4.2P Intraclass, Interclass Correlations, and Estimated Common Variance Between Factor Structures.....	207
4.3A Scree Lines, Percent of Real Distance Accounted For, and Cumulative Percentages.....	210
4.3B Means, Standard Deviations, and Test-Retest Reliabilities For Select Pairwise Comparisons For Time 1 To Time 3 Administration Scores.....	211-212
4.3C Time 1 Distance Means Matrix.....	215
4.3D Time 2 Distance Means Matrix.....	216
4.3E Time 3 Distance Means Matrix.....	217
4.3F Time 1 Factor Coordinate Matrix.....	219
4.3G Time 2 Factor Coordinate Matrix.....	220
4.3H Time 3 Factor Coordinate Matrix.....	221
4.4A Reliability Ratios For Time 1 and Time 2 Synchronous Correlations.....	237
4.4B Reliability Ratios For Time 2 and Time 3 Synchronous Correlations.....	238
4.4C Reliability Ratios For Time 1 and Time 3 Synchronous Correlations.....	239
4.5 The Estimated General Factor For the First, Second, and Third Administration Scores.....	242

LIST OF FIGURES

Figure	Page
1 USACC Organizational Structure.....	68
2 Design of the Teambuilding Seminar/Workshop.....	71
3 Behavioral Shift.....	89
4 A Representation Correlation Matrix Summarizing The Computational Nature of the Static, Cross-Lag, Impact, and Dynamic Data For Three Time Periods.....	102
5 Cultural Innoculation Theory: A Schematic Diagram....	123
6 Behavioral Change as a Function of Time and Cultural Innoculation: Some Major Outcome Possibilities.....	126
7 Random and Non-Random Scree Lines.....	148
8 ODTTB-MDS Plot.....	222
9 Schematic Diagram of Cross-Lagged Correlation Analysis.....	228
10 The General Factor in Operation in Cross-Lagged Correlational Analysis.....	230

CHAPTER 1

INTRODUCTION

The Primacy of Organizational Survival

Every age develops a dominant form of human organization that is unique and responsive to the requirements of that era, asserts Warren Bennis (1969). Eras change and by necessity, this implies that organizations must engage in revitalization, rebuilding, or development. The reason is simple. The first and ultimate test of any organized human effort is survival and successful functioning.

The importance of organizational survival cannot be underscored. Our society is a society of organized institutions. Increasingly, nearly every major social task is today being entrusted to large scale organizations. To these institutions, the average citizen of today looks for his livelihood, opportunity, security, status, achievement, and fulfillment as a unique individual (Drucker, 1974). Indeed, a significant number of citizens come into contact with them, spend much of their time in them, and are influenced by them (March and Simon, 1958, p. 2.)

The delicate interdependencies among individuals, organizations, and society, thus, serve as a continual reminder of the paramount importance of organizational survival. The social imperative of this is clear. If large scale organizations are to survive, its

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Competent Management: A Decisive Resource

All institutions, to function successfully, require a competent management. It is evident that managerial work is almost completely that of developing, directing, and energizing organization (Barnard, 1938). The roles of management are, of course, multiple. But the role of the manager may be best summarized as the dynamic, life-giving, and life-sustaining element in every organization. Of all the "factors of production", competent management is probably the most decisive especially in a competitive economy marked by scarce resources. Without competent, responsible management, there can be no successfully functioning organization. Indeed, organizational survival hinges upon management, its competence, and its performance. Truly, modern society has an important stake in the competence, skill, and responsibility of management (Drucker, 1954, p. 5).

This imperative holds true not only for profit-oriented corporations. It is also appropriate to the service institutions, especially government activities, the armed forces, and the provision of efficient military defense. Contemporary society has become much disenchanted with the frequent revelations of ineptness, wastefulness, gross inefficiency, and the lack of results occurring within government. Thus, there will be ever increasing pressure for the public sector or the service institutions to improve productivity and effectiveness (Guildner, 1975;

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Thomas, 1976). This may depend, to a large extent, on an ability to produce able, responsible, and innovating managers, willing and capable of seizing the initiative in learning how to manage service institutions for effective performance. Thus, the ability to develop competent managers and maintain a steady supply, for the service institutions, may well be the biggest and the most important challenge in this century (Drucker, 1974, p. 166). In addition to skill development, there are norms, values, and perspectives appropriate to each work organization which managers must learn in order to be effective.

Competent Management: A Scarce Resource

According to a recent review (Campbell, et al., 1970), the flow of high-level manpower into managerial functions is far below current demands. The prediction is that in the future, an increasing number of managerial jobs will become unfilled because fewer persons will be available to staff them. Lower birth rates, smaller proportions of college graduates willing to enter business careers, and rapid organizational growth are but some of the factors contributing to the short supply of available managerial talent.

The major implication of these current and impending shortages is that business firms and government agencies need desperately to learn more about how to develop, nurture, and conserve the scarce resource of effective managers (Campbell, et al., 1970, p. 2). This view, together with the view of management as a crucial factor in economic and social growth,

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has led management training and development to become a major focus of business as well as an important governmental concern. Ralph J. Cordiner, formerly of General Electric (now retired) a top ranking industrial executive, articulates this concern nicely:¹

"There has been a growing realization...that great untapped opportunities lie in finding ways to develop more fully our human resources--particularly...managers...technological advances and the increasing complexities of managing under today's and tomorrow's conditions have made manager development a necessity as well as an opportunity."

The Management Development Boom

Apparently, many have heeded such advice for the evidence strongly suggests that management training and development is becoming increasingly popular and widespread. That is, many organizations have tended to expend large amounts of time, money, and energy to nurture managerial talent. In short, management development has in itself become big business and a major source of income to academicians and consultants. This has led to a proliferation of management training and development programs used by organizations. According to Drucker, (1974, p. 15). "Nobody in the 1970's can count the number of advance management courses, advanced management seminars, special schools, special institutes, staff colleges, and other institutions concerned with the professional function and advanced training

¹Quotation found in Peter Drucker, The Practice of Management. (New York: Harper and Row, 1954), p. 184.

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of managers all over the world." Recently, some new training strategies have emerged that are also designated to promote managerial development and "planned change" in organizations. These training strategies are encompassed under the general concepts of organizational development and teambuilding.

Organization development, according to Bell and French (1973, p. 15) is a long range effort to improve an organization's problem solving and renewal processes, particularly through a more effective and collaborative management of organizational culture--with special emphasis on the culture of formal work teams--with the assistance of a change agent, or catalyst, and the use of the theory and technology of applied behavioral science including action research. When organizational problems or crises arise, OD provides an approach to managing such problems that involve (a) the maximum use of human resources, (b) the learning of procedures for diagnosing causes of problems and innovative ways of dealing with them, and (c) a greater integration of individual needs with organizational goals (Burke and Schmidt, 1971).

Some cynics would claim that OD approaches to training are simply old merchandise in new wrappings (conference, lecture, role play, case studies, etc.). In other words, the OD approach to management training and development is essentially traditional training. Strauss (1976) however, has noted several features which distinguish this newer approach from their historical forerunners. Whether or not one distinguishes new and old approaches, the fact still remains that management training

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and development efforts have proliferated over the years in their frequency of usage as a change strategy.

Organizational Socialization and Management Development

Organizational socialization refers to the process by which a person learns the values, norms, roles, attitudes, skills, mental outlooks, and required behaviors which permit him to participate as an effective member of an organization. Upon entry, a person may be subject to "organizational forces of persuasion" to replace currently held ways of thinking or acting with favored alternative ones. In brief, organizational socialization is an organizationally initiated and directed process which prepares and qualifies individuals to carry out prescribed organizational roles. The roles can vary from attending meetings to speaking the "organizational line."

Successful organizational socialization, according to Caplow (1964), inoculates the individual with: (1) new self-images, (2) new involvements, (3) new values, and (4) new accomplishments. Hence, organizational socialization involves a type of metamorphosis where a person changes his existential state into the kind which is appropriate to the requirements or demands of the situation. It also can be typified as the extent to which an organization is willing to exert efforts in influencing an individual to acquire and maintain the knowledge, abilities, and motivation required to successfully carry out a particular role (Van Maanen, 1976). Perhaps the essence of socialization lies in the process of social persuasion which is based upon

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communications. The key variables in the process, Faswell (1948) states are: Who says what to whom, how, when, and with what impact.

Socialization and development share some important features. Both imply learning, growth, or change processes over time. Development may be referred to as the act, process, result or the state of being developed which in turn means to advance, to promote the growth of, to evolve the possibilities of, to further, to improve, or to enhance something. That something can be a manager or an organization. Connecting these words together creates the term "organization management development". Thus, organization management development can be defined as the act or process initiated and directed by an organization which is designed to further, advance, or promote its growth as well as the growth of its managerial cadre both individually and collectively.

As conceptualized here, organization management development is a form of organizational socialization. The common underlying feature is that the targets of change or the basic building blocks are the managers' beliefs, attitudes, norms, values, philosophy, and perspective. Collectively, these basic building blocks or change targets have been referred to by various names: culture, climate, cognitive structure, intermediating states, symbolic mediation, attitude, and a host of other names. Similarly, the very act, process, or strategy designed to change these building blocks or targets have been subsumed under various names: phenomenological change, cosmological change, attitude change, cultural change, normative reeducation, etc.

The Training Approach to Organization Management Development

Organization Management Development, as conceptualized above, has four major goals: (1) organizational continuity and effectiveness, (2) the sustenance of an adequate supply of competent managers, (3) the development of managerial teamwork and (4) individual manager development. Of note is the concept of managerial teamwork as an important goal of management development. As Mahoney (1961) has noted, the team concept is relevant to management development efforts because all managers must work in the same direction to accomplish organization goals.

The implementing strategies of organization management development can take on various forms. One implementing strategy of widespread use is management training. The concept "management training" may be defined narrowly or broadly or in evaluative terms. A narrow view of the concept would be to associate management training in simple learning terms. Under such a view, management training would be characterized as a situation where managers learn simple tasks such as defining terms, filling out forms, or receiving basic instructions. Management training can also be viewed pejoratively; that is, characterized as being irrelevant, a waste of time, a one-shot program which is shortly forgotten, etc. Neither the narrow view nor the pejorative view of management training is adopted here. Some degree of information dissemination is inevitable in management training, of course, but management training usually involves much more than "imparting information." As Caplow (1964, p. 173) states: "organizations that conduct training programs conceive

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of them as imparting skills, but analysis of any particular training program always shows it to be concerned with the communication of values, the development of ambience, the rejection of prior affiliations and the development of an appropriate self-image." Hence, management training is usually an expressive process designed to change an individual's motivation, self-image, and to perform specific managerial role-related skills required by an organization or situation.

In a similar vein of thought, Crane (1979) and Ashen (1954) assert that perhaps the greatest contribution of management training and development programs is the exposure they provide to the thinking and perspective of other managers facing similar problem situations. Effective management training and development efforts encourage managers to question their patterns of thinking, techniques, prejudices, and habits that have become ingrained over time. These efforts challenge, stimulate, excite, and broaden the thinking of managers and their imagination is stirred by discovering that other organizations and other managers, facing similar problems, have used different perspectives and solutions successfully.

Lerda (1967) has also suggested that management training and development has great value in modifying and even changing thoughts and attitudes and in extending one's practical knowledge through the learning of the experiences of others, the checking of ideas and opinions, and the sharing of information.

These views strongly suggest that management training as a management development strategy is more properly conceptualized

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as being closely related to the instrumental goals of the larger process of organizational socialization. Clearly, the management training and development process embraces more than simple learning tasks. It is also directed towards changing the outlooks, perspectives, attitudes, norms, values, and perceptions necessary for one to perform adaptively in a designated managerial role.

Organizational Development and The Teamwork Approach to Management Development

Earlier, it was mentioned that some relatively new techniques have been developed. Perhaps the most notable of these recent developments is organization development and the teamwork approach to management training and development.

Teambuilding and teamwork oriented interventions are at the heart of organizational development (French, Bell, and Zawacki, 1978, p. 148). Teambuilding for organization effectiveness has been described as a definitely proactive strategy, consisting of formal programs and sustained formal and informal efforts for the improvement of management (Patten and Dorey, 1977, p. 31). It has also been described as the most advanced and the most frequently used of all the OD technologies (Beer, 1976, p. 955).

Several reasons may be advanced to justify the emphasis on the teamwork philosophy. First, much individual behavior is rooted in the sociocultural norms and values of the work team. Hence, changing team norms and values are likely to

produce immediate and lasting effects upon individual behavior. Second, the work team is the source of most of the individual's knowledge about organization processes such as decision-making, communication, goals, and leadership. These processes exert significant influence over individual performance. Third, various individual needs for social interaction, status, recognition, respect, certainty are related and can be met by the work group. Any intervention that enhances work group performance is more than likely to satisfy some important social needs of individual members. Fourth, productivity and problem solving by teams can be superior as compared against a collection of non-interdependent individuals. Depending upon the goals to be achieved and the skills of a leader, if group liabilities are avoided and if assets are capitalized on, teams can exceed the performance of a superior individual functioning alone even with respect to productivity (Maier, 1967; French and Bell, 1978, p. 83).

In essence, the emphasis on the teamwork concept is premised on the belief that it will eventually lead to proper management development and, in turn, to organization development.

The Character of Team Development/Building Interventions

Argyris (1970, p. 15) says that to intervene is to enter into an ongoing system of relationships between or among persons for the purpose of helping them. Hence, one perspective is that teambuilding activities are part of the process of organizational

socialization.

The goals and objectives of teambuilding vary according to the nature of the problems which need to be addressed. Goals may relate to task issues such as the way things are done, the needed skills to accomplish tasks, or resource allocation or they may relate to the nature and quality of interpersonal relationships within and between teams (French and Bell, 1978, p. 107).

Typically, teambuilding activities have five main areas of concern: (1) to set goals and priorities, (2) to analyze or allocate the way work is performed, (3) to examine work group processes such as problem-solving, decision-making, and communication, (4) to examine the roles and relationships among team members and (5) to provide a means whereby team members can come together in a learning setting to acquire skills for task accomplishment (Beckhard, 1972 and Patten and Dorey, 1977).

As a social change technology, teambuilding interventions take on a variety of forms. At least ten different interventions designed to improve the effectiveness of teams have been identified (French and Bell, 1973, p. 197): interviews or questionnaires, team training, family T-group, survey feedback, process consultation, role negotiation grouping, role analysis technique, collages, "start-up" teambuilding activities and various other normative reeducation activities. Generally speaking, however, teambuilding activities can be described as a sequence of techniques involving shifts in focus from the individual level, to the group, to finally dealing with the organization as a whole. A full-fledged OD teambuilding intervention, for example, may proceed along the

following lines:

Step one might involve consultant entry and diagnostic activity. This step might typically involve data gathering about group processes and problems.

Step two might involve a series of meetings where the data is presented and discussed by the consultant and the work group.

Step three might involve the categorization of problems to work group effectiveness, prioritization, and action planning. During this phase the consultant may provide various learning experiences which enable teambuilding participants to communicate openly with one another, critique their own group functioning, confront and resolve conflict, develop analytical and problem-solving skills, or to acquire behavioral science knowledge on such topics as leadership, motivation, decision-making, etc.

Step four might involve activities similar to step three but the focus would be on intergroup relations such as those between departments and other work teams.

Step five might involve structural changes affecting the organization as a whole. These changes may involve alterations in authority relationships, goal-setting, roles, communication patterns, evaluation patterns, and reward systems.

Step six might involve some follow-up interventions and subsequent complete withdrawal by the consultant.

Estimates of the time span from the start to the finish of OD, teambuilding interventions have been frequently cited anywhere between one to five years. It is conceivable, however, that if one takes into account decision futurity or visibility of

intended results, a teambuilding intervention may even span across several decades of time.

Not all teambuilding interventions follow the sequence of activities outlined. There are a number of variations. Beer (1976), for example, identifies four teambuilding models classified according to the issues treated: (a) goal setting activities which enable team members to establish clear, acceptable objectives (b) interpersonal development which enable team members to interact more effectively with one another (c) role clarification activities which enable team members to understand their work role and its relationship to the team and (d) "Managerial Grid" group development aimed at developing a 9,9 culture. Other variations include the Gestalt therapeutic approach where the primary thrust is upon individual awareness, integration, authenticity, maturation, self-regulation, and behavior change (Herman, 1970); and the TORI approach where the emphasis is on the individual growth factors of trust, openness, realization, and interdependence (Gibb, 1972). Some teambuilding interventions may be classified as "booster shot" activities. Such activities usually have a modest goal and are designed to put an organization "on the right track." In this design, one or more of the steps mentioned may be side-stepped. Steps five and six, for example, steps that involve structural-organization wide change, may omit an active, formal involvement of the external consultant. It is presumed that subsequent structural-organization wide change would occur through "contagion effects." Succinctly, this "theory" asserts that if the initial teambuilding intervention is successful, the beneficial

effects will spread throughout the organization as "success stories" spread and encourage others to adopt the teamwork mode (Gibb, 1972, p. 37).

Several suggestions have been offered on how to provide optimal learning conditions for participants of a teambuilding effort. Solomon (1977, p. 187) recommends designing teambuilding training sessions that are: (1) internally consistent, (2) sequential with each segment building meaningfully on previous work, (3) accounts for the stage of development and maturity of the team being trained, (4) provides assurances that all team members are on the same plane of learning, understanding, and "internalization" of the ideas being covered, and (5) helpful to the team in conceptualizing its learning experiences with on-the-job situations. Based upon their experiences in conducting teambuilding workshops in an OD program within a municipal government organization, Bell and Rosenzweig (1978) suggest that successful team training interventions: (1) get the right people together for, (2) a large block of uninterrupted time, (3) to work on high priority problems or opportunities that, (4) they have identified and worked on, (5) in ways that are structured to enhance the likelihood of, (6) realistic solutions and actions plans that are, (7) implemented enthusiastically and (8) followed-up to assess actual versus expected results.

Organizational Socialization, Organizational Development, and
Normative Reeducation

Earlier organizational socialization was viewed as an active strategy initiated by an organization directed towards inoculating "culture" or a sort of organizational Weltanschauung consisting of unique norms, values, attitudes, perspectives, and an outlook toward the organization, the situation, and the managerial role which is shared among managers. Management training and development was viewed as a subset of this larger, ongoing process directed toward change.

In organization development, three general strategies for effecting changes in human systems have been classified: empirical-rational strategies, normative-reeducative strategies, and power coercive strategies (Chin and Benne, 1969, pp. 32-59).

Empirical rational strategies assume that the behavior of persons or groups are predominately regulated by self-interest and that persons or groups are rationally calculating entities. Hence, change will be adopted when a person or a group can rationally justify the change as being instrumental to self-interest.

Power-coercive strategies rely upon the manipulation of reward and sanctions to secure compliance in the direction of the change sought. In general, the change strategy involves the emphasis upon political or moral suasion, economic sanctions, and the use of rules and regulations in the exercise of power.

Normative reeducational strategies emphasize the importance of values, sociocultural norms, and perceptions as salient

determinants of social change. It is assumed that individuals or groups are guided by internationalized meanings, values, or decision rules. This perspective assumes that people

"...are guided in their actions by socially funded and communicated meanings, norms, and institutions, in brief by a normative culture...Changes in patterns of action or practice are, therefore, changes, not alone in the rational informational equipment of men, but at the personal level, in habits and values as well and, at the sociocultural level, changes are alterations in normative structures and in institutional roles and relationships, as well as in cognitive and perceptual orientations." (p. 101).

To bring about changes, therefore, one would have to mount an educational campaign to change norms, values, and the "meaning" that a new situation has for the targets of change. The focus of normative change is not upon personally held, deep-seated values unrelated to work, but relate more to perceptions, values, norms on how to accomplish best organization mission and task objectives (French and Bell, 1978, p. 76). Although conceptually there is a great deal of overlap among the three general strategies, a number of OD practitioners have emphasized the normative-reeducation aspects of OD. Bennis (1969) has said that "OD is a ...complex educational strategy intended to change...beliefs, attitudes, values..." Similarly, French and Bell (1978) consider OD with a clear reference to the importance of culture as a major variable for change and the normative reeducation aspects of the change process. Hence, normative reeducation is considered as an indispensable ingredient for successful OD efforts which also include teambuilding interventions, the heart of organization development efforts. Normative reeducation is a

representative process or a facsimile of organizational socialization. Thus, management training and development and teambuilding interventions reflect the process of organizational socialization. Both seek to maintain organizational survival through the development of competent management. Both are not limited to nominal change objectives but seek to change values, perspectives, norms, the cognitive structures of managers. Both are premised on the belief that these targets of change are important causal determinants of managerial behavior and performance.

Dissertation Thrust and Organization

Management training and development efforts, both the conventional and the more recent organization development and teambuilding approaches, are all aimed at bringing about managerial metamorphosis in intended ways. As was mentioned, this change process has been referred to by various names such as normative reeducation, cultural change, attitude change, and the like. The central domain of this dissertation deals with validating and verifying this change process. How efficacious are management training and development efforts as an organizational socialization strategy? What is the character of scientific knowledge, theory, and evidence in this area? What are the critical, unresolved issues in this area and therefore, the critical knowledge and research needs? And most important of all to this research is the question of how one can detect, monitor, and assess whether or not management training and development, particularly in the newer form based on the organization

development and teamwork approach, actually altered managers' perceptions, outlooks, values, norms, attitudes, and cognitive structures in intended ways.

Chapter 1 has focused on the importance of organizational survival, the importance of competent management as a decisive determinant of organizational survival and the importance of organizational socialization as a strategy used to ensure the development of competent management. It was also pointed out that management training, including the newer OD approach to management-team training, is an integral part of the larger organizational socialization process. Hence, management training goes beyond the mere attainment of nominal goals and is normally intended to be more far-reaching in its impact.

Chapter 2 provides an overview of the major theoretical positions regarding the causal determinants of managerial change. A literature overview of the empirical literature on management training and development including teambuilding efforts is provided. Some central theoretical and research issues will be identified together with the central problem or issue this research project addresses. As was mentioned earlier, most management training efforts are aimed at the alteration of implicit mediating events. Following a review of the empirical, validating research results, it will be noted that the results are divergent and contradictory. Equally varied, moreover, are the measurement procedures and techniques used. These observations give rise to the central problem or issue this research project addresses: Are the divergent conclusions drawn a function of divergent theoretical and measurement

strategies? In addressing this issue, three studies were conducted.

Chapter 3 provides background information on the structure of the three studies. The research context, the nature of the training stimulus, the participating managers, research design, measurement instruments, and data analytic strategy will be described. For each study, theoretical viewpoints and some derivable, testable predictions will be discussed.

Chapter 4 presents the empirical results of each of the studies. A discussion of the results follows this presentation.

Chapter 5 identifies several limitations of this research effort, suggestions for future work, some recommendations regarding management training and development efforts conducted by the U.S. Army Communications Command and other similar organizations, and offers some concluding observations.

CHAPTER 2

A LITERATURE OVERVIEW AND RESEARCH DIRECTIONAL AVENUES

Introduction

In this chapter, a theoretical overview of the role of mediating symbolic processes as causal determinants of managerial learning is presented. Some assumptions and the theoretical biases of this investigator are identified. This is followed by an overview and then an assessment of the empirical literature bearing upon the question of the relative efficacy of management training and development efforts as an organizational socialization strategy. The important theoretical and research needs addressed by this dissertation are also identified and discussed.

Symbolic Processes and Managerial Learning: A Theoretical Overview²

Earlier, it was mentioned that management training and development is typically aimed at producing behavioral change in certain desired directions. Noteworthy also is the notion that the processes, procedures, and techniques used to develop and maintain behavioral change will be largely determined by one's belief about the causal determinants of human behavior. As Bandura (1969, p. 45) states:

The process of behavioral change will be conceptualized quite differently depending upon

²This overview is based upon the work of A. Bandura, Principles of Behavior Modification. (New York: Holt, Rinehart, and Winston, Inc.), 1969.

whether one assumes that responses are regulated predominantly by external stimulus events or partly by mediating symbolic events.

Few would quarrel with the notion that "normally" functioning adults (e.g., the typical manager) are capable of thinking and feeling. Such covert events have been designated various names: cognition, cognitive structure, attitude, culture, meaning, experiential phenomena, cosmology, phenomenology, higher level symbolic events, awareness, psychological climate, implicit mediating events, covert verbalizations, and a host of other labels.

From a social learning perspective, these symbolic or cognitive processes are chained events which may be arranged by a hierarchy of complexity and underlying such processes are different forms of learning.³ At a higher level of learning, stimulus inputs must be registered, coded, and organized into associational relationships, principle guides governing the occurrence of rewards and punishments corresponding to actions are developed and tested, and once confirmed, rules and strategies are formulated which can serve to guide appropriate future performances when similar situations are encountered. The key theoretical issue is, however, whether implicit symbolic activities control and regulate human behavior.

The theoretical issue may be phrased in layman's language: Is managerial behavior a function of how managers think and feel about themselves and the "real world"? In other words, do

³See, for example, R. M. Gagne, The Conditions of Learning. (New York: Holt, Rinehart and Winston), 1963.

symbolic mediating events exercise influential control in directing overt behavioral action among managers? This is where theoretical systems diverge and lock horns.

According to nonmediational theorists, a school of thought consisting mainly of Skinnerian advocates, the reinforcing consequences following overt responses act directly and automatically to strengthen preceding overt responses. Eventually, a person may be able to verbalize his behavior and specify the actual response-reinforcement relationship but this capacity, according to this view, in no way affects overt motor responses causally. In short, cognitive and affective processes are resultants rather than determinants of behavior.

An interesting version of the foregoing position treats cognitions and feelings as independent response systems which may or may not covary depending upon the manner in which their respective reinforcement contingencies are arranged. It is postulated that the occurrence of reinforcement produce other responses, and that these responses loom large in accounts of emotion and cognition. Adherents to this position deny the legitimacy of self reports of affect or rule statements inferred from correct responses as indexes of mental states. It is asserted that there exists no inherent causal relationships between self reports of cognition and affect and actual motor performance. The empirical problem rather is one of examining the conditions under which the different response systems (what people say, feel, and do) are either correlated or independent (Cherrington, Reitz, and Scott, 1971). As with nonmediational theorists, proponents of this school of thought

deny that feelings or symbolic processes exert influence on motor performance on both conceptual and methodological grounds.

The foregoing theoretical positions, while acknowledging cognitive and emotional events, adhere quite rigorously to the view that behavior can be satisfactorily explained, predicted, and controlled primarily in terms of manipulable, external reinforcing events and by remaining outside the individual. Simply stated, their position is that symbolic events or private thoughts and feelings are irrelevant. Given this view, all management training and development programs that are based on phenomenological change are superfluous and highly unlikely to bring about behavioral change. Stated bluntly, such programs, given this view, are misguided, ineffectual vehicles of behavioral change.

In contrast with the preceding theories is the theoretical view which asserts that one cannot account satisfactorily for human behavior completely in terms of external stimulus events. In this view, the learner plays a far more active role and mediational processes are considered to be important ingredients in improving performance. The role of the learner as an information processor, who extracts, differentiates, assimilates, generalizes, and acts upon information present in stimuli itself or by symbolic transformations of external stimuli, is accentuated in this view. Internal mediating activities are regarded as important phenomena worthy of scientific study in its own right or as prevalent symbolic regulators which exercise control over overt performance. It is asserted that during the learning process, individuals not only emit different types of overt responses,

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they also process information about what they are required to do and when. Once subjects have figured out what they are supposed to do, and depending upon their valuation of contingent incentives, rules or guides are subsequently developed about the required response class. These rules, when evoked, serve to direct instrumental action and can result in substantial increases in improved performance. Hence, according to this view, symbolic and emotional activities are crucial causal aspects of behavioral change processes.

Some Assumptions and Theoretical Biases

In this dissertation, it is assumed that the thoughts, ideas, and feelings managers may have are not beyond the domain of scientific inquiry. It is also assumed that managerial learning is subject to symbolic and emotional mediation. Most behavioral scientists and practitioners interested in the area of management training and development would agree, on common sense or experiential grounds, that it is much more pragmatic to regard the normally functioning adult manager as an information processor and that a manager will behave depending upon how he thinks or feels about a given situation. Hence, the inclusion of symbolic mediational processes, I believe, is essential for the development of an adequate theory of organizational socialization associated with management training and development efforts. Moreover, progress in this direction will depend upon the use of a measurement methodology which permits sensitive and accurate evaluation of changes in implicit mediating events across time.

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According to most mediational models, the environmental event contains a rich store of potential information. External stimuli may contain both reinforcing and feedback properties. These stimuli may be transformed into an implicit cue (cognition, belief, perception, affect) which eventually exercise regulatory control over behavior. Such a view, however raises the question of how symbolic mediating processes are to be adequately measured.

Homme (1965) contends, that under most situations, covert activities can be easily detected by the individual in whom they are occurring. Hence, if one wanted to ascertain whether a manager altered his internal state, one could simply ask the manager if such an event transpired. Of course, it must be noted that the admission of subjects' verbal reports as indicants of hypothesized mediating states must be approached with caution. Safeguards in the assessment procedures must be employed to check against unwanted bias, distortions, or invalidity. Moreover, the quality of verbal reports may be conditioned upon subjects' willingness and linguistic competence to describe their mediating, cognitive state or process. As with the contention of Spielberger and DeNike (1966), nevertheless, I find unacceptable, non-mediational theorists' complete rejection of verbal reports as indices of mediating cognitive states on the grounds that such a rejection will more than likely retard theoretical development that is sorely needed in the area of management training and development.

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now shifts to an overview and assessment of the relevant empirical literature.

A Literature Overview

An in-depth review of the voluminous literature providing empirical findings on each of the preceding theoretical positions goes beyond the scope and purpose of this dissertation. An excellent review is provided by Bandura (1969). His work shows that the studies have produced either (a) conflicting if not uncertain interpretive results or (b) positive results in support of each theoretical position. Moreover, proponents of each point of view have generated a number of methodological criticisms on the scientific work carried on in the opposing camp (Spielberger and DeNike, 1966).

In the area on teamwork research, the growing use of team-building technologies in OD efforts, unfortunately, has not been accompanied by rigorous, scientific evaluation of results. With a few exceptions, the literature on teambuilding centers mainly on testimonials, anecdotes, case studies, and "one-shot" correlational research. This body of material focuses on different themes mostly from the vantage point of consultants and practitioners.

Some articles highlight the importance of teamwork (Burke, Weir, Tamara, 1976; Brandon, 1976; Hill, 1976; Varney, 1976; Posner, 1976) while others point out various conditions for effective teamwork (Lewis, 1975; Siepert, 1973; Beckhard, 1972; Likert, 1967; French and Hollman, 1975). Others offer several

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caveats to implementing teambuilding. Patten (1977) points out the time waste which can occur following an uncritical advocacy of teambuilding activities. Kiessler (1977) suggests that teamwork effectiveness depends on managerial style and the perceived complexity of the task confronting the team. Lewis (1975) adds that the team approach may be more successful in complex decision-making situations. Beckhard (1972) indicates that a significant amount of man hours can be spent by work groups on teambuilding tasks in addition to performing regular administrative duties. Alderfer (1977) notes that teambuilding interventions have been applied in a wide variety of settings including international relations, government, health care delivery systems, and schools. Solomon (1970, p. 192) offers testimony that the team development approach to training

"...has proven successful in helping reticent personnel become communicative; the reserved and secretive become involved and open; the conflict-oriented become cooperative; the apprehensive become trusting; the impersonal develop mutual concern and shared objectives; the independent or counter-dependent become interdependent; and the individualistic develop a gregarious team spirit."

Others (Alston, 1977; Hill, 1976; Chambers, 1974; Johnson, 1973) also provide testimonials on the success of teambuilding interventions.

The impact of teambuilding has been evidenced other than by the sole testimony of consultants and practitioners. Teambuilding results have been explored through a systematic data collection process by several researchers. Such studies, however, have been few in number.

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Friedlander (1967) evaluated a team development technology conducted off-site and lasting 4-5 days in duration. The objectives were to identify group problems, develop solutions, and to implement action plans. Friedlander found that four teams reported significantly higher increases in group problem-solving, effectiveness, mutual influence, and participation when compared to eight other control teams. In a subsequent data analysis, Friedlander found that the impact of teambuilding varied greatly among the four experimental teams depending upon the quality of integrated prework and postwork processes and the level of intragroup trust at the outset of the development effort.

Kimberly and Nielson (1975) evaluated the impact of teambuilding and intergroup problem-solving interventions in an automobile plant comprised of 2600 hourly and 200 salaried personnel. The OD interventions took place during a period of 15 months. Pre and post attitudinal and performance indicators over a four-year period were obtained. A wide variety of changes in organization climate and supervisory behavior was observed. There was a significant decrease in production variance as well as increases in production quality and plant profitability from before to after the OD intervention. Production rates which had been declining before the OD intervention returned to their pre-decline rates.

Hand et al. (1975) conducted a quasi laboratory experiment involving 216 business students working as teams in a business game. Several experimental teams were subjected to an OD intervention described as a nonstructured survey feedback

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followed by a team development effort. Problems worked on included the problems of leadership, decision-making, and the lack of commitment to decisions of the team. The dependent variables included performance variables obtained by each team and individual satisfaction. The researchers found significant differences in need satisfaction between the control and experimental groups after the OD treatment. The OD treatment had no significant effect on the performance variables.

Rotondi (1975) examined the relationships between organizational identification and effectiveness and creativity among a sample of 107 R and D personnel. The organizational identification scale consisted of five response categories reflecting the components of similarity, membership, and loyalty. Creativity was measured using a combined score of objective measures such as patents or patent applications, awards, publications, and cost effectiveness suggestions. Effectiveness was measured through the use of five point Likert scales reflecting the dimensions of work group stability, integration, voluntarism, and achievement. Respondents were asked to assess the efficiency of coworkers, the adaptability of coworkers to changes in task requirements, the degree to which coworkers engage in interpersonal conflict which impedes performance, job satisfaction as expressed by coworkers and the success of coworkers in achieving project goals. Hence, Rotondi's effectiveness scale reflects various aspects of teamwork functioning.

In a sample of 107 R and D personnel, Rotondi found a significant negative relationship between organizational

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identification and effectiveness ($r = -.23$, $p < .05$) and a significant positive relationship between effectiveness and creativity ($r = .32$, $p < .05$). On the basis of his results, Rotondi argues that organizational identification is not conducive to teamwork functioning and stresses the importance of creativity as a productive factor in R and D organizations.

Lawler, Hall, and Oldham (1974) conducted a study to test the view that organization structure and processes are related to organizational climate which in turn is related to organizational performance and employee satisfaction. Collaboration support, the extent to which engineers and scientists collaborated with one another, was conceptualized as a process variable and was measured by a single item Likert scale. Lawler et al. found that collaboration support was insignificantly correlated with all other variables in their study.

Hewitt, O'Brien, and Hornik (1974) examined the relationships among different forms of teamwork or cooperation and group productivity. Subjects of their experiments were 96 undergraduate students assigned to work in four different task organizations: coacting, coordination, collaboration, and coordination-collaboration. Productivity scores reflected the amount of joins each group completed on a fitting task. The researchers found that group task organization accounted for the major portion of the variance in productivity scores.

Kraut (1975) examined the relationships among organizational commitment, teamwork, and turnover among 911 salesmen. Salesmen were asked to rate the teamwork among the people they worked with

and their intention to remain working for their employer on a five point Likert scale. Teamwork was uncorrelated with various measures of turnover. Teamwork however was found to be correlated to organizational commitment as indicated by significant static (.28) and dynamic (.16) correlations. Organizational commitment was found to be significantly correlated with short term turnover (-.17) and long-term turnover (-.17). Teamwork and satisfaction with advancement were also found to be significantly correlated with one another.

Pritchard and Karasick (1973) conducted an investigation into the relationships between climate, job performance ratings made by consultants, and satisfaction as measured by the MSQ. Teamwork was conceptualized as part of climate and defined as the degree to which managers (N = 68) either competed with each other or worked together in getting things done and in the allocation of scarce resources such as materials, clerical help, etc. This dimension, labeled conflict vs. cooperation, consisted of five items with a Spearman-Brown reliability of .68. Teamwork correlated with other climate dimensions to the following degrees: autonomy (-.05), social relations (.29), supportedness (.31), structure (.20), level of rewards (.36), performance-reward dependency (.50), achievement (.44), status polarization (-.29), flexibility and innovation (.44), and decision centralization (-.09). Teamwork correlated significantly with satisfaction (.48) but was correlated insignificantly with performance ratings (.16).

Lafollete and Sims (1975) directed their study towards the

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issue of whether satisfaction is redundant with organizational climate. Through the procedure of oblique factor analysis, the researchers constructed a teamwork scale defined as the manner in which an individual's group works together and accepts changes in directions. Teamwork was conceptualized as part of the general factor organization practices, which in turn was distinguished from organizational climate. Performance ratings and JDI satisfaction scores were collected from respondents of a medical complex representing an array of occupations involving nurses, technicians, clerks, and maintenance services (N = 900). Their results show teamwork being correlated .50 with affect tone toward management and .52 with affect tone towards others. Teamwork also correlated significantly with performance ratings (.09), satisfaction with work (.29), satisfaction with supervision (.35), satisfaction with coworkers (.31), satisfaction with promotion (.28), and satisfaction with pay.

Stogdill (1972) in his review of the literature examined three components of team performance: productivity, drive, and cohesiveness. Productivity was defined and measured as expectancy, values, subjective ratings of group productivity, and objective measures such as dollar values or number of units produced. Drive was defined as the intensity with which members invest expectation and energy on behalf of the group. Drive included such dimensions as group arousal, motivation, freedom, enthusiasm, or spirit. Cohesiveness was defined as within group harmony, intermember attractiveness, and the extent to which members reinforce each other's expectations and group identity.

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On the relationship between productivity and cohesiveness, Stogdill found, in his literature review, twelve significant positive relationships, eleven nonsignificant relationships, and eleven significant negative relationships. In his studies of twenty-six organizations, he found twenty-two of twenty-six correlations in the negative direction, ten of them being significantly negative. The remaining four correlations were in the positive direction but statistically insignificant and moderately low. Hence, Stogdill found that productivity may or may not be significantly or positively related with cohesiveness. Similar uncertain results were found with respect to the relationship between productivity and drive, drive and cohesiveness, and productivity and cohesiveness under the condition of high drive. Stogdill remarks "neither the theories of group performance nor the studies of productivity, drive, and cohesiveness are characterized by profound insight into the relationships between the three variables" (p. 33).

Howe (1977) evaluated a teambuilding effort in a chemical manufacturing plant. The goal of the teambuilding project was to improve worker productivity and morale and thereby get the plant's operation into a more productive track. Two consultants (one external, the other internal) worked in the plant to (1) define and implement the "Participative Management Philosophy" and (2) to increase work teams' problem solving capabilities. A series of within group and intergroup problem solving and role clarification sessions were held during the year. Additionally, managers were taught (by moduling sessions, readings, and

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coaching) techniques in teambuilding, managerial practices, and employee attitude sensing, all of which were intended to enhance productivity and morale. Various productivity and attitudinal measures were used to evaluate the teambuilding effort.

In terms of increased productivity and efficiency, Howe notes that pounds produced per unit per month increased in three of four departmental areas within two months after the first intervention, the plant was able to reduce its head count by one instead of adding three additional workers despite increasing production demands, and that the net annual savings to the plant in labor cost for the first year amounted to \$80,000.

On the attitudinal measures, Howe found that each plant manager reports significant changes in plant teamwork as measured by Argyris' (1965) ten principles of effective team behavior. Areas in which the nine plant managers reported significant changes included group contributions, team spirit, consensus decision-making, commitment to decisions, team evaluation, goal clarity, conflict, solution generation, and confrontation.

Howe concludes that the team approach enables managers to obtain high performance standards by raising awareness and commitment of individuals and teams to increased productivity.

Butterfield and Farris (1974) researched various aspects of Likert's (1961, 1967) theory on the four types of management systems: (a) authoritative, (b) benevolent authoritative, (c) consultative, and (d) participative. A twenty item Likert

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Organizational Profile questionnaire was administered twice to approximately 250 employees working in thirteen Brazilian development banks.

Using principle components with varimax rotation factor analysis, the researchers identified six "somewhat interpretable factors with at least some relationship to (Likert's) theory." The items on type of motivation and amount of teamwork did not find a place in any of the six factors. Other factor analyses were performed on the data which tended to confuse rather than clarify the factor structure. In subsequent analysis, the researchers used the average of all twenty items to explore other relationships.

Using time two results, the researchers correlated the average actual profile scores against various measures of bank effectiveness and employee satisfaction. On three independent "objective" measures of bank performance, no significant relationships were found. Each bank's self-rating of effectiveness correlated highly ($.78, p < .01$) with the average actual profile scores. The scores also correlated highly with employee satisfaction with the bank ($.77, p < .01$), employee evaluation of the bank as a place to work ($.83, p < .01$) but was insignificantly correlated with employee satisfaction with their immediate supervisor.

Motowidlo and Borman (1977) developed behaviorally anchored scales for measuring morale in military units. Eight dimensions of group morale were identified (a) community relations, (b) teamwork-cooperation on the job, (c) superior subordinate relations, (d) performance and effort on the job, (e) bearing, appearance,

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and military discipline, (f) pride in unit, army, and country, and (g) the use of time during off-duty hours.

Interrater reliability of the teamwork scale was .57. All scales were used to assess the morale of forty-seven platoon units of thirteen U.S. Army companies stationed in a foreign location. This was done by having the company commander and the first sergeant rate their platoons on the eight dimensions of morale. Additionally, these raters evaluated their platoons on six global seven point scales on the degree or frequency of dissent, drug abuse, destruction/sabotage, participation in fund raising drives, and unit effectiveness. Thirteen randomly sampled enlisted personnel from each platoon completed a questionnaire on the level of "your morale", "morale in your unit", and their intention to reenlist.

The researchers found that the company commanders' and first sergeants' evaluation on teamwork-cooperation on the job were insignificantly related to enlisted soldiers' perceptions concerning one's own morale, unit morale, and intention to reenlist. As predicted by the researchers, company commanders' and first sergeants' assessment of teamwork-cooperation on the job were significantly negatively related to their perceptions of the level of dissent (-.44), drug abuse (-.38), destruction/sabotage (-.71), and positively related to unit effectiveness (.79).

Ivancevich (1974) explored the impact of two trainer styles on selected phases of team development. Sixty-four first level managers in a manufacturing company were assigned to one of two groups. Training content and materials were the same for each

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group. The teaching style of the trainer differed for each training group. For one group, the trainer adopted an active and directive role. For the other group, the training style was less directive and structured. The research found that the structured and directive style was more effective in achieving group cohesiveness, minimizing participant conflict, increasing communication, achieving group productivity, and encouraging a favorable attitude toward the trainer than a less structured trainer style.

DeCotiis and Koys (1978) developed a "theory" of the determinants, content, and consequences of organizational climate. Briefly stated, their theory asserts that the mission or goals of an organization together with its dominant human resources philosophy of its leadership determines organizational structure and the nature of its human resource processes. Structure and human resource characteristics determine climate perceptions which, in turn, affect organizational outcomes.

In their view, climate consisted of various dimensions: autonomy, trust, cohesiveness which dealt with peer support, togetherness, and teamwork, time pressure, supportiveness, recognition, and fairness. Cohesiveness intercorrelated .04 with autonomy, .49 with trust, .32 with pressure, .52 with support, .47 with recognition, and .40 with fairness.

Using separate step wise multiple regressions and a significance level of .05, the authors found that the structural variables of centralization and role conflict produced beta weights of .11 and -.22 respectively when regressed against the climate

dimension of cohesiveness. The process variables of communications and leadership style produced beta weights of .34 and -.19 respectively.

In subsequent analysis, the authors regressed cohesiveness against several outcome measures of motivation, individual performance ratings, organizational performance ratings, satisfaction, organizational commitment, psychological stress, and morale. The results ranged from -.11 to .25. Cohesiveness was not significantly related to motivation and satisfaction, commitment, and various performance measures. On the other hand, cohesiveness was significantly related to other measures of performance, satisfaction, performance, and morale. Hence, their results are not readily interpretable and no apparent pattern emerged from their analysis of cohesiveness as a determinant of outcome variables.

As part of an OD effort, Bare (1978) collected questionnaire data on various aspects of leadership behavior and group performance on 43 library work groups. Eight supervisory role dimensions were constructed: formalizing, counseling and teambuilding, coordination and control, staffing, external representation, training, communication and feedback, performance reward contingency management. Various supervisory ratings on different aspects of team effectiveness were collected and collapsed into two dimensions: performance and adaptability. The eight dimensions of leadership were regressed in unconstrained, step wise fashion against an overall index of group effectiveness. Bare's results indicate that the eight dimensions of leadership accounted

for 42% of the variance in group effectiveness scores. Staffing and training accounted for a major proportion of criterion variance. The remaining six leadership variables accounted for very little or none of the remaining criterion variance.

This literature overview reveals that there is scarce evidence available which bears directly on the question of the efficacy of teamwork training as an organizational socialization strategy. Most of the research are one-time correlational studies based upon the question on the extent to which teamwork attitudes may be correlated with other attitudes. To measure growth processes, longitudinal designs are necessary and such designs are clearly lacking in this regard. Notable exceptions to these criticisms perhaps are the works of Friedlander (1967), Kimberly and Nielson (1975), and Howe (1977), all of which appear to be supportive in character.

Mosvick (1971) reviewed the relative efficacy of managerial training on human relations involving the technical professions in producing attitude, personality, and behavioral change. Management training was dichotomized into two types: conventional classroom methods and T-group management training types where the focus is on learning about oneself, others, and groups. Mosvick found very mixed and equivocal results on whether or not these management training efforts produced personality and attitudinal change. Mosvick concludes that his review of the literature does not support the claim of the superior effectiveness of newer approaches to management training typified by T-group training. It is important to note that many of the studies differed

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greatly in methodology, measurement, and in the choice of dependent variables. The same general mixed and equivocal findings have also been reported by Campbell et al.'s (1971) review of fifty-two empirical studies and Whitelaw's (1971) review of six studies on management training.

Similar results have also been found in evaluation studies involving the training of military officers in OD techniques. Cohen and Turney (1979, p. 718) report "The evidence of effects on perceptions and attitudes is inconsistent with indications of positive and negative changes, instability in changes, and no change." Hence, the overall evidence bearing on the issue of whether or not management training and development has value in modifying managerial perspectives, thoughts, ideas, and attitudes remains equivocal to date.

An Assessment of the Literature

In all of these studies, it is important to note that the examination of the socialization process has fallen under the domain of attitude change. Moreover, a number of different measurement instruments and procedures have been used to assess attitudinal changes. Hence, it would appear that the use of attitude measures as part of validation and evaluation of management training efforts as a socialization strategy has a rather widespread degree of acceptance.

Typically, training designers and OD facilitators who attempt to alter attitudes and researchers who strive to validate attitudinal changes are not only interested in attitudes per se

or the check-marking behavior of subjects to a questionnaire. The primary interest, rather, is in the modification of managerial practice. Conceptualizing management training as a persuasive effort, and depending upon training content, the goal is to convince people to engage in certain preferred courses of action such as setting goals, allowing subordinates to participate in decision making, and the like. Hence, the attitude change approach is one tactic of inducing behavioral change.

Attitude change approaches accept the major principle in most cognitive, interactional, and mediational theories that individuals are information processors who generate and respond to attributed psychological meanings of a given situation. The premise is that individuals behave in accordance with the meaning or the change in meaning that a situation or an idea signifies (Osgood, Suci, and Tannenbaum, 1957). It has been argued, also, that some value may be obtained from the use of attitude constructs and measures if they were used to represent higher level symbolic mediational processes or individual perceptions and constructions of the external or task environment (Bandura, 1969; James et al., 1979). Hence, to the extent that attitude measures can reflect patterned ways of thinking or cognitive/affective structures of an individual and to the extent that such a structure regulates behavior, the concern over attitudes may be warranted. In addition to the hypothesized causal relation between symbolic processes and behavior, the concern over attitudes reflect the belief that the newly acquired patterns of behavior will be more durable and stable across time if they are buttressed by both

emotional and cognitive support. For these theoretical reasons, the development of favorable attitudes is seen as a major objective of management training and development programs even when their main objectives are stated in terms of knowledge or skills (Hamblin, 1970).

Given the supposedly controlling functions of symbolic representation upon overt behavior, it is of no surprise perhaps that the bulk of the limited studies assessing cognitive and emotional changes associated with management training and development programs have employed the use of attitude measures. A number of different attitudinal measures and measurement techniques are reported in the evaluation literature. In the measurement of attitude change, Likert scales, Thurstone scales, the semantic differential, multiple choice, essay questions, and the interview have been frequently used. Likert type scales, however, appear to be the Trojan workhorse of attitude measurement. Thus, it is widely assumed that Likert type scales are sufficiently sensitive and adequate to detect phenomenological change.

In the use of the Likert scale format, the subject is asked to indicate the degree to which he agrees with a statement. Statements vary from descriptive (my boss is friendly), evaluative (I dislike my boss), and may also involve decision rules, norms, or proverbs (a reprimand is most effective when done in front of others). Frames of reference and who assesses attitudinal changes are also equally varied. On one hand, an individual may be asked to describe his own attitudes while on other occasions he may be asked to describe the attitudes of others (e.g., most people

in my department feel job satisfied). Most attitudinal measures are obtained directly from trainees themselves although some studies have gathered opinions from the trainee's superiors, peers, subordinates, or independent observers as to how they thought training affected changes in the trainee's behavior and attitudes. Sometimes, choice behaviors are used as indicants of attitudes. Meignez (1963) provides an illustration of this methodology involving multiple choice scales. Here a subject is presented with a problem situation and is given a choice of possible answers. Each choice is defined as indicating an attitude set such as authoritarian or democratic. It should be noted that this methodology effectively eliminates the differentiation between attitude measures as indicants of cognitive representation and overt behavior. As a consequence, the issue of causality between symbolic mediational events and behavior is reduced to a tautology.

Ideally, evaluation of management training programs founded on symbolic mediation theoretical approaches would examine three interrelated concerns (1) whether or not subjects fundamentally changed in existential state (2) whether or not such a change is attributable to training effects and (3) whether or not such changes, in turn, produced beneficial changes in overt managerial performance. On each of these questions, the literature overview suggests mixed and equivocal results. Hence, on the question of whether or not organizational socialization or normative reeducation took place as a consequence of management training, some studies indicate positive results, others indicate no significant

or negative change, while others show mixed results; that is, some attitudes changed while others did not. Obviously, many different variables may be pointed to as giving rise to such divergent results. Measurement concerns, because of their obvious relevance to validating and evaluating behavioral change, however, warrant some attention within the context of management training and development since one typical aim of such an effort is to provide managers with information and ideas which managers will be able to put into practical use when they return to their jobs. Thus, given the goal of modifying symbolic and affective processes among managers, the issue of how such processes can be satisfactorily measured in order to validate such changes must be carefully examined. Obviously, it is of considerable importance to devise and to use efficacious measurement devices and procedures that can be specifically directed toward validating and assessing the socialization process brought about by management training and development efforts.

According to several reviewers (Campbell et al., 1971, Whitelaw, 1972; Van Maanen, 1976), there have been a few attempts to document organizational socialization processes associated with management training and development programs. These efforts, however, taken collectively, do not suggest a growing trend towards a concern on measurement methodology as a key variable to be reckoned with. There are probably several reasons for this.

One reason, as mentioned earlier, there are some behavioral scientists who do not believe in the causal properties of higher level symbolic functions. For those who hold this view, measurement

problems are psuedo issues since the way managers process and react to information or the way they think and feel about stimulus objects or situations are regarded as causally irrelevant. On the other size of the coin, there may be some behavioral scientists and practitioners who feel that symbolic mediational change is both obvious and automatic in management training and development programs. In other words, subject managers cannot help but alter their patterns of thought or emotions after being bombarded with facts, new ideas, and persuasive communications by either the trainer or their peers. Under this belief, management trainees will automatically obtain new ideas, norms, ways of thinking that will be of value when applied to the work situation. Hence, attempting to validate the socialization process concomittant with management training and development efforts is regarded as a waste of time in trying to document something which happens automatically.

A second reason may be based on the interrelation between theory and measurement. As is well known in the field of psychometrics, theoretical and representational measurement concerns are virtually inseparable from one another. In the field of management training and development, the relative lack of concern over theoretical development has been pointed out by several reviewers (Hinrich, 1976; Campbell et al., 1971). Given, then, the relative deemphasis on theory, unsurprisingly, measurement concerns have been concomittantly deemphasized.

A third reason may be referred to as measurement ideology. Some behavioral scientists are disposed towards believing that

mental processes are impossible to measure. It would be like measuring a person's "soul" which does not belong to the natural plane. Advocates of this view would prefer to let the philosopher or theologian grapple with such variables and their measurement and to avoid the workings of the human mind for as long as possible. Hence, for some people, socialization processes are considered to be beyond the limits of scientific inquiry.

A fourth reason relates to the complexity associated in developing sound measures. Numerous methodological problems can be easily associated with index measures such as subject's verbal reports on their feelings and thought processes. Some researchers feel that subjects are merely rationalizing their actions, are incapable of telling the truth or verbalizing their thinking processes, or are hesitant to report how they truly feel or think. Given the whole host of problems associated with phenomenological data, some researchers are inclined to solve the problem by discrediting the theoretical role of symbolic mediation. Moreover, some behavioral scientists and practitioners have not been trained in the sophisticated uses of techniques involved with evaluating cognitive phenomena.

These reasons, taken together, may explain why only a few studies have been aimed at validating socialization processes hypothesized to be associated with management training and development programs. Given the different types of attitude measures and methodologies employed, it is also not surprising perhaps that the empirical literature reflects mixed and equivocal results.

Salient Theoretical and Research Needs

What directions, therefore, should scientific work in this area take? Several directional avenues have already been suggested by reviewers (Campbell, et al., 1970; Campbell, 1971; and Hinrichs, 1976). A comprehensive list of important theoretical, conceptual, and methodological questions that could be raised would surely be long and could easily represent a lifetime of work many times over. However, some concerns can be addressed within the limited confines of a dissertation research such as this.

The following elements comprise the key needs or concerns that this dissertation addresses.

1. Theoretical Concerns. Simply put, theoretical development or verification has been virtually ignored and downplayed in importance. According to Campbell et al. (1970, p. 269), there have been no explicit attempts to connect theoretical developments in behavioral research with the objectives and problems of developing managers through training. The "theory of change" which has been connected with management training and development efforts is the "unfreezing, moving, and refreezing" paradigm of Kurt Lewin (1947).

Other theoretical and research efforts have attempted to use general systems language. These attempts typically conceptualize the change effort in stimulus (inputs) and response (outputs) terms. Under these conceptualizations, the individual trainee is expediently treated as a "black box" (Berrien, 1968; Hinrichs, 1976). Implicitly, the individual is cast in a very passive,

non-information processing role. As a consequence, hypotheses tend to be encouched in simple "if-then" statements such as if given management training, then learning, sense of growth, teamwork, satisfaction, sense of competence, etc., as if these relationships are axiomatic. These S-R formulations may be criticized as providing no explanation as to why certain relationships can be logically presumed and effectively ignore the fact that individuals may follow different learning routes. Moreover, resistance to change represents important phenomena which must be encapsulated into a comprehensive theory of behavioral change. Such a theory would take into account or explicitly recognize the following key features of behavior and behavioral change.

A. Theory would encompass multiple sources of behavioral control; i.e., stimulus control, internal symbolic control, and outcome control. This conceptual scheme would not view individuals as mere passive reactors to external stimulation. Rather, it would presume that the learner plays an active role in the learning process and that his responses are subject to extensive cognitive determination. As described by Bandura (1969, p. 63): "At this higher level, stimulus inputs are coded and organized; tentative hypotheses about the principles governing the occurrence of rewards and punishments are developed and tested on the basis of differential consequences accompanying the corresponding actions; and once established, implicit rules and strategies serve to guide appropriate performances in specified directions." A comprehensive theory of change, therefore, must recognize and integrate

divergent forms of learning.

B. Given the ultimate objective of management training and development as organization effectiveness, behavioral change must be conceptualized as a sequence or series of events ordered by time. Filley and House (1969, p. 426) have pointed out that a manager who wants management development must realize that this means a change in himself, his subordinates, his superiors, or in some part if not all of his organization. Thus, a comprehensive theory of management development must have the capacity to account for different levels of analysis (individual, group, organization, societal). It should also have the explanatory capacity to move from one to another of these levels. Constructing such a theory is, of course, no easy task and involves some strange contradictions and paradoxes. Yet a comprehensive theory of change must seek to integrate these various levels so that (1) the limiting conditions of change can be specified (2) the social problems of power and conflict can be accounted for (3) to allow for new perspectives and shift away from myopic and closed-minded theoretical orientations.

C. It would view management and development as a social-influence process. Behavioral change would be in part conceptualized as a consequence of persuasive communication attempts and the exercise of power and influence.

2. Content Concerns. Campbell (1971, p. 594), in his review, concludes that there has been a broad and full scale retreat from a concern over content or what is to be learned. A bulk of the research has dealt with teaching techniques instead

of examining the relationship between training content and its appropriateness and relevance to managerial jobs.

In addition to skill development, a major part of management training and development deals with cognitive and affective change. According to Filley and House (1969, p. 423), a distinctive feature of management training and development programs involves that of attitude change and understanding. Management practitioners themselves report that the greatest contributions of these programs is the exposure they provide to the thinking of other managers and professionals from other industries, companies, location, and settings (Crane, 1979, p. 335). The programs encourage managers to question their prejudices, patterns of thinking, habits, procedures, and techniques that have developed and solidified over a number of years. Accordingly, a "good" management training development program is based on content which stimulates, challenges, and exercises the managements' minds, broadens their thinking, and permits them to examine how other managers or organizations have used other solutions and perspectives in confronting problems similar to their own.

Campbell et al. (1970, p. 486) recommend that considerable effort can be profitably devoted to mapping the theories or perspectives held by managers. This would constitute a step forward especially if we accept the assumption that a manager's implicit theory cues a predisposition to respond in certain ways. In a management training and development program, managers are furnished with a variety of concepts and behavioral principles that could be used as a guide for deciding future

courses of action. To the extent a manager's implicit theory influences his selection and interpretation of information presented, it could exert a considerable influence in his future work activities. This would occur especially when belief changes about advocated courses of actions and their consequences are combined with actual favorable incentive conditions as well (Bandura, 1969, p. 601).

It would appear, therefore, that the scientific study of attitude and attitude change has relevance for management training and development. Very few researchers, however, have tried to make an explicit connection between attitude research or theory into this area. As described by Campbell et al., (1971, p. 266):

"In sum, careful consideration of the elements making up an attitude, the methods available for changing attitudes, and the possible parameters affecting behavior change should provide a great deal of guidance for (management) training and development efforts. To date, very little of this body of knowledge has been exploited."

Most of the literature on management training and development reflects a down-grading of the importance in examining what is happening to the participant during training itself. A premium simply has not been placed on systematically and empirically examining the process, dynamics, and the content of training. Perhaps one important reason relates to the tendency of conceptualizing the individual trainee as a "black box" merely because it is expedient to do so. This expediency, however, has certain drawbacks. First, it does no justice to the complicated and difficult phenomena of management development. Management learning is conceptualized in very simplistic,

stimulus-response or associational terms. Second, the individual manager is cast in a passive, very complying role. Given this view, management training and development merely becomes one of providing "signal inputs". Given the compliant individual trainee, it is assumed that management learning will automatically "take". Hence, the important questions of how managers learn, whether learning really occurred, whether training content meshed with organization reality, or whether content was really reflective of change goals are all assumed away as trivial. The third drawback relates to the inherent inability of "black box" approaches to explain "surprising" or "mixed" evaluation results which have been obtained. All that one can conclude is that sometimes management training does or does not do something depending on what and how that something is measured and that it is difficult, if not impossible, to say why results were obtained. All these drawbacks, of course, are undesirable from a scientific standpoint.

The area of management training and development would stand to benefit, then, from research which systematically and empirically examines the dynamics, processes, and content of managerial learning as it unfolds during the training effort itself. It is important to ascertain whether or not managerial "first-order theories" or attitude structure underwent change during the training intervention. Such research would contribute to a general theory of management training and development, provide a basis for explaining unexpected results, and provide guides for mapping out meaningful and impactful change programs

involving managers.

3. Measurement Concerns. Given that management training and development involves complex learning processing, and that learning involves changes, a critical question becomes how does a behavioral scientist as intruder or unobtrusive observer proceed to measure, detect, and monitor change. In order to ascertain whether a program or intervention has "failed" or "succeeded", confidence in the process of detecting and measuring change is central (Golembiewski et al., 1975).

The question of how to measure change either as a result of or during a management training program represents a formidable task. The measurement of change has and continues to plague all of the behavioral sciences, and of course, the way change is conceptualized has important consequences. The dust-bowl empiricist may argue that "operationalism" is no longer a problem, that modern statistics have vastly improved our measurement techniques. However, the works of such people as Harris (1963), Cronbach and Furby (1973), and others which perforate the behavioral science literature suggest quite strongly that the measurement of change remains a "problem child". Despite the proliferation of measurement experiments, studies in construct validity and reliability, and so called "methodological" articles, the measurement of change is still poorly understood.

Complicating matters drastically is the fact that conceptual, theoretical, and measurement issues and problems are interwoven tightly. As was pointed out, theoretical development in the area of management training and development has not been

encouraging. Homey bits of advice to the effect that following a management development effort, there ought to be changes or better levels of productivity, consideration, attitudes, values, perceptions, satisfaction of different sorts, norms, culture, commitment, motivation, and so forth with little explanation as to why and how such outcomes occur and with almost no regard for how constructs can be measured reliably and validly. Seldom is there a clear theoretical specification of how change is expected to occur and how research designs can be constructed to detect and monitor change meaningfully.

If the goal of management training and development was reducible to a mere problem of simple skill acquisition, say for example, to teach managers how to add or subtract dollars and cents, the problem of measuring change would not be complicated. Typically, however, the change goals of such programs are multiple and complex, and to a large extent are aimed at phenomenological or ideational change. As was noted, a major target of change is cognitive structure or that which a manager has to know, believe, and feel in order to operate in ecologically functional ways. Given the view that managers engage in symbolic action, change focuses on the alteration of culture, defined as a shared system of symbols and meanings which consists of categories or "units" and "rules" about relationships and modes of behavior. The pressing concern at hand is how to measure such ideational systems in ways that permit sensitive, accurate, and reliable evaluation of socialization processes.

The field of attitude theory and measurement provides alternative measurement strategies, each with their own advantages and pitfalls. Classical approaches to attitude measurement have been developed by Thurstone (1928), Likert (1932), Guttman (1944), and Osgood et al. (1957). All of these procedures rely on verbal statements solicited from respondents. All of these procedures are susceptible to controversy simply because of the well known fact that variation on attitude measures can be attributable to a variety of extraneous and error sources. At its worst, attitude measures may simply reflect errors of measurement or transient factors (Tartar, 1972; Tosi et al., 1976), which are major sources of confusion in studies of change. Lord (1963, p. 27) illustrates the problem nicely:

"Consider a typical study of change. An initial measure (X) is obtained on each individual in a group, a "treatment" is given, and a final measure (g) is obtained. Can the observed change, g, be used as a useful approximation to the thing we are interested in - the true change? If x and y are measured without error, then g is the true change. But if x and y are fallible, the conclusion is different."

According to Campbell (1963, p. 212), the assessment of change must address two formidable problems: (1) did a change actually occur and (2) what caused the change. Given evidence of change and the desire to interpret it causally, the task becomes one of rendering implausible other plausible, rival explanations. Campbell and Stanley (1963) have identified eight classes of frequently rival hypotheses which when combined

with measurement error could all lead to mistaken conclusions about change or learning processes. Quite apparently, a million and one reasons could be offered to explain why people respond the way they do to attitude surveys and hence complicate the study of interpretable change tremendously.

Evaluation studies in the area of management training and development do not reflect a great deal of concern over the problems of measuring and interpreting change. A great proportion of the published studies deal with various kinds of attitudinal changes as measured by various versions of the Likert summated rating scale format. In spite of the glaring problems involved with measuring changes in cognition or perceptions, not a single study in this area has raised the serious question of whether or not the obtained result is a function of the particular properties of the measuring devices used. The typical study assumes construct validity of singular measuring techniques and assumes in advance that the only causal agent producing variations or changes in attitudinal measures is the training intervention. Hence, the typical study assessing attitudinal changes has merely focused on the question of whether or not observed attitudinal changes were detected. If no changes are observed, the axiomatic inference is the management training program "failed", a supererogatory conclusion.

A review of the studies focusing on attitudinal change theoretically attributable to management training has shown mixed results. Some studies have detected change, others report no significant change, others show mixed results depending

on the attitude of interest, and a few others show a degeneration in attitudes across time. It is plausible that much of these results could be explained in measurement terms. Hence, attitudinal changes may or may not be detected depending on such things as instructions given to filling out questionnaires, the scaling properties of the measures, subjects' initial scores and mood, the calibration of the measuring instrument, the wording and referent of the items, who uses the measurement instrument, the timing of measurement, and other similar, rival hypotheses.

Measurement methodology, of course, intertwine with research design considerations. A number of studies have used the simple post-test design and the pre-test and post-test design without a comparison group. The latter design appears to be the norm. One point or two points in time designs without a comparison group, however, are woefully inadequate for the detection of real change. This point has been starkly demonstrated by Tartar (1972) and Tosi et al. (1976). Their work and its implications are worthy of summary here.

Conceptually, these researchers point out that change programs involving managers typically do not involve a change in one simple dependent variable but changes in the configuration of a number of different variables of interest. This is true especially in programs aimed at changing cognitive structures, culture, or patterns of thinking among managers. One typical study is the cross-sectional correlational study,

where different variables are measured and subsequently correlated with one another, which in turn serves as the basis for causal inferences about a system of interacting variables. The critical problem with such data is that many rival, plausible hypotheses can explain such results.

To analyze change and test process assumptions, they suggest that it is more appropriate to observe the same individual across different states and time rather than merely comparing two different individuals under different states at the same time. One way to do this is to conduct a longitudinal study which rules out the rival hypothesis that the evidence of change is due to some undesirable artifact of measurement such as error or transient factors. The researchers developed two classes of models; one set assumes real change among a set of causally interacting variables, the other set postulating "pseudo" or apparent change. These models lead to grossly contradictory interpretations. They go on to demonstrate that only when data are gathered at a minimum of three points in time, can the two models be differentiated. Given a set of change measures at only one point or two points in time, one can conclude that real change and no real change occurred among a set of interacting variables simultaneously. The data may fit each of these contradictory interpretations and there is no way to tell which is invalid. The research implication of their work is obviously straightforward. A good test examining changes among a set of multiple dependent variables arising from a management training and development program requires a longitudinal study

involving measures taken in at least three points in time. Such studies are glaringly lacking in this area.

Summary

Campbell (1971) has described the literature as voluminous and largely nonempirical and atheoretical. The large body of literature on management training and development is highly fragmented, unintegrated, and like all roads from Rome, it takes the traveler in a multitude of directions. The theoretical and research problems in this area are indeed plentiful and the problems, issues, and concerns mentioned are by no means exhaustive.

The immediate research concerns addressed herein have been classified into three interrelated, general categories: theory, content, and the measurement of change relating to the socialization process associated with management training and development efforts. Succinctly, the problem is that these three areas have been neglected and too frequently down-played in importance. If this trend continues, the yield of knowledge supplied by scientific endeavor in this area will, in all probability, remain limited, uncharacterized by great strides. The fact is that the surface has been barely scratched in this agglomerous field of scientific pursuit. Clearly, the theoretical and methodological problems associated with validating the socialization process associated with management training and development efforts are much more complex and problematic than what past empirical work has tended to imply.

In summary, it has been argued that the three general concerns of theory, content, and the measurement of change represent fruitful

directional avenues for future research work. The following chapters address the three areas of concern.

CHAPTER 3

RESEARCH CONTEXT, METHODOLOGY, AND ANALYTICAL PROCEDURES

Introduction and Statement of the Problem

From the foregoing review of the literature, certain observations may be made: (1) management training and development programs frequently have the change goal of effecting organizational socialization or normative reeducation; that is, these efforts seek (a) to alter psychological structures of managers through the inoculation of new concepts, ideas and perceptives and (b) to encourage them to act therefrom once they, their peers, and counterparts have been similarly inoculated, (2) organizational socialization has been measured in a variety of ways and the predominant technique has been the use of attitude surveys via the Likert scale format and (3) empirical validation studies have produced a whole variety of different results. These observations raise the question as to whether these disparate results are a function of the measurement methodology employed to detect, validate, and assess the socialization process or normative reeducation. This question is the pivotal concern of this dissertation. Hence, the purpose of this dissertation research is to examine the problem of whether or not conclusions concerning the efficacy of management training and development programs as a socialization strategy may be attributable to variances in measurement instrumentation and procedures.

Three separate but interrelated studies were conducted

bearing on this concern. Each employed the same subjects, all were aimed at detecting, monitoring, and validating the socialization process, but each varied in measurement instruments, strategies, and techniques. This research project also represents the first application of metric multidimensional scaling as a way of detecting, monitoring, and validating the socialization or normative reeducation process in the area of management training and development based upon a start-up teambuilding, organizational development approach.

Organization

In preview, this dissertation provides empirical evidence strongly suggesting an affirmative response to the problem question. Before presenting and discussing the results, which is done in the next chapter, other background information on the character of the three studies must be provided. Accordingly, the purpose of this chapter is to describe the context, the methodology, and the organization of this research effort. Discussion will proceed as follows. First, a macro and contextual view of the focal organization, the United States Army Communications Command (USACC) will be provided. Hopefully, the reader will obtain a sense of "largeness" and complexity associated with this organizational arrangement. Second, the training stimulus will be described. Accordingly, a description of the nature of the management training and development intervention, its conceptualization by the trainer, history, purpose,

and design follows. Third, a description of the background characteristic of the managers who participated in this dissertation study will be provided. Last, the research structure of three empirical studies will be presented. In each of these studies, the relevant theory, testable predictions, measurement procedures, and data analytic steps will be discussed.

Research Setting

The USACC may be described as a microcosm of a complex, dynamic social milieu known as the U.S. Military. At the top of the command structure are the President of the United States who acts as Commander-in-Chief and the Congress who control critical input resources to the military. Reporting to the President is the Secretary of Defense responsible for coordinating three organic military functions: land, sea, and air. Below the Secretary of Defense are two complex organizational rungs: the Joint Chief of Staff and three Departments of National Defense: Army, Navy, and Air Force. Each of these departments are headed by civilian secretaries, each responsible for the supervision of internal affairs of his department.

The overall mission of the Department of Defense and the Joint Chiefs may be broadly described as providing national security for America. In reality, this mission when factored into its component goals, objectives, measures, and means-ends relationships is exceedingly complex. As is well known, current U.S. military strategy is highly complicated, dynamic, controversial and reflects an amalgam of various dimensions: military,

economic, legal, scientific, psychological, sociological, political, and international.

Looking at the Army side, presidential executive orders, the U.S. Constitution, and other legislation and regulations articulate its key functions:

- (1) preserving the peace and security, and providing for the defense of the United States, the Territories, Commonwealths, possessions, and any areas occupied by the United States;

- (2) supporting the national policies;

- (3) implementing the national objectives;

- (4) overcoming any nations responsible for aggressive acts that imperil the peace and security of the United States.

As with overall military strategy, the roles, goals, and objectives of the U.S. Army have provided a fertile ground for conflict over what constitutes effectiveness and efficiency. Concepts of U.S. Army effectiveness can be associated with many different types of governing concepts, strategies, tactics, and corresponding organizational structures, technologies, and decisionmaking processes. Additionally, formidable obstacles and widespread disagreement exist over measurement issues regarding military superiority, effectiveness, and strength. Despite dissensus over content issues of effectiveness, the U.S. Army has concerned itself with the pressing issue of how it can prepare its managers, both civilian and military, to cope successfully with the highly complex, uncertain, and dynamic role of providing national security.

The U.S. Army Communications Command (USACC)

With its headquarters located at Fort Huachuca, Arizona, the U.S. Army Communications Command is a major Army command responsible for providing the necessary communications for national defense "anywhere, anytime, around the world." USACC provides and manages communications for which the Army is responsible which excludes tactical communications organic to individual combat units. USACC directs the activities of some 30,000 military and civilian personnel assigned worldwide and throughout the United States.

At the top of the USACC's formal authority structure is a Commander, Deputy Commander, Chief of Staff and Secretary of General Staff. These key posts are all occupied by high ranking military officials. The USACC Commander, currently a Major General, is responsible to Headquarters, Department of the Army.

Military policies currently dictate that officers change their assignments after a given period of time. This period ranges from one to five years. In hardship areas, rotation may occur after one year but typically, rotation after three to five years is common. Hence, officer succession is highly routinized and frequently reoccurring.

At the time of this study, a "management by objectives" program, eventually called "Organization Effectiveness," OE, was in the process of being implemented. The impetus of this effort stemmed from the office of the Deputy Commander. The strategy of implementation required training and "pilot-testing" of MBO in a few subordinate command units starting with Fort Huachuca. The plan called for

full implementation in a majority of USACC's command elements within a three year period. One (and occasionally two persons) worked on this assignment.

USACC's staff group follows the dominant General Staff pattern throughout the military. Hence, staff operations are divided into various functional groupings: intelligence and security, logistics, operations and plans, personnel, force development and so forth (See Figure 1).

As is also shown in the organization chart, USACC is organized into various teams or subordinate commands primed to provide efficient, fast-reacting, global communications systems. Work within these communications systems require highly specialized, technological skills.

In summary, USACC may be described as a large bureaucracy within a "super-large" bureaucracy. USACC and the current U.S. military structure can thus be characterized as having a relatively high degree of specialization, formalization, centralization, extensive written records, and an accentuated authority structure made conspicuous through the use of rank and various status symbols. Following the work of Terrebery (1968), the environmental context of USACC can also be characterized as "turbulent". Hence, USACC (and the U.S. military) must cope with an environment which can be described as complex, dynamic, and unpredictable.

As with other military branches, USACC has also placed a premium on developing and sustaining an adequate supply of competent managers as well as enhancing organizational effectiveness and efficiency. It is a fair characterization of USACC to say that it

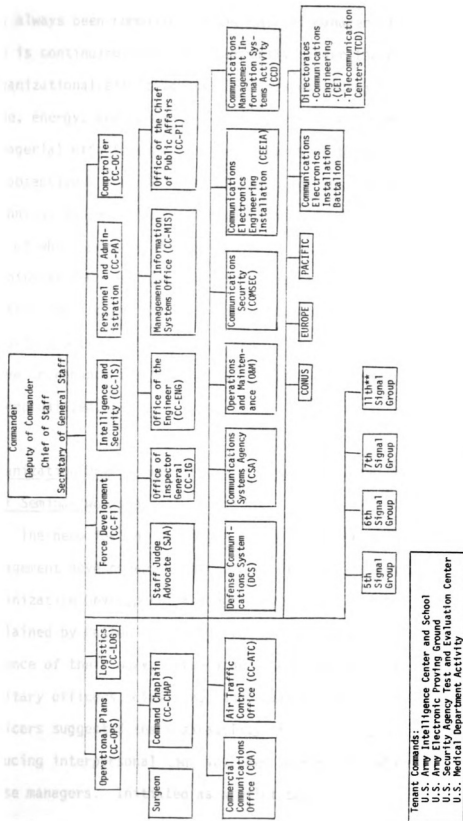


FIGURE 1

U.S. ARMY COMMUNICATIONS COMMAND ORGANIZATION STRUCTURE HEADQUARTERS, FORT HUACHUCA, ARIZONA

has always been committed to the task of managerial improvement and is continuing to do so. Currently, under the rubric of organizational effectiveness, USACC is expending large amounts of time, energy, and money on various projects designed to increase managerial effectiveness such as zero based budgeting, management by objectives, zero defects, organization development, career planning, job enrichment, PERT, and a host of other such projects, all of which provide strong testimony to a viable, continuing commitment towards improving its managerial resources. Reflective of this commitment, the following organization management development effort, properly viewed as one part of a larger, sustained USACC drive to enhance its total organizational effectiveness, was conceptualized.

Organization Development Through Teambuilding (ODTTB): A Series of Seminar/Workshops

The need for and rationale for establishing a series of management development workshops and seminars, eventually entitled Organization Development through Teambuilding (ODTTB), has been explained by Patten and Dorey (1977). To summarize briefly the essence of their work, data gathered through interviews from military officers, civilians, and retired military civilian officers suggested the desirability of increasing collaboration, reducing interpersonal conflict, and increasing teamwork among these managers. Initiated as a pilot test in December 1973, the content, structure, and schedule of ODTTB were revised over the first seven offerings into final form.

ODTTB: Its Goals

ODTTB was constructed as an integrative set of seminars, workshops, and learning experiences that would assist USACC participants in the managing of their subunits. Figure 2 outlines the design of ODTTB. The change goals of the seminar/workshop centered on normative, cognitive restructuring, and managerial skill development. The goals were:

- to help participants establish a sense of teamwork and mutual trust in their respective organization components;
- to enable participants to develop skills in resolving conflicts with persons and groups, communicating openly with others, confronting issues, and conducting inter-personal relations with peers, subordinates, counterparts, and superiors;
- to assist participants in understanding how to motivate others and obtain dedication to getting the job done;
- to review and examine basic managerial skills in such areas as work planning, setting managerial objectives, controlling activities so that goals are attained, managing the utilization of time, solving problems, and getting employees on the team;
- to connect ideas about manager and employee behavior and motivation with the administration of salaries and non-financial rewards.

	Monday	Tuesday	Wednesday	Thursday	Friday
	SELF-AWARENESS AS A MANAGER	GROUP DECISION- MAKING AND CON- SENSUS BUILDING	MB0 AND PROBLEMSOLVING	MB0, INTERPERSONAL COMMUNICATION ISSUES, AND DELEGATION SKILLS	OD, MB0, AND REWARD ADMINISTRATION
8:30-12:00	Theory input on OD	Theory input on teambuilding	Theory input on MB0	Theory input on rational and emotional issues in MB0 problemsolving	Theory input on OD, MB0, and rewards and penalties
	Johari Window	Desert Survival Problem	MB0 exercise on regular objectives	MB0 exercise on innovative goals	MANDOERS exercise on development and rewards
	FIRO-B exercise;	Debriefing and relating exer- cise to job	Debriefing of exercise	Debriefing of exercise	Debriefing of exercise
12:00-1:00	Lunch	Lunch	Lunch	Lunch	Lunch
1:30-3:00	Theory input on behavioral science	Theory input on consensus	Theory input on problemsolving and innovative objectives	Theory input on the management of managerial time	Theory input on the helping relationship in management and feedback
	Managerial style exercise	Interpersonal conflict management exercise	MB0 exercise on problemsolving goals	Time management and delegation exercise	Team peer evaluations
	System inter- vention exercise				
	Debriefing of exercise	Debriefing of exercise	Debriefing of exercise	Debriefing of exercise	Seminar/workshop evaluations
	UNFREEZING			CHANGING	REFREEZING

FIGURE 2

DESIGN OF THE TEAMBUILDING SEMINAR/WORKSHOP

ODTTB: Its Design

As revealed in Figure 2, the teambuilding seminar/workshop was scheduled over a consecutive five day period. Each respondent was given a seminar workbook which included biographical sketches of the seminar leaders, materials, questionnaires, exercises, worksheets, suggested additional readings, and evaluation forms. The nomenclature for each day consisted of "theory inputs" or lecture and discussion, working on exercises, and debriefing of each exercise. This general pattern was applied consistently each day throughout each seminar/workshop offering. Both originally devised and commercially available learning materials were used.

(The First Day)

The first day began with an introduction of the OD facilitator by the local training coordinator. "Administrative business" was handled at this time including the filling out the name cards, registration forms, and "kicking in" for coffee. The introductory comments by the instructor consisted of explanations about the goals and overall design of the seminar/workshop and the notebook and its contents. Participants were asked to develop a "They List". This list was intended to identify the barriers and obstacles that impeded managerial innovation. No restriction was placed on the definition of "they". Hence, "they" could refer to a variety of things such as the immediate supervisor, rules and regulations, the "top brass", etc. The initial theory input consisted of a lecture and discussion on the importance of self-awareness, learning by reflecting on one's experiences, and their relationship to the development of teamwork. Discussion continued

on OD values, conceptions of "healthy" and "unhealthy" organizations, interpersonal feedback, and the use of diagnostic instruments in OD. Participants were advised that diagnostic instruments were to be used during the course of the seminar/workshop. In discussing the resultant scores, participants were also encouraged not to "nit -pick" the various questionnaire items but to use them in a spirit of trying to learn more about their current managerial style, organizational practices, and how that information could be used to foster better performance through increased teamwork. After a brief introduction to the Johari Window (Luft, 1969), participants were also encouraged to give and to receive feedback in a helpful, nonthreatening way. The Firo-B, based upon the work of Schutz (1958) was then administered. Participants were instructed to respond to each questionnaire item using their current work situation as their basic frame of reference. On the basis of Firo-B scores, Base Team Groups were formed and organized. Each group contained individuals with diverse, total Firo-B scores. The groups thereafter discussed the meaning and accuracy of the Firo-B scores, what scores managers working as a team should have, and the steps that could be taken to help managers with diverse scores function as an effective team.

Following a brief lunch break, the lecture and discussion centered on "Current Behavioral Science Thinking on Modern Management". The works of Herzberg (1966), Likert (1961), Maslow (1943), McGregor (1967), McClelland (1961), and Levinson (1973) were briefly reviewed and discussed. Lecture and discussion then turned to the managerial grid as developed by Blake and Mouton (1964,

1969). Participants were instructed to fill out a leadership/management style questionnaire. After tabulating their scores, the groups were instructed to discuss the meaning and accuracy of their respective scores and the issue of whether working towards a "9,9" managerial style was desirable and realistic given their current organizational situation.

The final exercise of the first day was entitled the Nickel Auction. This exercise was intended to highlight teamwork as a problem-solving method, the role of interpersonal trust as a dynamic process affecting behavioral responses and to give participants an opportunity to try out their skills in changing the behavioral patterns of others.

(The Second Day)

The second day of the seminar/workshops focused on the concept of teamwork, group dynamics, group decision-making and consensus building, and the resolution of interpersonal conflict. The day began with theory inputs and discussions of various teambuilding strategies and techniques; differences between a teambuilding group and a T-group; and the roles of top management, an outside consultant, and an internal change agent in a teambuilding effort. Following this, the groups worked on the Desert Survival exercise. Those who were familiar with this exercise were asked to function as observers. Individual scores and group scores were tabulated and compared against the recommended answers to the exercise as given by a survival expert. Work groups were instructed to arrive at group decisions using consensus and not majority vote as the basic decision-making technique. During the debriefing

session, participants discussed the relative quality of group decisions as compared with individual decisions, the profile of scores work teams should have, and the steps that could be taken to assist managers with diverse scores to become a coherent work team. Before and after the exercise, participants responded to a ten-item questionnaire on "How do you feel about" teambuilding.

After lunch break, the workshop resumed with theory inputs and discussions on the nature and development of group consensus. Participants then worked on a didactic exercise developed by involving superior-subordinate relationships and the management of interpersonal conflict. To simulate partly the actual working conditions of the participants, they were told that they could not fire the "problem employee" of the case. The exercise was designed to help participants develop skills in recognizing different employee reactions to a manager's confrontation of inadequate performance and how to deal with each reaction in a constructive, problem-solving way. After the exercise, participants discussed how they could help weak performers improve and take corrective action as needed through the administration of various system rewards and sanctions.

(The Third Day)

The third meeting day dealt with management by objectives (MBO) and exercises on goal setting and the measurement of expected results. Initial theory inputs and discussion centered on various MBO topics such as organizational mission; the "how to" and "why" of MBO; and the various types of goals and objectives that could be established. During the lecture, MBO was presented

as a flexible, participative management system. In working through the various exercises, participants were instructed to focus on developing goals and objectives falling within the preview of their current job that could be attained realistically within a calendar or fiscal year.

For the first exercise, participants were formed into dyads. Each were asked to develop their own regular recurring work goals and objectives. Each member of the dyad was instructed to take their turn at explaining to the other what their goals and objectives were for the following fiscal or calendar year, how each objective was to be measured, and how objective attainment would be organizationally and managerially beneficial.

After the lunch break, participants were briefed on the distinction between innovative and problem-solving goals. They were then asked to return to their original base group teams and, working alone, to identify one problem-solving and one innovative work goal. After discussing these goals with one another, each group was asked to choose one problem-solving goal and one innovative goal for presentation to the other base group teams. Participants were instructed to work on goals and objectives they could realistically influence in the conduct of their work. They were asked to refrain from discussing "broad-gauged" organizational or larger system problems or other like problems which must be dealt with through top policy changes or fundamental revisions in organizational structure.

(The Fourth Day)

The morning of the fourth day continued with the MBO exercise on goal setting. The day commenced with theory inputs and a discussion of problem-solving and decision-making in MBO. Discussion centered on four different ways of solving problems and reaching decisions and their probable impact on the quality of the solution and subordinate acceptance of the decision.

Participants were instructed to continue working on the problem-solving or innovative goals they had identified the previous day. Participants were asked to choose one problem falling within the scope of their job and to analyze that problem using a recommended nine step problem-solving and decision-making model. Each base group team then chose one problem-solving or innovative goal for presentation and debriefing.

In the afternoon, attention turned to the topic of Time Management. After a brief lecture and discussion on the topic, participants completed a "Self-checklist on Delegation and Time Management", an exercise designed to identify common time management problems. Participants also completed a time log worksheet and examined how time spent in each activity would contribute to the work priorities each participant established for the next calendar or fiscal year. During the discussion session, participants talked about common or novel time management problem areas such as the handling of paper work, delegation, and meetings.

(The Fifth Day)

The final day of the seminar/workshop dealt with the inter-relationships among OD, MBO, and Reward Systems, the helping

relationship in teamwork, and reemphasized the importance of feedback in managerial learning. The initial lecture and discussion centered on the optimal pattern of OD, MBO, and Reward System interventions articulated by Patten (1972). This discussion session was intended to "pull together" the many ideas presented during the course of the seminar/workshops. Participants were asked to examine closely how they could use available rewards and sanctions to help motivate improved subordinate performance and to formulate strategies to use what they learned during the seminar/workshop for application back on the job.

In the morning using the Mandoers Precepts Exercise, the base team groups examined the topic of Management and Employee Development, Organizational Effectives, and Reward Systems in their work organizations. A representative from the Personnel Office familiar with the military and civilian pay systems was made available to the seminar participants as a resource person. This representative answered questions about salary and merit pay administration and made suggestions on how managers could go about using financial rewards in their specific work situation. The seminar participants identified some major problems relating to Management and Employee Development, Organizational Effectiveness, and Reward Systems occurring in their work situation and discussed alternative strategies dealing with such problems.

In the afternoon, the participants were asked to complete several evaluation forms. One evaluation form dealt with peer evaluations. Participants in each base team group were asked to evaluate one another in an effort to communicate to each other

ideas that would help that person function better as an executive and as a team member back on the job. The evaluation forms were then distributed to each member of the base team group without opportunity for defending oneself against the evaluations made by others. Participants then submitted their evaluation on the seminar/workshops as a whole and the contribution of the seminar leader.

On several occasions, participants were encouraged to apply whatever they had learned on the job. Follow-up training and assistance, in line with the larger amorphous view of organizational change, was implemented by several MBO experts working with managers one-on-one, the creation of an OE office offering a variety of behavioral science services and applications, the scheduling of numerous off-site seminars on cutting-edge topics in human resource management, the utilization of highly sophisticated career planning systems, and a considerable amount of orthodox management training and long-term university level in-residence programs.

Summation

In summary, the overall goal of ODTTB was to enhance the organizational effectiveness of USACC and its subunits. Theoretically, according to its sponsors, this would be attained through implementation of the teamwork concept by USACC managers. As mentioned earlier, ODTTB has been conceptualized as one step within a larger chain of events or processes culminating in organizational change and subsequently an enhancement in the ability of USACC and its subunits to cope successfully with its

environment. ODTTB, therefore, is but one part of a huge effort made by USACC since the early 1970's involving myriads of OD, MBO, training, and other interventions intended to improve management. Hence, this initial step of ODTTB can be conceptualized as a management training and development approach to teambuilding as described by Solomon (1977).

As is apparent from the goals of ODTTB, the nature of the change envisioned is a highly complex stimulus involving the development of a combination of skills, knowledges, perceptions, and attitudes. Clearly, it is aimed at producing organizational socialization or normative reeducation through the application and experiential testing of behavioral science ideas, concepts, and principles.

Research: Origination, Strategy, and Design

The first evaluation of ODTTB, based upon a clinical analysis of interview data based upon 28 persons from the first seven program offerings, is reported by Patten and Dorey (1977). They concluded: This long-range study suggests that the teambuilding model...(DTTB)...is a useful one in bringing about change..." In 1976, Patten, Dorey, and this researcher decided to launch another validation project using alternative measurement techniques and strategies couched in a more rigorous research design.

Experimental design, randomization, coupled with multiple measures on multiple dependent variables across several time frames provides the ideal setting for the study of interpretable change (Campbell, 1963, p. 213). While this design is clearly the most preferable, this application of this ideal was not possible



since this researcher was not privy to the selection of respondents or trainees. After careful consideration of the practical constraints involved, it was initially decided to employ a modified recurrent institutional cycle design combined with a three point in time series procedure.

The procedures, given three groups of subjects attending the seminar/workshop on a calendar schedule, were formulated as follows. Each group would be measured three points in time: before training, during training, and after training. Hence, an experimental group and a control group would, in effect, be created to allow for empirical testing of the inference that the training experience was responsible for changes manifested by the various measurement instruments. A comparison could be made between post test scores and pretest scores to test causal inferences about the seminar/workshop.

Data analytic procedures would be conducted using a two step strategy (1) first determine whether the criterion measures reflected changes across time for all of the subjects in the three training groups combined and (2) given the detection of changes in criterion measures, split the sample into experimental and control groups and test for differences between post test scores of one group against the pretest scores of another. This second step was eventually discarded as part of the analytical procedures because of the nature of the data results. The first step procedure revealed that on the criterion measures reflecting changes across time, the means increased and the standard deviations shrunk. Hence, splitting the sample into experimental

and control groups would essentially provide redundant information. As will be discussed later, the key threats to internal validity may rest upon instrumentation and reactivity.

Participant Sample Characteristics

In October 1976 and in January and February of 1977, data were gathered from three sets of training groups before, during and immediately following the program. Hence, all subjects were exposed to a common training stimulus and data collection procedures in all three validation studies, which will be outlined shortly. Individual managers from two groups were stationed at Fort Ritchie, Maryland. Participants of the third group were stationed at Fort Huachuca, Arizona. A total of seventy-one managers participated in the three program offerings of study. Participants either volunteered to attend the week-long seminar/workshops or were instructed to do so by their superiors.

The mean age of the three groups combined was 43 years of age. The participants were comprised of civilian managers (GS 13-15) and Army officers (Captain to Lieutenant Colonel) and represented diverse occupations from different various units of USACC. On the average, they spent three years in their current positions with the range being several months to eighteen years. Average educational attainment was three years beyond high school and the mean annual income was about \$26,000. All except two subjects were male. One member of the sample was black. Tables 3.1 to 3.3, all of which are self-explanatory, highlight

TABLE 3.1
BACKGROUND CHARACTERISTICS
MARYLAND ONE MANAGERS
(N = 19)

Variable	Mean	Range	Standard Deviation
Age	42	26 - 54	7.31
Years in Present Position	4	1 - 18	4.00
Years at Present Location	5	1 - 16	4.45
Education After High School	3.8	0 - 8	2.75
Income Before Deductions	\$25,868	\$18 - 32,000	\$4,153

TABLE 3.2
BACKGROUND CHARACTERISTICS
MARYLAND TWO MANAGERS
(N = 23)

Variable	Mean	Range	Standard Deviation
Age	45	33 - 60	6.71
Years in Present Position	4	1 - 15	3.25
Years at Present Location	7	1 - 23	6.41
Education After High School	3	0 - 6	1.82
Income Before Deductions	\$25,980	\$19 - 31,500	\$2,879

TABLE 3.3
BACKGROUND CHARACTERISTICS
ARIZONA MANAGERS
(N = 27)

Variable	Mean	Range	Standard Deviation
Age	44	34 - 56	5.40
Years in Present Position	2	1 - 10	2.53
Years at Present Location	5	1 - 24	4.96
Education After High School	3.7	0 - 8	2.52
Income Before Deductions	\$26,143	\$18 - 32,557	\$3,326

some of the background characteristics of each participant group. As these tables reveal, the background characteristics measured do not reflect dramatic differences across the groups. In this research, the impact of individual differences on the dependent variables of interest was not examined.

Data Gathering Procedures and Measures

As indicated, data was gathered from three managerial groups, before, during, and immediately following the management development program. At each data gathering point, subjects were requested to fill out several different types of questionnaire items.

One method of attitude measurement is based upon the work of Likert (1932). It is called the method of summated ratings or has been referred to as "Likert-type items" or "Likert Scales". The Likert method calls for the presentation of a statement to a sample of subjects to be studied. Several response alternatives to each statement are allowed. The first questionnaire was originally intended to explore the occurrence or non-occurrence of the Behavioral Shift Hypothesis as suggested by Patten (1973) and Mahler (1971). The key concepts were job satisfaction, job involvement, teamwork, performance reward association, trust, intrinsic motivation, openness of communication, participative goal setting, feedback, commitment, role clarity, and higher order need strength. The specific items used to tap into each of these constructs were obtained from a review of the published literature.

The second type of measures employed the use of metric multidimensional scaling distance items. Subjects were presented with an arbitrary standard or "measuring rod" which took the form: "If military personnel and civilians are 100 units apart..." They were then requested to use this referent and indicate their distance estimates between concepts X and Y.

The concepts selected for study were derived from the goals of the seminar/workshop. Concepts selected were:

1. Teamwork
2. Motivating Subordinates
3. Time Management
4. Resolving Interpersonal Conflict
5. Confronting Real Issues
6. Open Communications
7. Merit Pay
10. MBO
11. Trust
13. Group Decision Making

Additional concepts included for analysis included:

8. The seminar/workshop (ODTTB)
9. Relevant/Practical/Useful
12. Me
13. My Job

Subjects were also asked to indicate how important each of the following concepts were with respect to themselves and their job using a seven point Likert scale format: Teamwork and Cooperation, Motivating Subordinates, Time Management, Resolving

Interpersonal Conflict, Confronting Real Issues, Communicating Openly with Others, MBO, Contingent Rewards, Trust, and Group Decision Making. As with the MMDS methodology, subjects were left free to interpret the meaning of the constructs. A Sample copy of the MMDS questionnaire is contained in Appendix A.

All research instruments were pretested in October of 1976 primarily to ensure clarity of instructions and feasibility. At each administration, the sequence and polarity of some items were altered to protect against memory effects and response bias. It is uncertain whether this strategy was fully successful. Respondents were assured that their responses would be kept confidential and were informed that their questionnaires were part of a dissertation project.

Study 1. Theoretical Considerations, Predictions, and Data

Analytic Strategy

Introduction and Theoretical Considerations

From a theoretical standpoint, this study explores the occurrence or non-occurrence of the Behavioral Shift Hypothesis as suggested by Patten (1973) and Mahler (1971). The Behavioral Shift Hypothesis can be conceptualized as a stimulus-response model where the stimulus is represented as a "successful" management training intervention and where response represents a pattern of differential, perceptual-evaluative outcomes. This study, therefore, may be regarded as a derivative of the traditional approach to management training evaluation. The diagram below illustrates the essential thrust of the Behavioral Shift Hypothesis:

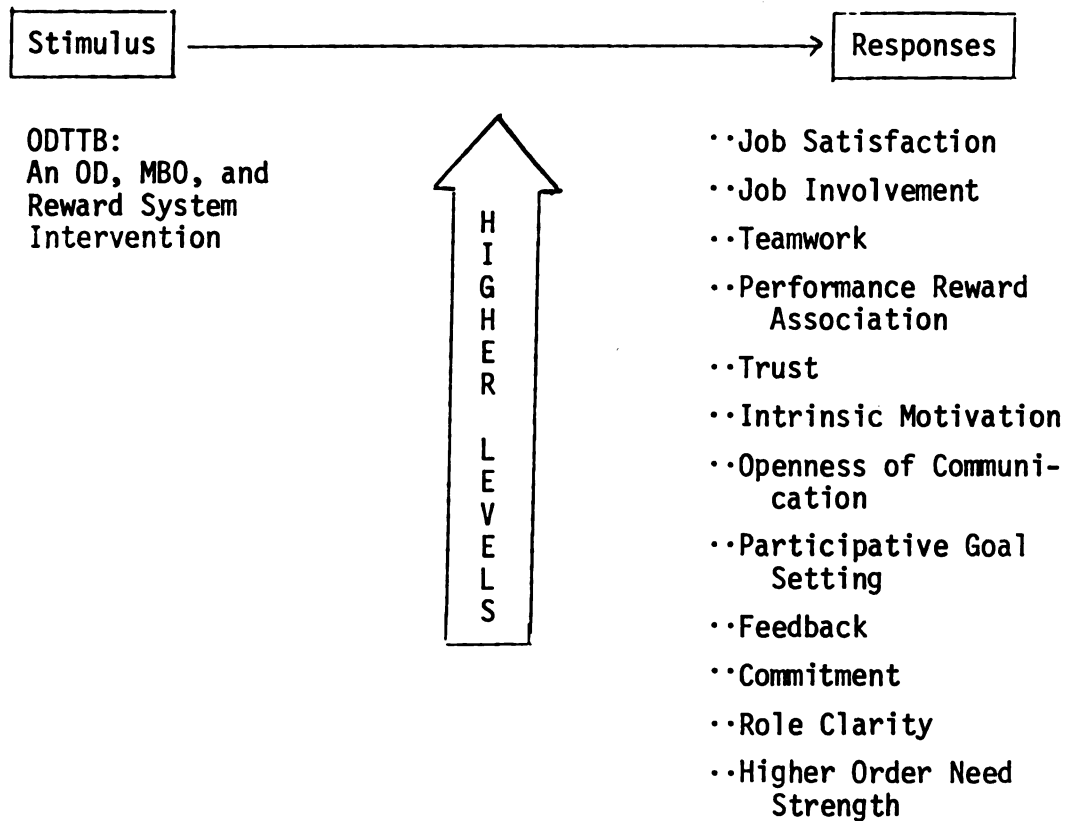


FIGURE 3
BEHAVIORAL SHIFT

As suggested by Patten (1972), the illustration reads as follows. Any successful change intervention follows the Lewinian pattern of unfreezing, moving, and refreezing. The stimulus, ODTTB, can be causally portrayed as OD → MBO → RP, where OD, MBO, RP represent major cultural concepts, norms, and ideas involving Organization Development, Management by Objectives, and Rewards and Penalties. Each major cultural concept must be presented and handled in the sequence prescribed in order to produce maximal socialization effects. Conceptually and ideally, the sequenced intervention, (OD, MBO, and RP), would combine to produce what might be characterized as

successive stages of effect. The cultural concept OD, for example, touches upon a set of interactive variables such as self-awareness, teamwork perspectives and the like, which, if altered in intended directions, will combine to produce a first stage effect such that resistance to change or social-emotional "blockages" to change is reduced or eliminated. The occurrence of the first stage facilitates second stage development and so forth culminating in the final stage of interest: behavioral shift. Behavioral shift, then, may be conceptualized as being a function of the cognitive, affective, and conative aspects of the major cultural concepts targeted for change. If this optimal pattern is followed, "behavioral shift" may take the form of reported changes in the levels of job satisfaction, involvement, trust, intrinsic motivation, teamwork, openness, feedback, performance-reward association, commitment, and the like as portrayed in the diagram. As an interesting aside, such changes would also be anticipated given the operation of the "Hawthorne effect" alluded to by a number of critics.

Drawing upon the Lewinian paradigm, an alternative hypothesis may be offered. Given, for example, the highly bureaucratized, authoritarian work setting of the respondents, the conflict over scarce resources, and the existence of a hostile, turbulent environment, one may predict that during the course of the seminar/workshop, managers will adopt a "cynical" perspective. As they uncover and discuss the multitude of problems arising from their job, it may be followed by confusion,

frustration, and perhaps bitterness (House, 1968) especially when they are exposed to new perspectives and concepts that may be incompatible with their prevailing social milieu. Moreover, respondents were unsure whether there would be follow-up assistance to this particular training effort in teambuilding. Such an uncertainty can fuel a reticence or active resistance towards advocated change.

Using Lewinian notions of change, one may predict that "behavioral shift" can alternatively take the form of degeneration. As subjects are exposed to new ideas, perspectives, and concepts and as they uncover work problems, they would experience a gap between "what is" and "what should be." Subsequently, one could predict that over time, subjects would report decreasing levels of job satisfaction, involvement, teamwork, performance reward association, intrinsic motivation, openness of communication, participative goal setting, feedback, commitment, role clarity, and higher order need strength. In other words, as subjects would heighten their awareness of job-related problems, they would become cynical in their views across time.

Research and Domain and Predictions

From the above discussion, several outcomes may be predicted to occur as a result of the seminar/workshop (ODTTB): either positive or negative shifts in viewpoints would be developed over time.

The key research question of Study 1 is thus: Are there

detectable, observable changes among the participants

- ...in their level of job satisfaction
- ...in their level of job involvement
- ...in their level of interpersonal trust
- ...in their level of intrinsic motivation
- ...in their level of commitment to their employing organization
- ...in their views regarding the importance of teamwork
- ...in their views on how teamwork is attained
- ...in their level of openness in communicating with others
- ...in their perception in the level of feedback, goal setting, and role clarity on their jobs
- ...in the strength of their high order needs
- ...in their perception of the association between performance and rewards

during the course of the seminar/workshop?

The testable predictions of Study 1, therefore, can be stated as follows:

- Prediction 1. Across three time administration scores, all of the means on all of the variables will significantly change.
- Prediction 2. Participants will come to share common viewpoints and thus the variances will shrink across time.

Measures and Analytical Procedures

With exception of the teamwork-related measures, which were "homemade", the measures used for this study were obtained from a literature review of the scholarly journals. All items forming each scale were obtained, in particular, from the Journal of Applied Psychology, Administrative Science Quarterly, and Personnel Psychology. Various researchers using these scales have claimed that the measures are "construct valid" to a satisfactory extent. Assuming these claims are accurate, one can presume that the scales are therefore sensitive in detecting attitude changes falling within each of their respective domains. Sixty-nine managers responded to questionnaires administered at three points in time during the course of the training session.

As a preliminary check to these construct validity claims, a cluster analysis (Tryon and Bailey, 1970) was performed on the various scales and their constituent items. According to the logic of cluster analysis, construct validity could be assessed by examining several criteria: (a) conceptual homogeneity of items belonging to a scale (b) "internal" consistency as reflected by coefficient alpha (c) conformity of scale items to a unit rank one matrix and (d) the degree to which items with scales conform to logically expected patterns of relationships to other scales and their constituent items. Pursuant to cluster analysis, the various scale item inter-correlation matrices and the scale intercorrelation matrix for

the overall sample would be computed by the PACKAGE routine (Hunter and Cohen, 1971) using the first time administration scores.

The analytical strategy initially formulated was based on a two step hierarchical approach. The first step would be to see if any observed changes could be detected. Change would be revealed by changing means and standard deviations across time. The second step was premised on the first. If changes were observed, the next step would be to examine whether or not these changes could be attributable to the seminar/workshop. This would be done by splitting the sample into an experimental group and a comparison group. This analytical phase was not carried out for reasons which will become apparent.

Summation

A "behavioral shift" hypothesis and its rationale have been presented. Two general, testable predictions on the means and variances of the dependent variables of interest, some key indicators of change, were advanced. In summation, Study 1 will be referred to as the traditional approach.

Study 2. Theoretical Considerations, Predictions, and Data

Analytic Strategy

Introduction

As with the first study, the second study also utilizes Likert scales as the measurement technique. This study, while still aimed at the assessment of the socialization process, differs in several major ways from Study 1. First, the major concepts of interest are rooted in the learning goals of the seminar/workshop thereby permitting a direct rather than an indirect examination of content. Secondly, the major concepts were left undefined thereby allowing the managers to attribute their own meaning to each of the major dependent variables. Third, an attempt is made to establish a representational measurement strategy by articulating the anticipated process of change and subsequent measurement of that change. As mentioned earlier, theory and measurement are intertwined together and the important theoretical task is to specify this interrelationship. In the discussion section on theoretical and measurement considerations, this specification will be attempted drawing especially upon the theoretical ideas on valuation activity by Dewey (1966). Subsequently, five models of change and their predictions of the data structure will be presented.

Some Theoretical and Measurement Considerations

In any evaluation study, a crucial question which must be confronted deals with the referent of change. One must therefore ask what type of socialization process ODTTB seeks to affect. Some important clues are provided in the stated learning goals of the seminar/workshop, which reveals the important referents of change: teamwork and cooperation, motivating subordinates, time management, resolving conflict, confronting issues, communicating openly, MBO, contingent rewards, group decision making, and trust. The question then is what is it about these cultural concepts that should undergo change.

Consider the statement, "We really ought to have more teamwork around here." Philosophers would regard such a statement as one involving norms or values. But what is a "value", what does it mean "to value", how does one "learn to value", how do value statements arise, and what do they mean? Answers to these questions of course could lead to a lengthy theoretical discourse, which is not the purpose here. However, a brief examination of the statement can reveal the essential characteristics of valuation processes, which in turn, can be useful in answering the concern of what it is about the socialization process that the training stimulus seeks to affect, the means used to produce such a change, and how that change may be measured.

Typically, a person who utters a normative proposition such as the statement cited does not do so out of the clear blue

sky or for no reason at all. It is reasonable to infer that the person is saying something about himself and his relationship to his environment, which in turn implies, that the person has taken some time to reflect upon this relationship. The statement suggests several things about a situation from the viewpoint of the observer.

First, the statement suggests that "something is the matter" with an existing situation. There is something lacking, wanting, and absent and if events are left to its natural course, conflict, adverse consequence and catastrophe may be expected to occur. As Dewey (1966, p. 12) puts it: When analyzed, the statement implies (i) there exists an objectionable, obnoxious situation (ii) the person uttering the expression is unable to cope with the situation and (iii) a better situation is anticipated when certain responses are obtained from others. Valuation processes therefore have two properties: one is affect which involves an aversion to an existing situation and an attraction toward a prospective future situation; while the other involves a means-ends chain or an instrumental relationship. Valuation, as also suggested by attitude theorists (e.g., Krech, Crutchfield, Ballachey, 1962), has at least a dual meaning involving a union or affective-ideational motor activity.

Secondly, and from the foregoing, the statement suggests that valuation constitutes problem solving and decision making activities. In other words, cognitive, ideational, or information

processing activities are involved. Value propositions may differ according to (a) the adequacy of the inquiry of given situational conditions and (b) the adequacy of the formulated means-ends chain, which if acted upon, actually satisfy the needed requirements of the aversive or troublesome situation.

We know that in the course of human events, action may take place with or without the precedence of critical inquiry. Unthinking habits or routines are examples of the former. A number of proverbial sayings hint at the functional qualities of the valuation process: "Look before you leap"; "a stitch in time saves nine"; "when angry, count to ten"--are some examples. Frequent references are also made to the "maturity" of an individual or group, "learning from experience", and "learning to learn". These expressions advocate a change in some sort. At the very least, that change involves a transition from action based upon history, "reflex", "impulse" to one which incorporates the aspects and results of critical inquiry or thinking processes. This inquiry usually centers on an examination of the conditions which produce experiences of frustrations, defeats, and dissatisfaction and an examination of means, ends, and consequences anticipated or actualized. Value propositions or normative or instrumentality statements may represent the result of this examination or cognitive process.

Finally, other functional elements or properties of value propositions may be identified. Value propositions arise from the dynamics of social interaction. They can also serve as a

signal stimulus or a cue for evoking actions by others in certain directions. Hence, value propositions contain the elements of a persuasive communication effort. Others are prompted to think, feel, and act in certain ways. Whenever there is a valuation, rules become developed as to the best way(s) of bringing desired events or consequences to pass. These rules, either implicitly, or explicitly, assert relations between things or social objects as means and other things or social objects as consequences. Rules are not only capable of directing human activity, they also serve as criteria or norms for judging the fitness, usefulness, utility of the proposed modes of action. Subsequently, certain proposed modes of conduct are adjudged as effective, economical, efficient, wise, sensible, relevant, or stupid depending upon beliefs and estimates about the interrelationships among means, ends, and consequences. The statement "we ought to have teamwork", in reference to the example, is a conclusion reached by the subject as a result of processing and interpreting information. The statement has a strong instrumental connotation in that the subject believes that if teamwork is engaged in, beneficial results are anticipated. How a person arrived at such a conclusion, however, is not revealed in the statement. The critical thesis, nevertheless, is that such a statement or rule is reflective and a consequence of symbolic manipulations performed by the subject and therefore an indicant of change in psychological structure.

The foregoing analysis provides clues regarding possible

measurement strategies of socialization such as that which may be involved with this particular training effort. The analysis suggests that measures of change can, with plausibility, be focused on the rules (beliefs) subjects may hold regarding appropriate modes of conduct. Assuming that valuation activity has taken place, one can assess the degree to which beliefs regarding means, ends, and consequences become altered through time in ways which are advocated.

Valuation activities, following the work of Rand (1966), may be evaluated on the basis of content, what is wanted or the relation between means-ends or means-consequences and intensity, the degree of importance of content to the individual. Locke (1976) argues that importance reflects the relative intensity of desires or the strength of what is desired. Shaw and Wright (1967) suggest, that in valuation activity, the affective component is probably the most salient. Hence, one fruitful way of measuring the socialization process is by assessing the degree of importance an individual attaches to advocated viewpoints about means-ends or means-consequences (perceived instrumentality) relationships.

In accord with the foregoing ideas, subjects were requested to indicate the degree to which they perceived the degree of importance of each of the major concepts in relation to themselves and their jobs. This was done through the use of seven point Likert scales administered at three points in time.

Analytical Procedures and Predictions

Following the work of Tartar (1972) and Tosi, et al. (1976), a "good" test of dynamic processes involving change requires a longitudinal study with measurement of constructs occurring at three points in time. These authors have warned that in studies involving self-report data several rival and contradictory hypotheses would have to be ruled out and that this can be done with measures gathered on the same subjects across three time periods.

For each of the eleven scales, each manager had several different types of scores: a score on the first, second, and third administration, and change scores between the second and first administration, the third and the second administration, and the third and the first administration. Thus in all, there are 66 variables to be correlated and so the full correlation matrix would be 66 X 66. Figure 4 shows the relevant parts of this correlations matrix. The table has been sectioned into various blocks and shows the type of correlations associated within each block.

Given the availability of three time measures on 11 scales, there are a variety of coefficient matrices correlating two variables within and between time frames that are of interest. First, there are three sets of static correlations among the 11 scales for each respective time period. Second, there are three sets of cross-lag correlation matrices. The diagonal elements of each of these matrices are the test-retest correlations of each scale, the off-diagonal entries are the cross-lags,

Time 1 1...11	Time 2 12.....22	Time 3 23.....33	$T_2 - T_1$ A1...A11	$T_3 - T_2$ B1...B11	$T_3 - T_1$ C1...C11
1 · Static · r's · 11	Cross-Lag r's	Cross-Lag r's	Impact r's	Impact r's	Impact r's
12 · · · 22	Static r's	Cross-Lag r's		Impact r's	
23 · · · 33		Static			
A1 · · · A11			Dynamic r's		
B1 · · · B11				Dynamic r's	
C1 · · · C11					Dynamic r's

FIGURE 4

A REPRESENTATION CORRELATION MATRIX SUMMARIZING THE COMPUTATIONAL NATURE OF THE STATIC, CROSS-LAG, IMPACT, AND DYNAMIC DATA FOR 3 TIME PERIODS

For each pair of variables, the corresponding cross-lags are given below and above the diagonal entry. Third, there are three sets of change scores which consists of two sets of "immediate" change scores $X_2 - X_1$, $Y_2 - Y_1, \dots$ and $X_3 - X_2$, $Y_3 - Y_2, \dots$ and a set of "remote" change scores $X_3 - X_1$, $Y_3 - Y_1$. These sets of change scores are used to generate four sets of impact correlations and three sets of dynamic correlations. The four sets of impact correlations together contain two sets of "immediate" impact correlations $r_{x_1, y_2 - y_1}$, and $r_{x_2, y_3 - y_1}$. The diagonal elements of the impact correlation matrices are the self-impact correlations $r_{x, \Delta x}$.

In addition to these correlations, the means and standard deviations for all 11 scales and for all three time administration scores are computed.

In examining changes as reflected in each of the 11 scales, the results can be compared against various models of change for relative "fit". By comparing various models and their derivative predictions against actual results, several rival explanations of subject responses can be eliminated. The two general classes of models of cognitive change, one which assumes no change and the other posits real change together with their relevant predictions and mathematical proofs, have been provided for in detail by Tartar (1972). Hence, only a brief overview of the logic of each model together with their specific predictions will be provided here. The obtained results will be compared against each set of specific predictions or hypothesis. Five

different types of models are identified, two of which are predicated on the assumption of "no change." The two "no change" models are: the error of measurement and the "mood" model.

Error of Measurement Model

The predictions for the Error of Measurement Model are straightforward and rigid. Considering each variable separately, for the three time administration scores:

- A. The three means will be equal.
- B. The three variances will be equal.
- C. The three test-retest correlations will be equal.
- D. The three self-impact correlations will be equal and spuriously negative.

For each pair of different variables, X and Y, for the three time administration scores:

- E. The static correlations will be equal.
- F. The six cross-lag correlations will be equal.
- G. All off-diagonal impact correlations will be equal.
- H. All dynamic correlations will be zero.
- I. The cross-lag correlations will equal the static correlations.

"Mood for the Day" Model

As the title of this "no real change" model suggests, on some days, a person can be in a "good mood" or in a "bad mood." The mood a person is in for any given day could be a result of

a multitude of sources such as personal health, family situation, personal problems, pressures from the job, and the like.

A person's mood, however, is transient and it is assumed that a person's mood for one day does not influence a person's mood at another point in time. In other words, a person's mood at two different points in time are uncorrelated with one another. On the other hand, a person's mood is assumed to influence all of his perceptions, feelings, and attitudes. That is, a person's mood affects all of one's responses to a questionnaire and is thus a transient common factor to all scored variables. The "Mood for the Day" model assumes, therefore, (1) there is no change in the true score between administration on any variables (2) the observable change is a function in part of one's mood at the point in time (3) mood is uncorrelated with true scores and (4) a person's mood at two different time points are uncorrelated with one another.

The underlying model can be expressed in the following terms

$$X_1 = T + H_1 + e_1 \text{ (Time 1)}$$

$$X_2 = T + h_2 + e_2 \text{ (Time 2)}$$

$$\begin{aligned} \Delta X &= X_2 - X_1 \\ &= (T + h_1 + e_1) - (T + h_2 + e_2) \\ &= h_2 - h_1 + e_2 - e_1 \\ &= \Delta m + \Delta e \text{ (Change in } X) \end{aligned}$$

$$Y_1 = U + h_1 + E_1 \text{ (Time 1)}$$

$$Y_2 = U + h_2 + E_2 \text{ (Time 2)}$$

$$\Delta Y = X_2 - X_1$$

$$\begin{aligned}
 &= (U + h_2 + E_1) - (U + h_1 + E_2) \\
 &= h_2 - h_1 + E_1 - E_2 \\
 &= \Delta h + \Delta E \quad (\text{Change in } Y)
 \end{aligned}$$

where

X and Y = observed scores for variables X and Y

T = true score for variable X

U = true score for variable Y

h = mood for time i

e = error of measurement for variable X at time i

E = error of measurement for variable Y at time i .

The key critical assumptions are that true scores are uncorrelated with mood, mood for different times are uncorrelated, and errors of measurement are uncorrelated with one another, with mood, and with true scores. The corresponding predictions of the mood model are as follows.

For each variable separately:

- A. The three means will be equal.
- B. The three variances will be equal.
- C. The three test-retest correlations will be equal.
- D. The three self-impact correlations will be equal and negative in sign.

For two different variables, X and Y :

- E. The three static correlations will be equal.
- F. The six cross-lag correlations will be equal.
- G. The static correlations will be larger than the cross-lags.

H. The impact correlations will be negative.

I. The dynamic correlations will be positive.

Attention now turns to the consideration of real change models and their predictions.

(Real Change Models)

Given three measurement points on a variable of interest, real change may be tested in several ways. The first type of evidence lies in the means of each of the variables of a multivariate system. If real change occurred, the means of each of the variables would significantly differ across time.

The second bit of evidence embedded in the assumption of real change models lies in the variance of each variable. Real causal influences can produce either a sharp increase or decrease in variance. Sharp increases in variances may occur especially when those who score high at time one score higher at time 2 while those who score low at time one score lower at time 2. Alternatively, variances may also "shrink" across time. This is equivalent to saying that all members of a cultural set came to adopt a commonly shared viewpoint.

The third set of evidence lies in the test-retest correlations. If for a given variable, $r_{13} = r_{12} = r_{23}$, that is, all test-retest correlations are equal, then the evidence suggests no change in the given variable.

Several initial tests and predictions can be made to check whether or not real change can be detected in the given data sets. If absolutely no change occurred in all of the variables,

then for each variable separately the following general predictions would hold:

1. There are no changes in means in all of the variables across time.
2. There are no changes in the variances in all of the variables across time.
3. For all variables separately, $r_{13} = r_{12} = r_{23}$, or all test-retest correlations will be equal.

Three types of real change models will be identified: endogenous real change, exogenous real change, and "gamma" change.

Endogenous Real Change Model

The endogenous real change model examined here assumes that all eleven variables of interest form a closed system of interacting variables all of which exert positive causal influence upon one another. It is further assumed that each variable has its own independent meaning. How could endogenous real change arise? This would be possible if respondents made associational connections among the various constructs. For example, during the seminar/workshop, the managers may have come to view each construct as being closely related to one another such that to have teamwork, there must be effective group decision making. To have effective decision making, one must confront issues, communicate openly, and resolve conflict, etc. To the extent then, that the variables become more closely associated with one another across time, endogenous real change

may be said to have occurred. The predicted match-ups between the specific predictions of such an endogenous change model and the obtained data results are as follows:

1. The static correlations will be positive.
2. The static correlations will exhibit differing patterns and will increase across time.
3. The self-impact correlations will be positive.
4. The cross-lag correlations will be larger than the static correlations.
5. If a given variable, X , is not affected by other variables within the system, then r_{13} will be smaller than r_{12} and r_{13} will be smaller than r_{23} for the cross-lag correlations.
6. The off-diagonal impact correlations will be positive.

Exogenous Real Change Model

The exogenous change model asserts that change on the various variables of interest are produced by an outside causal factor. That causal factor, it is assumed, is the training stimulus. It is presumed that this exogenous factor affects each participant differently. In other words, the exogenous factor will not have the same effect on each of the variables of interest. Given these conditions, the following predictions are advanced in addition to the general predictions of the real change models identified earlier.

1. The static correlations should all be positive.

2. The cross-lag correlations should all be slightly smaller than the corresponding static correlations.
3. The dynamic correlations should all be positive.
4. Given a large number of positive dynamic correlations (which indicate the presence of a single causal exogenous factor), the static correlations should increase from one administration to the next.

"Gamma" Change Model

In addition to the above procedures, factor analysis is also used for manipulating the data. The computer program used is called FCOMP which is in the OSIRIS III Package. The specific factor analytic procedure to be used is principal factoring with iterations (PFA-2) followed by varimax rotation with standardization by Kaiser normalization. This program allows for the comparison of congruence of two factor structures using the Ahmavaar's (1954) technique. This technique processes a "problem" and a "target" matrix. The technique allows comparison of two factor matrices by rotating them into a common space through a statistical procedure which maximizes their congruence. The technique also computes interclass and product moment correlations. The interclass correlation indicates the degree of similarity in pattern and magnitude of two factorial structures while the product moment coefficients indicate the degree of similarity in patterning only. According to Golembiewski and his colleagues, the interclass r may be used to detect

the occurrence of "gamma change." Hence, according to their logic, variations in factor structures may be important indicators of change resulting from experimental, therapeutic, or Organization Development interventions. They have conceptualized gamma change as that change involving a redefinition or reconceptualization of some domain, a major change in the perspective or frame of reference within which phenomena are perceived and classified, in what is taken as some slice of reality (p. 135).

In accord with this analytic strategy, three comparisons will be conducted. Time 1 data would be regarded as the target matrix and time 2 and time 3 would be called the problem matrices. Subsequently, time 2 data would form the target matrix with time 3 being the problem matrix. This would also allow legitimate comparisons between factor structures involving time 1 and time 2, time 1 and time 3, and time 2 and time 3 administration scores.

The specific prediction to be tested, given the occurrence of gamma change, is that there would be little congruence between factor structures (Golembiewski et al., 1975). Hence, the corresponding correlation coefficients reflecting the degree of similarity between two factor structures under comparison are expected to be low.

Summation

In this study, five models of change have been identified. The first two models are premised on the assumption that no real

change has occurred among the managers across time. The remaining three models are premised on the assumption that real change among the participants has taken place across time. Each model yields some testable predictions about the character of the empirical results. These predictions were identified and when matched against the actual obtained results, a test of fit can be made.

The measures used in this study are anchored into the goals of the seminar/workshop and its use has been rationalized through valuation theory. Since this is a longitudinal study utilizing correlational and factor analytic approaches, this study will be referred to as the panel approach.

Study 3. Theoretical Considerations, Predictions, and Data Analytic Strategy⁴

Introduction

In the literature review, it was mentioned that theories of cognitive change and subsequent performance change together with representational measurement concerns have not been given their due emphasis in the field of management training and

⁴In discussing MMDS, this author will reference several unpublished papers by Dr. Joseph Woelfel. It is my understanding that these unpublished papers will eventually become published in book or journal form. Readers interested in obtaining copies of the cited unpublished manuscripts should contact Dr. Woelfel at the College of Communications, Michigan State University.

development. Kurt Lewin's (1947, p. 34) unfreezing - moving - refreezing paradigm is frequently alluded to as a "theory of change" (Schein 1973; Filley, House, Kerr, 1976). Unfortunately, the general character of Lewin's paradigm limits its ability to describe, explain, and predict changes in managerial learning. What is needed therefore is an integrating theory necessary for explaining, predicting, and assessing the antecedents, processes, and consequences of both cognitive and behavioral changes over time associated with management training and development or similar efforts. Such a theory should also be capable of empirical validation facilitated through the specification of corollary measurement processes. As Campbell et al. (1971) have pointed out, the area of management training and development is fertile ground for fresh new approaches to the measurement of criterion variables. Perhaps too much reliance has been placed on 4 to 7 point Likert-type scales as measurement devices without serious questioning of its propriety and limitation as a monitor of change. These challenges obviously represent quite a tall and prodigious order. Yet, steps must be taken in this direction if the scientific character of management training and development is to advance. This study attempts to address these concerns.

(Organization)

Discussion proceeds as follows: first, a general theory of management training and development is sketched; second, a heretofore new measurement technique in the area of management

training and development known as metric multidimensional scaling is discussed; third, is a connection of the general theory and MMDS performed by reconceptualizing the seminar/workshop in accordance with several deductions from the general theory and by indicating the relevant measurement implications. Lastly, several predictions are advanced in accordance with the MMDS technique.

Cultural Innoculation Theory: A General Perspective

Borrowing some of the ideas of McGuire's (1964) theory, I shall call my proposed conceptual apparatus Cultural Innoculation Theory. Cultural Innoculation Theory focuses on describing, explaining, and predicting the antecedents, the facilitating conditions for, the processes, and the consequences of adaptive behavioral changes through time associated with changes in thinking or reflective processes. As a philosophy of science, Innoculation Theory adopts the fundamental premises of Field Theory (Lewin, 1942). Innoculation Theory, however, stresses the principle of parsimonious explanation. In other words, a scientist need not find all of the existing variables related to cultural change; all he needs to find are the existing relevant variables which impact upon a unit's behavior at a given moment. To understand the antecedents and consequences of cultural change, one must take into account the life space of a given set of social actors, how perceptions of life space become widely shared, and the consequences of overt behavior that make human life

viable in particular ecological settings. In this view, human adults are not classified as being either completely passive or reactive or completely proactive. Rather, human adults can be both depending upon the interaction of external stimuli, internal information processing events, overt motor performance, and reinforcing response feedback mechanisms. Successful ecological functioning by human adults therefore is contingent upon the proper match between external stimuli, actual task requirements, information processing events, actual overt motor performance, and reinforcing consequences.

(Cultural Innoculation: A Medical Analogy)

The major conceptual thrust of Innoculation Theory can be made through a medical analogy. Change interventions are much like an injection of some sort. Like an injection, the purpose of therapeutic interventions is to inoculate new ideas, practices, or objects thereby making a "sick" organism healthier or immune against a given set of "germs". Germs, as with cultural values or attitudes, may be highly contagious depending upon circumstances. Intruding into social systems with therapeutic intentions, therefore, can be viewed as being similar to administering a "social penicillin shot" or a "shot in the arm". Unlike penicillin, however, intervention outcomes, reactions, and their probabilities of occurrence remain relatively uncertain, at least at this stage of theoretical development. The inoculation procedure can produce a wide variety of outcomes which may be classified as predictable, unpredictable, beneficial or

harmful. Innoculation, for example, may cause anxiety, fear, hope, an improved stable condition, degeneration, or even death to a human subject.⁵ As mentioned, inoculation procedures are also subject to the process of contagion as information about the relative success or failure become disseminated to other members in a given system. When successful, an inoculated unit becomes strengthened and is stimulated to develop further defenses capable of handling other stronger threats or "social bacteria", e.g., bad advice.

(The Major Concepts)

The main concepts of the theory are: inoculation, communication structure, diffusion channel availability, initial cognitive state, personal defense mechanism, strategy learning, normative formation, normative reeducation, psychomotor learning, custom formation, system integration, and environmental reaction. Each of the concepts is defined as follows:

Innoculation refers to any type of externally induced change, program, or innovation intended to be of benefit to a person, group, organization, or institution ("patient").

Communication structure refers to the salient attributes of an intended message. Key attributes include magnitude of advocated change, the directionality of advocated change, the

⁵For example, the exportation of trust as a culture value in a highly volatile field as in a military or ghetto situation may be inappropriate and could yield disastrous consequences to a trusting subject. The Jonestown case is perhaps a more morbid example of how intrusion may ultimately lead to the destruction of a given system.

frequency of messages, and message clarity. In persuasion attempts, source credibility is expected to be an important determinant of the saliency and strength of communication structure (Howland, Janis, Kelley, 1953; Woelfel and Saltiel, 1975; Sherif and Sherif, 1967).

Diffusion channel availability refers to the presence of message transmission. In order for communication to occur, a channel must be present. It is expected to be a function of the number of liaisons and bridges who link members together in a communication network (Farace, Monge, Russell, 1977; Taylor, 1977). Type of communication channels may range from being informal (gossip) to formal (policy announcement). It is assumed that liaisons and bridges function as gatekeepers (Lewin, 1943) who regulate the flow and quality of message transmission.

Initial Cognitive State refers to the current predisposition to a new idea or social object held by an individual. Subjects' currently held predisposition to a suggestion to behave or think differently is a function of past experience or history, prior messages received, time perspective, position in communication network structure, and mood at the moment of message reception (Lewin, 1943; Woelfel and Saltiel, 1975; Leavitt, 1951; Shaw, 1964). Initial cognitive state may take the form of avoidance, rejection, ambience, or attraction to messages received.

Personal defense mechanisms involve individual resistance to the suggestion to change. Two key defensive mechanisms are identified here: source attack and denial. Source attack consists

of disparaging the message source. Denial consists of invalidating or attributing as untrue the message assertion or principle. Source attack and denial can also be formed into a combinatorial resistance to change strategy as exemplified when a person declares "message source is a liar".

Strategy learning refers to the qualitative process of how a given unit comprehends or gives "meaning" to new information. It refers strictly to information processing and is distinguished from other types of learning such as psychomotor learning, normative reeducation, normative formation, and custom formation. Strategy learning encompasses four types of learning, all of which are contingent on one another: concept learning, principle learning, and program learning. Concept learning refers to the process where a subject organizes, sorts, or differentiates various bits of information into categories or classification schemes. In principle learning, the subject makes an association between two distinct concepts in a pattern of relationships based upon a set of criteria. In program learning, the subject connects several principles together and forms an integrated pattern of interrelationships. Driving a car or calculating a correlation coefficient are examples of program learning. The final type of learning falling under the rubric of strategy learning is called "insight learning". Insight learning involves a degree of conceptual or associational "unblocking". Typically in insight learning, the subject takes old information and "sees something else." This "seeing of something else," however, results in

major cognitive change. In daily experience, insight learning may be observed as the "Aha, now I see" effect as a result of instruction or message dissemination.

Normative formation refers to the process of creating or promulgating decision rules or a set of decision rules serving as cues, guides, and regulators of overt behavior. The result of normative formation is a self-command or set of self commands that has behavioral implications. "I never inform my boss of bad news" is an example of a self-command. Normative formation can be assessed according to the type, saliency, and number of self-commands. A self-command is translated into a cultural norm when the decision rule(s) becomes shared among two or more persons located within a circumscribed boundary. A cultural norm establishes a principle or set of principles defining "right" action which is binding upon members and which serves to guide, control, or regulate proper and acceptable behavior.

Normative reeducation refers to the process wherein a new social object, idea, or innovation are perceived as to be congruent and nonthreatening to an individual's self concept. Normative reeducation may also be referred to as valence, appreciation, value, ideological learning, or acculturation. Normative reeducation involves a widely shared awareness or perception of the worth of an object, event, body of ideas, or decision rules or the recognition of the aesthetic value of an object, event, body of ideas, or rules governing behavior. Normative reeducation has an affective component such as good-bad, like-dislike. The

most critical attribute of normative reeducation is its influence on the psychological acceptance or rejection of an object, event, or idea. In essence, the process of normative reeducation reflects the extent to which an individual finds the adoption or rejection of an object, event, or idea psychologically and emotionally rewarding.

Normative reeducation is a function of social or self influence. One source of social influence is through compliance. Normative reeducation can occur through compliance, for example, when one accepts a decision rule with the hope of gaining some reward or avoid punishment controlled by a referent person or group. Normative reeducation through self influence can occur through internalization or instrumentalization. Internalization occurs when an individual adopts a decision rule or norm either because it is consistent with his/her value system or because the rule or norm itself is seen as intrinsically good or rewarding. Normative reeducation through instrumentalization occurs when an individual perceives that the use of a rule or adherence to a norm is associated with the preservation of self interest, status, image, and competence (Kelman, 1961; Katz, 1960; Sherif and Sherif, 1967; and Whyte, 1955).

Psychomotor learning refers to the translation of knowledge to application. It involves the merging of strategy learning with body movements, skills, and actions.⁶

⁶The relationship between psychomotor learning and strategy learning may or may not be contingent on one another. An athlete,

Custom Formation may be viewed as habit formation or "persistence learning". In learning theory formulations, custom formation is identical with the maintenance aspects of overt behavior. Custom formation refers very specifically to overt, observable patterns of behavior. "Talking" or "thinking" behaviors are excluded from this conceptual domain. Hence, a sharp demarcation is made between public announcements of intention and actual overt behavior thereby preserving the distinction between what people say or think they will do in a given situation and what they do under actual conditions. Custom formation deals with acquired modes of behavior that show regularity and becomes fixed or prevailing practice through repetition. Custom formation can take on the force of unwritten law when behavior becomes repeatedly habituated and ingrained. Custom formation can be measured in terms of persistency or frequency in the occurrence of behavioral patterns over time (Skinner, 1953).

System integration refers to the degree to which an organization formally adopts or rejects a new social object, innovation, or suggestion for change. System integration of new ideas occurs when innovation becomes integrated as part of organization structure and process. (Rogers and Shoemaker, 1972; Taylor, Farace, Monge, 1976). Changes in organizational structure and process should be accompanied by quantitative and qualitative changes

for example, may know how to do (psychomotor learning) but not know or be able to explain how he performs. Conversely, an academician may understand and can explain what and how to do (strategy learning) but may be unable to actually perform as verbally intended.

in system output.

Environmental Reaction refers to the degree to which the relevant environment (person, group, or organization) react to changes in system output and has implications for resource input and, hence, touches upon survivability issues of the focal system (Yuchtman and Seashore, 1967). At the most basic level, environmental reaction can be measured in terms of acceptance or rejection of output alterations.

(The Interrelationships Among The Concepts)

Figure 5 highlights the key components and direction of inter-relations as suggested by Cultural Innoculation Theory. It presents a "circulatory system" illustration of how the major concepts interrelate to one another and is keeping with the medical analogy. The schematic diagram may be interpreted as follows. The dark lines represent the main artery carrying "nourishment" or sustaining "life energy" to a focal system. The arrowheads denote direction of flow. The lines represent sensors which transmit signals to other vital parts. The darkened rectangular boxes represent stress or "endocrinic" centers which can induce tension or conflict, fight or flight behaviors. These centers function analogously to the endocrine system which secretes hormones into the bloodstream telling other systems which specific actions to take. They also represent critical points of rigorous resistance to change and "blockage" tends to alter existing equilibrium and is an important factor in "disease" causation, system degeneration, or regeneration.

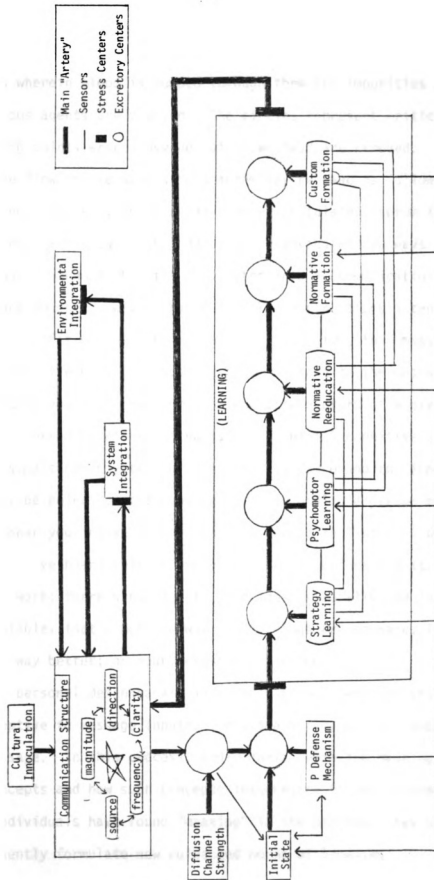


FIGURE 5
CULTURAL INNOCULATION THEORY: A SCHEMATIC PRESENTATION

The circles denote "excretory systems" which function like kidneys wherein blood is pumped through them and impurities and infectious agents are removed. The circles represent critical screening points where "psychological wastes" are removed.

The flow of the schematic diagram may be read as follows. Following diagnosis, an external source inoculates "serum X" which represents new ideas, concepts, or advocated new ways of behaving. "Serum X" becomes translated into a communication structure which advocates change in certain directions intended for the benefit of the focal organism. Over time, this message is repeated frequently and as subsystems attend to the message, information about change spreads among other actors of a given system. Personal defense mechanisms and initial cognitive state may be simultaneously triggered at this juncture and the innovation may be rejected at the outset. For example, a person may say "I hear your noises but I'm not in a mood to listen; I don't like it; I've heard this before or I tried it before and it doesn't work; there's no payoff; your idea is morally and legally unacceptable; that's not the way we do things around here; I like my way better; or your message is garbled."

If personal defenses are inoperable or weak and the organism is receptive to message inputs, individuals then try to comprehend the message. In this process, individuals learn the meanings of new concepts and how such concepts interrelate to one another. Once individuals have found "meaning" in the message, they can subsequently formulate new rules and norms of behaving.

Subsequently, behavioral change can be observed as it impacts upon other elements within a system. Specifically, behavioral change impacts in the form of messages to political elites who control critical resources rewards, sanctions, and information flows. Political elites may reject the new patterns of behavior or they can incorporate them as part of organization structure and processes thereby altering output patterns. Changes in output impacts upon the relevant external environment and in turn sends messages back into the system indicating the degree of acceptance or rejection of output. When communication structure is stabilized, the system creates a state of stationary equilibrium which is altered when new messages re-enter into the system.

(Cultural Innoculation: Some Major Outcomes)

Figure 6 illustrates a number of different cultural and behavioral change patterns that may result from a cultural intrusion upon a given system. The initial $t_0 - t_1$ period is characterized as a quasi-stationary equilibrium. Changes occur but are highly transitory in nature and show fluctuations around an average level of zero. Following inoculation, patterns of cultural change can take a negative or positive function. Marked fluctuations in culture or behavior change may occur at this stage. At the final stage, several different patterns can be established. One is that a "new social order" may come into existence. In other words the state of the system may become substantively altered. Another outcome is that the system may, in time, decay and subsequently cease to exist. A third outcome

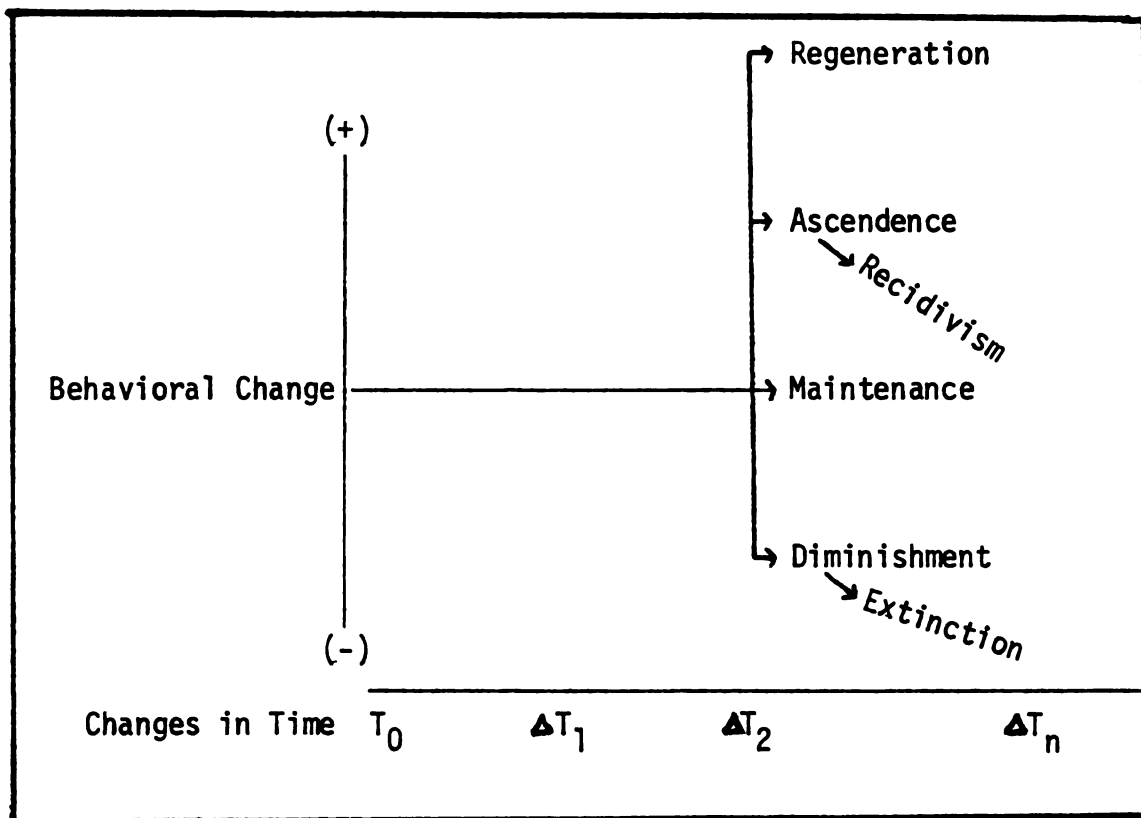


FIGURE 6

BEHAVIORAL CHANGE AS A FUNCTION
OF TIME AND CULTURAL INNOCULATION:
SOME MAJOR OUTCOME POSSIBILITIES

is that following a flurry of activity, changes settle at essentially the same quasi-stationary level prior to the event of cultural intrusion. The last two possible outcomes relate to minor positive or negative changes in the quasi-stationary equilibrium levels.

Cultural Innoculation Theory: An Illustration

An example would help to illustrate the major component and dynamics of Cultural Innoculation Theory. Consider an actor, Captain John Smith, a 40 year old company commander of an infantry organization. Captain Smith has been instructed by Battalion staff to attend a training seminar entitled "Organization Synergism" (innoculation) sponsored by a Professor Doe from State University. On the first day of the training session, after taking the proper seat, Captain Smith silently asks himself "What is this organization synergism and what does this doctor have to say." In time, Professor Doe announces (the communication channel) that organization synergism deals with effective teamwork. Says Professor Doe, teamwork is good for military managers. "I say so, behavioral science research says so, the Army Chief of Staff says so. And if you try it, as you will in this session, you will come to like it too" (communication structure). Assuming that this message is received (sensory registration) by Captain Smith, he may react to this persuasive attempt depending upon his initial cognitive state (e.g., mood, previous experiences with the concept of teamwork, past experience with attempted managerial change).

At this point, one avenue of reaction could take the form of resistance to change. Our Captain Smith may say "This O.S. stuff sounds fishy to me (invocation of personal defense mechanism). Professor Doe must be naive of the military situation (source attack). "Teamwork may be good for academia but it's inappropriate for my situation" (denial). Captain Smith, for the duration of training, may retain this cognitive structure, in which case one would predict no change in performance when he returns to his work setting. Let us say that Captain Smith, who uses the rule "don't make waves," is receptive to the communique. Captain Smith has now been exposed to or has invoked various concepts: teamwork, good, me, my job as executive officer. He may ask "what does all of this mean and how do they relate to one another" (strategy learning). In time, Captain Smith may learn what Professor Doe means by teamwork (concept learning), that teamwork is good (principle learning), and the basic steps involved with implementing the teamwork concept (program learning). Let us say that Captain Smith now knows what Professor Doe means by teamwork: allowing subordinates participate in decisions affecting their welfare. Professor Doe may now assign Captain Smith to a "buzz group" working on an exercise in order to practice applying what he now knows about teamwork. The exercise, say, consists of tower building using tinker toy construction. During the exercise, and as a consequence of social interaction with others, Captain Smith will receive and transmit a variety of different bits and pieces of information, some favorable some

unfavorable to the adoption of the teamwork concept. The point is that Captain Smith is now being subjected to new and additional information. He may hear his peers say, for example, "The first General at this post implemented 'Operations Management.' The second implemented 'Organization Effectiveness.' Now this one has a program called 'Organization Synergism.' If we can stick it out another three years, all this will go away. Unfortunately, it will only be replaced by another program." Of course, Captain Smith may also hear his peers say "This organization synergism stuff is a good idea. It's about time someone stressed the importance of soliciting feedback and ideas from subordinates."

Professor Doe may follow-up the exercise with a debriefing and discussion session, in which case, our Captain Smith is again subjected to redundant, reinforcing, or new information. Assuming that the persuasive attempts have been successful, Captain Smith may come to accept the concept of teamwork as an integral part of management. He may arrive at the conclusion that the teamwork concept is good, worthwhile, of value, and worthy of implementation (normative reeducation). Captain Smith may even "internalize" a self-rule which says "The next time I encounter a problem on my job that impacts upon the welfare of my subordinates, I will use teamwork ideas and have them participate in the decision-making process" (Normative Formation). If other participants also develop the same hypothesis, then a cultural norm or change is said to have taken place.

Back on the job, Captain Smith must now apply what he has

learned. Successful application depends of course on a number of different variables one of which is appropriate stimulus discrimination. In other words, there must be a proper match between actual task requirements and Captain Smith's motor response. If one of his subordinates validly communicates the message "The Russians are just beyond the hill and are about ready to attack," for example, the response "Call my platoon leaders, first sergeant, and XO and let's have a discussion in this" would be inappropriate. Hence, Captain Smith must know when and how to apply the teamwork concept in appropriate, task requirement matching ways.

The question may now arise as to the dynamics and the process by which the teamwork concept translates into "organization effectiveness." In other words when and how does system change occur? It may proceed along the following paths. Captain Smith may, in a meeting with his subordinates, announce that they will now engage in "Organization Synergy." He may proclaim that "O.S. is good for the company, subordinates, civilians, the Army, and National Defense. I believe this and so do management experts and the Army Chief of Staff, and the Secretary of Defense. And if you try it, I think you will come to like it." In this event, all of Captain Smith's subordinates would have to undergo similar "convincing" processes and the dynamics of change repeats itself. Given successful experiences, Captain Smith and his officers may repeat teamwork behaviors as similar problem situations arise as a matter of routine and habit (custom

formation). The teamwork concept may also be written into company operating policy (system integration). But maintenance and judged effectiveness also depend on the reaction of powerful elites outside the system (environmental reaction). The Battalion Commander or some influential Congressman may react negatively, for example, and in their view, teamwork may not conform to "the appropriate military image of a commander." Captain Smith, in this instance, may be passed over three times for promotion and be subject to ridicule and vicious gossip. On the other hand, depending upon the character of the surveillance system established by key evaluators, our Captain Smith may have a "story book finish". As a result of the management training program and subsequent changes in managerial practices, the Government Accounting Office may observe cost savings, people working diligently at their desks, and individuals showing up for work on time. Behavioral scientists, in examining their attitude questionnaires, may find significant positive results as a consequence of people willing to place checkmarks on the top of the rating scales. Grapevine rumors may have it that Captain Smith is "on the rise" in his career and is a brilliant young man. In time, our Captain Smith may receive the Army commendation medal for excellent service, various letters or awards, and favorable merit ratings. Of course, it is entirely possible, that following management training, nothing changes.

Given the foregoing illustration, it is important to reflect on the nature of the cognitive change process which subjects

such as our Captain Smith must go through in a management training and development effort. Management training and development, as conceptualized by Cultural Innoculation Theory, is a process of social influence based upon persuasive communication attempts. Initially, the trainer must "innoculate" or "inject" certain ideas and concepts into the representational schemes of trainees. Given stimulus inputs, the trainee must now search for meaning and arrange the concepts in a pattern which is knowable and understandable. In a typical management training and development program, a trainee has several information processing concerns: (a) What is the meaning of the new concept or idea (social object) (b) What is the relationship of the social object to me as a person and (c) How is that social object ecologically functional. In other words, these concerns must be mapped in "cognitive space."

This mapping function is very crucial to Cultural Innoculation Theory and, as we shall see, it has important measurement implications. In essence, this mapping function is a process of relating objects of thought to one another. According to Woefel (n.d.), "Fundamentally, this involves taking note of similarities and differences between objects, or identifying the attributes of an object (or the self) with similar attributes of different objects, and differentiating the attributes of the object from those attributes of the objects' which are different." In other words, in establishing meaning, the basic processual character of mapping is one of establishing distances, similarities, or

differences at least between two social objects, concepts, or ideas.

Returning to our example, Captain Smith, after being initially exposed to certain concepts e.g., teamwork and good for you, had to establish the meaning of each of these ideas separately and create an additional meaning by combining each of the two concepts together, i.e., "Teamwork is good for me." In essence, if this is the conclusion reached, Captain Smith effectively reduced the distances or dissimilarities between the concept teamwork and the idea: good for me. At a primitive level, then, socialization processes involve the establishment of distances or similarities between concepts and that it is these distances between concepts that can be subject to representational measurement.⁷ Of note also is that Likert type attitude measures also involves the notion of distance estimates. A subject for example may be asked to agree or disagree with the statement "I'm satisfied with my job." Implicitly, the subject is being asked to estimate the distances or the degree of similarity between the statement and his self concept. If the subject agrees with the statement, this implies that the distance between the subject's definition of himself and the statement is "close" or similar.

⁷For an extended discussion on this point, refer to J. Woelfel, "Foundations of Cognitive Theory." Unpublished paper, College of Communications, Michigan State University, 1976.

Cultural Innoculation Theory: A Summation

In summary, the essence of Innoculation Theory is that the antecedents and consequences of behavioral change results from different kinds of reinforced learning prompted by communication messages. The major variables of Innoculation Theory focus on learning processes, the formulation of decision rules, communication and information processing, resistance to change, social influence and dynamic changes in quasi-stationary levels through time. Hence, Innoculation Theory offers a dynamic model of behavioral change and views individuals and organizations as information processors who react to and enact task relevant environments (Galbraith, 1977). Lastly, Cultural Innoculation Theory is based on a cognitive interactionist approach to organizational socialization and allows for the use of continuous ratio-scaleable measures which fit multidimensional scaling procedures.

Multidimensional Scaling: A Brief Description and Introduction

Multidimensional scaling, a statistical technique long used in psychology, is now undergoing rapid growth and its application is spreading to many other fields. Multidimensional scaling has been used to study political attitude formation (Barnett, Serota, and Taylor, 1974), mass communication (Woelfel and Barnett, 1974), comparative cultures (Wigland and Barnett, 1975), psychometric scale structure (Karni and Levin, 1972), job attributes (Brown, 1967), marketing strategies (Green and Carmone, 1972),

human information processing (Shepard, 1963), self-concept (Green, Makeswari, and Rao, 1969; Landis, Hayman, and Hall, 1971), cognitive structure (Traub and Hableton, 1974), and organizational climate (Albrecht, 1978). The use of multidimensional scaling, however, has not spread to the field of Management Training and Development. Yet, it seems that multidimensional scaling and its related techniques can provide a fruitful new perspective in conceptualizing, measuring, and detecting change within a management training and development context (Golembiewski et al., 1975). Since excellent overviews of multidimensional scaling have already been provided (Subkoviak, 1975; Kruskal and Wish, 1978; Green and Carmone, 1970; Shepard, Romney, and Nerlove, 1972; and Green and Rao, 1972), this review will focus on metric multidimensional scaling in cursory way.

MMDS: A Procedural Overview

Herein, multidimensional scaling refers to the analysis of judged similarity data by techniques which represent these data in a spatial configuration. Metric multidimensional scaling, typically, uses assumed ratio-scaled judgments of distance or dissimilarity between stimuli (concepts or persons) and generates a spatial representation of the interrelationships among a set of objects $O_1, O_2 \dots O_n$. Normally, respondents are not told the basis upon which to arrive at a judgment of distance or similarity

between stimuli.⁸ The procedures for MMDS data gathering consist of the following steps. First, the concepts of study are identified. Secondly, subjects are then asked to complete an $N(N - 1) / 2$ set of paired comparisons against an arbitrary standard "measuring rod" or referent which takes the general form:

If the difference between concept A and
concept Z is X units apart, how far apart
or different are (concept 1) and (concept
2)?

In metric multidimensional scaling using ratio scaled techniques, values on the scale of measurement may range from 0 to infinity where 0 signifies a perceived identity one-to-one correspondence between two objects.⁹ Input into the data analysis procedures is a symmetrical data matrix whose rows and columns correspond to the objects $O_1, O_2, \dots, O_n$. The ij th cell of this $n \times n$ matrix, D , contains the judgment of proximity

⁸The primary reason for this method is to prevent the imposition of a nonexistent causal or cognitive structure on respondents. This results in some interpretative problems of factors or dimensions. There are now three schools of thought on how to approach the resulting factors. One school ignores attempts to label or interpret factors. Another school attaches primary importance in trying to understand what the factors represent. The third school takes a compromise position between the two extremes.

⁹A common practice by users of this technique is to reject subjects who report extreme values from the data analysis on the basis that such deviant values "distort" the distribution of the values in mean distance matrix.

or dissimilarity between objects 0_i and 0_j . Data are aggregated and averaged into a distance means matrix¹⁰ and converted into a "double centered" matrix of scalar products matrix B^* , whose elements, b^*_{ij} are given by

$$b^*_{ij} = 1/2 \left(\frac{\sum_{i=1}^n d^2_{ij}}{n} + \frac{\sum_{j=1}^n d^2_{ij}}{n} - \frac{\sum_{i=1}^n \sum_{j=1}^n d^2_{ij}}{n} \right) - d^2_{ij}$$

Hence, placing the origin of the space at the centroid (geometric mean) of the space is done by subtracting out the grand row and grand column means leaving only the "interactions" (in ANOVA terms) (Carroll and Wish, 1974, p. 85).

This centroid scalar products matrix is then transformed linearly by a modified factorization routine of Van de Geer (1971) to arrive at a matrix of coordinate values for the set of concepts (Serota, 1974). The result is a factor matrix F whose columns $F_1, F_2 \dots F_k$ are orthogonal vectors with their origin at the centroid of the vector space spanned by F and where F_{ij} represents the projection (loading) of the i th variable on the j th factor (Woelfel, n.d.). This solution also yields the Euclidean components of real and imaginary space or negative eigenroots. Negative eigenroots result when any 3 points i, j , and k fail to satisfy the relations:

¹⁰Woelfel (1973; 1974) argues that the resulting matrix D accurately represents a "cultural" viewpoint. This averaging procedure is justified on the theoretical basis that culture represents "widely shared views."

$$d_{ij} + d_{ik} = d_{jk}$$

$$d_{ij} + d_{jk} = d_{ik}$$

$$d_{ik} + d_{jk} = d_{ij}.^{11}$$

The procedures used here also allows for longitudinal comparison. This is accomplished by measuring the distances between $O_1, O_2, \dots O_n$ at various time points and approximating the trajectories of motion. Multidimensional scaling, then, can incorporate time as a unit of analysis through the use of translation and rotation. According to Serota (1974, pp. 67-68):

"Translation is facilitated in the computation of scalar products where, for each configuration, the origin is set at the centroid of the distribution. The centroid of one distribution may be considered to be superimposed upon the centroid of another distribution. The axes are then rotated pairwise so that the distances between all concepts, on all possible pairs of axes, are minimized by a Gaussian least squares (squared distances of the projections from each other) best fit... This procedure (in effect reduces the representation from multiple spaces at different points in time to a single space in which the trajectories of motion are plotted."

MMDS: Some Methodological Advantages

Several features of metric multidimensional scaling suggest its relevancy and superiority as an assessment procedure of cultural variables and processes. One relates to the need for

¹¹Two interpretations may be given for the occurrence of "imaginary space." One interpretation is that subjects may at times not think or render judgments that are perfect, logical, categorical syllogisms. Either subjects are confused, "illogical," or their individual estimates are unreliable. Woelfel (n.d.) suggests the occurrence of a "shortening" of the distance in the space relative to the sizes of the concepts scaled.

precise measurement free from some of the critical weaknesses associated with traditional unidimensional, Likert-type scales. These weaknesses include questionable assumptions concerning a common origin, bipolarity of scales, equi-distance from origin and standardization of scale metric, and the occurrence of "ceiling effects" due to the arbitrary limiting character of such scales. Metric multidimensional scaling does not appear to suffer from these limitations. As Woelfel and Barnett (1974) explain, no restrictions are placed upon the respondent, who can report any positive real value whatever for any pair comparison. The measures used then are not arbitrarily bounded at the high end and continuous over the entire range. The scale used is a ratio scale with a rational zero point where zero distance represents identity between concepts and where the unit of measure is consistent throughout (i.e., the unit is provided in the conditional statement "If X and y are u units apart and thus every scale unit is $1/u$ units). Hence the range of permissible arithmetic operations is extended through the use of ratio scales. Moreover, since the unit of measure is the same from one measurement to another both across samples and across time periods, comparative and time series analyses can be performed at relatively high levels of precision.

The second advantage of metric multidimensional scaling relates to the handling of complex phenomenon. From previous theoretical explorations, research, and common sense, it is well established that the antecedents and consequences of cultural

change is multivariate in nature. As Taylor et al. (1976) state: "the problem is integrating the set of cultural objects, the set of attributes by which objects are categorized, and the set of individuals into a coherent and useful multivariate data analysis framework." As its name implies, multidimensional scaling appear to facilitate this integration of complex data.

The last advantage of using metric multidimensional scaling to be mentioned is that it provided a vehicle for an empirical test of several derivable propositions from Cultural Innoculation Theory.

MDS: Summation

By using the spatial maps generated by the method and by observing the values in the means distance and factor coordinate matrices, one can monitor the socialization or normative reeducation processes. For example, one can evaluate the position of points representing self, the job, and other concepts of interest relative to one another. By examining the relationships through time, one can analyze predicted or "surprise" changes that result from cultural intrusion induced by communications from a change agent. Metric multidimensional scaling, then, when combined with Innoculation Theory, offers a promising, rigorous method of measuring, detecting, and analyzing complex data and change.

Cultural Innoculation Theory Deductions and Implications for MDS

In the preceding discussions, Cultural Innoculation Theory was advanced and Metric Multidimensional Scaling procedures were described. The task at hand is to establish their interrelationship.

A fundamental tenet of Cultural Innoculation is that cognitive representations of meaning govern human actions as well as the converse. Persuasive efforts ranging from political rhetoric to mass advertising are based on such an assumption. Management training and development, including OD type process interventions, are not much different. As Hand et al. (1975) note: "the usual assumption is that changes in individual attitudes and values will cause changes in individual behavior which, in turn, will lead to increased need satisfaction and improved long run performance of the workgroup and organization."

Cultural Innoculation Theory suggests that the present seminar/workshop (ODTTB) can be conceptualized as a therapeutically oriented change process characterized by (1) acceptance (2) over time (3) of certain specific advocated ideas or practices (4) among a set of individuals (5) linked together by channels of communications (6) to a social structure and (7) to a given system of values (Katz, et al., 1972). More succinctly, ODTTB can be viewed as a complex communication effort where ODTTB's principle change strategy relies upon persuasive communication messages and changes in cognitive structure.

A focal interest in theoretical and applied communication

research is perception, that is, one's view of the outside world. Most researchers in this area are convinced that there is an influential relationship between an individual's or group's conception of reality and the messages they receive about that reality. Moreover, Schramm (1973) notes:

The main effect of communication...is on the pictures in our heads, and the cognitive maps of the environment, our image of ourselves, the beliefs and values we have accepted and are prepared to defend.

On the relationships of communications and behavior, Roberts (1972) observes:

Communications do not directly mediate overt behavior. Rather, they tend to affect the way a receiver organizes his images of the environment, and this organization influences the way he behaves...individuals interpret information in order to organize or structure their world, thereby facilitating interaction with the environment.

ODTTB, then, as a normative reeducational process, involving a series of steps (Rogers and Shoemaker, 1972):

1. New social objects (concepts, ideas, practices) must be introduced to a given set of individuals (the cultural set)
2. The cultural set must exhibit an interest in the social objects
3. There must be a trial period of learning about the new idea or practice by the given cultural set
4. The social objects are accepted by the cultural set as an innovation.

Several other deductions follow:

1. The cultural set must have altered their viewpoints or "cognitive maps" in some substantial, observable way. That is, learning has taken place.
2. The decision rules defining appropriate behaviors or "point of view" (attitudes) must have been altered.
3. The set of restraining forces (resistance to change) induced by the introduction of the stimulus object have been overwhelmed or neutralized.
4. A positive, instrumental relationship between perceived self and the stimulus object introduced must have taken place.

To the extent that these deductions hold and the sequence of activities outlined occur, ODTTB can be labelled as a "successful" change effort.¹² Hence, socialization or normative reeducation is said to have taken place to the extent to which new espoused ideas and managerial behavioral patterns are accepted by the cultural set (the seminar participants). Acceptance is reflected to the extent to which a person perceives the new social object as similar to his conceptualization of self and his work. Stated differently, when successful normative reeducation occurs, individuals adopt new ideas,

¹²To appropriately regard ODTTB as successful, other deductions must also hold such as custom formation, system, and environmental integration. These events, however, are expected to occur (if indeed they do occur) after the training/seminar event. Such events, of course, have not been monitored given the present research design.

objects, and practices that are perceived to be instrumental and compatible with one's view of self and conception of work. Thus, "successful socialization" will be expected to occur most predictably when: 1) the discrepancy between an espoused idea or practice suggested during the seminar/workshop and the prevailing beliefs, attitudes, and values of participants are minimized, 2) the attitudes, beliefs, and values which define a member's perception of that person's self and job are specifically linked to the espoused idea or practice and 3) the beliefs and attitudes linked to the espoused idea or practice are instrumental to the performance of the job. These notions square with the common observation that people are attracted to social objects found positively valent and more readily adopt viewpoints that conform to their world view.

How does normative reeducation occur and what are the dynamics of the process? Cultural Innoculation Theory offers some clues as to how successful or unsuccessful change efforts may take place. In applying the theory to ODTTB, this means that individuals acquire, process, and transmit information through their interactions with others. Each message is a force which advocated changes in certain directions. Through the communication and the learning process, participants define the meaning of social objects and their interrelationships which is then shared among members.

(Normative Reeducation: An Example from ODTTB)

Consider, for example, the construct of Time Management, one area of focus for change efforts advocated by ODTTB. Through time, participants receive an array of messages about the construct of time management, what it means, and what it entails from various message sources. The message sources are the seminar leader, self, and other seminar participants. Each communicate about time management has the additional attributes of frequency, clarity, directionality and magnitude. With each message exposure, participants may hear that time management is job relevant, that effective managers practice time management, that one time management practice is delegation, that delegation enhances subordinate motivation and results in time savings, that the secretary should be the one to make all phone calls, that meeting can be potent time-wasters, and so forth. Participants may also be exposed to contradictory messages. They may hear suggestions to the effect that time management is nice in theory but job irrelevant, a manager in USACC does not have much discretionary time, my subordinates hate delegation, I prefer working on details myself, work interruptions are inevitable, and so forth. Through strategy learning or through the recall of prior messages and experiences, participants attach meaning to each concept affiliated with time management and establish principles or time management strategies. One time management strategy could be as follows: Step 1 is to determine job objectives, Step 2 is to know how one spends time, Step 3 is to

determine time-wasters, Step 3 is to develop plans on eliminating time-wasters, and so forth. Psychomotor learning can be enhanced as participants practice time management principles and share ideas during the seminar/workshop. Eventually, participants come to judge the worth or utility of the construct of time management and its related concepts and principles which has implications for custom formation or "back on the job application." Participants may reject the construct of time management and its related constructs through the use of various defense mechanisms. Participants may deny the assertions that time management is related to enhancing self interest, the job, their "real world" situation, and so forth.

(Summary)

In summary, ODTTB can be conceptualized as a complex aggregation of message stimuli structured to exert a substantial influence upon the determination of judgments by participants. The primary task of ODTTB, as a normative reeducation process, is to effect perceived relationships between anchor points or key concepts such that the dissimilarity or the distance between two anchor points or key concepts is minimal. This minimizing function is enhanced through the appropriate structuring of communication patterns and learning experiences of the participants during the course of the training program. To the extent that participants receive messages which define the new idea or practice and express an instrumental relationship between the social objects and objects that are already salient

to participants, "psychological meaning" will be established. If this meaning is of the type that unambiguously establishes an instrumental relationship between self definition, job definition, and espoused ideas or managerial practices, observed decreasing dissimilarity or distance between key anchor points may be expected to occur across the duration of the seminar/workshop.

Predictions, Rationale, and Testing Procedures

Several predictions can now be advanced and tested by metric multidimensional scaling procedures. Each of these will be presented together with a brief explanation of why they are advanced and how each will be tested using MMDS procedures.

Prediction 1: Participant responses to the MMDS questionnaire are all random.

Rationale: Cultural Innoculation Theory can also be applied to the MMDS questionnaire. The questionnaire is itself a persuasive communication act directed at behavioral change. In particular, the instructions are persuasive communication acts which participants, through the use of defense mechanisms, can reject or accept. If participants rejected the communication to fill out the MMDS questionnaire appropriately, then the distance estimates merely represent "random noise." In other words, participants gave the appearance of filling out the MMDS questionnaire appropriately but, in fact, did not. In this situation, participants merely reported randomly generated

numbers as distance estimates thereby giving rise to prediction 1. This prediction, if confirmed, would be a fatal threat to the entire study.

Testing Procedures: To test prediction 1, a visual test, known as the scree test, will be used. As the diagram below illustrates, if the stressed distribution shows a sharp elbow in the curve, then the proximity estimations are non-random. Random proximity estimations will tend to yield increasing "Flat" stress distributions.

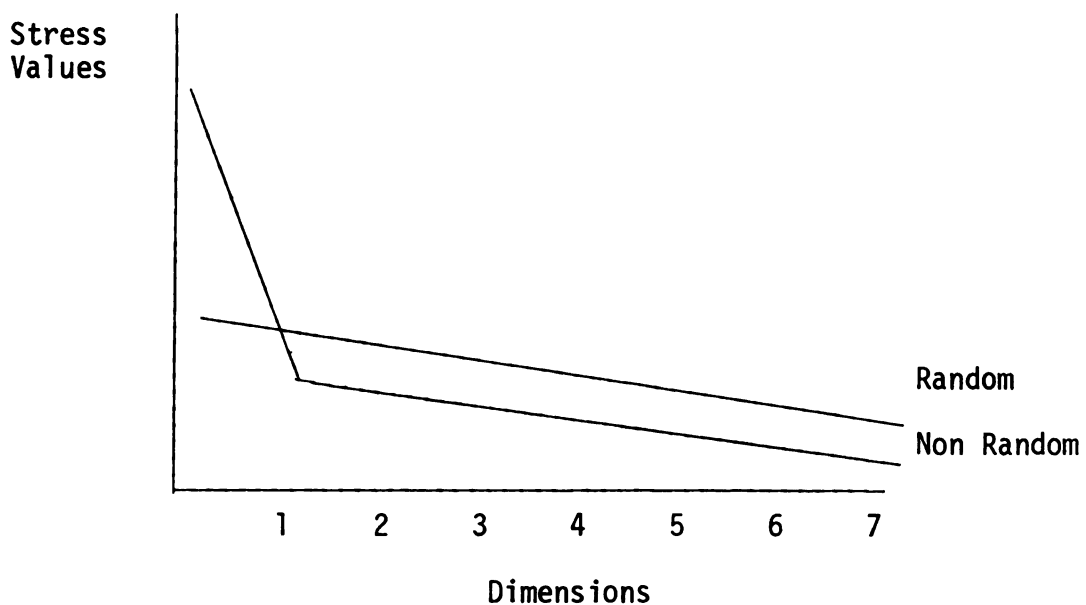


FIGURE 7

RANDOM AND NON-RANDOM SCREE LINES

Stress tests indicates the variance explained by each dimension or factor (Taylor, 1977, p. 48).

Prediction 2: Over time 1 to time 3 administration scores, participants' self concept and anchor points (key concepts) teamwork, motivating subordinates,

time management, resolving interpersonal conflict, confronting real issues, open communications, merit pay, management by objectives, trust, and group decision making will converge towards congruency.

Rationale: The anchorage points are the key concepts representing the goals of the seminar/workshop. As was discussed earlier, the key function of ODTTB as a normative reeducation strategy is to reduce the distinction between self and the external referent points. By reducing these discrepancies, this implies that acculturation has taken place such that the external anchors, teamwork, MBO, and the like have become increasingly meaningful and important to participants' self image.

This hypothesis if not confirmed would imply the presence and saliency of rigorous resistance to change among participants. If increasing dissimilarities occur, this implies the operation of defense mechanisms. Hence, if participants' self concept and the external anchors remain far apart or become increasingly distant from one another, this suggests that during the seminar work, participants came to view the acceptance of the key concepts as not in keeping with their self image or interest.

Testing Procedure: To test prediction 2, an examination is made on some of the values of the means distance matrices across time. If prediction 2 is supported, then the mean distances and standard deviations between the concept Me and the external anchors will "shrink" across time.

Following the same rationale and testing procedures of prediction 2, other related hypotheses can be proposed:

Prediction 3: Over time 1 to time 3 administration scores, participants will come to view the external reference points as congruent with the concepts Relevant/Practical/Useful.

Prediction 4: Over time 1 to time 3 administration scores, participants will perceive an increasingly closer relationship among the key anchor points and their perception of their job.

Prediction 5: Across the three time administration scores, participants will increasingly perceive the goals of the seminar/workshop as central in their cognitive environment and they will tend to view the concepts as being inter-related with one another.

Rationale for Prediction 5. According to Patten and Dorey (1977), the seminar/workshop was built around the theoretical model and change strategy wherein OD → MBO → R/P. As they explain:

...to change executive behavior we must begin with heightening the individuals' self-awareness as to their present managerial style so that they become interested in OD (or developing and improving the management of their work organization). Then they are provided with a chance to learn skills as team members in reaching decisions based upon consensus and interpersonal conflict resolution. From this they are given an opportunity to practice goal setting, work planning and review, problem-solving, and time

management, all basic parts of MBO. Finally, linkage is made with the organizational reward system (RS) by pointing out concretely how managers in an OD mode and using MBO skills can relate to employees and administer the available financial and nonfinancial rewards so that employees are motivated to perform assigned work and are committed to high standards... (p. 34).

Restating what they say in terms of Cultural Innoculation Theory, ODTTB was intentionally designed as a complex set of persuasive, interrelated messages. As a communication effort, ODTTB was constructed so as to encourage the participants to view the key concepts as being related to one another. The basis for establishing a pattern of interrelationships may take the following form. Effective teamwork requires self-awareness and high trust levels. Effective teamwork also demands confrontation of the real issues, group decision-making, resolution of conflict, and open communications. Teamwork by itself however is insufficient. Teamwork must be accompanied by relevant job goal setting and effective performance must be buttressed by time management and merit pay. These practices, as advocated by ODTTB, can result in higher levels of motivation and are relevant to the participants' on the job concerns. Hence, all key concepts form a pattern of interrelationships.

This prediction, if not supported, would imply that the participants perceive the concepts as being unrelated to one another and remain or increasingly become unconvinced about the pattern of interrelationships. Several reasons may be

offered. It could be for example that ODTTB as an educational strategy "failed" to establish clear associational or instrumental relationships among the concepts. It could also be that participants have "sized-up" their relevant work environment and, after assessing the key concepts, have rejected them on the basis that such concepts would be inappropriate to their situation.

Testing Procedures. Prediction 5, as with predictions 3 and 4, can be tested several ways. In separate tests, the mean distances and the standard deviations between all pairs of concepts should "shrink" or decrease in value across time. It is also predicted that the percentage of distance accounted for by the first three vectors (factors) will increase over time. Predictions 3, 4, and 5 also suggest that over time, the concepts and their interrelationships will become meaningful, logical, and widely shared among the participants. Accordingly, additional corroborating evidence would appear in the trace, the number of vectors accounting for real distance, and the negative eigenvalues of the eigenvector matrix. In particular, the trace and the eigenvalues will shrink across time and the number of vectors accounting for real distance will increase across time.

Summation

Study 3 is based upon a cultural inoculation theory. To test this theory in part, metric multidimensional scaling procedures and techniques are used to test five predictions. Since a metric multidimensional scaling methodology is utilized

in this study. Study 3 will be referred to as the MMDS approach.

Summary

Empirical validation studies of organizational socialization associated with management training and development efforts reflect varied outcomes and conclusions. Equally varied are the measurement methodologies used to detect, monitor, and validate the change process. Representational measurement has primarily taken the form of attitude surveys via the Likert scale format. The key research question of this dissertation centers on the inquiry of whether the divergent conclusions drawn are bound with the variances in measurement methodology. As part of this general problem, it was also noted that previous work has deemphasized theory, measurement, and training content concerns.

Three studies were formulated and conducted addressing the general problem identified. For each study, the theoretical, measurement, and data analytical structures together with testable predictions were described. In the third study, the relatively new methodology of Metric Multidimensional Scaling was introduced. All studies involved the same managers who were subject to the similar training event and who responded to all of the measurement instruments involving Likert scales and MMDS distance estimates. All three study results are presented and discussed in the following chapter.

CHAPTER 4

RESEARCH RESULTS AND DISCUSSION

Introduction

In this chapter, the empirical results of each of the three studies outlined will be presented first. Each prediction will be matched against the actual results. These match-ups will be presented in the following order: first for Study 1, which represents the traditional approach; secondly for Study 2, which represents the panel approach; and finally for Study 3, which represents the metric multidimensional scaling approach. It will be seen that the results of Study 1 are terse and straightforward. The results of Studies 2 and 3, however, are rather complicated and extended. Following the presentation of these match-ups, a general discussion of the results will follow.

Study 1. The Traditional Approach: The Empirical Findings

Seventy-one managers responded to the measures of this study across all three time periods, of whom sixty-nine rendered usable returns. In this study, the measures were subjected to a cluster analysis first. Thereafter, the predictions were examined against the data results for confirmation.

The scales, the items with scales, the various intercorrelation matrices, and coefficient alphas for each scale for each of the three administration scores relevant to cluster analysis are contained in Appendix B.

The central prediction of this study was that there were significant changes in the attitudes of the respondents. In particular, across the three time administration scores, it was predicted that the means of job satisfaction, job involvement, trust, intrinsic motivation, organizational commitment, teamwork utility, teamwork norms, openness, feedback, goal setting, role clarity, performance-reward association, and higher needs would change across the duration of the seminar/workshop. Since the training session was also designed to encourage participants to adopt similar views, it was also predicted that the variances of each of these variables would shrink across time.

Table 4.1A presents the means and standard deviations of the various scales. The findings are startlingly clear and straightforward. With possible exception of the job involvement scale, no significant observed changes were reflected by these scales. The means and standard deviations, some key indicators of change, remained remarkably stable across the three time points. The predictions asserting change, therefore, are disconfirmed by the empirical evidence of Study 1.

Study 2. The Panel Approach: The Empirical Findings

In the previous chapter, it was mentioned that the panel approach is a study involving a longitudinal design. In such a design, measures from participants are gathered before change is introduced and several times thereafter. From these measures,

TABLE 4.1A
MEANS AND STANDARD DEVIATIONS
FOR THE FIRST, SECOND, AND THIRD ADMINISTRATION
SCORES

Scale ^a	<u>Means</u>			<u>Standard Deviations</u>		
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
501	.391	.458	.423	.773	.860	.841
502	.215	-.106	-.164	.526	.591	.636
503	.526	.554	.577	.581	.552	.577
504	1.322	1.333	1.275	.397	.378	.387
505	.386	.365	.412	.670	.600	.643
506	3.923	3.938	4.021	.492	.463	.497
507	.996	1.300	1.219	.406	.534	.477
508	2.748	2.841	2.728	.670	.696	.672
509	3.594	3.658	3.667	.607	.603	.586
510	3.141	3.159	3.120	.766	.847	.824
511	3.272	3.351	3.233	.711	.728	.737
512	3.058	3.145	3.083	.881	.843	.822
513	4.014	4.064	4.159	.589	.539	.554
514	3.996	4.014	4.120	.529	.591	.451

TABLE 4.1A (Continued)

^aFor scales 501, 502, 503, 504, 505, 507, and 515, the scale values ranged from -2 to +2. The remaining scale values ranged from +1 to +5.

Note: The legend for table 4.1A is as follows:

<u>Scale</u>	<u>Variable Name</u>
501	Job Satisfaction
502	Job Involvement
503	Trust
504	Intrinsic Motivation
505	Organizational Commitment
506	Perceived Utility of Teamwork
507	Teamwork Norms
508	Performance-Reward Association
509	Openness
510	Feedback
511	Role Clarity
512	Participative Goal Setting
513	Higher Order Need Strength
514	Mood

various different scores can be calculated and if they indicate improvement, then the change is considered to be validated. The particular strength of a longitudinal study is that it allows an investigator to test certain process assumptions by observing the same set of individuals across time and by examining the causal relationship between variables.

Given a set of panel data, there are a number of different alternative methods of analysis an investigator can choose. Correlational analysis and factor analysis were the chosen methods here. In this study, then, the empirical results about to be presented reflect two types of data sets relating to (a) a comparison of various models of change and their predictions and (b) a comparison of factor structure congruency across time. First, the obtained empirical results will be presented. Secondly, these results will be compared against the predictions of the various models of change in order to determine which model "explains" the data set best. And third, the factor analytic results will be presented.

(The Empirical Results)

Table 4.2A contains the means, standard deviations and test-retest reliabilities for each of the eleven single item scales. The formulas used to calculate one-tail significance tests for nonindependent means and standard deviations were made by the use of the SPSS program for the differences in correlated

TABLE 4.2A

MEANS, STANDARD DEVIATIONS, AND TEST-RETEST RELIABILITIES
FOR THE FIRST, SECOND, AND THIRD ADMINISTRATION SCORES
(N = 69)

Item	Scale	Time 1	Time 2	Time 3	Reliabilities		
					T ₁ T ₂	T ₂ T ₃	T ₁ T ₃
1	Teamwork	5.89 (1.15)	6.15 (1.08)	6.19** (.90)**	.62	.69	.70
2	Motivating Subordinates	6.01 (1.21)	6.13 (1.14)	6.12 (.94)**	.33	.62	.50
3	Time Management	5.83 (1.18)	5.96 (.99)*	6.10** (.93)**	.41	.58	.31
4	Resolving Inter-personal Conflict	5.70 (1.18)	5.75 (1.28)	5.75 (1.14)	.56	.68	.65
5	Confronting Issues	6.19 (1.02)	6.32 (1.04)	6.32 (.85)**	.33	.52	.42
6	Communicating Openly	6.26 (.98)	6.19 (.97)	6.32 (.83)	.38	.65	.51
7	MBO	4.61 (1.62)	4.99* (1.48)	5.45** (1.38)	.58	.77	.50
8	Merit Pay	5.03 (1.39)	4.77* (1.63)	5.03* (1.56)	.50	.76	.51
9	Contingent Non-Monetary Rewards	5.26 (1.54)	5.42 (1.41)	5.25 (1.60)	.51	.59	.49
10	Trust	6.23 (.81)	6.03 (1.19)*	6.19 (.81)**	.36	.64	.43
11	Group Decision-Making	5.16 (1.21)	5.41 (1.30)	5.74** (1.38)	.44	.71	.40

Note: Standard deviations in parentheses.

*Differences significant at $p < .05$ level one-tailed test between focal mean or standard deviation and that immediately preceding.

**Differences significant at $p < .05$ level one-tailed test between time 3 mean or standard deviation and that of time 1.

means and by the formula given by Glass and Stanley (1970, p. 306) for the correlated sample variances.

Tables 4.2B, 4.2C, and 4.2D contain the static correlation matrices among the eleven variables for time 1, 2, and 3 respectively. Tables 4.2E, 4.2F, and 4.2G contain the cross-lag correlation matrices for time 1 and time 2, time 2 and time 3, and time 1 and time 3 respectively. The diagonal elements of the cross-lag correlation matrices are the test-retest reliabilities for each of the variables. Tables 4.2H, 4.2I, 4.2J, and 4.2K contain the impact and self-impact correlation matrices for time 2 minus time 1 and time 1 administration scores, time 3 minus time 2 and time 2 administration scores, and time 3 minus time 2 and time 1 administration scores, and time 3 minus time 1 and time 1 administration scores, respectively. In these matrices, the self-impact correlations are in the principal diagonal. Tables 4.2L, 4.2M, and 4.2N contain the dynamic correlation matrices for time 2 minus time 1 scores, time 3 minus time 2 scores, and time 3 minus time 1 scores, respectively.

Given the empirical results, these data can be matched against the predictions that each model of change asserts. When this is done, the following results obtain for the error of measurement model, the mood model, the endogenous real change model, and the exogenous real change model, respectively.

TABLE 4.2B

STATIC CORRELATION MATRIX
FOR THE FIRST ADMINISTRATION SCORES^a
(N = 69)

<u>Time 1</u>	<u>Time 1</u>										
1	1	2	3	4	5	6	7	8	9	10	11
2	.668	1.0									
3	.410	.458	1.0								
4	.486	.592	.290	1.0							
5	.167	.249	.323	.538	1.0						
6	.441	.557	.359	.324	.422	1.0					
7	.199	.229	.365	.245	.063	.121	1.0				
8	.158	-.035	.129	.104	.121	.016	.207	1.0			
9	.023	-.088	.143	.196	.089	.109	.070	.159	1.0		
10	.548	.586	.256	.477	.447	.648	.172	.059	.080	1.0	
11	.540	.574	.362	.375	.166	.325	.318	.155	.095	.399	1.0

TABLE 4.2B (Continued)

^aSignificant value of r:

- .10 level = .156
- .05 level = .199
- .01 level = .282

Note: The legend for Table 4.2B is as follows:

<u>Symbol</u>	<u>Variable Name</u>
01	Teamwork
02	Motivating Subordinates
03	Time Management
04	Resolving Interpersonal Conflict
05	Confronting Issues
06	Communicating Openly
07	MBO
08	Merit Pay
09	Contingent Non-Monetary Rewards
10	Trust
11	Group Decisionmaking

TABLE 4.2C
 STATIC CORRELATION MATRIX
 FOR THE SECOND ADMINISTRATION SCORES^a
 (N = 69)

Time 2	Time 2											
	12	13	14	15	16	17	18	19	20	21	22	
12	1.0											
13	.622	1.0										
14	.586	.384	1.0									
15	.509	.783	.421	1.0								
16	.724	.476	.588	.472	1.0							
17	.746	.602	.557	.605	.741	1.0						
18	.501	.159	.370	.247	.320	.338	1.0					
19	.364	.390	.394	.298	.254	.269	.420	1.0				
20	.299	.269	.161	.214	.310	.295	.349	.524	1.0			
21	.734	.466	.488	.422	.662	.732	.435	.437	.476	1.0		
22	.663	.621	.505	.585	.537	.590	.516	.504	.356	.589	1.0	

TABLE 4.2C (Continued)

^aSignificant value of r:

.10 level = .156

.05 level = .199

.01 level = .282

Note: The legend for Table 4.2C is as follows:

<u>Symbol</u>	<u>Variable Name</u>
12	Teamwork
13	Motivating Subordinates
14	Time Management
15	Resolving Interpersonal Conflict
16	Confronting Issues
17	Communicating Openly
18	MBO
19	Merit Pay
20	Contingent Non-Monetary Rewards
21	Trust
22	Group Decisionmaking

TABLE 4.2D
 STATIC CORRELATION MATRIX
 FOR THE THIRD ADMINISTRATION SCORES^a
 (N = 69)

Time 3	Time 3												
	23	24	25	26	27	28	29	30	31	32	33		
23	1.0												
24	.810	1.0											
25	.526	.415	1.0										
26	.707	.712	.455	1.0									
27	.674	.474	.651	.567	1.0								
28	.748	.672	.473	.641	.708	1.0							
29	.383	.341	.402	.333	.354	.400	1.0						
30	.406	.395	.445	.540	.348	.378	.527	1.0					
31	.215	.205	.354	.326	.323	.286	.319	.698	1.0				
32	.518	.319	.445	.496	.661	.543	.385	.379	.387	1.0			
33	.663	.525	.458	.674	.460	.614	.476	.640	.472	.626	1.0		

TABLE 4.2D (Continued)

^aSignificant value of r:

- .10 level = .156
- .05 level = .199
- .01 level = .282

Note: The legend for Table 4.2D is as follows:

<u>Symbol</u>	<u>Variable Name</u>
23	Teamwork
24	Motivating Subordinates
25	Time Management
26	Resolving Interpersonal Conflict
27	Confronting Issues
28	Communicating Openly
29	MBO
30	Merit Pay
31	Contingent Non-Monetary Rewards
32	Trust
33	Group Decisionmaking

TABLE 4.2E
CROSS-LAG CORRELATION MATRIX^a
FOR THE TIME 1 AND TIME 2 ADMINISTRATION SCORES^b
(N = 69)

Time 1	Time 2										
	12	13	14	15	16	17	18	19	20	21	22
1	(.618)	.415	.395	.393	.360	.476	.370	.168	.009	.453	.470
2	.282	(.331)	.099	.384	.079	.298	.223	-.141	-.156	.174	.222
3	.148	.039	(.410)	.236	.131	.273	.303	.117	-.106	.077	.201
4	.267	.458	.127	(.555)	.177	.268	.174	.169	.078	.185	.245
5	.203	.106	.096	.319	(.332)	.305	.148	.267	.067	.153	.075
6	.201	.154	.012	.299	.120	(.379)	.175	-.026	-.058	.322	.181
7	.151	-.004	.090	-.019	-.109	-.083	(.574)	.177	.163	.052	.154
8	.203	.010	.278	.029	.106	.083	.271	(.496)	.271	.221	.213
9	.012	.238	-.097	.188	-.052	.025	-.069	.308	(.505)	.044	.005
10	.283	.223	.086	.285	.209	.318	.200	.086	.068	(.361)	.316
11	.288	.295	.116	.236	.029	.187	.191	-.003	-.057	.232	(.436)

TABLE 4.2E (Continued)

^aTest-retest reliability coefficients are contained in the diagonal.

^bSignificant value of r:

.10 level = .156
 .05 level = .199
 .01 level = .282

Note: The legend for Table 4.2E is as follows:

<u>Symbol</u>	<u>Variable Name</u>
01,12	Teamwork
02,13	Motivating Subordinates
03,14	Time Management
04,15	Resolving Interpersonal Conflict
05,16	Confronting Issues
06,17	Communicating Openly
07,18	MBQ
08,19	Merit Pay
09,20	Contingent Non-Monetary Rewards
10,21	Trust
11,22	Group Decisionmaking

TABLE 4.2F
CROSS-LAG CORRELATION MATRIX^a
FOR THE TIME 2 AND TIME 3 ADMINISTRATION SCORES^b
(N = 69)

Time 2	Time 3										
	23	24	25	26	27	28	29	30	31	32	33
12	(.689)	.654	.561	.508	.609	.688	.402	.348	.272	.577	.524
13	.553	(.621)	.239	.625	.246	.454	.103	.354	.317	.293	.551
14	.324	.402	(.582)	.263	.261	.392	.187	.257	.260	.249	.311
15	.504	.515	.233	(.684)	.291	.463	.139	.306	.372	.345	.561
16	.426	.389	.426	.316	(.518)	.495	.176	.149	.247	.436	.335
17	.565	.473	.484	.505	.531	(.651)	.177	.180	.227	.495	.442
18	.446	.360	.420	.285	.285	.362	(.768)	.458	.346	.321	.360
19	.303	.192	.406	.364	.267	.262	.375	(.760)	.609	.346	.502
20	.216	.145	.114	.138	.292	.211	.159	.322	(.592)	.239	.152
21	.589	.481	.505	.471	.560	.616	.289	.317	.316	(.636)	.455
22	.629	.549	.418	.495	.348	.600	.357	.509	.394	.472	(.701)

TABLE 4.2F (Continued)

^aTest-retest reliability coefficients are contained in the diagonal.

^bSignificant level or r:

- .10 level = .156
- .05 level = .199
- .01 level = .282

Note: The legend for Table 4.2F is as follows:

<u>Symbol</u>	<u>Variable Name</u>
01,23	Teamwork
02,24	Motivating Subordinates
03,25	Time Management
04,26	Resolving Interpersonal Conflict
05,27	Confronting Issues
06,28	Communicating Openly
07,28	MBO
08,29	Merit Pay
09,30	Contingent Non-Monetary Rewards
10,31	Trust
11,32	Group Decisionmaking

TABLE 4.2G

CROSS-LAG CORRELATION MATRIX^a
 FOR THE TIME 1 AND TIME 3 ADMINISTRATION SCORES^b
 (N = 69)

<u>Time 1</u>	<u>Time 3</u>										
	23	24	25	26	27	28	29	30	31	32	33
1	(.703)	.626	.410	.461	.500	.633	.446	.206	.086	.446	.485
2	.487	(.501)	.038	.376	.182	.450	.217	-.055	-.125	.103	.202
3	.255	.136	(.314)	.142	.160	.253	.240	.091	.000	.143	.222
4	.403	.396	.110	(.653)	.319	.370	.203	.228	.222	.323	.375
5	.218	.085	.167	.331	(.423)	.293	.159	-.031	.177	.277	.197
6	.396	.232	.197	.308	.447	(.510)	.250	-.043	.053	.271	.175
7	.173	.155	.194	.162	.103	.127	(.502)	.324	.141	.057	.128
8	.302	.276	.271	.273	.266	.246	.261	(.513)	.317	.126	.169
9	.049	-.014	.012	.152	.170	.082	-.103	.244	(.491)	.065	.082
10	.447	.289	.126	.334	.384	.589	.236	.065	.093	(.427)	.341
11	.461	.373	.156	.285	.194	.388	.186	.169	.064	.134	(.397)

TABLE 4.2G (Continued)

^aTest-retest reliability coefficients are contained in the diagonal.

^bSignificant value of r:

.10 level = .156

.05 level = .199

.01 level = .282

Note: The legend for Table 4.2G is as follows:

<u>Symbol</u>	<u>Variable Name</u>
01,23	Teamwork
02,24	Motivating Subordinates
03,25	Time Management
04,26	Resolving Interpersonal Conflict
05,27	Confronting Issues
06,28	Communicating Openly
07,29	MBQ
08,30	Merit Pay
09,31	Contingent Non-Monetary Rewards
10,32	Trust
11,33	Group Decisionmaking

TABLE 4.2H
 IMPACT AND SELF-IMPACT CORRELATION MATRIX^a
 FOR TIME 2 - TIME 1 AND TIME 1 ADMINISTRATION SCORES^b
 (N = 69)

Time 1	Time 2 - Time 1										
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
1	(-.500)	-.246	-.076	-.062	.171	.029	.157	.035	-.016	.083	-.031
2	-.478	(-.612)	-.371	-.179	-.145	-.234	-.097	-.118	-.059	-.228	-.304
3	-.321	-.375	(-.648)	-.356	-.163	-.079	-.100	.007	.050	-.117	-.132
4	-.279	-.143	-.181	(-.406)	-.307	-.052	-.096	.086	-.132	-.141	-.101
5	.027	-.133	-.240	-.196	(-.568)	-.107	.082	-.081	-.029	-.153	-.078
6	-.299	-.366	-.346	-.001	-.257	(-.561)	.044	-.013	-.060	-.120	-.118
7	-.068	-.260	-.287	-.269	-.149	-.183	(-.536)	-.001	.082	-.066	-.139
8	.038	.115	.104	-.074	-.011	.089	.046	(-.383)	.090	.184	.067
9	-.014	.278	.061	.008	-.122	-.075	-.150	.183	(-.572)	-.011	-.081
10	-.335	-.334	-.201	-.171	-.201	-.299	.012	.038	-.019	(-.323)	-.054
11	-.031	-.304	-.132	-.101	-.078	-.118	-.139	.067	.081	-.054	(-.481)

TABLE 4.2H (Continued)

^aSelf-impact r's are contained in the diagonal.

^bSignificant value of r:

.10 level = .156

.05 level = .199

.01 level = .282

Note: The legend for Table 4.2H is as follows:

<u>Symbol</u>	<u>Variable Name</u>
01,A1	Teamwork
02,A2	Motivating Subordinates
03,A3	Time Management
04,A4	Resolving Interpersonal Conflict
05,A5	Confronting Issues
06,A6	Communicating Openly
07,A7	MB0
08,A8	Merit Pay
09,A9	Contingent Non-Monetary Rewards
10,A10	Trust
11,A11	Group Decisionmaking

TABLE 4.21
 IMPACT AND SELF-IMPACT CORRELATION MATRIX^a
 FOR TIME 3 - TIME 2 AND TIME 2 ADMINISTRATION SCORES^b
 (N = 69)

Time 2	Time 3 - Time 2										
	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
12	(-.576)	-.100	-.069	-.071	-.248	-.202	-.191	-.045	.007	-.441	-.151
13	-.218	(-.597)	-.181	.293	-.303	-.274	-.095	-.074	.091	-.345	-.063
14	-.427	-.062	(-.516)	-.245	-.379	-.283	-.297	-.217	.136	-.413	-.232
15	-.120	-.438	-.230	(-.511)	-.258	-.268	-.178	-.006	.212	-.242	-.004
16	-.500	-.189	-.181	-.249	(-.635)	-.406	-.235	-.163	-.033	-.472	-.240
17	-.372	-.258	-.118	-.202	-.337	(-.567)	-.263	-.142	-.042	-.511	-.167
18	-.175	.173	.024	.010	-.095	-.037	(-.432)	.029	.043	-.280	-.181
19	-.151	-.285	-.017	.037	-.039	-.059	-.107	(-.398)	.167	-.260	.021
20	-.161	-.178	-.062	-.118	-.078	-.147	-.304	-.317	(-.345)	-.406	-.252
21	-.329	-.028	-.018	0.0	-.224	-.263	-.252	-.196	-.124	(-.734)	-.322
22	-.189	-.204	-.130	-.187	-.277	-.143	-.278	-.024	-.091	-.524	(-.347)

TABLE 4.2I (Continued)

^aSelf-impact r 's are contained in the diagonal.

^bSignificant value of r :

.10 level = .156

.05 level = .199

.01 level = .282

Note: The legend for Table 4.2I is as follows:

<u>Symbol</u>	<u>Variable Name</u>
12,B1	Teamwork
13,B2	Motivating Subordinates
14,B3	Time Management
15,B4	Resolving Interpersonal Conflict
16,B5	Confronting Issues
17,B6	Communicating Openly
18,B7	MBO
19,B8	Merit Pay
20,B9	Contingent Non-Monetary Rewards
21,B10	Trust
22,B11	Group Decisionmaking

TABLE 4.2J

IMPACT AND SELF-IMPACT CORRELATION MATRIX^a
 FOR TIME 3 - TIME 2 AND TIME 1 ADMINISTRATION SCORES^b
 (N = 69)

Time 1	Time 3 - Time 1										
	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
1	(-.043)	.130	-.014	.026	.054	.082	.068	.044	.092	-.193	.042
2	.168	(.105)	-.071	-.063	.078	.109	-.031	.129	.020	-.135	-.016
3	.087	.091	(-.132)	-.142	.000	-.073	-.121	-.044	.110	.026	.037
4	.093	-.159	-.028	(.039)	.093	.061	.022	.073	.177	.046	.182
5	-.029	-.043	.068	-.030	(.015)	-.070	-.000	-.083	.066	.046	.165
6	.174	.048	.195	-.031	.272	(.072)	.087	-.023	.001	-.178	.000
7	-.009	.163	.102	.215	.213	.243	(-.162)	.197	-.005	-.017	-.027
8	.065	.159	-.028	.283	.124	.162	-.042	(-.005)	.088	-.176	-.048
9	.038	-.307	.122	-.068	.211	.057	-.042	-.108	(.049)	.001	.101
10	.123	.021	.035	.019	.116	.236	.029	-.036	.037	(-.090)	.047
11	.131	.018	.033	.025	.143	.184	-.026	.243	.133	-.183	(-.032)

TABLE 4.2J (Continued)

^aSelf-impact r's are contained in the diagonal.

^bSignificant value of r:

.10 level = .156

.05 level = .199

.01 level = .282

Note: The legend for Table 4.2J is as follows:

<u>Symbol</u>	<u>Variable Name</u>
01,B1	Teamwork
02,B2	Motivating Subordinates
03,B3	Time Management
04,B4	Resolving Interpersonal Conflict
05,B5	Confronting Issues
06,B6	Communicating Openly
07,B7	MBQ
08,B8	Merit Pay
09,B9	Contingent Non-Monetary Rewards
10,B10	Trust
11,B11	Group Decisionmaking

TABLE 4.2K

IMPACT AND SELF-IMPACT CORRELATION MATRIX^a
 FOR TIME 3 - TIME 1 AND TIME 1 ADMINISTRATION SCORES^b
 (N = 69)

Time 1	Time 3 - Time 1										
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
1	(-.634)	-.195	-.083	-.047	.251	.104	.193	.070	.064	-.093	.001
2	-.404	(-.668)	-.403	-.278	-.098	-.189	-.112	-.025	-.038	-.450	-.299
3	-.296	-.387	(-.709)	-.185	-.191	-.156	-.173	-.026	.141	-.123	-.098
4	-.241	-.312	-.192	(-.448)	-.274	-.011	-.077	.145	.029	-.143	.037
5	.004	-.201	-.180	-.265	(-.651)	-.187	.077	-.148	.029	-.158	.046
6	-.186	-.412	-.192	-.032	-.050	(.614)	.098	-.031	-.054	-.351	-.111
7	-.090	-.185	-.201	-.107	.023	-.014	(-.615)	.149	.072	-.107	-.151
8	-.108	.276	.080	-.200	.102	.245	.016	(-.404)	.160	.062	.029
9	.020	.085	.144	-.059	.053	-.042	-.169	.109	(-.492)	-.013	-.003
10	-.279	-.395	-.167	-.187	-.127	-.160	.031	.012	.014	(-.533)	-.017
11	-.254	-.310	-.225	-.121	-.005	.005	-.171	.033	-.030	-.247	(-.479)

TABLE 4.2K (Continued)

^aSelf-impact r 's are contained in the diagonal.

^bSignificant value of r :

.10 level = .156

.05 level = .199

.01 level = .282

Note: The legend for Table 4.2K is as follows:

<u>Symbol</u>	<u>Variable Name</u>
01,C1	Teamwork
02,C2	Motivating Subordinates
03,C3	Time Management
04,C4	Resolving Interpersonal Conflict
05,C5	Confronting Issues
06,C6	Communicating Openly
07,C7	MBO
08,C8	Merit Pay
09,C9	Contingent Non-Monetary Rewards
10,C10	Trust
11,C11	Group Decisionmaking

TABLE 4.2L

DYNAMIC CORRELATION MATRIX
FOR THE FIRST AND SECOND ADMINISTRATION SCORES^a
(N = 69)

<u>Time 2 - Time 1</u>	<u>Time 2 - Time 1</u>										
	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
A1	1.0										
A2	.589	1.0									
A3	.467	.566	1.0								
A4	.389	.490	.314	1.0							
A5	.302	.402	.499	.464	1.0						
A6	.501	.544	.485	.352	.576	1.0					
A7	.195	.226	.333	.401	.325	.356	1.0				
A8	.181	.376	.132	.232	.221	.200	.206	1.0			
A9	.318	.057	.164	.140	.331	.281	.324	.103	1.0		
A10	.508	.469	.474	.398	.591	.577	.387	.241	.426	1.0	
A11	.461	.553	.453	.494	.500	.468	.496	.465	.464	.542	1.0

TABLE 4.2L (Continued)

^aSignificant value of r:

.10 level = .156
 .05 level = .199
 .01 level = .282

Note: The legend for Table 4.2L is as follows:

<u>Symbol</u>	<u>Variable Name</u>
A1	Teamwork
A2	Motivating Subordinates
A3	Time Management
A4	Resolving Interpersonal Conflict
A5	Confronting Issues
A6	Communicating Openly
A7	MBQ
A8	Merit Pay
A9	Contingent Non-Monetary Rewards
A10	Trust
A11	Group Decisionmaking

TABLE 4.2M
DYNAMIC CORRELATION MATRIX
FOR THE SECOND AND THIRD ADMINISTRATION SCORES^a
(N = 69)

<u>Time 3 - Time 2</u>	<u>Time 3 - Time 2</u>										
	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
B1	1.0										
B2	.298	1.0									
B3	.307	.207	1.0								
B4	.286	.526	.517	1.0							
B5	.493	.374	.552	.535	1.0						
B6	.378	.469	.212	.416	.532	1.0					
B7	.106	.051	.263	.279	.312	.350	1.0				
B8	.204	.374	.278	.274	.269	.341	.226	1.0			
B9	.021	-.027	.157	.000	.104	.177	.227	.431	1.0		
B10	.253	.076	.190	.116	.394	.305	.375	.277	.341	1.0	
B11	.289	.073	.338	.311	.413	.319	.518	.247	.401	.612	1.0

TABLE 4.2M (Continued)

^aSignificant value of r:

- .10 level = .156
- .05 level = .199
- .01 level = .282

Note: The legend for Table 4.2M is as follows:

<u>Symbol</u>	<u>Variable Name</u>
B1	Teamwork
B2	Motivating Subordinates
B3	Time Management
B4	Resolving Interpersonal Conflict
B5	Confronting Issues
B6	Communicating Openly
B7	MB0
B8	Merit Pay
B9	Contingent Non-Monetary Rewards
B10	Trust
B11	Group Decisionmaking

TABLE 4.2N
DYNAMIC CORRELATION MATRIX
FOR THE FIRST AND THIRD ADMINISTRATION SCORES^a
(N = 69)

<u>Time 3 - Time 1</u>	<u>Time 3 - Time 1</u>										
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
C1	1.0										
C2	.447	1.0									
C3	.279	.598	1.0								
C4	.439	.613	.474	1.0							
C5	.025	.376	.460	.502	1.0						
C6	.135	.522	.311	.315	.328	1.0					
C7	-.092	.248	.281	.248	.100	.104	1.0				
C8	.061	.165	.185	.197	.248	.188	.126	1.0			
C9	.093	.230	.121	.173	.102	.246	.306	.335	1.0		
C10	.204	.519	.339	.354	.376	.341	.242	.255	.289	1.0	
C11	.259	.486	.318	.428	.183	.354	.431	.470	.399	.468	1.0

TABLE 4.2N (Continued)

^aSignificant value of r:

.10 level = .156

.05 level = .199

.01 level = .282

Note: The legend for Table 4.2N is as follows:

<u>Symbol</u>	<u>Variable Name</u>
C1	Teamwork
C2	Motivating Subordinates
C3	Time Management
C4	Resolving Interpersonal Conflict
C5	Confronting Issues
C6	Communicating Openly
C7	MBQ
C8	Merit Pay
C9	Contingent Non-Monetary Rewards
C10	Trust
C11	Group Decisionmaking

(The Change Models)

Earlier, two different classes of change models were identified: (1) apparent or no change models and (2) real change models. Furthermore, two types of no change models were identified: the error of measurement model and the mood model. The error of measurement model asserts that the results are all due to measurement error or unreliability and hence no substantive meaning can be attached to the data except to characterize it as "junk." The mood model asserts that change occurs but it is only temporary and transient. Hence, while change occurs, it is only "apparent" since there is no change in the true score of a manager between time administration on any of the dependent variables.

Two types of real change models were also identified: endogenous change and exogenous change. The endogenous change model asserts that the variables form a closed system of mutually interacting variables, all of which exert positive causal influences upon one another. The exogenous change model asserts that real change in the variables is produced by a variable outside the system and that this outside variable has a differential impact on each of the dependent variables of interest.

Each of these models, as was revealed in the previous chapter, yields certain predictions on the structure of the empirical results. Hence, if the empirical results match the predictions, then support is accorded to the model as a plausible explanation.

If the data set does not match the predictions, then the model must be rejected as implausible. Given the empirical results presented above, they can now be matched against each of the predictions the various models of change assert. When this is done, the following results are obtained first for the error of measurement model, secondly for the mood model, thirdly for the endogenous change model, and lastly for the exogenous change model.

(The Error of Measurement Model)

The relevant match-ups of the results against each prediction of this model are as follows. For each variable separately, for the three time administration scores:

Prediction A. The three means are all equal.

Mixed.

According to Table 4.2A, some of the means increased over time while others did not. For example, the means for the concept of teamwork changed significantly over the entire time 1 to time 3 interval while the means for the concept motivating subordinates did not change significantly over time. Hence, there is mixed support for prediction A.

Prediction B. The variances are all equal.

Mixed.

According to Table 4.2A, some of the variances changed significantly over time while others did not. For example, the

variance of trust increased significantly over the first time interval and then decreased to its original value over the second time interval. The variance of MBO did not change significantly over time. Hence, there is mixed support for prediction B. Prediction C. The test-retest correlations are all equal.

False.

Table 4.2A, under the reliabilities column shows that the vast majority of the test-retest reliabilities are not equal to one another. For the concept of teamwork, the values of the various test-retest correlations are close to being identical. However it is important to note that the error of measurement model predicts that the test-retest reliabilities will be exactly equal, a strict condition which is not met by the data. Hence, prediction C is unsupported.

Prediction D. The three self-impact correlations are equal and spuriously negative.

False.

The self-impact correlations are the diagonal elements in Table 4.2H, 4.2I, 4.2J and 4.2K. While a large majority of the self-impact correlations are negative, the respective self-impact correlations are not equal to one another. Hence, prediction D is unsupported by the evidence. For each pair of different variables, X and Y, for the three time administration scores:

Prediction E. The static correlations are all equal.

False.

Visual inspection of Tables 4.2B, 4.2C, and 4.2D, which contain the static correlations for time 1, 2, and 3, respectively, reveals that all of the corresponding static correlations across the three time periods are not equal to one another. Hence, prediction E is not supported by the evidence.

Prediction F. The cross-lag correlations are equal.

False.

Visual comparisons of the matrices in Tables 4.2E, 4.2F, and 4.2G, which contain the cross-lag correlation values reveal that the cross-lag correlations are not equal to one another. Hence, prediction F is unsupported by the evidence.

Prediction G. All off-diagonal impact correlations are equal.

False.

Tables 4.2H, 4.2I, 4.2J, and 4.2K contain the relevant off-diagonal impact correlations. A comparison of these tables reveals that the off-diagonal impact correlations are not equal to one another. Hence, prediction G is unsupported.

Prediction H. All dynamic correlations are zero.

False.

Inspection of Tables 4.2L, 4.2M, and 4.2N reveals that none of the dynamic correlations are equal to zero. Hence, prediction H is not supported.

Prediction I. The cross-lag correlations are equal to the static correlations.

False.

In verifying this prediction, one must compare Tables 4.2B,

4.2C, and 4.2D against Tables 4.2E, 4.2F, and 4.2G respectively. Consider, for example, the relationship of teamwork and motivating subordinates for the first and second administration scores. The static correlation for time 1 is .668; for time 2, the static correlation is .622. In Table 4.2E, the cross-lag correlation between teamwork at time 2 and motivating subordinates at time 1 is .282. The cross-lag correlation for teamwork at time 1 and motivating subordinates at time 2 is .415. In comparing the statics and cross-lag correlations against one another, obviously, $.668 \neq .622 \neq .282 \neq .415$. Hence, for this pair of variables, the data do not support the prediction. If one carried out this analysis for the rest of the remaining pairs of variables across the various time periods, one would find that none of the relevant correlations support prediction I. Thus, prediction I is unsupported by the evidence.

(Summary Comments)

The Error of Measurement Model yielded nine derivative predictions. When these predictions are matched against the actual results, two predictions have mixed support and the remaining seven are unsupported. Taking all of the results together, it appears that this model is grossly inadequate as providing a full explanation for the obtained results. Attention now turns to the mood model.

(The Mood Model)

The relevant match-ups of the results against each prediction of the mood model are as follows. For each variable separately, for the three time administration scores:

Prediction A. The three means are equal.

Mixed.

Prediction B. The three variances are equal.

Mixed.

As was mentioned earlier, the relevant data are contained in Table 4.2A. The data show that some of the variances and means significantly changed across time while others did not.

Hence, the results for predictions A and B are mixed.

Prediction C. The test-retest correlations are equal.

False.

Again, this result is reflected in Table 4.2A which shows that the test-retest correlations relating to each of the eleven variables of interest are not equal to one another. Hence, there is no support for prediction C.

Prediction D. All self-impact correlations are equal and spuriously negative.

False.

This result is obtained by comparing the diagonal elements of Table 4.2H, 4.2I, 4.2J, and 4.2K which contain the relevant self-impact correlations. For example, the self-impact correlations for teamwork are $-.500$, $-.576$, $-.043$, $-.634$. Obviously, these numbers are not identical. When one repeats this analysis,

for the remaining ten variables, similar results are obtained. While the self-impact correlations are negative in sign, their values are not equal, hence, prediction D is false.

For each pair of different variables, X and Y, for the three time administration scores:

Prediction E. The static correlations are equal.

False.

This result has already been established. Tables 4.2B, 4.2C, and 4.2D show that all of the corresponding static correlations across the three time periods are not equal to one another. Hence, prediction E is unsupported.

Prediction F. The six cross-lag correlations are equal.

False.

Tables 4.2E, 4.2F, and 4.2G contain the six cross-lag correlations that must be compared against one another. Consider, for example, the cross-lag correlations for time 1 and time 2 involving the relationship between teamwork and communicating openly. For these administration scores, the cross-lags are .201 and .476. For the time 2 and time 3 administration scores, the cross-lag correlations are .565 and .688. For time 1 and time 3, the correlations are .396 and .688. Obviously, these correlations are not equal to one another. Moreover, when these comparisons are generalized to the remaining correlations similar results are obtained. Hence, prediction F is not supported.

Prediction G. The static correlations are larger than the cross-lag correlations.

True.

To test this prediction, the off-diagonal static correlations (absolute values) were averaged as given in Tables 4.2B, 4.2C, and 4.2D, respectively. The obtained average static correlations .286, .469, and .502 for time 1, time 2, and time 3 respectively. In addition, the off-diagonal correlations (absolute values) of the cross-lag correlation matrices for both the upper and lower halves as given in Tables 4.2E, 4.2F, and 4.2G were averaged. The obtained values were .161 and .208 for the lower and upper halves, respectively, for the time 1 and time 2 administration scores; .391 and .366 for the lower and upper halves respectively, for the time 2 and time 3 administration scores; and .232 and .236 for the lower and upper halves, respectively, for the time 1 and time 2 administration scores. Hence, the data are in accord with prediction G.

Prediction H. The static correlations are larger than the dynamic correlations.

Mixed.

The off-diagonal dynamic correlations (absolute values) in Tables 4.2L, 4.2M, and 4.2N were averaged. The results are .382, .299, and .298 for each of the tables respectively. When they are compared against the average static correlations (.286, .469, .502), the results are mixed. The average static correlation for time 1 is lower than the average dynamic correlations while the

remaining average static correlations for time 2 and 3 are in the predicted direction. Hence, support for prediction H is mixed.

Prediction I. The impact correlations are negative.

Mixed.

Tables 4.2H, 4.2I, 4.2J, and 4.2K show somewhat mixed results. Some impact correlations are positive but low in magnitude. A very large number of impact correlations, however, are negative in sign. Hence, support for prediction I appears mixed although the large number of negative impact correlations should be noted.

Prediction J. The dynamic correlations are positive.

True.

Tables 4.2L, 4.2M, and 4.2N show overwhelming support for this prediction. Only two out of a possible 165 correlations have a negative sign. Hence, prediction J is strongly supported by the evidence.

(Summary Comments)

Ten predictions of the mood model have been matched against the empirical results with mixed findings. Other important bits of evidentiary information can be processed which confirm or disconfirm "mood" as a rival explanation to the data results.

One important set of evidence lies in the means, standard deviations, and the test-retest correlations which are all contained in Table 4.2A. Table 4.2A, reveals that some of the means and standard deviations did change significantly and, therefore, some of

the variables did undergo real change. Moreover, if the mood model fits the data, then each of the scales would fit the strong prediction that $r_{12} = r_{23} = r_{13}$ or the test-retest reliabilities would all be equal. Visual inspection of the right hand column of Table 4.9A shows, however, that this is not the case.

The mood model also predicts that the coefficients of equivalence, r_{11} , r_{12} , and r_{33} will all be equal and lower than the test-retest correlations. If one had parallel items, one could compute coefficient alpha as a measure of "equivalence." The computation of coefficient alpha, however, given only single items is obviously impossible in this study. To circumvent this problem, however, and to test this prediction, various communality estimates were generated using factor analysis techniques. In particular, principal factor with iterations, varimax, and Rao's canonical factoring were used to estimate the various communalities for each of the variables across each time period. The results of this sub-analysis are contained in Appendices I, J, and K for time periods 1, 2, and 3 respectively. The factor structures of each type of factor analysis were essentially similar and the communality estimates for each type of factor analysis for each variable across time differ roughly by the amount of sampling error. For each variable separately, the three estimated communalities were then averaged and this result was used to test the prediction that the communalities of the variables in time 1, time 2, and time 3 will all be equal and lower than the test-retest correlations. The

results show that this strong prediction is disconfirmed by the evidence.

Another strong prediction that the mood model makes is that the static correlation matrices would be equal to one another as would the correlations in the cross-lag matrices but that the static correlations would be larger than the cross-lag correlation matrices. Mixed support is found with this prediction. The prediction of equal correlations is clearly unsupported. However, it is also true that the statics, not only increase across time, but they are generally larger than the cross-lag correlations. This peculiar pattern of the static correlations warrants further examination, a topic which will be discussed in more detail later. Suffice to say, however, that the strong prediction of equal static correlations across time and equal cross-lag correlations across time that the mood model makes is not supported by the evidence.

The final bit of evidence unsupportive of the mood model lies in the direct assessment of the variable "mood" itself. In this study, "mood" was directly assessed by a four item questionnaire. These items were cluster analyzed and the results are contained in Appendix B. The means, standard deviations, and coefficient also of mood across each of the three time periods are given below:

Mood:	Time 1	Time 2	Time 3
Mean	4.00	4.01	4.16
S.D.	.53	.59	.45
Alpha	.69	.69	.60

The scale ranged from one to five where an average of 5 represents respondents indicating being in an extremely good mood. These results show that the means and standard deviations do not significantly change across time. It is reasoned that a variable which itself does not change across time cannot be a cause of observed changes in other variables. Hence, if mood did not change across time, it cannot provide an explanation for the real change which was observed.

Taking all of the evidence together, it appears that a highly transient and unstable factor such as mood is incapable of accounting for the complete data structure. The data hints quite strongly that a few of the variables have undergone real change. A consideration of the class of real change models now follows.

(Real Change Model)

Two types of real change models, as mentioned earlier, will be considered: endogenous real change and exogenous real change. Each of these real change models share some general, common predictions. The match-up of these general predictions against the data set contained in Table 4.2A will be presented first. Then, the match-up of the predictions against the obtained results of the endogenous and, subsequently, the exogenous real change model will be presented.

(General Real Change Model Predictions)

The basic assumption here is that some of the variables underwent real change. If this assumption is tenable then the results will conform to certain predictions made by real change models. The match-up between these predictions and the empirical results in Table 4.2A are as follows.

For each variable separately:

General Prediction 1. There are significant differences in the means of each of the variables across time.
Mixed.

General Prediction 2. There are significant differences in the variances of each of the variables across time.
Mixed.

General Prediction 3. The test-retest correlations are not equal; i.e., $r_{13} \neq r_{12} \neq r_{23}$.
True.

These match-ups are redundant and have already been previously established in the consideration of apparent or no change models. The data supports the assertion that at least some real change occurred among some of the variables of interest as discerned from Table 4.2A. Such a conclusion is a highly tempered one and obviously must be differentiated from a conclusion which asserts changes in all of the variables across time. Given the finding of real change, attention now turns to examining the character of

that change. This examination proceeds first with the consideration of endogenous real change.

(The Endogenous Real Change Model)

Do the variables of interest anchored in the goals of the seminar/workshop form a closed system of mutually interacting variables which causally affect one another through time? If the answer is in the affirmative, then the results will match the predictions of the endogenous real change model. The degree of correspondence between the predictions of the endogenous real change model and the obtained results are as follows:

Prediction 1. The static correlations are positive.

True.

Visual scanning of Tables 4.2B, 4.2C, and 4.2D shows that virtually all of the static correlations for time 1, 2, and time 3 administration scores are positive in sign. The exceptions are contained in the static correlation matrix of time 1 (Table 4.2B). Hence, prediction 1 has support.

Prediction 2. The static correlations exhibit differing patterns and increase across time.

True.

A comparison of the static correlations contained in Tables 4.2B, 4.2C, and 4.2D shows that the rank of order of the correlations differ across all time periods. Moreover, the average static correlations increased from .286 to .469 to .502 across time periods 1, 2, and 3 respectively. Hence, prediction 2 is supported.

Prediction 3. The self-impact correlations are positive.

False.

With two exceptions, all of the self-impact correlations, the diagonal elements in Tables 4.2H, 4.2I, 4.2J, and 4.2K, are negative in sign. Hence, prediction 3 is unsupported by the evidence.

Prediction 4. The cross-lag correlations are larger than the static correlations.

Mixed.

Earlier, it was reported that the average values of the static correlations in Tables 4.2B, 4.2C, and 4.2D were .286, .469, and .502 respectively. It was also reported that the average values for the lower and upper half of the cross-lag correlations in Tables 4.2E, 4.2F, and 4.2G were .161 and .208 for the time 1 and time 2 administration scores, .391 and .366 for time 2 and time 3 administration scores, and .232 and .236 for time 1 and time 3 administration scores. A comparison of these average correlations, therefore, reveals mixed support for the prediction.

Prediction 5. If a given variable X is not affected by other variables within the system, then $r_{13} < r_{12}$ and $r_{13} < r_{23}$ for the cross-lag correlations.

Mixed.

The relevant data are contained in Tables 4.2E, 4.2F, and 4.2G. Visual scanning and comparisons of the values in Tables 4.2G and 4.2E reveal that some of the time 1 and time 3 cross-lag correlations are less than the cross-lag correlations of time 1

and time 2 while others are not. Similar observations can be made when comparing the cross-lag correlations of Table 4.2G and Table 4.2F against one another. Hence, there is mixed support for the prediction.

Prediction 6. The off-diagonal impact correlations are positive.

False.

Examination of Tables 4.2H, 4.2I, 4.2J, and 4.2K reveals that a very large majority of the off-diagonal impact correlations are, in fact, negative in sign. Hence, prediction 6 is not supported.

(Summary Comments)

Overall, mixed findings are obtained. The results appear to show some support for the endogenous change model. This would suggest that a moderate degree of endogenous real change took place among some of the variables of interest. This conclusion, however, may depend on where one wants to place emphasis. A wine bottle filled halfway may be described as half-empty or half-full. Certainly, here one could conclude that the results show some support for the finding of no real endogenous change.

In the discussion which will follow later, an extended treatment of the endogenous real change model together with the assumptions and logic of cross-lagged panel correlational analysis will be made. In that discussion, a more extensive analysis of endogenous real change will be made. The general, tentative conclusion reached at this stage of analysis is, however, that endogenous

real change has taken place but that change appears to be modest in magnitude and confined to certain variables and time frames of measurement.

(The Exogenous Real Change Model)

The Endogenous Real Change Model assumed that the variables formed a closed system of interacting variables that influenced one another. Under this model, it is assumed that real change is produced by a variable outside the system. The resulting match-ups between its derivative predictions and the empirical results are as follows:

Prediction 1. The static correlations are positive.

True.

Prediction 2. The cross-lag correlations are slightly smaller than the static correlations.

True.

Prediction 3. The dynamic correlations are positive.

True.

Prediction 4. Given positive dynamic correlations, the static correlations increase across time.

True.

Verification of the above four predictions has already been established in the preceding discussions. The data support the exogenous effects model thereby suggesting that some of the variables underwent real change and that change is attributable

to the presence of a causal exogenous factor. What is that factor? The seminar/workshop represents a plausible explanation.

Attention now turns to the factor analytic portion of this panel study and to the presentation of the results.

(Factor Structure Comparisons and the Gamma Change Model)

The purpose of this particular analysis is rooted in the work of Golembiewski et al. (1975) who have differentiated several types of change. Given the initial finding of change, this analysis is directed towards a further examination of the type of change involved. In particular, the basic question is whether or not a basic redefinition of the relevant psychological space of the participants changed as a consequence of the seminar/workshop intervention. Such a basic redefinition or "gamma" change was predicted to happen. As was pointed out earlier, the seminar/workshop was intentionally designed to produce alterations in "culture" and to also provide new substantive meaning for the major concepts (e.g., teamwork and MB0) grounded in the goals of the intervention. Fundamental changes in conceptualizations/valuations, in factor analysis terminology, is defined as the substantial ingruence of pairs of between-wave factorial structures as defined by the Ahmavaara's (1954) technique (Golembiewski et al., 1975, p. 144).

Accordingly, the variables of Study 2 were also subjected to a varimax rotated factor analysis. Table 4.20 contains the

TABLE 4.20
VARIMAX ROTATED FACTOR MATRICES FOR TIME 1 TO TIME 3
(Normalized Solution)

Item Description	Time 1			Time 2		Time 3	
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 1	Factor 2
1 Teamwork	.49	-.06	-.61	.80	.35	.91	.17
2 Motivating Sub.	.59	-.24	-.61	.80	.11	.83	.11
3 Time Management	.24	-.10	-.67	.63	.29	.55	.42
4 Resolving Conflict	.68	.23	-.30	.79	.06	.76	.33
5 Confronting Issues	.71	.21	.03	.77	.23	.76	.27
6 Communicating Openly	.76	-.11	-.20	.86	.20	.84	.22
7 MBO	-.07	.29	-.69	.23	.70	.31	.59
8 Merit Pay	-.11	.69	-.33	.20	.78	.24	.86
9 Contingent Non-financial Rewards	.25	.74	.21	.11	.77	.05	.87
10 Trust	.79	-.03	-.27	.66	.53	.56	.45
11 Group Decisionmaking	.32	.08	-.67	.68	.50	.59	.59
Percent of Variance	38.26	11.71	11.47	53.31	11.82	54.41	12.32
Cumulative Percent of Variance	38.26	49.97	61.44	53.31	65.12	54.41	66.73

abbreviated results of the resulting factor loadings. As shown in Table 4.20 the factor structures changed somewhat slightly between time 1 and time 2 and remained stable between time 2 and time 3. Also of note is that the number of factors which explained the bulk of the variance reduced from essentially three factors to two factors. The items which loaded negatively on the various factors, in time, took on positive values.

Table 4.2P displays the various intraclass and product moment correlations between the various time periods. As indicated previously, the interclass correlation reflects the degree to which two structures are similar in pattern and magnitude. The product moment coefficient indicate the degree of similarity in patterning only and the square represents the percent of variance two structures being compared have in common. Tables 4.20 and 4.2P indicate, therefore, that the factor structure underwent a slight change during the time 1 and time 2 interval thereafter remained essentially the same. Hence, the basic prediction that the factor structure would differ across time must be tempered by the character of these results.

(Summary)

This concludes the presentation of the results of Study 2. The reader is again reminded that these results will be discussed in an upcoming discussion section. Attention now turns to the presentation of the results of Study 3 which involves the use of metric multidimensional scaling procedures.

TABLE 4.2P
INTRAClass, INTERCLASS CORRELATIONS,
AND THE ESTIMATED COMMON VARIANCE
BETWEEN FACTOR STRUCTURES

	Time 1,2	Time 2,3	Time 1,3
Intraclass r	.861	.940	.864
Interclass r	.866	.939	.869
Estimated Common Variance	74.9	88.2	75.5

Study 3. The Metric Multidimensional Scaling Approach:

The Empirical Results

In the previous chapter, a cultural inoculation theory perspective of the seminar/workshop together with a brief overview of metric multidimensional scaling procedures was discussed. It was suggested that the seminar/workshop could be conceptualized as a persuasive communication attempt designed to affect normative reeducation and that such changes could be detected, monitored, and validated through the use of the MMDS methodology. In particular, changes in the distance means and factor coordinate matrices would be observed. A set of five testable predictions together with the suggested MMDS verification strategies were identified. The MMDS results will now be presented.

(Sample Sizes and Basic Statistics)

The number of respondents who indicated distance estimates differed according to the time administration. This breakdown is given for the interested reader in Appendices C, D, and E for time 1, 2, and 3 paired comparisons respectively. The respondents of Study 3 are essentially the same as those in Studies 1 and 2. Appendices F, G, and H reflect some descriptive statistics for all of the paired comparisons for time 1, 2, and 3 respectively.

(MMDS Predictions and Results Match-Ups)

The match-ups between the MMDS predictions and the data results are as follows:

Prediction 1. MMDS responses are completely random.

False.

Table 4.3A contains the data pattern directly relevant to the testing of this prediction. The plot of the scree lines shows a distinct elbow shaped pattern and is not "flat." The rival, cynical assertion that subjects gave random responses and are not theoretically meaningful, therefore, can be safely rejected. Thus, prediction 1 is not supported.

Prediction 2. Over time, the mean distances between the concepts reflecting the goals of the seminar/workshop and the concept Me will diminish.

True.

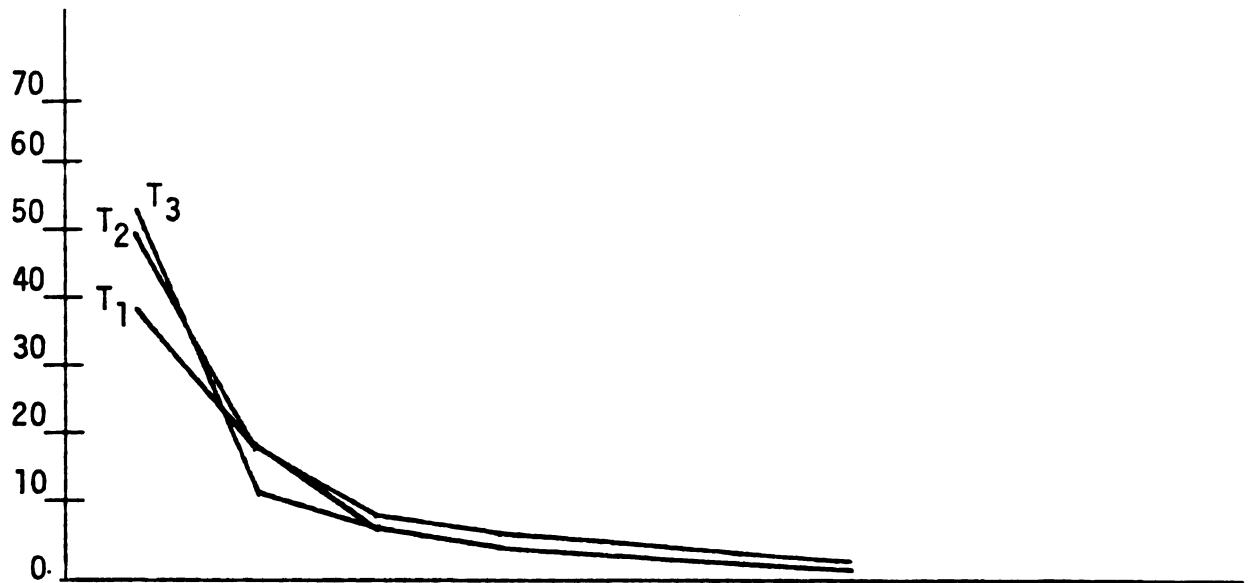
Table 4.3B contains the relevant data. As this table demonstrates, the mean distance gradually diminished across the entire time 1 to time 3 interval for all relevant paired comparisons. The data suggest that during the course of the seminar/workshop, participants regarded the goals or central concepts as not being inconsistent or threatening with their self concept and therefore suggest the occurrence of positive normative reeducation. Hence, prediction 2 is supported.

Prediction 3. Over time, the mean distances between the concepts reflecting the goals of the seminar/workshop and the concept My Job will diminish.

True.

TABLE 4.3A
SCREE LINES,
PERCENT OF REAL DISTANCE ACCOUNTED FOR,
AND CUMULATIVE PERCENTAGES

Percent of distance accounted
for by each vector



Factors:

% of distance
accounted for:

Time 1	39.67	19.15	10.57	7.81	6.45	4.69	4.43	3.39	2.72	1.15
Time 2	51.32	19.12	9.92	5.60	4.12	3.58	2.69	1.86	1.29	.51
Time 3	54.11	14.01	9.08	6.65	4.80	3.81	2.82	2.36	1.25	.79

Cumulative %
of distance
accounted for:

Time 1	39.67	58.82	69.38	77.19	83.64	88.33	92.65	96.14	98.86	100.00
Time 2	51.32	70.44	80.36	85.96	90.07	93.65	96.34	98.20	99.45	100.00
Time 3	54.11	68.12	77.20	83.85	88.65	92.47	95.29	97.65	98.90	99.68

TABLE 4.38

MEANS, STANDARD DEVIATIONS, AND TEST-RETEST RELIABILITIES FOR TIME1 TO TIME 3 ADMINISTRATION SCORES

	Means			Standard Deviation			Test-Retest Reliabilities		
	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	T ₁ , T ₂	T ₂ , T ₃	T ₁ , T ₃
Teamwork and Me									
My Job	41.00	28.23*	23.42**	39.50	31.04	31.09	.46	.78	.54
R/P/U	49.64	34.90*	31.81**	47.78	43.58	39.96	.52	.64	.49
	35.75	30.15	25.00**	37.37	37.95	34.51	.39	.80	.50
Motivating Subordinates and									
Me	37.70	28.66*	23.90**	40.11	29.80	31.98	.39	.71	.39
My Job	34.09	28.78	24.69**	42.62	34.91	32.61	.52	.77	.42
R/P/U	45.44	29.51*	26.93**	50.51	35.03	34.41	.13	.74	.25
Time Management and									
Me	43.13	33.31*	23.85**	40.29	32.40	29.72	.62	.68	.68
My Job	41.22	34.72	29.93**	44.84	39.17	37.57	.63	.78	.57
R/P/U	45.53	32.25*	23.36**	42.35	33.74	31.96	.23	.80	.39
Resolving Interpersonal Conflict and									
Me	43.29	24.86*	22.11**	40.52	28.03	28.60	.69	.80	.52
My Job	43.23	27.82*	27.68**	43.47	36.03	27.68	.56	.73	.55
R/P/U	45.62	34.79*	30.28**	39.93	40.95	39.50	.26	.73	.35
Confronting Issues and									
Me	34.27	24.51*	24.64**	37.16	28.40	30.23	.59	.61	.52
My Job	43.57	33.24*	28.09**	45.62	41.18	37.73	.63	.63	.67
R/P/U	44.87	30.14*	25.70**	41.62	33.18	31.84	.30	.53	.27
Communicating Openly and									
Me	33.19	20.99*	19.79**	34.81	23.96	25.04	.64	.72	.58
My Job	42.61	26.27*	23.08**	44.94	34.21	34.31	.49	.81	.40
R/P/U	42.73	23.87*	23.52**	43.37	31.06	31.37	.28	.74	.35
Merit Pay and									
Me	83.91	69.93*	66.55**	76.82	66.01	60.32	.72	.48	.49
My Job	87.42	77.75	69.01**	80.03	64.11	63.28	.64	.58	.64
R/P/U	90.28	72.54*	67.18**	74.34	70.59	56.29	.56	.58	.62

TABLE 4.3B (Continued)

		Means			Standard Deviation			Test-Retest Reliabilities		
		Time 1	Time 2	Time 3	Time 1	Time 2	Time 3	T ₁ , T ₂	T ₂ , T ₃	T ₁ , T ₃
ODTTB and	Me	44.68	31.17*	28.73**	43.72	34.44	33.43	.57	.66	.50
	My Job	55.30	40.11*	35.00**	48.31	43.49	41.07	.57	.65	.56
	R/P/U	49.02	35.78*	27.75**	44.13	40.28	33.67	.41	.65	.41
MBO and	Me	59.87	39.37*	30.56**	75.08	36.48	33.54	.56	.69	.54
	My Job	58.83	41.48*	33.31**	52.74	38.35	34.52	.61	.77	.45
	R/P/U	66.29	36.97*	31.13**	72.24	50.59	46.58	.27	.85	.30
Trust and	Me	25.45	20.35	18.17**	30.68	26.65	25.79	.47	.87	.43
	My Job	38.22	30.00*	25.64**	43.42	39.15	35.58	.65	.80	.69
	R/P/U	44.52	30.57*	28.93**	45.95	39.70	35.46	.35	.66	.47
Group Decision Making and	Me	41.70	30.63*	23.45**	41.24	33.36	28.87	.49	.76	.50
	My Job	45.64	39.27	33.80**	43.40	46.63	46.95	.64	.87	.67
	R/P/U	49.12	26.48*	24.01**	45.97	36.68	32.35	.43	.76	.30
Me and	R/P/U	35.16	27.29	24.14**	39.40	37.73	30.94	.31	.73	.51
	My Job	31.48	22.96*	22.11**	39.45	32.20	33.73	.56	.81	.69
P/P/U and	My Job	36.75	33.07	26.48**	41.81	46.05	38.70	.47	.75	.60

*p < .05 one-tailed test for paired comparisons between Time 2 or Time 3 and the time interval immediately preceding it.

**p < .05 one-tailed test for paired comparisons between Time 1 and Time 3 administration scores.

Table 4.3B also contains the supporting data. As can be seen, the mean distances shrunk in the hypothesized direction across the entire time 1 to time 3 interval. The data suggest that as participants reflected upon the concepts of the seminar/workshop and their jobs, they increasingly perceived the goals of the seminar/workshop as being congruent with their perceptions of their work. The shrinking variances also suggest that across time, increasing numbers of participants came to share that common viewpoint. Hence, prediction 3 is supported.

Prediction 4. Over time, the participants will increasingly perceive the key concepts or the goals of the seminar/workshop as being close to the concepts Relevant/Practical/Useful.
True.

Again, Table 4.3B contains the supporting data. The mean distances between the key concepts and Relevant/Practical/Useful decreased significantly across the entire time 1 to time 3 interval. The data suggest that participants increasingly established an instrumental relationship between the goals of the seminar/workshop and the task requirements of their work situation and therefore increasingly perceived the central concepts as being Relevant/Practical/Useful. As with the other paired comparisons, a great number of the variance diminished across time suggesting that respondents moved towards adopting such a similar viewpoint. Hence, prediction 4 is supported.

Prediction 5. Across time, participants will increasingly perceive the key concepts of the seminar/workshop as central in their cognitive environment and will tend to view the concepts as being inter-related with one another.

True.

There are several evidentiary sets of information relating to hypothesis 5. The first set lies in the mean distance matrices as reflected in Tables 4.3C, 4.3D, and 4.3E for time 1, time 2, and time 3. Visual inspection reveals that the mean distances for all paired comparisons tend to shrink across time. In all, there were 91 paired comparisons possible in each time period. Hence, there are 91 perceived distances that could undergo significant changes from time 1 to time 3. The results of a paired comparison test shows that 82 out of the possible 91 show significant changes at the .05 one-tailed test level. The perceived relationships between concepts which reflected no significant change are teamwork and merit pay, ODTTB and teamwork, teamwork and trust, teamwork and group decision making, motivating subordinates and merit pay, confronting issues and trust, merit pay and trust, and merit pay and group decision making. The perceived relationship between merit pay and group decision making changed significantly across the time 2 and time 3 interval but remained insignificant across the entire time 1 to time 3 interval.

The second set of evidence lies in the test-retest reliabilities of the paired concepts reflected in Table 4.3B. The test-retest

TABLE 4.3C

TIME 1 DISTANCE MEANS MATRIX

Concept	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 TEAMWORK	0.00													
2 MOTIVATI	37.46	0.00												
3 TIME MGT	44.29	48.58	0.00											
4 RESOLVIN	40.57	43.04	59.50	0.00										
5 CONFRONT	41.13	56.14	55.36	55.76	0.00									
6 OPEN COM	29.54	42.21	49.41	38.89	39.20	0.00								
7 MERIT PA	96.53	67.11	86.26	93.63	92.96	96.73	0.00							
8 SEMINAR/	37.97	56.44	55.65	60.96	65.70	47.52	101.02	0.00						
9 RELEVANT	35.75	45.44	45.53	45.62	44.87	42.73	90.28	49.02	0.00					
10 MBO	50.74	67.40	53.97	73.36	64.55	77.03	120.96	48.73	66.29	0.00				
11 TRUST	26.73	33.48	63.77	35.24	41.91	26.86	165.88	58.10	44.52	72.48	0.00			
12 ME	41.00	37.70	43.13	43.29	34.27	33.19	83.91	44.68	35.16	59.87	25.45	0.00		
13 GROUP DE	23.60	47.73	55.19	50.33	51.53	40.46	180.36	38.44	49.12	72.67	52.04	41.70	0.00	
14 MY JOB	49.64	34.09	41.22	43.23	43.57	42.61	87.42	55.30	36.75	58.83	38.22	31.48	45.64	0.00

TABLE 4.30
TIME 2 DISTANCE MEANS MATRIX

Concept	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 TEAMWORK	0.00													
2 MOTIVATI	31.71	0.00												
3 TIME MGT	37.44	45.94	0.00											
4 RESOLVIN	31.30	35.36	49.58	0.00										
5 CONFRONT	32.87	40.59	42.58	35.85	0.00									
6 OPEN COM	22.80	28.24	42.68	23.66	23.10	0.00								
7 MERIT PA	87.61	68.24	80.56	94.65	90.35	85.63	0.00							
8 SEMINAR/	29.32	39.62	42.51	49.79	44.79	28.28	96.48	0.00						
9 RELEVANT	30.15	29.51	32.25	34.79	30.14	23.87	72.54	35.78	0.00					
10 MBO	31.86	41.03	33.59	53.24	41.73	33.80	84.01	31.52	36.97	0.00				
11 TRUST	25.91	28.80	59.79	26.76	32.96	22.61	81.48	44.14	30.57	50.92	0.00			
12 ME	28.23	28.66	33.31	24.86	24.51	20.99	69.93	31.17	27.29	39.37	20.35	0.00		
13 GROUP DE	15.84	34.41	41.27	38.80	33.52	22.65	101.34	24.34	26.48	31.87	26.34	30.63	0.00	
14 MY JOB	34.90	28.78	34.72	27.82	33.24	26.27	77.75	40.11	33.07	41.48	30.00	22.96	39.27	0.00

TABLE 4.3E

TIME 3 DISTANCE MEANS MATRIX

Concept	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 TEAMWORK	0.00													
2 MOTIVATI	27.65	0.00												
3 TIME MGT	30.32	30.78	0.00											
4 RESOLVIN	31.03	27.54	41.36	0.00										
5 CONFRONT	28.28	33.45	34.29	31.62	0.00									
6 OPEN COM	19.62	23.19	33.07	21.76	24.16	0.00								
7 MERIT PA	81.06	62.12	76.21	77.47	79.44	78.59	0.00							
8 SEMINAR/	31.52	31.37	31.83	31.73	39.93	27.04	69.59	0.00						
9 RELEVANT	25.00	26.93	23.36	30.28	25.70	23.52	67.18	27.75	0.00					
10 MBO	27.58	37.19	27.29	36.48	29.65	24.44	72.39	24.90	31.13	0.00				
11 TRUST	22.93	26.69	44.37	22.25	30.92	18.45	77.04	40.21	28.93	31.76	0.00			
12 ME	23.43	23.90	23.85	22.11	24.65	19.79	66.55	28.73	24.14	30.56	18.17	0.00		
13 GROUP DE	17.32	28.93	30.85	22.89	30.70	18.73	89.51	23.24	24.01	24.72	23.80	23.45	0.00	
14 MY JOB	31.81	24.69	29.93	27.68	28.10	23.03	69.01	35.00	26.48	33.31	25.63	22.11	33.80	0.00

reliabilities for most of the concepts are low and none exceed the .9 level thereby suggesting instability or change.

The third set of evidence lies in the factor coordinate matrices and their corresponding data contained in Tables 4.3F, 4.3G, and 4.3H respectively. Several points are noteworthy from these tables. First, the trace values, which constitute an overall proxy measure of the variance of the concepts from the centroid, decreased over time. The trace values diminished from 21362.2 to 13185.2 to 9468.7 across the time 1, time 2, and time 3 respectively. Hence, it appears that overall the concepts moved closer to the centroid.¹³ How each concept moved towards the center, however, is qualitatively different.

In order to examine the nature of the movement of each of the concepts, each concept was plotted against the first three factors across time. The first three factors explain the great portion of the variance (an average of 76%) in real distance but not all.¹⁴ Hence, some caution must be reserved in interpreting Figure 8 which contains a plot of the movements of each of the concepts in relation to the first three factors.

¹³Ideally, one would perform a significance test for testing the centroid hypothesis that the projections for each of the concepts diminished across time. The key problem here involves dependent samples and this writer is unaware of an acceptable statistical test for significant differences in projections.

¹⁴In time 1, the first three factors account for 70% of the variance in real distances. In time 2, the first three factors account for 80% of the variance. In time 3, the first three factors account for 77% of the variance in real distances.

TABLE 4.3F

TIME 1 FACTOR COORDINATE MATRIX

(GALILEO ROTATED COORDINATES OF 14 VARIABLES IN A METRIC MULTIDIMENSIONAL SPACE FOR DATA SET 1)

Concept	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 TEAMWORK	-14.30	-3.45	8.38	2.00	-8.66	16.53	3.96	-6.33	-4.14	.85	-.01	-3.47	11.44	-11.12
2 MOTIVATI	17.74	-.88	5.83	14.67	3.13	4.62	-11.64	-4.61	-8.50	-.27	-.00	5.95	-4.48	-9.65
3 TIME MGT	1.40	23.69	-2.74	-14.27	18.34	12.36	.67	9.44	-2.66	3.44	.06	-1.82	-7.56	-3.36
4 RESOLVIN	-.70	-19.28	-1.22	18.95	13.05	4.09	10.65	.10	15.58	.67	-.05	.53	-1.77	-2.16
5 CONFRONT	-3.18	-7.46	-25.22	-17.89	-15.06	3.62	-2.01	-6.01	7.17	-3.21	-.02	1.31	-6.46	-6.93
6 OPEN COM	-5.99	-22.51	3.38	-8.37	-.56	4.56	1.84	15.77	-2.96	-6.36	-.05	3.27	6.96	8.42
7 MERIT PA	81.18	13.73	5.95	-.89	-6.99	.68	1.23	-1.42	3.49	-.85	.03	-1.33	2.40	8.05
8 SEMINAR/	-18.24	15.54	27.81	-.14	-10.90	-11.82	4.31	5.53	3.10	-3.79	.04	-.93	-6.75	-9.70
9 RELEVANT	-1.68	-1.87	-2.70	-7.92	7.24	-9.70	20.71	-10.85	-9.78	.61	-.00	1.78	-.32	3.46
10 MBO	-34.40	41.23	-12.11	13.77	-6.19	2.15	-.76	-.86	1.68	-.73	.10	1.50	3.17	13.21
11 TRUST	-2.65	-24.20	-9.02	14.22	-9.68	-1.46	-1.73	4.42	-8.84	2.23	-.06	-4.52	-9.34	8.06
12 ME	1.11	-2.72	-6.46	-3.73	-5.22	-12.59	-3.51	7.52	2.29	11.27	-.01	1.61	7.54	-5.97
13 GROUP DE	-21.31	-13.26	20.71	-12.41	5.45	.45	-12.78	-10.67	4.62	2.79	-.03	-.32	-1.15	13.71
14 MY JOB	1.03	1.43	-12.59	2.01	16.06	-13.51	-10.90	-2.04	-1.05	-6.64	.00	-3.57	6.34	-6.00

EIGENVALUES (ROOTS) OF EIGENVECTOR MATRIX--

9193.34 4412.20 2434.14 1799.35 1485.02 1080.00 1019.82 780.03 625.56 263.91

PERCENTAGE OF DISTANCE ACCOUNTED FOR BY INDIVIDUAL VECTOR--

39.67 19.15 10.57 7.81 6.45

TRACE 21362.15

TABLE 4.36

TIME 2 FACTOR COORDINATE MATRIX

(GALILEO ROTATED COORDINATES OF 14 VARIABLES IN A METRIC MULTIDIMENSIONAL SPACE FOR DATA SET 2)

Concept	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 TEAMWORK	-11.51	1.53	-5.70	-.19	8.02	3.45	11.74	-.22	.98	4.84	.02	-.50	-4.97	-3.07
2 MOTIVATI	8.85	-6.63	-9.53	-8.63	4.16	6.19	-7.65	-4.16	8.02	-.39	.01	-.13	1.11	-6.97
3 TIME MGT	2.25	25.74	19.75	-3.35	6.05	-3.65	1.67	-2.37	1.09	-.03	.02	2.08	9.38	-1.41
4 RESOLVIN	-13.78	-21.20	13.42	-8.31	5.42	2.71	1.04	7.33	.93	-1.74	.02	-2.19	1.02	9.45
5 CONFRONT	-10.90	-5.40	11.59	18.71	-7.57	2.29	-2.00	-3.44	4.43	1.53	-.02	1.57	.37	4.69
6 OPEN COM	-9.82	-5.55	-1.89	1.95	-5.09	2.32	-4.19	8.09	-.26	1.96	-.01	5.54	-.45	-2.04
7 MERIT PA	75.76	.19	-3.98	1.82	-.25	-.59	1.69	.97	-.34	.31	-.00	.30	-1.07	8.34
8 SEMINAR/	-17.68	15.33	-13.32	-8.27	-9.18	-10.09	-1.69	1.95	1.36	1.89	-.03	-2.22	3.15	6.73
9 RELEVANT	3.55	1.87	.39	7.75	10.40	-7.73	-9.02	2.93	-4.07	.73	.03	-2.23	-3.60	-8.28
10 MBO	-4.00	25.08	-6.57	3.55	-3.41	13.27	1.21	3.53	-2.90	-2.98	-.01	-1.81	1.14	-3.35
11 TRUST	-3.66	-24.26	-10.77	3.55	-.37	-1.38	3.69	-3.40	-4.54	-.74	-.00	.15	13.03	-3.77
12 ME	4.58	-5.13	4.04	-.32	-7.04	-8.53	7.21	.94	2.85	-3.85	-.02	.26	-6.65	-11.37
13 GROUP DE	-25.06	3.77	-9.21	3.08	6.70	-2.13	-.58	-5.58	-1.14	-3.15	.02	2.54	-6.61	12.10
14 MY JOB	1.40	-5.35	11.78	-11.33	-7.83	3.87	-3.12	-6.56	-6.41	1.61	-.02	-.22	-5.86	-1.55

EIGENVALUES (ROOTS) OF EIGENVECTOR MATRIX--

7365.13 2743.52 1423.53 803.40 590.67 513.55 386.00 266.42 185.05 73.70 -.01 -62.41 -432.46 -670.95

PERCENTAGE OF DISTANCE ACCOUNTED FOR BY INDIVIDUAL VECTOR--

51.32 19.12 9.92 5.60 4.12 3.58 2.69 1.86 1.29 .51 -.00 -.44 -3.01 -4.68

TRACE 13185.15

TABLE 4.3H
TIME 3 FACTOR COORDINATE MATRIX
(GALILEO ROTATED COORDINATES OF 14 VARIABLES IN A METRIC MULTIDIMENSIONAL SPACE FOR DATA SET 3)

Concept	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 TEAMWORK	-12.85	1.06	.02	1.45	13.22	.91	-.55	-1.23	5.12	-4.80	1.05	.00	1.22	.56
2 MOTIVATI	6.55	-5.87	.80	-11.23	5.89	-1.71	-7.21	-6.57	-3.84	.58	-.84	-.01	-.68	-7.43
3 TIME MGT	-3.72	20.52	-11.30	-8.96	.37	-4.34	3.65	-.67	-1.98	.30	1.34	.02	-4.47	6.36
4 RESOLVIN	-7.88	-13.57	8.30	-4.45	-10.09	2.91	3.59	-1.77	-2.33	-3.44	2.61	-.02	-.69	.20
5 CONFRONT	-9.34	-2.56	-15.26	9.26	-5.71	8.55	-2.34	-6.25	.56	-.28	-1.47	-.00	-1.48	2.86
6 OPEN COM	-10.72	-4.45	2.12	2.44	-.99	-2.01	-6.23	-.36	3.24	5.35	2.86	-.01	1.89	3.44
7 MERIT PA	67.12	-1.36	1.67	2.82	1.36	1.17	.69	-.27	-.01	-.25	.20	-.00	1.81	5.57
8 SEMINAR/	.92	13.70	16.96	-1.82	-5.71	1.74	-1.96	-.19	4.25	.14	-1.81	.02	-5.54	-1.24
9 RELEVANT	1.16	4.51	-4.49	-3.13	2.00	11.58	-1.05	9.52	-1.45	.91	.59	.01	.40	-6.84
10 MBO	-3.12	12.84	3.57	16.75	-.64	-6.01	-.27	-.26	-4.11	-.82	.68	.02	1.54	-7.29
11 TRUST	-8.07	-18.26	1.91	5.78	6.52	-3.40	2.92	4.31	-1.92	1.26	-1.12	-.02	-7.68	3.77
12 ME	.74	-3.71	-2.98	-2.44	.00	-1.58	11.56	-3.01	3.26	2.81	-.68	-.00	2.98	-8.08
13 GROUP DE	-22.05	3.35	8.32	-2.64	1.76	1.75	1.39	.72	-3.15	.57	-2.02	.00	7.95	9.29
14 MY JOB	1.27	-6.21	-9.62	-3.82	-7.98	-9.57	-4.18	6.03	2.35	-2.32	-1.37	-.01	2.75	-1.16

EIGENVALUES (ROOTS) OF EIGENVECTOR MATRIX--

5555.89 1438.78 932.09 682.62 493.06 391.39 289.75 242.70 127.93 80.73 32.57 .00 -203.28 -415.43

PERCENTAGE OF DISTANCE ACCOUNTED FOR BY INDIVIDUAL VECTOR--

54.11 14.01 9.08 6.65 4.80 3.81 2.82 2.36 1.25 .79 .32 .00 -1.98 -4.05

TRACE 9468.72

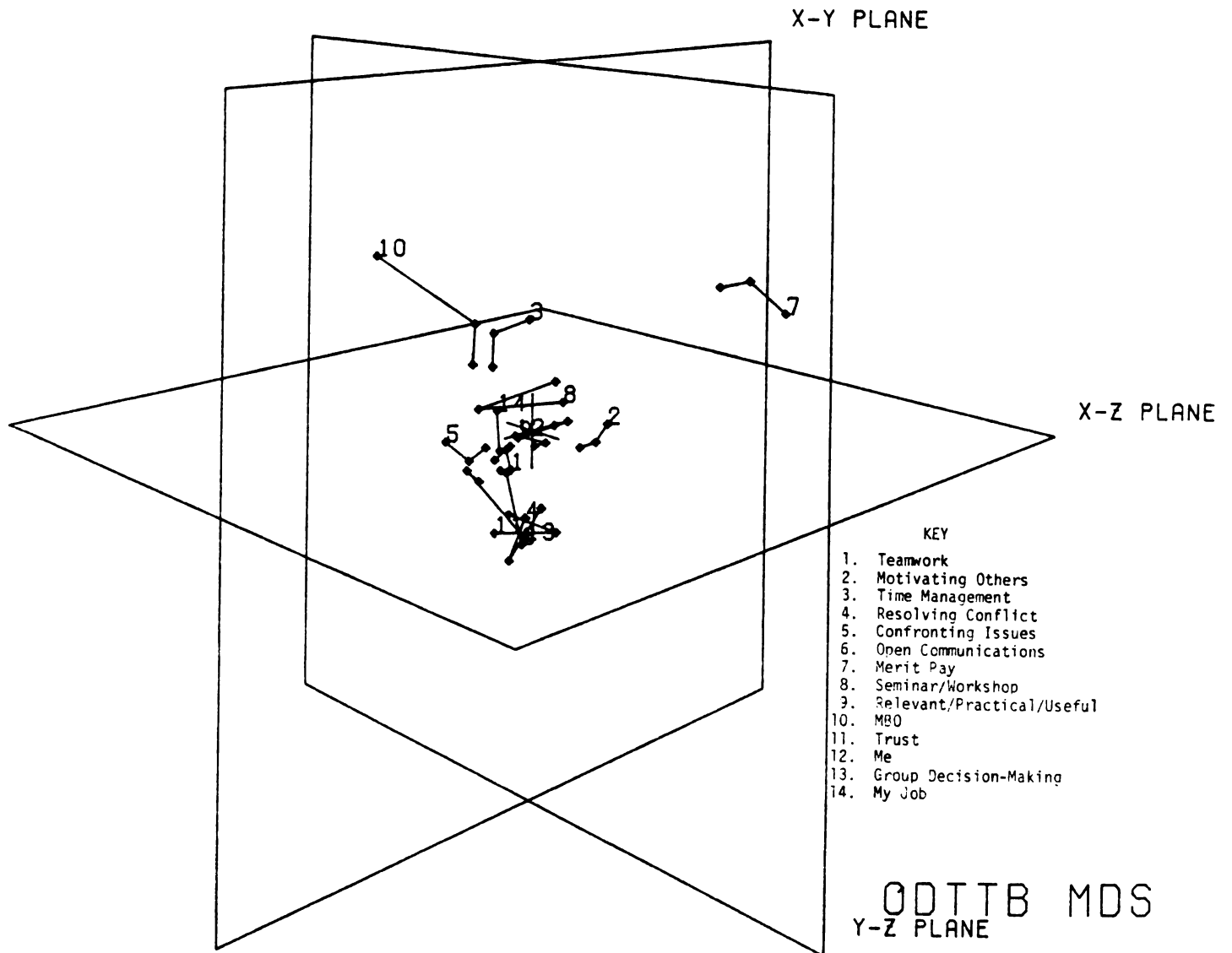


FIGURE 8
ODTTB-MDS PLOT

According to the schematic plot, the concept of teamwork (1) moved slightly towards the centroid but moved back out again. The concept motivating subordinates (2) gradually moved towards the centroid across time. The concept time management (3) gradually moved into the center of space. The concept resolving interpersonal conflict (4) appears to have initially moved away from the center of space only to fall back close to its original position in cognitive space. The concept confronting issues (5) gradually moved closer to the centroid. The concept open communication did not move drastically from time 1 and time 2 but moved closer to the centroid in a tangential way. The concept merit pay (7) moved a little towards the center across time. Relative to the other concepts, merit pay was distant or "way out" from the center of space. Although it moved towards the centroid, it still remained somewhat distant. The movement of ODTTB (8) is characterized as "side to side" movement. The concept moved in cognitive space but it would appear that that movement is restricted around a somewhat close periphery of the centroid. The concepts Me (12), and Relevant/Practical/Useful (9) are the concepts closest to the centroid of space relative to the other concepts as would be reasonably expected. The concept MB0 (10) displayed drastic movement towards the center of space relative to the other concepts. This suggests that the concept apparently underwent a salient change in redefinition or meaning. The concept trust (11) moved "sideways" and then moved towards the center of space.

The concept group decision making (13) initially moved away from the centroid and eventually moved closer to the center. Its total net movement towards the centroid from start to finish however was slight. The movement of this concept suggests that the participants initially were adverse to the concept then changed their minds in the positive direction but not by very much. The concept My Job (14) maintained some distance from the centroid indicating that it was distinguishable from the other concepts. Initially the concept moved around the periphery of the center of space and then "inched" its way towards the center. Again, it must be pointed out that these observations concerning concept movement is restricted only with respect to the first three factors. Since the trace shrank, it also suggests that participants increasingly came to share common viewpoints and hence indicates cultural change. This is also corroborated by the data in Appendices G, H, and I, which show a shrinkage in the variance among a large number of paired concepts across time.

The second set of observations noteworthy from Tables 4.3F, 4.3G, and 4.3H relate to the negative eigenvalues and the number of "imaginary" dimensions. Negative eigenvalues occur when intransitivity is reported among comparisons of the concepts. When intransitivity occurs, the data does not fit certain triangular requirements and thereby giving rise to negative eigenvalues

and "imaginary" dimensions.¹⁵ Hence, to some extent, the presence of imaginary dimensions and the negative eigenvalues can be taken as a proxy measure of how well participants established meaning among the concepts. If this is the case, then the concepts acquired increased meaning across time and subjects were increasingly able to process the concepts in an increasingly "rational" manner. This is suggested by the decreasing number of imaginary dimensions and negative eigenvalues across time. Thus, taking all of the evidence into account, there is strong support for prediction 5.

(Summary)

In summary, the results of study 3 indicate (a) that the responses to the MDS questionnaire are not random (b) support for predictions 2, 3, and 4 and (c) that although the empirical results reflect differences in pattern according to time and concepts, there is overwhelming support for prediction 5.

Discussion of the Results

In this section, a discussion of the results of the three studies ensues. A comparison of the findings across studies will also be conducted.

¹⁵Real space is defined as one in which any 3 points i, j, k , satisfies the relation $d_{ij} + d_{ik} \geq d_{jk}$; $d_{ij} + d_{jk} \geq d_{ik}$; and $d_{ik} + d_{jk} \geq d_{ij}$. If these distances do not satisfy these triangular constraints, factorization a la the Galileo routine will produce negative eigenroots and negative eigenvalues.

Study 1. The Traditional Approach: Discussion.

The results of Study 1 led to the finding of no significant change on twelve out of thirteen dependent variables of interest.

On one variable, job involvement, a shift in the negative direction was observed. On the basis of this study alone, therefore, one could conclude that seminar/workshop was unsuccessful as a persuasive socialization or normative reeducation attempt. The data from this study would appear to suggest that the theory inputs, the experiential exercise, group discussions, or even the "Hawthorne effect" had virtually no impact on the attitudes, cognitions, value judgments, and perceptions of the participants.

Hence, it would appear that on the basis of Study 1 alone, the managers remained unchanged across time and did not undergo a substantial transformation of any sort. According to the results, the managers entered the seminar/workshop with a set of job-related or self attitudes, perceptions, norms, values, and outlook that remained essentially the same throughout. Thus, Study 1 suggests, that while the managers were in a rather good mood throughout, they retained a set of job-related or self attitudes, perceptions, values, norms, and outlook at the ending of the seminar/workshop which was essentially the same from the outset.

Study 2. The Panel Approach: Discussion.

Study 2 results, when contrasted with the first study, yielded somewhat of a different, if not more complicated, story. With the

measures rationalized by valuation theory, Study 2 utilized correlational and factor analyses to examine the character of the change process. Several no change and real change model predictions were tested. One early finding was that some normative changes took place but those changes depended upon the various variables and time frame involved and that errors of measurement or transitory influences such as mood are not rival, plausible hypotheses. The means of the teamwork, time management, MBO, merit pay, and group decision making increased significantly across time, suggesting that as participants examined each of the concepts during the seminar/workshop, they arrived at the judgment that the concepts were of utility in relation to their work. In addition, the variance significantly decreased for the concepts teamwork, motivating subordinates, confronting issues, trust, and group decision making thereby suggesting that during the course of the seminar/workshop participants increasingly came to hold common viewpoints. Hence, the data suggests that for some variables, cultural change occurred.

There is one troublesome feature of the data, however, and that concerns the nature of the change involved. Do the variables interact causally with one another? If so, what is the character of that causal relationship? In exploring these questions, the endogenous change model was tested which yielded equivocal results.

In an attempt to clarify the nature of the causal relationships that may be involved, the data were retranslated into the language of cross-lagged correlational analysis and further data manipulations

were made. Cross-lagged correlational analysis is appropriate in examining hypothesized causal priority between two variables asserted to be reciprocally causally related as was done in Study 2 under the endogenous change model.

Cross-lagged correlational analysis requires two different constructs, x and y , measured at two different time frames. Consequently, two constructs measured at two different times yield at least four variables (x_1 , x_2 , y_1 , and y_2) which in turn can be used to generate two auto correlations or test-retest reliabilities ($r_{x_1x_2}, r_{y_1y_2}$), two synchronous or simultaneous correlations ($r_{x_1y_1}, r_{x_2y_2}$), and two cross-lagged correlations ($r_{x_1y_2}, r_{x_2y_1}$). These different correlations are depicted in the Figure below:

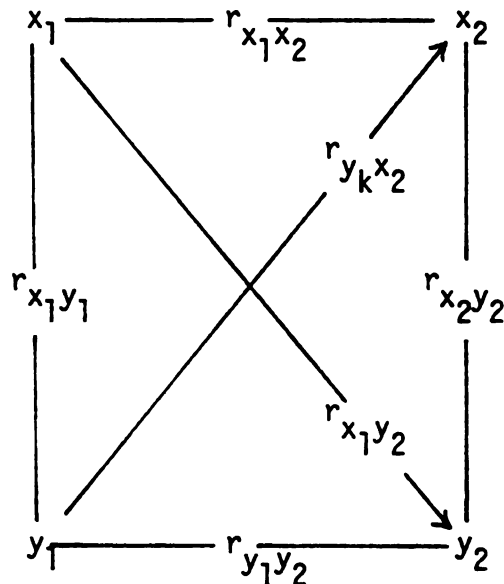


FIGURE 9

SCHEMATIC DIAGRAM OF CROSS-LAGGED ANALYSIS

Some critical assumptions of this technique include synchronicity, stationarity, uncorrelated residuals, and zero correlation between residuals and the main variables of interest. Given these assumptions and assuming that all of the four main variables have been perfectly measured, then the causal inference process works accordingly (Clegg et al., 1977):

$$\text{If } x \text{ causes } y, \text{ then } r_{x_1 y_2} > r_{x_1 y_1} \cong r_{x_2 y_2} > r_{y_1 x_2},$$

$$\text{if } y \text{ causes } x, \text{ then } r_{y_1 x_2} > r_{x_1 y_1} \cong r_{x_2 y_2} > r_{x_1 y_2}.$$

Alternatively stated, in the event of monocausality, the causal cross-lag will be larger than its non-causal cross-lag counterpart and both static correlations, the static correlations will be roughly equal and larger than the non-causal-cross lag. In the case of reciprocal causation (i.e. x causes y and y causes x in roughly equivalent strengths), the $r_{x_1 y_2} \cong r_{y_1 x_2} > r_{x_1 y_1} \cong r_{x_2 y_2}$.

Bohrnstedt (1969) has recommended a constructive modification on the cross-lag correlations. He recommends the procedure of residualization or the use of partial correlations. Consider, for example, $r_{x_1 y_2}$ or the notion that x causes y . Y_2 , however, has two sources of variation: x_1 and y_1 . Hence, the variation in y_2 can be attributable, in part, to y_1 . Thus, y_1 must be controlled by removing its effect on y_2 . This removal is called residualization and is effectively done through the use of partial correlation $r_{x_1 y_2 \cdot y_1}$. This procedure was carried out in a subsequent data

reanalysis, the results of which will be presented shortly.

In using the cross-lagged correlational approach, there are quite a number of key interpretive threats which can arise depending, for example, on how well the critical assumptions mentioned hold. Moreover, the ways in which to cope with violations of assumptions are debatable, tedious, and complicated. The key interpretative threat to this study and important to this discussion is that of spuriousness.

As Kenny (1975) suggests, an important rival explanation to the assertions that x causes y or y causes x or x and y cause one another is that the observed relationships between x and y are due to a third variable z . In other words, x and y really are not causal determinants of one another but rather are spurious effects of a third variable z . This third variable, z , is sometimes referred to as a general factor and its operation is illustrated for three time points in Figure 10, below.

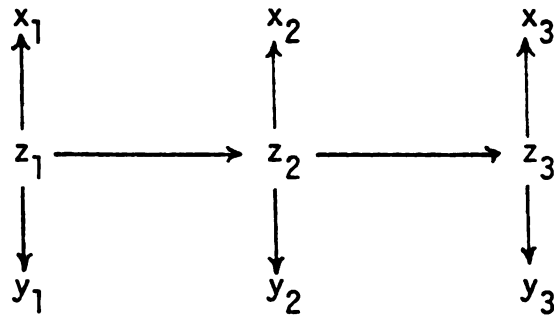


FIGURE 10

THE GENERAL FACTOR IN OPERATION IN CROSS-LAGGED CORRELATIONAL ANALYSIS

If this general factor model holds, then the static and cross-lag correlations would depend on the changing or unchanging character of z across time. If the general factor is in operation and does not change across time, the static correlations will be roughly equal to one another, the cross-lag correlations would also be roughly equal to one another, but the static correlations will be greater than cross-lagged correlations. Put differently, the prediction for an unchanging general factor across time is

$r_{x_1y_1} \cong r_{x_2y_2} > r_{x_1y_2} \cong r_{x_2y_1}$. In the case of a changing general factor across time, the prediction of the static or synchronous correlation and the cross-lag correlations will depend on the character of that change. In particular, it will depend upon the changing character of the variance of the general factor across time. If the variance of the general factor decreases across time and increasingly approaches constancy, the static and the cross-lag correlations will also decrease and will approach zero. If the variance of the general factor increases across time, the static correlations will also increase across time but will remain larger than the cross-lag correlations. Hence, by comparing the magnitude of the static correlations against the cross-lag correlations, an initial test for spuriousness as an alternative explanation can be made.

The basic issue at hand can be narrowed down to the question: which is a more valid explanation of the data results: the endogenous change model or the general factor model? In other words,

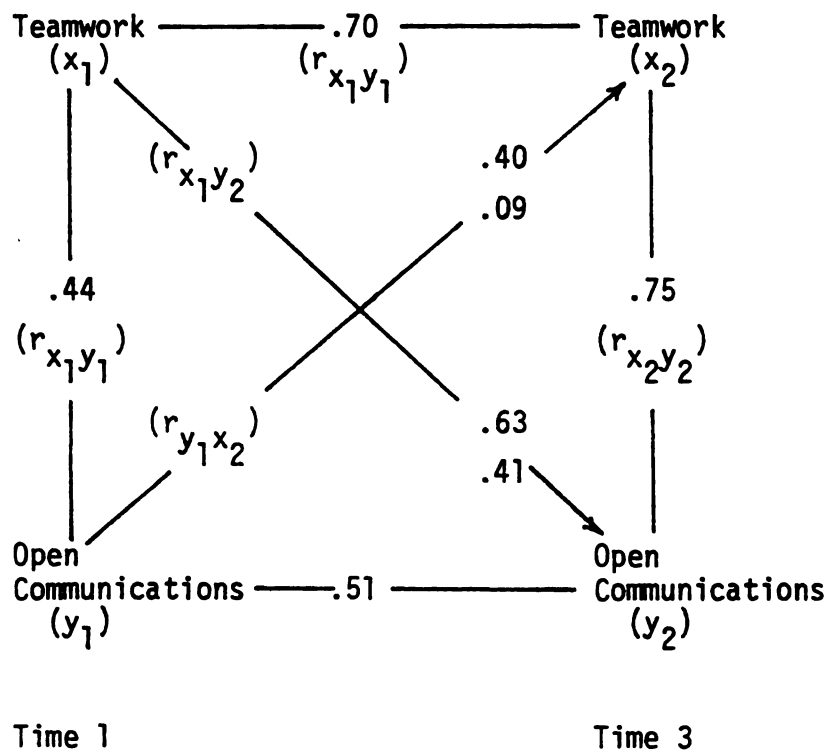
does teamwork causally affect or lead to the motivation of subordinates or vice versa; does teamwork lead to or cause trust or vice versa, does trust lead to open communications or vice versa, etc., or are all these relationships spurious and due to a global, general factor? It is noted that this issue goes back to the initial questions raised earlier in the discussion pertaining to what causes what and what is the character of the change involved. In order to explore the issue of whether the endogenous change model or the general factor model holds, the results were retranslated into the procedures of cross-lagged analysis and further data manipulations were made.

(Cross-Lagged Panel Correlation: A Reanalysis)

The reader is reminded that there are 11 dependent variables of interest: teamwork, motivating subordinates, time management, resolving conflict, confronting issues, communicating openly, MBO, merit pay, contingent nonfinancial rewards, trust, and group decision making. These variables were measured at three points in time for a net total of 33 variables. As the reader is aware, the static or synchronous correlations as well as the autocorrelations or the test-retest reliabilities, and the cross-lagged correlations have already been calculated. Additionally, following the advice of Bohrnstedt (1969), partial cross-lagged correlations were also computed. Given 33 variables, there are 165 cross-lagged correlation analyses to be performed. If each of these were retranslated into cross-lagged correlation analysis diagrams such as that in

Figure 9, there would be 165 such diagrams. These diagrams are all contained in Appendices L, M, and N for time 1 and time 2, for time 2 and time 3, and for time 1 and time 3, respectively. For each diagram, the autocorrelations, the static or synchronous correlations, the unpartialled, and the partialled cross-lag correlations have all been appropriately recorded.

Consider what appears to be one typical result: the relationship between teamwork and open communications during the time 1 to time 3 interval. Does teamwork lead to or cause the development of open communications or is open communications more of a primary cause which eventually leads to the use of teamwork? The relevant results are reproduced below:



In this example, the static or synchronous for teamwork and for time 1 and time 3 are .44 and .75 respectively. The autocorrelations or the test-retest reliabilities for teamwork and for open communications are .40 and .63 when these are partialled, then $r_{y_1x_2 \cdot x_1} = .09$ and $r_{x_1y_2 \cdot y_1} = .41$. The results suggest the tentative causal inference that teamwork primarily causes or leads to open communications rather than the reverse.

There are two interpretative threats, however, to the causal inference: changing reliability and spuriousness, both of which must be ruled out. As Campbell (1963) has pointed out, variables which increase in internal reliability would appear to be effects and variables which decrease in internal reliability would appear to be causes. Hence, one rival explanation is that the teamwork leads to open communications notion is based on artifacts of unreliability and is thus not theoretically meaningful. The variable teamwork simply decreased in internal reliability while the variable open communications increased across time.

The rival hypothesis of unreliability, however, can be easily ruled out by the following procedures. Given singular measures for each variable, internal reliability (r_{xx}) may be defined as the correlation of the variable with another variable like itself with an exact same error component. In factor analysis terms, internal reliability is simply another term for communality. Communality estimates, then, can be used as an approximation for internal reliability. Average communality estimates were used as a measure of internal reliability. When this is done, the internal reliability

for teamwork at time 1 and time 3 increased from .58 to .85. The internal reliability for open communications increased very slightly from .63 to .70.¹⁶ According to the rival hypothesis, the reliability of teamwork should have decreased. This prediction was not borne out and so the rival explanation of changing reliabilities can be ruled out. What remains is the second rival explanation, spuriousness, a topic which will receive extended discussion shortly.

Other important information is also contained in the example. One notes that the static correlations increased across time and are larger than the partialled cross-lag correlations. This suggests two ideas. One is that the assumption of perfect stationarity is not a reasonable one to hold. This, in turn, implies that the causal structure of teamwork and open communications changed during the course of the seminar/workshop. The second is that spuriousness or the operation of a general factor may be a reasonable alternative as a rival explanation.

The reader is invited to visually scan the remaining 164 cross-lagged analysis diagrams or to choose several causal relationships of interest and to conduct a similar analysis as in the above example. Visual scanning of the results in Appendices L, M, and N would lead to the following observations or inferences. The first observation relates to the question of what variables caused what, in what direction, and in what magnitude. Obviously, the answer to this question must be a contingent one, depending upon the

¹⁶The average communality estimates for each variable for the three time periods are contained in Appendices I, J, and K.

variables and time frame involved. Both symmetric and asymmetric causal relationships can be observed thereby suggesting the occurrence of endogenous change, however, the magnitudes of the non-zero relationships are generally modest in size. The second observation is that the partialing procedure generally reduced the size of the cross-lag correlations and, in some instances, reversed the sign or the direction of causality. The third observation deals with the static or synchronous correlation. As was mentioned, the average static correlations increased across time. Tables 4.4A, 4.4B, and 4.4C provide for a more detailed look at the character of that change. The tables show the various reliability ratios. They were derived by simply dividing the static correlation of two variables at a later point in time by the static correlation of the same two variables at a previous point in time. In the teamwork and open communication example, the static or synchronous correlation at time 1 was .44 and the static correlation at time 3 was .75. Hence, $.75/.44 = 1.70$. A value of 1.0 represents no change, a value of less than 1.0 represents a decrease, and a value over 1.0 represents an increase. In the example, the static correlations increased across time 1 and time 3 by 170 percent. From Tables 4.4A, 4.4B, and 4.4C, it can be observed that the static correlations from time 1 to time 3 and time 1 to 2 increased quite substantially while the static correlations increased only by a small amount. In fact, the static correlations increased by an average of 281 percent between time 1 and time 2, an average of 298 percent between time 1 and time 3, and only an

TABLE 4.4A

RELIABILITY RATIOS
FOR TIME 1 AND TIME 2
SYNCHRONOUS CORRELATIONS

[illegible]

TABLE 4.4B

RELIABILITY RATIOS
FOR TIME 2 AND TIME 3
SYNCHRONOUS CORRELATIONS

[illegible]

TABLE 4.4C

RELIABILITY RATIOS
FOR TIME 1 AND TIME 3
SYNCHRONOUS CORRELATIONS

[illegible]

average of 110 percent between time 2 and time 3. This suggests that perfect stationarity is an unreasonable assumption especially for time 1 and time 2 and time 1 and time 3 which means that the causal structures for the dependent variables underwent change especially for those time intervals. The fourth observation is that, in a great number of instances, the static correlations are greater than the uncorrected cross-lags and, certainly, the partial cross-lag correlations. This fact, together with the observation increasing static correlations, is symptomatic of the possibility that spuriousness or the operation of a general factor may be occurring. It could be that a general factor is giving rise to the obtained correlations and that it is changing across time. It is imperative, therefore, that this rival explanation be examined and, if possible, be ruled out. Attention now turns to a consideration of a general factor model.

(A General Factor Model)

In order to examine the general factor model, obviously one needs an approximate measure of the general factor. The general factor has not been actually observed and so a direct test cannot be made. However, the eleven dependent variables can serve as proxy measures for the general factor since they are correlated with it. Thus, the average value of the eleven indicators can represent a reasonable estimate of the general factor. It is important to note that the general factor is a variable in its own right and has an error component in it. If the general factor

undergoes real change, then certain predictions should hold. The means of the general factor should be significantly different across time, the variance should change significantly across time, and the test-retest correlations for the estimated general factor should also be significantly different across time.

Table 4.5 contains the relevant means, standard deviations, test-retest reliabilities, and coefficient alpha for the estimated general factor at each of the three points in time. According to the Table, the various levels of coefficient alpha indicate that the eleven items provide a very good estimate of the general factor across time. The means and the variances significantly increase across time. Of note is that the variance increased significantly from the time 1 to the time 2 interval and across the entire time 1 to the time 3 interval. Additionally, after performing a one-tailed z test on the sum of the differences between the test-retest correlations of the three time periods,¹⁷ a significant difference between the test-retest correlations of the estimated general factor is obtained.

Overall, the results suggest strongly that a general factor is in operation and is undergoing real change. The pattern of change in the variance of the general factor also explains the pattern of change of the static correlation matrices. The fact

¹⁷The formula used to conduct this z test is contained in J. L. Tartar, "Mathematical models of attitude change in a longitudinal study of large organizations." Unpublished Doctoral Dissertation, Michigan State University, 1972; p. 109.

TABLE 4.5
 THE ESTIMATED GENERAL FACTOR
 FOR THE FIRST, SECOND, AND THIRD
 ADMINISTRATION SCORES
 (N = 69)

	Means	Standard Deviation	Coefficient Alpha	Test-Retest Reliability		
				T ₁ T ₂	T ₂ T ₃	T ₁ T ₃
General Factor Time 1	5.65	.69	.78	.46	.77	.57
General Factor Time 2	5.74	.87*	.90			
General Factor Time 3	5.87**	.81**	.90			

* p < .05 one-tailed test for the difference between time i and the time period immediately preceding i.

** p < .05 one-tailed test for the difference between time 3 and time 1.

that the static correlations increased from time 1 to time 2, from time 1 to time 3, and remained relatively stable from time 2 to time 3 can be explained by the similar pattern of changes in the variances of the estimated general factor. The general factor model holds and, therefore, the alternative rival explanation of spuriousness cannot be effectively eliminated.

What is the general factor? A precise identification of it is impossible but a reasonable guess can be made. The essence of the general factor would have to reflect the major concepts of the eleven dependent variables which act as indicators of the general factor. The eleven dependent variables appear to reflect an emphasis on a particular type of work relationship, one based on openness, teamwork, trust, confrontation of real issues, and open communications, and an emphasis on productivity through the managerial use of time management, management by objectives, group decision making, and the exercise of contingent rewards. Collectively, this orientation perhaps might be labeled as a teamwork philosophy of productive managerial work. Under this interpretation, then, positive valuations of this teamwork philosophy increased throughout the course of the seminar/workshop. The increasing variance of the estimated general factor also suggests, that across time, those who adhered positively to this philosophy increased their positive valuations of it. On the other hand, those who did not espouse this philosophy as strongly, decreased their positive valuations of the teamwork philosophy slightly

across time. Hence, under this interpretation, the seminar/workshop appears to have strengthened the already preconceived notions participants may have held about a teamwork philosophy of productive managerial work across a one week span of time.

(The "Gamma" Change Model)

Following the recommendation by Golembiewski et al. (1975), the static correlation matrices were also subjected to factor analysis of the varimax with rotation type. According to these authors, changing factor structures may be important indicators of change resulting from social interventions such as those associated with experimental, therapeutic, training, or Organization Development efforts. In particular, they have asserted that substantial incongruence of pairs of between-wave factorial structures is indicative of a particular type of change which they have labelled gamma effects and is distinguished from beta or alpha effects. Alpha change, beta change, and gamma change have been defined as follows:

1. ALPHA CHANGE involves a variation in the level of some existential state, given a constantly calibrated measuring instrument related to a constant conceptual domain.
2. BETA CHANGE involves a variation in the level of some existential state, complicated by the fact that some intervals of the measurement continuum associated with a conceptual domain have been recalibrated.
3. GAMMA CHANGE involves a redefinition or reconceptualization

of some domain, a major change in the perspective or frame of reference within which phenomena are perceived and classified, in what is taken to be relevant in some slice of reality (pp. 134-135).

This typology of change, however, warrants some clarification and further sharpening.

Alpha change involves a minor or undramatic change in some existential state and assumes that the measurement process of that change has not been substantially altered. Existential states may refer to an observer of change or the actual referent of change (the real world) or both. Suppose, for the purpose of illustration, that a behavioral scientist is interested in monitoring changes in the minds of secretaries arising from a human relations training effort. Suppose, also, that he does so through the use of Likert scale items and format. Say, he is interested in the degree to which secretaries perceive their immediate supervisors as being friendly. He therefore asks the secretaries the degree to which they agree or disagree with the statement: "My boss is friendly." The secretaries are instructed to use a 5 point scale ranging from -2 which denotes strongly disagree, -1 which denotes agree, 0 which denotes neutrality, +1 which denotes agree, and +2 which denotes strongly agree. Faced with this measurement task, the secretaries must search their memory and interpret what "friendly" means. Suppose secretaries define "friendly" as the frequency with which their boss says "Good Morning" on Mondays.

Suppose their immediate supervisors do make such utterances. The secretaries then may place their checkmark on the under +1 which signifies that they agree with the statement. Suppose that during the training effort, the secretaries uncover "new" information; that is, their boss actually says "Good Morning" not only on Mondays but on Fridays as well. In other words, they have changed their minds slightly in their regard of their boss as being friendly. To indicate this change on the second administration of the questionnaire, the secretaries may place a checkmark under +2 which denotes strong agreement with the statement. Now, if there were 1000 such secretaries, the difference between a +1 and a +2 would be statistically significant. Of note, however, is that the secretaries did not alter the measurement instrument in any fundamental way. The secretaries did undergo change in their existential state, namely how they judged their boss as being friendly, but that change may be regarded as trivial, inessential, and undramatic. Such is alpha change.

In beta change, the primary emphasis is on the measurement process and the nature of the measurement instrument being used to measure change. Unfortunately, "beta change" is somewhat of a difficult and slippery concept to grasp coherently at first and it appears that perhaps different types of beta change can be distinguished depending upon what is meant by "response scale recalibration." One type of beta change is the case where there is no real change in existential state but observed change has taken place because the measurement process has been altered. This,

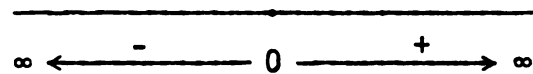
however, is simply the case of test-retest unreliability, instrumentation decay, or error of measurement, a model which was previously considered.

A second type of beta change assumes the occurrence of real change in some existential state. Observers of that change, however, cannot effectively communicate that change to others because of certain structural limitations inherent in the measurement task. Artifactual "ceiling effects" provides a good example of this phenomena. As with the previous illustration, secretaries at time 1 may have indicated strong agreement to the statement "My boss is friendly." Following an intervention, the secretaries may have changed their minds in the direction where they now perceive their boss as being friendlier than they had previously imagined. However, a change cannot be recorded since they have previously used the extreme end of the Likert scale. It is important to note also that ceiling effects need not occur only at the extreme ends of the scale. For example, respondents may view themselves as not being strongly opinionated and may, subsequently, invoke a rule never to use the extreme ends of the Likert scale. In this situation, artifactual ceiling effects can occur but at points lower than the extreme ends of the scale.

The third type of beta change also assumes the occurrence of real change in some existential state as well as defects in the measurement instrument. Another assumption is added, however, which is somewhat complicated. It can be characterized as follows. Given real change in some existential state, a defective or

insensitive measurement instrument, and the task of communicating the occurrence of real change to others, observers will cope by redefining or altering the measurement instrument being used to measure such a change. What is the nature of that coping process? The following conceptualization is proposed. It is important to keep in mind that the processes are assumed under the third type of beta change.

Given the task of measurement in a questionnaire setting, the respondent (e.g., the hypothetical secretary) is faced with the task of making category judgments or ratings of social objects. The respondent is given a range of values whereby the "true score" of an object can be located on an attribute or scale of interest. Given a bipolar format, this range of values initially takes on the entire range of negative and positive real numbers:



Given also the choice of five category responses, the respondent must now slice this range into five equal sizes or intervals. Moreover, each of these intervals must be assigned a specific categorical meaning. Typically, all this has been prespecified by the research investigator. In our example, the resulting scale after segmentation and definition is the familiar Likert scale where:

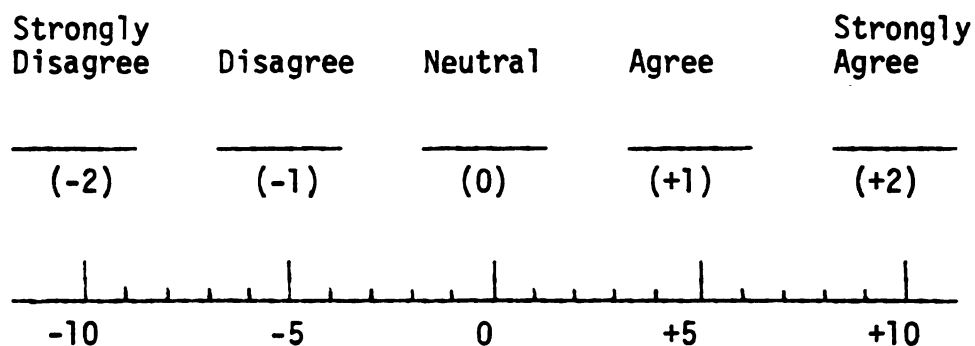
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
-2	-1	0	+1	+2

All that is left is for the respondent to use this scale as specified by the research investigator. Suppose, as in our example, a secretary placed a checkmark in the line above +1 indicating agreement with the statement "My boss is friendly." Suppose, after an intervention, she changes her perception of her boss and would like to report that change. Say that she still agrees with the statement but she now perceives her boss as being friendlier than was previously thought but not enough to classify her boss as being a "very close" friend. She is in a quandary however because if she again placed a checkmark at +1, the investigator would erroneously conclude that no real change in state occurred. Of course, this secretary can cope with this situation in various ways. For example, she can place a checkmark under the "disagree" category, complain bitterly to the researcher and subsequently refuse to respond to the item, place a checkmark on the extreme right hand side of the line as opposed to placing a checkmark on the left hand side of the line under the agree category, or she may place a checkmark right between the words "agree" and "strongly agree." Under the third type of beta change none of the above alternatives would be adopted. Instead, another

alternative referred to as "response scale recalibration" is assumed to occur.

Under the response scale recalibration strategy, the respondent rejects the preordained segmentation and definition of category assignments. A new scale, in the mind of the respondent, is generated and used. This new scale, its properties and the rules governing its use, is substantively different from that originally specified by the research investigator. By what process is this new scale developed? This process is accomplished through "interval stretching." This occurs when the respondent increases the length of an interval underlying a particular response category.

Going back to the illustration, the secretary may redefine the length and the meaning of the interval underlying the various judgmental categories. For example, she may adopt the following scale:



In this example, the neutral point, zero, has remained the same. -10 and +10 have been adopted as arbitrary limits to the scale. The numbers in the parenthesis are merely label numbers for the various categories. The size of the intervals from zero are the

same, that is, they are all 5 units in length. Note, however, that the size of the interval under the "agree" category has now "stretched." Whereas previously the size of that interval was only one unit, it is now 5 units. Given these 5 units, the secretary can now use them to indicate a change in her perceptions under the "agree" category.

When the respondent recalibrates and redefines a measurement scale, the point which apparently Golembiewski et al. are attempting to make, the scale numbers and category meanings are substantively different. In other words, what a researcher means by the sign +1 and what the respondent means by +1 are not the same. When "interval stretching" or response scale recalibration occurs through the extended process aforementioned, beta change of the third type described is said to have taken place. And to the extent that this type of beta change occurs, as Golembiewski et al. (1975) correctly assert, serious interpretative problems of questionnaire results based on the Likert scale format can arise.

If response scale recalibration occurs, then something must have caused it. That something is the social intervention designed to alter the knowledge experience or internal culture of the participants. This intervention, such as ODTTB, can significantly alter culture by modifying or enlarging an individual's knowledge or experiences. This, in turn, can lead to drastic redefinitions of cultural concepts as well as a change in a person's existential state. Golembiewski and his colleagues refer to this phenomenon as "gamma change." Gamma change incorporates the essential

features of the third type of beta change; that is, the occurrence of real change in some existential state and response scale recalibration. In gamma change, however, one more feature is added and that deals with the nature of the change in some existential state.

Gamma change has been characterized as "big bang" change. It implies a very substantial or fundamental change in existential state. A worker who has lost an arm in an industrial accident because of a failure to heed the warnings of the Safety Department may thereafter view the admonitions of the Safety Department in a new and completely different light than he did previously. A secretary may change her pattern of hair styles but this would be superficial and cosmetic (alpha change). On the other hand, if she changed her outlook on life and her personality in a basic way, then this would be gamma change. The fabled Dr. Jekyll and Mr. Hyde metamorphosis is another example of gamma change. Such a change may be characterized as penetrating, deep-rooted, substantial, and far-reaching. In a similar way and as a consequence of gamma change, respondents in a questionnaire survey, can change the knowledge-experience that provide the anchoring points used to judge a concept, idea, or social object.

Returning to our illustration, it will be recalled that in evaluating the concept "friendly," secretaries used only one attribute to establish meaning to the term. That attribute was the degree to which their supervisor said "good morning" to them during the week. Suppose that after an intervention, secretaries now use more than one attribute to define the concept "friendly."

Let us say that someone has pointed out to these secretaries that their bosses typically have done much more than merely say "good morning" to them during the week. This person could have reminded the secretaries that the boss does not scold them when typing errors are committed, buys their families a turkey every Thanksgiving, sends them Christmas cards, permits them to take extended coffee breaks on occasion, allows them to come in a half an hour late on Mondays to cope with long gas lines, and are generally easier to get along with relative to other habitually grumpy bosses in other departments. As a consequence, secretaries now have a different estimate of reality on the degree to which they perceive their bosses as being friendly. In other words, secretaries have changed the way in which they define concepts by adding new attributes or indicators of meaning. When this re-conceptualization occurs, it is called "gamma change." Gamma change then has three essential properties: (1) real change in some existential state has occurred within a respondent, (2) that change is basic or fundamental in character and (3) response scale recalibration has taken place.

The question now arises as to how one can proceed in detecting gamma changes. Golembiewski and his colleagues have suggested the following procedural steps. First, factor analyze the static correlation matrices for each point in time. It does not matter what factor analytic technique is chosen for the resulting factor structures will be essentially the same. Secondly, using the

Ahmavaara's (1954) statistical procedures, calculate the interclass correlation coefficient r . Square this correlation coefficient and call it the estimated common variance between-wave factorial structures. By definition, it will vary from zero to one hundred percent. The third step is to look at the value of the estimated common variance r^2 for this indicates whether or not gamma change has occurred. But first one needs a rule of thumb to direct the inference process further. Let one adopt a rough rule of thumb that an estimated common variance r^2 of around .90 be used to establish the critical cutoff point. Hence, if the obtained r^2 is less than .90, conclude that gamma effects occurred. If r^2 is greater than .90 but less than 1.00, conclude that alpha change has occurred.

The computational procedures have been carried out and the results in Table 4.20 and 4.2P have already been presented. Table 4.2P contains the interclass r and the estimated common variance r^2 . The estimated common variance is 75% for time 1 and 2, 88% for time 2 and 3, and 76% for the entire time 1 to time 3 interval. In a way, these statistics provide redundant information. In the consideration of real change models, it was observed that the static correlations increased from time 1 and time 2, and from time 2 to time 3, the static correlations increased only slightly. The interclass r and the estimated common variance, r^2 , merely mirror this fact. Following the work of Golembiewski and his colleagues, however, one would attach a different theoretical

interpretation of the results from that which has been already advanced thus far under the panel approach.

This interpretation would proceed as follows. Upon looking at the estimated common variance from time 1 and 2 and for time 1 and 3, the obtained values are .75 and .76, respectively. Since these values depart from .90, the suggested rule of thumb, for these two time intervals, gamma change occurred. Thus, between these two time intervals, participants underwent a substantial change in existential state. Hence, ODTB penetrated the psyche of the respondents in a very fundamental way. Moreover, this intervention was sufficiently forceful enough to cause a change in the participants' knowledge-experiences which provided the basis for evaluating the key cultural concepts involved in the dependent variables of interest. Thus, during the time 1 and 2 and the time 1 and 3 intervals, the participants altered, in a fundamental way, the process of ascribing meaning to the key concepts of teamwork, motivating subordinates, time management, resolving interpersonal conflict, confronting real issues, communicating openly, merit pay, contingent nonfinancial rewards, MBO, trust, and group decision making. This is in accord with the change goal of ODTTB. Additionally, between these two time periods, the magnitude of the estimated common variance suggests that the respondents, in using the Likert scale, stretched the size of the intervals and thereby engaged in response scale recalibration of type described earlier. Between the time 2 and 3 interval, on

the other hand, the obtained estimated common variance does not depart very much from the rough rule of thumb of .90. Hence, only alpha change occurred between this time interval. Thus, although some change occurred, this change was not as "deep" or substantial as that which had occurred during the time 1 and time 2 interval.

How, specifically, did the managers alter the meaning they attached to each of the key concepts? It is impossible to delineate this change precisely. The best possible information would obviously have to come from the participants themselves. To obtain this information, however, one would be faced with the unenviable task of asking each respondent at each time point how they interpreted each key word in each question in the questionnaire. In addressing this interpretative problem, one may be tempted to examine the factor structure matrices and to note the differing pattern or eigenvalues on the way each item "loads" on the various dimensions at each point in time. There are a number of different problems associated with such a strategy, two of which will be noted here. First is that the factor structures as indicated by the eigenvalues will differ according to the factor analytic procedure used. The second problem is that in comparing factor structure across time, the matrices of comparison must be centered in a common origin. The varimax results in Table 4.20 are separate analyses for each time frame and have not been centered on a common origin. Thus, a comparison of the eigenvalues of each item across

time is logically impermissible. Hence, no attempt will be made here to interpret the factor structures revealed in Table 4.20.

There is one weakness in the logic advanced by Golembiewski and his colleagues which would be appropriate to discuss at this point. This involves the response scale recalibration inference. It has been suggested that low interclass correlations implies the occurrence of response scale recalibration. Unfortunately, the logical bridge one must traverse in going from an interclass correlation coefficient to an inference that the respondents recalibrated the Likert scales is non-existent. Perhaps the most direct evidence of response scale recalibration is that which is obtained by letting each respondent define their own scales and specify the length of each of the intervals. If the respondent changes the measurement scale and the rules of measurement, then this would constitute direct evidence of response scale recalibration. Typically, however, as in the present study, such a measurement task is not required of respondents. Usually, the measurement scale and the rules of measurement are specified in advance by the researcher. Another erroneous conceptualization, given a predefined Likert scale, is that the line or blank space provided under each category assignment represents an interval length of some sort. The line under each category rating is merely a place where the respondent can place a checkmark where he so desires. It does not matter at all if the line is drawn a quarter of an inch long or two inches long. It does not matter also where on that line the respondent places his checkmark. Moreover, when

it is determined that the respondent is not following prescribed instructions on the correct use of the scale, the researcher will typically throw away the questionnaire calling it an unusable response. The inference of the response scale recalibration as suggested rests on grounds which cannot be logically defended in absence of direct empirical evidence. Certainly, such an inference is unwarranted and unjustified here. In this research project, managers reported no difficulty in understanding how the Likert scales were supposed to be used.

Golembiewski and his colleagues, on the other hand, appropriately reflect the important concern over situations in which the detection monitoring, and validating real change may be inaccurately assessed because of certain defects or limitation inherent in the measurement instrument itself. Such a situation was described earlier under beta change. Arbitrary scale limitations could preclude the finding of real change even though such a change actually occurred. This concern is addressed in Study 3 which employed the use of metric multidimensional scaling procedures.

Study 3. The Metric Multidimensional Scaling Approach:

A Discussion

Study 3 involving the use of metric multidimensional scaling procedures suggests a much more positive and different conclusion than from those reached in Studies 1 and 2. Study 3 was conducted with the prior intent of avoiding the possible problems that could

have been associated with artifactual, upper scale limits inherent in Likert scales. Again, following the lead of Golembiewski et al. (1975), who recommended multidimensional scaling as a promising way to measure change, Study 3 represents the first application of the technique in the area of management training and development. As mentioned earlier, the MDS technique used here is theoretically meant to represent fundamental measurement processes. In this study, the scales are assumed to be ratio scales having a rational zero. Consistency checks to verify this ratio scale assumption are not possible in this study since in the distance means matrices no information was gathered on the upper half of the diagonal.

The MDS results may be interpreted as follows. The seminar/workshop brought together a set of managers who initially held somewhat divergent opinions and viewpoints with respect to the key concepts. As the meaning of each of the concepts became clarified, the managers came to share common viewpoints and moved in the direction of accepting some of the key ideas and concepts as having practical value. Relative to the other concepts, initially the concepts of merit pay and MBO were the farthest from the centroid. This suggests that the managers either were unsure as to how to process the meaning of these concepts or found them to be alienating in terms of their self and work conceptions. Merit pay was by far the most alienating concept. This comes as no surprise given what is already known about the managers' work

environment. Merit pay and its correlated concept, performance appraisal, were salient "bones of contention" to many as was revealed during the discussions where participants raised a number of questions on administrative procedures and highlighted various problems. During the course of the seminar/workshop, the participants were persuaded to some extent that the concept of merit pay could be associated with some positive attributes. Apparently, the managers came to view merit pay as potentially important to their self concept and their work. But the fact that the concept of merit pay remained distant at the third time point relative to the other concepts even though it moved in the desired and predicted direction suggests that resistance to change can also be associated with the concept. In short, it appears that although the managers could be swayed in their views about merit pay, they retained a skeptical outlook as to whether the concept could be applied satisfactorily in their work environment.

The concept MBO underwent a radical redefinition during the course of the seminar/workshop. Concepts that undergo radical changes in cognitive space have been referred to as "gamma change" by Golembiewski et al. (1975). Initially, the managers were either familiar or unfamiliar with the concept MBO. Those who were familiar with the concept received negative messages from their work environment and hence found the concept alienating. Management by objectives was part of a larger organization change effort called Organizational Effectiveness at Fort Huachuca. During the

discussions, it was apparent that the managers at Fort Huachuca regarded the MBO program as authoritative in character and "difficult to understand." Some voiced their dissent with the authoritarian, non-participative character of the way MBO was implemented. Some mentioned that their initial exposure to MBO was through a policy directive and regulations and others reported that they were mandated to generate written statements on a set number of objectives, the nature of their job notwithstanding. The Maryland managers, for the most part, were unfamiliar with the MBO concept. Some heard about MBO through the "grapevine" but were uncertain what the concept meant or implied.

During the course of the seminar/workshop, the trainer presented his definition of the meaning of management by objectives which was substantially different from the preconceived views participants held. Essentially the "new" view of MBO presented was one of participative and joint setting of goals, goal setting and action planning tailored to meet job requirements, a deemphasis on bureaucratic "paperwork," and an emphasis on voluntarism. Participants came not only to understand this view but increasingly came to accept the new view as non-threatening and having a degree of utility on the job. As with the merit concept, however, this new view of MBO, relative to the other concepts, was not located close to the centroid and the mean distances between the concept and the concepts Me, My Job, and Relevant/Practical/Useful at the ending of the seminar/workshop did not converge to zero. This

suggests that participants probably had some question, reservation, or skepticism as to whether this new view of MBO could be implemented as an acceptable "way of life" in their respective units or in USACC generally.

In addition to the concepts merit pay and MBO, the concepts teamwork, time management, resolving conflict, and group decision making also took on changes in meaning by the participants during the course of the seminar/workshop in the desired direction. Most of these changes appear to have taken place between the measurements of time 1 and time 2 with changes leveling off from time 2 to time 3. Some changes did occur among some of the concepts in the desired direction between time 2 and time 3.

If the negative eigenvalues are any indication, it appears that participants had most trouble establishing the meaning of group decision making in relation to the other concepts or goals of the seminar/workshop. It is not apparent as to why this occurred although it may be interesting to note that for some reason one respondent declared group decision making as being an undesirable form of socialism. It may be that the concept group decision making had a double meaning: group decision making as it relates to themselves and their subordinates and group decision making as it relates to themselves and their superiors. Ritchie and Miles (1970), in their study, discovered that individuals may apply different standards when it comes to participation in decision making. In essence, their study suggests that individuals

want group decision making when it affects themselves but are reluctant to apply the concept in dealing with others as superiors. Perhaps a similar phenomenon may be occurring here thereby giving rise to intransitive responses.

The concept trust may also be another concept which may invoke the application of different standards depending upon the frame of reference. Apparently and perhaps unsurprisingly, participants had high trust in themselves and increasingly strengthened this viewpoint. When it comes to trusting others, however, a different picture emerges. During the discussions, for example, some respondents reported that they did not trust their superiors in rendering an unbiased, accurate, or immensely fair performance appraisal. Over time, the managers came to view the concept of trust as being relevant/practical/useful and appropriate to their jobs. As with the other concepts, however, it appears that this was a "guarded" conclusion.

In the results section, the prediction that the various concepts would be perceived as being interrelated with one another was tested. Statistically, this meant that the mean distances between all paired comparisons would shrink across time. It was noted that of all possible 91 changes across time 1 through time 3, only eight paired comparisons remained insignificant. Some plausible explanations can be offered for the insignificant changes. The paired comparisons involving teamwork, group decision making, and merit pay indicate that participants saw little connection among

them. In other words, they were relatively distant from one another. These results are not unexpected since merit pay decisions, in the managers' "real world" of work, are not based upon such criteria. Merit pay, motivating subordinates, and trust also remained distant from one another throughout the course of the seminar/workshop. Apparently, the managers do not view merit pay as currently administered and structured in their work environments as an effective way to motivate subordinates and that when it comes to merit pay, they do not trust their respective work organization in such matters. The paired comparisons involving ODTTB and teamwork, and teamwork and group decision making indicate that these concepts were perceived as being synonymous with one another as would be expected.

Overall, the results of the MMDS indicate that the managers' responses to the paired comparisons are not attributable to "random noise". All hypotheses relating to predicted and desired changes were supported. The results indicate that widespread and fundamental cognitive change processes took place during the seminar/workshop. According to the MMDS results, ODTTB was successful in presenting new ideas and concepts which, by the ending of the session, the participants would find of some help and relevance in managing the work situation.

Judging ODTTB a success as a normative reeducation process must be, of course, in relative terms. The overall results suggest that the participants' views, cognitions, or attitudes can be altered through learning experiences arising from a management

training and development effort such as ODTTB. The question arises, however, as to how much change can be reasonably expected from a change effort such as ODTTB. There is a saying around training circles that one can only achieve so much from a training effort. Perhaps this is also true here. In other words, ODTTB, as a persuasive attempt, probably achieved a majority of the changes it could have affected. Normative reeducation or convergence between the goals of the seminar/workshop and participants views of themselves, their jobs, and the utility of the various concepts took place to some desirable degree but socialization was not "total" in the sense that the mean distance values did not go to zero. Ethically, morally, and pragmatically, it is not clear that change efforts should produce mean distance values or eigenvalues of zero. This would mean that an individual would become totally immersed in one's job. To use job involvement terminology, such an individual would eat, sleep, breathe, think, and interpret the world solely or predominantly in terms of his job. Whatever the case, assuming that respondents are not reluctant to use the lower extreme end of the MDS scale, the results suggest that there is "room for improvement." Stated differently, this means that managers could still undergo further positive and desired changes but what is needed is a much more cogent and salient persuasion attempt. No doubt that some theorists will quickly point out that such a message would involve actual on-the-job changes.

Some Theoretical and Empirical Contradictions and a Comparison
Across Studies

The results of this research contain several theoretical and empirical contradictions which, in turn, give rise to interpretive difficulties that are not easily resolvable.

Consideration of the factor analytic study, the endogenous real change model, and the general factor model could lead to theoretical contradictions in interpreting the results of Study 2. Using the logical structure of Golembiewski et al. (1975), interpretation of the results lead to the conclusion that fundamental redefinitions of the central concepts changed across time. Hence, participants underwent some change in existential state. Such an interpretation was further buttressed by the results of the MMDS study. The endogenous real change analyses led to the inference that the causal structure among some of the variables changed and that across time, participants increasingly established certain interrelationships among some of the concepts. The strength of the causal structure and perceived interrelations ranged, however, from low to modest. The MMDS study would carry this inference further and assert that among all of the variables, the causal structure and the perceived interrelationships changed across time. The factor analysis study, the endogenous real change model, and the MMDS study all assumed that each of the concepts or variables possessed an independent, substantive meaning of their own which distinguishes them from one another. The general factor model,

however, suggests an entirely different view. As was seen earlier, the presence and real change in a general factor could not be eliminated as a rival explanation for the results in Study 2. This general factor, it was suggested, could be identified as a teamwork philosophy of productive managerial work. It was also suggested that the variables teamwork, motivating subordinates, time management, resolving conflict, confronting issues, communicating openly, merit pay, MBO, trust, and group decision making tap into or are surrogate measures of that general factor. This would mean that the specific variables are trivial and that the differences in the managers' responses to the different items do not reflect substantive differences in viewpoints but trivial, idiosyncratic responses. Hence it may be argued, for example, that the variables or concepts teamwork, motivating subordinates, time management, resolving conflict, confronting issues, and communicating openly do not constitute a set of mutually interacting variables, each with their own theoretical meaning. Rather these variables or concepts are measures of a common underlying general factor, say, philosophy of work and that it was this underlying factor that underwent change during the seminar/workshop. One practical implication of this view is that social change efforts of this type would be greatly facilitated if they were directed towards changing the general factor initially rather than upon the rational, technical aspects of each of its components individually. It is also important to note that the general factor model is a rival

alternative explanation to interpreting the interclass correlation. Hence, one could conclude that the results of the factor analytic study reflected changes in a general factor rather than gamma change of the third type. The general factor model also serves as a key interpretative threat to the MMDS results. In other words, the MMDS results could be a reflection of real positive change in a general factor such as a teamwork philosophy of productive managerial work. No direct examination of this rival hypothesis was undertaken. If a general factor was operative in Study 2 and Study 3, the question can be raised as to why it did not exert an influence over any of the variables in Study 1. This question remains unanswered.

It may be of interest to note that some of the variables are contained in all three studies. Teamwork is one such variable. In Study 1, several items were used to measure the construct "Utility of Teamwork" defined as the extent to which the managers perceive teamwork as necessary, important and an integral part of their job. On this measure, teamwork averaged around 4.0 on a 5 point scale and did not significantly change across time. In Study 2 as well as Study 3, the teamwork concept did change significantly across the entire time interval.

Trust was the second variable common to all three studies. In Study 1, the means and the variances of trust hardly changed at all and only by decimal dust. In Study 2, the mean of trust did not significantly change but the variance did. The variances

increased and then shrank back to its original level. In Study 3, trust showed a steady pattern of positive change across time.

A third variable common to all studies is communications. In Study 1, openness may be defined as the extent to which a manager feels secure in speaking openly, candidly, and easily with members of his work group. The mean of this variable averaged 3.6 on a 5 point scale and, as with the variance, did not change significantly over time. In Study 2, communicating openly did not change significantly across time. This fact reveals another weakness only at the interclass r as an indicant of gamma effects. The interclass r is a summary measure and may hide the fact that when dependent variables are involved, only some of them may have undergone so-called gamma change. Of note also is that the mean of this variable in Study 2 averaged 6.3 on a 7 point scale and the variances were relatively small. This indicates that the managers as a group regarded communicating openly as an important managerial aspect of their work and tended to use the extreme positive end of the scale. This view did not change in the negative direction as one would predict if the managers changed their minds and regarded "telling it like it is" as only leading to "political trouble". However, if the managers changed their perception in the positive direction, that is, communicating openly is much more important than what the managers previously thought, this change would be extremely difficult to detect because of the arbitrary limits placed on the positive polar end of the Likert

scale. In Study 3, the results suggest that normative positive changes occurred as the concept converged closer to the concepts relevant, practical, useful, me and my job across time.

MB0 is the fourth measured concept common to all three studies. MB0, as with the other variables of interest, can be measured in various different ways. For example, it is well known that MB0 has a number of different attributes or features. Hence, various attributes of MB0 or MB0 as a global concept may be measured. In this research project both alternatives were chosen. In Study 1, the attributes of MB0 selected for measurement and monitoring were participative goal setting, role clarity, and feedback. The mean of these variables averaged roughly 3.2 on a 5 point scale. And as was reported earlier, the means and the variances of these variables did not change across time. These results suggest that as the managers reflected on their knowledge-experiences, their perceptions of the amount of feedback, participative goal setting, and role clarity established on the job did not substantially change across time. In other words, as the managers reflected on their knowledge-experiences, they found no compelling reason for believing that the amount of feedback, participative goal setting, and role clarity in their work was better than or worse than they had previously imagined. The results of Studies 2 and 3, however, convey a different dynamic. In Study 2, MB0, measured as a global concept, relative to the other concepts had the lowest mean and the largest variance at time 1. This suggests that managers differed markedly from one another in their view of the MB0

concept and did not approach the concept initially in a highly enthusiastic and positive way. The results suggest, however, that in time, the managers changed their views about the concept of MBO in a more positive direction. The results suggest further that the managers made a distinction between MBO as is practical and MBO as it ought to be implemented in their work setting. The fact that MBO did not take on values towards the positive polar end of the scale suggests another dynamic. Although the managers learned some new ideas about MBO and increased their opinions of the concept in a favorable way, it appears to be a "guarded" conclusion. In other words, although MBO, as the managers reconceptualized the concept, has promising possibilities, they were skeptical about its prospects of implementation. Such an interpretation is also in accord with the MMDS study as was discussed previously. As was seen in Study 3, MBO underwent pronounced change but still remained somewhat distant from the concepts me, my job, and relevant/practical/useful.

In addition to MBO, the concept of merit pay or performance contingent rewards also generated a great deal of reaction and discussion by the managers. In Study 1, the variable performance-reward association reflects the extent to which the managers perceive rewards, both financial and nonfinancial, as being contingent upon good performance. The mean of performance-reward association was about 2.8 on a 5 point scale and relative to the other concepts represented the lowest value. Hence, the managers perceived a rather low performance-reward association. Moreover,

as they processed their knowledge-experience about the degree to which rewards are based upon performance, the managers found no compelling reason for believing that the situation was much worse or better than they had previously thought. In Study 2, merit pay decreased in perceived importance between time 1 and time 2 and, between time 2 and time 3, it returned to its original level. This result characterizes the managers as changing their views about merit pay during the seminar/workshop and ended up where they began initially. Their view of making nonfinancial rewards contingent upon performance did not change over time. The results suggest that the managers apparently distinguished monetary and non-monetary contingent rewards. The variances also suggest that the managers differed somewhat widely from one another in their views on whether or not rewards could or should be based upon performance. It appears that some degree of skepticism prevailed as to whether performance based rewards could be implemented in a way acceptable to them within their work environment. It should be noted that the managers also had a number of complaints about their current performance appraisal system and retained a leery posture towards the concept. The MMDS study reflects a contradictory result during the time 1 and time 2 interval. Unexplainable is the fact that the MMDS study showed positive normative change in merit pay, which is in direct contradiction to the finding in Study 2. As with the MBO concept, the results of Studies 2 and 3 suggest

that while the managers could find positive and desirable features about the concept of merit pay, they remained somewhat unconvinced as to whether or not it could be implemented in an acceptable way. Hence, as far as merit pay and MBO are concerned, the managers adopted a guarded view and a "wait and see" attitude.

Another contradiction in the results appears between Studies 1 and 3. In Study 3, the paired comparison between the concepts me and my job, following the lead of Taylor (1977) and Albrecht (1978), was interpreted in job involvement terms. Thus, if the distance between me and my job was close to zero, it was interpreted to signify that a respondent was highly psychologically involved with his job. In the MMDS study, the means decreased across time which appears to suggest that the respondents increased their degree of job involvement as the seminar/workshop progressed. The results of Study 1, on the other hand, yield a direct contradiction to this interpretation. In this study, the results show that job involvement decreased over time which would suggest the psychological distance between the managers' self-image and their job is increasing across time. This contradiction is also unexplainable.

The variable mood leads to some interpretative difficulty. In Study 3, the widespread significant differences found in the results appear to rule out a highly transient variable such as mood as a rival explanation. In Study 2, mood was also ruled out as an explanation. In Study 1, however, in a reanalysis of the data, it was found that mood is a plausible rival explanation.

In examining, for example, the last two pages of Appendix B, one will find that mood is positively correlated with the other dependent variables in time 1. Similar patterns have also been observed in times 2 and 3. This suggests that, in Study 1, job satisfaction, involvement, trust, intrinsic motivation, commitment, teamwork, performance-reward association, openness, feedback, role clarity, participative goal setting, and higher order needs are all a function of a manager's mood. In other words, the way a manager thinks and feels about aspects of himself and work depends on whether or not he is in a good or bad mood at the time when the questionnaire is administered. Mood, however, is a variable which should have generalized effects. It is uncertain why mood exerted salient effects only in Study 1 and not in the other two studies.

The final contradiction of the results deals with the observed negative impact and self-impact correlations observed in Study 2. The results obtained here are similar to those found by Tosi et al. (1976), where in their study, the impact correlation matrix had almost all negative correlations. These authors remark (p. 285): "It is tempting to consider there was no real change in the system and that the negative impact correlations are some sort of artifact not yet identified, but this can only mean that the dynamic correlations are similarly artifacts." Subsequently, these researchers invoke real and "artifactual regression to mean of a global factor" in explaining away the "apparent" contradictions. Their explanation, unfortunately, is not completely

applicable to the results obtained here.

The results of this study differ from the Tosi et al. (1976) study in several important ways. In this study, several of the means increased and standard deviations decreased whereas in their study, the clear majority of the means and standard deviations did not change significantly. In their main sample, the means as well as the standard deviations did not change. As with their study, the presence of a general factor was also found. However, the characteristics of the general factor found here differ in some important ways. In their study, the mean of the general factors did not significantly change and the variance of the general factor decreased across time. In this study both the means and the variances increased across time. In their data, the general factor model fitted their results. In their data, moreover, it appears that their subjects were strongly predisposed toward "central tendency" in the use of their scales. In this study, the mean value was about a 6.0 on a seven point scale. Moreover, if most of the subjects were reluctant to use the extreme top end of the Likert scale, the "ceiling effect" could be in operation. These differences, taken together, render implausible the suggestion that real regression to the mean of a general factor can reconcile the apparent contradictory findings. What needs to be explained away are the negative signs of the impact correlations.

It is suggested here that the obtained negative impact correlations are indeed statistical artifacts produced by subtracting

scores at a later point in time which are higher in value. It is important to note that the Pearson correlation coefficient also contains rank order information. Hence, if a correlation of +1.0 is obtained on two variables, this suggests that the highest scoring person on variable 1 also scored high on variable 2. In the use of gain scores or deviation scores, a different situation arises. The work of Wanous and Lawler (1972) provides an example of what appears to be happening when one correlates deviation scores and original scores. In their study, job satisfaction was operationalized in two ways: one way was in the traditional raw score form, the other by subtracting two scores from one another. Both of these measures, if they measured the same variable, job satisfaction, should have been positively correlated with one another. In fact, all correlations between deviation scores and original, nonsubtractive scores were all negatively related to one another, which lead to a strange finding that job satisfaction is negatively related to itself. The point is this. Subtracting scores from one another drastically alters the rank ordering of individuals and changes the sign of the correlation coefficient in the opposite direction. Hence, individuals who tend to score high on a measure will now score low on the deviation measure and vice versa. The overall result is a negative impact correlation produced by the subtraction process. Hence, the suggestion is that negative impact correlations are artifactual and any attempt to attach theoretical meaning to them in terms of growth processes

is a dubious exercise. If this is the case, then the dynamic correlations are also artifactual and, subsequently, raises a skepticism about the theoretical utility of the dynamic correlations. The theoretical utility of the dynamic correlations appears to be doubtful and limited. Contrary to Vroom's (1966) assertion, the dynamic correlations relative to the static correlations, in this research project, were not particularly useful in detecting spuriousness. Such a conclusion is also reinforced by Clegg et al. (1977).

It is important to note that one may obtain an impact r of zero or one and still detect real change. It depends critically upon the nature of the change itself, the scale properties of the measurement instrument, and what happens to deviation scores which determine the correlations coefficient as a consequence of change. Recall that the impact correlation involves arithmetic operations among three scores: X_1 , Y_1 , Y_2 where deviation scores $Y = Y_2 - Y_1$. Of importance therefore is what happens to Y_1 as a consequence of change. Assume the case where a training program produces a similar, beneficial effect on everyone. In other words, each individual score Y_1 increases by an additive constant thereby producing Y_2 scores. The deviation score $Y_2 - Y_1$ will be equal to that additive constant and when correlated with Y_1 , the impact correlation will be equal to zero. Conversely, it is entirely possible to have an impact r equal to one and still have real change occurring among a set of subjects. Assume the existence of a training program which has a differential impact on a set of

subjects such as those who held positive attitudes increasingly improved while those who held negative attitudes increasingly got more cynical in their views. Assume also that the net positive and negative changes are perfectly counter balanced. This instance will produce not only increasing variance but an impact correlation of 1.0. Hence, in interpreting impact correlations correctly as an indicant of change one must know the precise nature of the change process and its impact upon subject responses at a later point in time which are used to calculate change scores. The preceding discussion assumes that no arbitrary limits have been placed on the extreme ends of the measuring scale. Arbitrary limits such as those on Likert type scales can drastically affect obtained correlation coefficients thereby producing statistical artifacts and this in turn could lead a researcher to draw erroneous inferences and conclusions.

A Cautionary Note on the Correlation Coefficient

Given the methodological character of this dissertation it may now be appropriate to raise the general question of the adequacy of relying upon correlation coefficients in validating the effects of a change effort such as the seminar/workshop here. It is asserted here that the correlation coefficient itself constitutes a particular "theory of change" and is useful in detecting limited types of changes but not all changes that a researcher might be interested in detecting. Hence, great caution must be

exercised in interpreting correlation coefficients as evidentiary tests of change or no change. The following examples highlight the reason for this caveat.

Consider a validation study employing the use of Likert scales such as those in Studies 1 and 2. Consider also the most ideal situation involving cognitive changes involved with a management training effort. Assume that a researcher has five dependent variables of interest each measured on a five point scale where 1 denotes unfavorable attitudes and five denotes extremely unfavorable attitudes. Also assume no measurement error; that is, subjects know their true feelings and tell the truth. Consider the most ideal training situation and the most successful one. In this situation, let us say that all the subjects at time 1 are very cynical in their views and, therefore, all of them score 1's on all the scales. Presume that the training program, however, is successful in producing favorable changes and, thus, at time 2 everyone scores 5's on all of the scales. In this example, all impact, cross-lag, and static correlations would be zero, except of course, those variables which are correlated perfectly with themselves. An unwary researcher looking solely at correlation coefficients may be "tricked" into concluding that no change occurred. Moreover, examination of the diagonal elements of the cross-lag correlation matrix may lead one to dismiss the entire results as pure "measurement error." The point here is that test-retest correlations equal to zero may reflect either

measurement error or real change or both. Hence, a "low" test-retest correlation should not be automatically interpreted as reflecting only measurement error or statistical artifacts as some researchers have tended to assume.

In the second example, assume a different change dynamic and the existence of variability on initial scores. In fact, assume that the set of dependent variables at time 1 are perfectly and positively correlated with one another thereby implying that if a person has a favorable attitude on one variable, he also has a favorable attitude on the other dependent variable of interest and the converse. Assume also that the effect of the training program was to reverse completely the attitudes of all of the respondents. In other words, those who had favorable attitudes now have unfavorable attitudes and vice-versa. In this instance, the means and standard deviations would be the same, the test-retest r 's would be equal and negative, the statics would all be positive and equal, the cross-lags would be equal and negative, the dynamic r 's would be positive and equal, and the impact r 's would be positive and equal. Again, a researcher can be "duped" into erroneously concluding that no change occurred simply by looking for differences in correlations across time. Simply looking at mean differences or differences in variances may also lead to erroneous conclusions. Tosi et al. (1972), in their discussion of a general factor model, also illustrates how real change can occur without a corresponding change in means across time.

The third example involves a change dynamic when evaluators ask: "Who benefited from the program--the 'healthy' (top) half of the sample or the 'unhealthy' (bottom) half?" Assume that the training program had the effect of making the healthier increasingly more healthy and the unhealthy increasingly "unhealthier" in their attitudes. This would be tantamount to multiplying all time 1 scores by a positive constant. Assume that at time 1, all dependent variables are positively and perfectly correlated with one another. In this instance, across time 1 and time 2, the means and variances would increase, the statics would all be equal and positive, and cross-lags would be equal and positive and the diagonals (test-retest) would be high and positive, and the dynamics would be equal and positive. Again, the researcher could draw the erroneous inference of no change simply by examining the various correlation coefficients. This example also suggests that real change can occur even given perfect test-retest reliabilities. In this instance, an evaluator could "dub" this program as a success or failure or both depending upon his criterion. The program could be considered a "success" in that it improved the attitudes of some. On the other hand, it could be considered a failure since those who needed positive change the most got worse. Or one could argue that the program was a complete failure in that the worse got worse and the "good" did not need changing anyway.

The last example that will be considered involves the inquiry of what happens given ceiling effects or an arbitrary upper limit

to a measuring scale. Of course, given an initial score at the top of the scale, a person simply cannot report "improvement" at a later time point. The ultimate purpose in typical attitude change programs is to ideally have a variance of zero and mean value equal to the upper limit of the scale. In other words, ideally everyone should have positive and identical viewpoints. In reality, of course, participants will vary in their attitude scores unless they were selected on the basis of low initial scores. Hence, some participants will have favorable, positive views to various domains of interest while others will hold initial unfavorable views. In this situation, the change goal of the trainer would be to maintain favorable attitudes and to improve unfavorable or undesirable viewpoints or opinions. Given these goals and this fairly typical situation, then, the desired pattern of results should take the following forms: across time, the means should increase and ideally would equal the upper limit of the scale; the standard deviations should shrink and ideally would equal zero; the static correlations should change from negative to positive and should approach and attain a value of zero; the test-retest correlations should shrink and ideally be equal to zero; the off-diagonal cross-lags would shrink and ideally will approach zero; the impact correlations will shrink and approach zero. That the derivations are logical can be seen by examining the nature of the correlation coefficient:

$$r_{xy} = \frac{\sum xy}{N \gamma_x \gamma_y}$$

where x and y are deviation scores.

Examination of this formula reveals that the only change that the correlation coefficient can detect is when deviation scores and standard deviations are disproportionately affected by a stimulus such as a training program. Hence, it is entirely possible for two correlations involving two variables across time to be the same and yet have the occurrence of real change. Examination of the formula also reveals as to why it is expected that the various correlations, under the ideal case, should go to zero. As was mentioned, the purpose of most training programs is to persuade individuals to adopt a certain viewpoint as measured by an arbitrary scale bounded at the upper limit. In other words, the purpose of training programs is to reduce deviation scores until constant scores are obtained. Now the correlation of a constant with another variable or constant is always equal to zero. Hence, correlation coefficients must be approached with great caution in using them as evidentiary tests for or against the finding of change.

Summary

This chapter has presented the results of Studies 1, 2, and 3. The results of each of the studies were also discussed. Study 1 led to the conclusion that no phenomenological change occurred.

Study 2 results suggested a moderate conclusion. Study 3 results lead to a much more optimistic conclusion. If a scale of "socialization potency" would be generated ranging from unsuccessful to successful, Study 1 would place this exemplar management training and development program on the lower end of the scale, Study 2 would place the change effort somewhere in the middle, and Study 3 would place the effort towards the success end of such a scale.

The limitations, conclusions, and implications of this study project are highlighted in the final chapter.

CHAPTER 5

SUMMARY, LIMITATIONS, IMPLICATIONS, AND CONCLUSIONS

Introduction

As noted in the earlier chapters, a majority of management training and development efforts are aimed at phenomenological change, normative reeducation, or succinctly, organizational socialization. Such change efforts are predicated on the theoretical assumption that the way managers process information and their view of themselves and of reality constitute an important influence on their behavior and subsequent performance. Such an assumption was also made here. A number of different studies have been conducted to validate the socialization process. As was pointed out in the literature review, these studies vary not only in the quality of their conclusions but also in the types of measurement scales and procedures used in the assessment of the change process. This observation gave rise to the central problem or question this dissertation addresses: Could the varied conclusions be a function of the variance in measurement methodology? It was also noted that the evaluation literature has neglected theoretical and content concerns and the question was raised as to whether the over reliance on the use of Likert scales to monitor change was tenable. In order to meet these theoretical, content, and measurement concerns, three studies were conducted on the same subjects attending the same seminar/workshop using different

measurement techniques. The purpose of the three studies was the same: to detect, monitor, and validate the normative reeducational change or socialization process if such a process occurred. In this chapter, an overall summary of all three studies will be provided together with a discussion on the limitations and implications. Suggestions for future work are forwarded and some general conclusions are drawn.

General Overall Findings

The general findings appear relatively clear cut and straightforward and hence the response to the general problem question must be in the affirmative. Apparently variations in measurement scales and processes can make a substantive difference in drawing conclusions about change. Thus the divergent conclusions drawn reflected in the literature may be, in large part, explainable by the variability in measurement methodology.

Study 1, representing the validation of normative or attitudinal change from a traditional stance, reflected no change in means and standard deviations. Most of the measures used were obtained from the professional literature and a number of researchers have regarded these scales as construct valid. If this is true, as Campbell and Fiske (1959) point out in their classical article, then these measures should also be able to detect changes affecting their domain. During the discussion session, it was quite apparent that the managers were facing a number of different

problems at work. As problems surfaced and some current organizational problems were criticized, one high-ranking officer said, in reflecting on the discussions, "There's so much mickey mouse bullshit going on and they wonder why I sometimes don't give a rat's ass." On other occasions in informal talks with the participants, some mentioned to this researcher that one should make a separation between the job and the family, otherwise one can go "nuts." Study 1, however, creates a picture of the managers going through a flurry of motor activities for one week in a way which did not affect their attitudes or reflective processes. Even at face value, these results lead to an implausible conclusion. A suggestion could be made that the training stimulus was inherently weak as a vehicle for producing normative reeducation or socialization. Such an explanation, however, is at odds with the finding of change in Studies 2 and 3. Another suggestion could be that a number of the items dealt with descriptions of on-the-job processes and practices and since the job itself or on-the-job behaviors were not altered. Thus, no change was reported. This does not explain, however, why the evaluative items did not reflect change in any direction. Another possible explanation, with the exception of the job involvement scale, is that participants assign different meaning to the concepts and arrive at meaning through a different process than that meaning which is arrived at through clustering or factor analytic methods. Whatever the reasons, however, the conclusion from Study 1 is that the managers remained unchanged

and unaffected by the seminar/workshop. From this perspective and on this basis, the seminar/workshop, as a persuasive effort, could be judged as a non-effective organizational socialization strategy.

The increasing means and decreasing standard deviations of some of the eleven scales of Study 2 suggest that real change occurred among some of the variables relating to the goals of the seminar/workshop. Several different types of correlation matrices were calculated and these data, in turn, were used to verify the predictions of real change and "apparent" change models proposed by Tosi et al. (1976). Overall, the results appear to disconfirm the error of measurement model and the mood model and to support the real change endogenous and exogenous models. An examination of the static and cross-lagged correlations also suggests that the causal structure of some of the variables underwent change. A comparison of factor structures and the interclass correlation coefficients also suggests that a change in factor structures occurred, particularly across time 1 and time 2. The determination of what changed and in what way, however, was indecisive or inconclusive.

The pattern of the static and the impact correlation matrices gives rise to some consternation. As noted in the results, the average static correlations increased across time. According to Tosi et al. (1976), this suggests the existence of a macro, general factor which underlies the entire data set and that it is this

factor which is undergoing change; specifically, real regression to the mean. This explanation, however, is unsatisfactory in explaining the results here. Their general factor model assumes constant means and decreasing variance which did not happen in this data set. Nevertheless, a general factor was found in the data set and underwent real change. Thus, the operation of a general factor, called the teamwork philosophy of productive managerial work, could not be eliminated as a rival hypothesis.

The negative values of the impact correlations also produces consternation. Real positive change, if it occurred as suggested, would not produce negative impact correlations. The fact is, however, the overwhelming majority of the impact correlations were in the negative direction. The suggestion was made that they are statistical artifacts produced by subtracting scores on one scale from scores on another scale which are generally higher in value. It is important to note that the pattern of the impact correlations is predicted quite accurately by the mood model. The mood model would predict that the impact correlation would be negative and that the off-diagonal impact correlations would be smaller than the diagonal or self-impact correlations. The data fit this pattern. But the mood model is also contradicted by other data pertaining to real change.

In all, the results of Study 2 do not fit decisively into one and only one model. Could it therefore be that the data capture an element of truth from all of the models? As was seen, some

variables changed while others did not. For the variables that did change, they could be subject to errors of measurement, mood, a general factor, endogenous, or exogenous change and could also reflect subfactor and unique item variance. What may be needed therefore is a much more complex theoretical model of change. It could be that the nature of the changes associated with this data set is much more complicated than that envisaged here and that the study results merely scratch the surface of that change process. This of course is conjecture at this point and represents an area for future work.

Study 3 applied metric multidimensional scaling techniques and procedures. The results indicated widespread changes in the predicted and desired direction. During the course of the seminar/workshop, the key goals or concepts, which included teamwork, motivating subordinates, time management, resolving conflict, confronting real issues, communicating openly, merit pay, management by objectives, trust, and group decision making, converged closer to the participants' self concept and images of their job. These key concepts were also progressively seen as being relevant, practical, and useful thereby suggesting that the seminar/workshop succeeded in inoculating new ideas and concepts which the managers could put to use back on their jobs.

Limitations

The limitations of this dissertation are several. One involves the use of statistical significance tests and the method of statistical analyses performed. Studies 2 and 3 involved the examination of eleven and ninety-one means, respectively, across three time points. In each study, the respective means were intercorrelated within and between time points in varying degrees. Dependent samples were involved and, in Study 3, the sample sizes were different. In both studies, the sample sizes were somewhat small which may, in turn, have given rise to somewhat large sampling errors. All these create statistical problems involving the legitimate use of t tests. The t tests involving differences in means are not technically correct. Ideally, a MANOVA involving several correlated dependent variables and unequal sample sizes with time as a factor should have been performed. Ideally, the comparison of factor structures in Studies 2 and 3 would also have been subjected to statistical significance tests involving differences across time. A satisfactory significance test, however, to this researcher's knowledge, is yet to be created and published in the literature.

The second limitation, related to the first, involves the appropriate match between experimental units and the units of statistical analysis. This limitation or problem is one which plagues evaluation research in the area of management training

and development and perhaps even all of the research done under the rubric of Organization Behavior. In most cases, this limitation has been ignored or overlooked, a criticism which also applies to this dissertation.

A valid, legitimate statistical analysis requires the meeting of the assumption that all subjects have responded to the dependent variables in a way which is completely independent of one another. In practical terms, this requires that the subjects or units must not have interacted in any way whatsoever. As is apparent, this assumption is exceedingly difficult to meet especially in social system situations where the units of analysis must interact with one another in networks of communication, persuasion, and influence. Violation of the independence assumption, however, is not robust and can lead to serious type 1 and type 2 errors. To the extent that these errors occurred here, they would constitute a serious limitation.

It may be recommended that "classroom" be used as the unit of analysis. In this study this would mean that $n = 3$. Although statistical analysis could be performed, the results would hardly be worthwhile. In the design phase, this researcher anticipated the problem of obtaining independent samples and considered using training groups as the unit of analysis. But the assumption now requires independence across training groups. Certain individuals across training groups, however, in all likelihood, are bound together in communication and friendship ties. Hence, unless the

researcher has total control over the lives of respondents, there is absolutely no guarantee or complete assurance that the assumption of independence has not been violated in any way. No doubt, the assumption of independence poses a serious dilemma to training evaluators. In this dissertation, violation of the assumption of independence among subjects may be a limitation and may have increased the probability of errors.

The third limitation deals with the MMDS procedures. It was assumed that the scales were ratio in nature. Whether this assumption is warranted, however, has not been verified by consistency checks. Moreover, it was assumed that the observed scores have no error components. As with the factor structures of Study 2, the dimensions produced by the MMDS procedures are difficult to interpret. MMDS methodologists, however, are in disagreement as to whether these dimensions should be interpreted. Certainly the question can be raised whether the various dimensions are statistical conveniences which reveal more about the character of computer programs rather than being reflective of fundamental, judgmental processes. A critical weakness of the MMDS procedures used here is that the results do not lend themselves to an eminently clear, reliable, and unequivocal theoretical interpretation. Based upon observations and by listening-in into the group discussions and informal chats, this researcher gave one interpretation for the MMDS results.

The fourth limitation deals with individual differences. The

results of Studies 2 and 3 may be subject to individual or "subcultural" differences. It could be, for example, that those who are relatively new on the job may be more prone to persuasion attempts when compared against "old timers" who have had more time to develop and test their perceptions and judgments relating to their work environment. Perhaps also, the work environments and organizational practices of the Arizona and the Maryland sample could have been salient enough to produce moderating effects. Such individual differences, however, were not examined and tested in this dissertation.

The final limitation discussed here deals with the basic assumption underlying cognitive, interactionist models. In other words, the question can be raised as to whether the cognitive or affective changes observed here lead to improved managerial practices and results. Answering this question would be worthy of another research effort. Since no follow-up to this project ensued, the question remains unanswered and this dissertation can provide no empirical data on this matter.

With these limitations in mind, discussion now turns towards distilling some implications of this dissertation.

Implications of this Research Project

Two different sets of implications may be drawn from this research project. One set relates to some suggestions for future research work as they relate to the area of management training and development generally and to this particular socialization effort.

The second set relates to some practical implications regarding organizational change in the U.S. military and in the U.S. Army Communications Command in particular.

Future Research Suggestions

1. Golembiewski et al. (1975), in their award-winning article, suggested that the way change is conceptualized is of critical importance in validating and evaluating change efforts involving the quality of organizational life. This research strongly reaffirms their basic thesis and adds that inadequate conceptualizations can lead to inadequate and divergent measurement methodologies, which in turn, can lead to disparate conclusions. What is badly needed, therefore, are "stronger" theories of change and measures of change, especially as it relates to the area of management training and development. It is recommended that future research activity move towards this direction and place a higher premium on both the theory and the measurement aspects of change than has been previously bestowed. Of course, additional work should be carried out to buttress the finding that divergent measurement scales and procedures can lead, in fact, to drastically divergent conclusions.

2. As the results imply, the suggestion was offered that measures based upon the Likert format may contain certain inherent structural limitations which, under certain circumstances, may render them weak in detecting, monitoring, and validating the

socialization process. Hence, it may be that artifactual limitations such as bounded upper scale limits may be prohibitive in detecting certain kinds of changes. These limitations can bias applied research efforts against the finding of change. Hence, the scaling properties of the measures used can lead to type II errors, depending upon the type of arbitrary limits that are imposed. Given the predominant use of Likert scales in the area of management training and development, future research activity should not only guard against this possible bias but should also more in the direction of specifying precisely the conditions of when the use of Likert scales can be inadequate in monitoring change and how to rectify the situation. MMDS scaling techniques appear to be a promising alternative to the use of Likert scales. As was mentioned, more research involving comparisons of alternative measurement strategies are needed.

3. In accord with the foregoing recommendations, more work needs to be done in assessing the relative superiority of metric multidimensional scaling as a validation technique. Work in this area can proceed along several lines. The MMDS procedure used here assumes that the scales reflect ratio measurement. This implies that the scales will meet or satisfy certain technical conditions. These conditions have been identified by Suppes and Zinnes (1963). Future research may be directed towards verifying whether in fact these scales satisfy the technical conditions. Future work should also move in the direction of facilitating

dimensional interpretation. When combined with theory, the use of multiple linear regression using the coordinates of the configuration as the independent variables may produce fruitful efforts. In addition to the assertion that the scales are representative (i.e., they are reflective of the ways subjects using them think), the scales are also index measures. This index property should be examined empirically by future research. In particular, the MMDS scales should be examined to verify its predictive utility. In this study, for example, the MMDS procedures reflected change. Future work may be directed to see whether such changes predict changes or improved managerial performance. Additionally, research must establish whether such predictions represent an improvement over and beyond those yielded by the use of ubiquitous rating scale methods. Future MMDS work in the area should also move in the direction of examining subgroup or subcultural differences across time.

4. As indicated in the literature review, previous validation research on management training and development has typically focused on the end products of the training process. In the typical study, the subject is conceptualized as a passive "black box" and the concern over how a subject processes information and eventually formulates rules or guides for future behaviors is ignored and neglected. Although this research effort has attempted to delve more deeply into the character of the learning process, attention was focused on judgmental outcomes rather than the

dynamics of information processing itself. The statement "teamwork is relevant for me and my job" for example is a conclusion reached by a subject through a process of critical inquiry and theoretically one would predict that such a person would be more likely to engage in teamwork behavior as compared to a person who believes and declares "Teamwork is baloney." More valuable insights, however, into the nature of the learning process may be obtained by examining, more thoroughly, the information strategies a subject uses in arriving at that conclusion. Cognitive information processing programs could subsequently be developed which can facilitate the change process. Future research work, therefore, is encouraged to use protocol tracing techniques (Simon, 1976) as part of validation methodology. Such techniques could provide a rich store of data revealing how subjects process and react to information-rich situations provided by management training and development programs and would be extremely valuable in developing more comprehensive and dynamic theories of change. It would also be helpful in the development of improved measurement strategies involving changes in "theories" managers hold or in the psychological representations of their task environments.

Practical Implications

The results and analyses provided for in this research project have several implications especially for management training units in the USACC and the U.S. Army.

First, the results of this study suggest that managers can be inoculated with new ideas and concepts and also be persuaded to be willing to try out new ideas in the work place. This, of course, is not a novel or startling finding. What is pragmatically important, however, if the MMDS results are any indication, is that some degree of skepticism, ambivalence, or resistance to change took place. Hence, while the managers were at least willing to try out new ideas, that willingness, it appears, was tempered with some reluctance. Two important reasons may be cited: lack of source credibility from the top and no on-site follow-up to the present training effort. Additionally, a number of the managers have apparently experienced several management improvement "crash programs" appear and disappear with some regularity in their work environment. These factors could comprise a set of disconfirming, negative messages. Thus, while the managers were assured that the Commanding General and the Chief of Staff were supportive of the teamwork concept, the MMDS results seem to suggest that a much more persuasive communication message must be generated.

It is uncertain precisely how many management training and development programs are sponsored by the U.S. Army each year. Also uncertain is how many programs contain a "no follow-up" provision. When no follow-up occurs, the benefits arising from training can dissipate over time. In fact, repeated cycles of training and no follow-up can create cynicism so that eventually, training events are not taken seriously and are treated with disdain. The MMDS study suggests that when trainees are uncertain about follow-up and

top management commitment, that knowledge can impair the persuasion attempts of management training and development efforts encouraging them to adapt alternative views, perspectives, and behavioral patterns in advocated directions. Behavioral science research, including evaluation research conducted by the U.S. Army (Cohen and Turney, 1978) has uncovered this finding with remarkable levels of high consistency. Yet, the U.S. Army continues to maintain the practice of providing limited or no follow-up support to a significant number of management training efforts, the present change effort (ODTTB) included. The immediate practical implication therefore is that the U.S. Army and the U.S. Army Communications Command not only continue to support evaluation efforts, but to also provide follow-up support to its management training and development efforts as a matter of standard operating procedure.

The second practical implication discovered during the course of this research project deals with certain military practices and situational features that may impact on the transfer of training effects. The practice of institutionalized rotation of commanders at the top may transmit negative information to management trainees and can fuel resistance to change. As was seen in the theoretical review, the journey from individual change to organizational change can be a long, tedious, and complicated one. Success of a change effort may take several years in the making and may also depend on a stable top management team and a minimum

of turnover by key personnel. These Army practices and organizational conditions may also exert negative influences upon management training efforts. It would behoove the U.S. Army and the U.S. Army Communications Command to focus on delineating the scope and nature of the problems to which management development and training efforts such as ODTTB can reasonably address.

The third practical implication deals with evaluation or validation efforts. This research has shown that measurement methodology can have substantial effects on the conclusions one can draw on the relative success of a training effort as an organizational socialization strategy. The results here suggest that arbitrary bounded scales and traditional psychometric attitude measures such as those used to assess changes in job satisfaction, motivation, and climate of various sorts may, under certain conditions, be inadequate to detect, monitor, and assess certain types of changes. Caution, therefore, must be exercised in using and in interpreting scales such as those in the Likert or the semantic differential format. It may be unwise for future evaluation efforts of management training and development programs to rely solely on such artificially bounded measures.

Summary and Conclusions

Several general conclusions emerge from this research effort. First, conceptualizing management training and development as a persuasive communication attempt in persuading managers to adopt

new viewpoints, concepts, and guiding principles and subsequently improve their individual performance as well as the quality of organizational life can be of considerable utility. Such a view can serve as the focus for validation and evaluation efforts and the relative "success" of a management training and development effort can be judged on its efficacy as a social influence mechanism.

A related observation is that strong theory and measurement in this domain is badly needed. As this research has illustrated, the way change is conceptualized and subsequently measured can lead to divergent, if not contradictory, conclusions about management training as a strategy of organizational socialization. It is also important to note that this observation may also apply to the field of Organizational Development where evaluation efforts are also characterized by divergent, contradictory conclusions and the application of varied measurement strategies. Golembiewski et al. (1975) have argued that in order to ascertain whether a particular intervention has "succeeded" or "failed", that knowledge not only demands confidence in measuring the quantity of change, but also demands confidence in the concept of change which underlies measurement. As Anderson (1967, p. 164) has said, "Indeed the scale of measurement may be in general be considered as an integral part of the theory." This research lends strong support to their arguments. The problem of measuring change in the area of management training and development is rather well known. Surprisingly,

however, the number of studies that have focused upon this problem and have proposed new alternative measurement strategies is, practically speaking, virtually nonexistent. This research project represents a movement towards confronting this problem directly and suggests that metric multidimensional scaling procedures and analytical techniques may be a promising alternative. Obviously, more work needs to be done in this area.

Finally, in surveying the entire field of management training, it may be surprising to note how much more knowledge must be generated both in quantity and in kind. In implementing a management training and development effort, practitioners are urged to conduct needs analysis, apply sound theory, and evaluate their efforts. This is easier said than done, however. The fact is that what constitutes managerial effectiveness is subject to much controversy and divergent judgment. And this is particularly true for managers within a military setting. Moreover, so-called "sound" theories of change or theories articulating the antecedents and consequences of managerial learning are glaringly absent. We have tidbits of knowledge or learning "principles" but as Gagne (1962) suggests they are of little help and may even be impediments to the change effort itself. Practitioners are also admonished to validate the goals of their training effort but the plain fact is that the current state of knowledge on measurement, depending upon the nature of the change, may be inadequate if not misleading to the task. Clearly, this field must be penetrated by fresh,

integrating theoretical perspectives and new measurement devices and procedures if knowledge is to grow and accumulate. The field can ill afford to repeat similar types of research efforts based upon limited measurement approaches. As an old saying goes: "Things that do not change, remain the same."

In conclusion, this researcher has conducted three research investigations or studies, each leading to different conclusions. Study 1 results led to the finding of no change, Study 2 moderate change, and Study 3 widespread change. Which study, one may inquire, is "the" correct one? The choice may well depend upon one's theoretical preference and mood towards management training and development on a given day. This investigator regards the MMDS study and the general factor model results and interpretation as being both plausible. Overall, it is suggested that management training and development efforts, particularly the more recent OD-teambuilding type approaches as exemplified by ODTTB, can accelerate the organizational socialization process and therefore act as a "booster shot" for management development efforts.

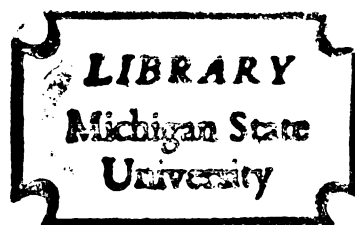
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APPENDIX A

MMDS QUESTIONNAIRE

APPENDIX A: MMDS QUESTIONNAIRE

ORGANIZATION DEVELOPMENT THROUGH TEAM BUILDING

M D S

Research Project

Michigan State University
School of Labor and Industrial Relations
East Lansing, Michigan

Respondent Code: _____

Time Series No.: _____

ORGANIZATIONAL DEVELOPMENT THROUGH TEAM BUILDING

Questionnaire

Instructions to Respondents

This is a Multidimensional Scaling (MDS) attitude questionnaire. This survey asks you to give your judgment on a set of ideas or concepts that are related to you, your job, your work organization, and the training you will have received in team-building. We would like you to give your opinions by telling us how different pairs of concepts or ideas are. The way you will do this is by estimating how far apart or unrelated two concepts are. Distance or relationships between concepts are measured in units so that the more different or unrelated two concepts are, the more units apart they are from each other.

To give you a "yardstick" enabling you to express how far apart or unrelated two concepts are, we will say that Military Personnel and Civilians are 100 units apart. In other words, all the differences between Military Personnel and Civilians together account for 100 units of difference.

The main idea here is for you to tell us your opinion of how many units apart or unrelated the concepts which follow are from each other. Remember, the more different or unrelated two concepts are from each other, the larger the number of units apart they are.

If you think any pair of concepts are more different or unrelated than Military Personnel and Civilians, you would write a number larger than 100.

If you think two concepts are less different than Military Personnel and Civilians, you would write a number smaller than 100.

If you think two concepts are identical, that is, they mean the same thing, you would write a "0".

For example, when completing a similar questionnaire, a respondent was instructed that operating management and staff specialists were 100 units apart. That person was then asked to estimate the distance between:

QUALITY WORK AND PUNCTUAL

The respondent determined that since producing quality work required being punctual on the job seldom or never, the two concepts were unrelated and were 160 units apart. After completion, the sample line looked like this:

QUALITY WORK AND PUNCTUAL 160

We realize that you might feel that your estimates are not perfectly accurate for every pair of concepts. Remember, there is no one right answer. Providing your own best estimate of the distances between each pair will be sufficient for our purposes.

Some key definitions need to be kept in mind as you begin to make your distance estimates:

1. The TRAINING SEMINAR/WORKSHOP refers to "Organizational Development Through Teambuilding" as conducted by Dr. Patten.
2. MBO refers to Management By Objectives.
3. The MERIT PAY CONCEPT refers to the idea and practice linking financial rewards to job performance.

For our coding purposes, please fill-in the blank spaces provided adjacent to the following items:

Your Birth Date: _____

Your Social Security Number: _____

IF MILITARY PERSONNEL AND CIVILIANS
ARE 100 UNITS APART, HOW FAR APART
ARE:

TEAMWORK AND MOTIVATING SUBORDINATES	_____
TEAMWORK AND EFFECTIVE TIME MANAGEMENT	_____
TEAMWORK AND RESOLVING INTERPERSONAL CONFLICT	_____
TEAMWORK AND CONFRONTING REAL ISSUES	_____
TEAMWORK AND COMMUNICATING OPENLY WITH OTHERS	_____
TEAMWORK AND THE MERIT PAY CONCEPT	_____
TEAMWORK AND THE TRAINING SEMINAR/ WORKSHOP	_____
TEAMWORK AND RELEVANT/PRACTICAL/USEFUL	_____
TEAMWORK AND MBO	_____
TEAMWORK AND TRUST	_____
TEAMWORK AND ME	_____
TEAMWORK AND GROUP DECISION-MAKING	_____
TEAMWORK AND MY JOB	_____
MOTIVATING SUBORDINATES AND EFFECTIVE TIME MANAGEMENT	_____
MOTIVATING SUBORDINATES AND RESOLVING INTERPERSONAL CONFLICT	_____
MOTIVATING SUBORDINATES AND CONFRONTING REAL ISSUES	_____

IF MILITARY PERSONNEL AND CIVILIANS
ARE 100 UNITS APART, HOW FAR APART
ARE:

MOTIVATING SUBORDINATES AND COMMUNICATING OPENLY WITH OTHERS	_____
MOTIVATING SUBORDINATES AND THE MERIT PAY CONCEPT	_____
MOTIVATING SUBORDINATES AND THE TRAINING SEMINAR/WORKSHOP	_____
MOTIVATING SUBORDINATES AND RELEVANT/ PRACTICAL/USEFUL	_____
MOTIVATING SUBORDINATES AND MBO	_____
MOTIVATING SUBORDINATES AND TRUST	_____
MOTIVATING SUBORDINATES AND ME	_____
MOTIVATING SUBORDINATES AND GROUP DECISION-MAKING	_____
MOTIVATING SUBORDINATES AND MY JOB	_____
EFFECTIVE TIME MANAGEMENT AND RESOLVING INTERPERSONAL CONFLICT	_____
EFFECTIVE TIME MANAGEMENT AND CONFRONTING REAL ISSUES	_____
EFFECTIVE TIME MANAGEMENT AND COMMUNICATING OPENLY WITH OTHERS	_____
EFFECTIVE TIME MANAGEMENT AND THE MERIT PAY CONCEPT	_____
EFFECTIVE TIME MANAGEMENT AND THE TRAINING SEMINAR/WORKSHOP	_____
EFFECTIVE TIME MANAGEMENT AND RELEVANT PRACTICAL/USEFUL	_____
EFFECTIVE TIME MANAGEMENT AND MBO	_____

IF MILITARY PERSONNEL AND CIVILIANS
ARE 100 UNITS APART, HOW FAR APART
ARE:

EFFECTIVE TIME MANAGEMENT AND TRUST	_____
EFFECTIVE TIME MANAGEMENT AND ME	_____
EFFECTIVE TIME MANAGEMENT AND GROUP DECISION-MAKING	_____
EFFECTIVE TIME MANAGEMENT AND MY JOB	_____
RESOLVING INTERPERSONAL CONFLICT AND CONFRONTING REAL ISSUES	_____
RESOLVING INTERPERSONAL CONFLICT AND COMMUNICATING OPENLY WITH OTHERS	_____
RESOLVING INTERPERSONAL CONFLICT AND THE MERIT PAY CONCEPT	_____
RESOLVING INTERPERSONAL CONFLICT AND THE TRAINING SEMINAR/WORKSHOP	_____
RESOLVING INTERPERSONAL CONFLICT AND RELEVANT/PRACTICAL/USEFUL	_____
RESOLVING INTERPERSONAL CONFLICT AND MBO	_____
RESOLVING INTERPERSONAL CONFLICT AND TRUST	_____
RESOLVING INTERPERSONAL CONFLICT AND ME	_____
RESOLVING INTERPERSONAL CONFLICT AND GROUP DECISION-MAKING	_____
RESOLVING INTERPERSONAL CONFLICT AND MY JOB	_____
CONFRONTING REAL ISSUES AND COMMUNICATING OPENLY WITH OTHERS	_____
CONFRONTING REAL ISSUES AND THE MERIT PAY CONCEPT	_____

IF MILITARY PERSONNEL AND CIVILIANS
ARE 100 UNITS APART, HOW FAR APART
ARE:

CONFRONTING REAL ISSUES AND THE TRAINING
SEMINAR/WORKSHOP

CONFRONTING REAL ISSUES AND RELEVANT/
PRACTICAL/USEFUL

CONFRONTING REAL ISSUES AND MBO

CONFRONTING REAL ISSUES AND TRUST

CONFRONTING REAL ISSUES AND ME

CONFRONTING REAL ISSUES AND GROUP
DECISION-MAKING

CONFRONTING REAL ISSUES AND MY JOB

COMMUNICATING OPENLY WITH OTHERS AND
THE MERIT PAY CONCEPT

COMMUNICATING OPENLY WITH OTHERS AND
THE TRAINING SEMINAR/WORKSHOP

COMMUNICATING OPENLY WITH OTHERS AND
RELEVANT/PRACTICAL/USEFUL

COMMUNICATING OPENLY WITH OTHERS AND
MBO

COMMUNICATING OPENLY WITH OTHERS AND
TRUST

COMMUNICATING OPENLY WITH OTHERS AND ME

COMMUNICATING OPENLY WITH OTHERS AND
GROUP DECISION-MAKING

COMMUNICATING OPENLY WITH OTHERS AND
MY JOB

THE MERIT PAY CONCEPT AND THE TRAINING
SEMINAR/WORKSHOP

IF MILITARY PERSONNEL AND CIVILIANS
ARE 100 UNITS APART, HOW FAR APART
ARE:

THE MERIT PAY CONCEPT AND RELEVANT/ PRACTICAL/USEFUL	_____
THE MERIT PAY CONCEPT AND MBO	_____
THE MERIT PAY CONCEPT AND TRUST	_____
THE MERIT PAY CONCEPT AND ME	_____
THE MERIT PAY CONCEPT AND GROUP DECISION-MAKING	_____
THE MERIT PAY CONCEPT AND MY JOB	_____
THE TRAINING SEMINAR/WORKSHOP AND RELEVANT/ PRACTICAL/USEFUL	_____
THE TRAINING SEMINAR/WORKSHOP AND MBO	_____
THE TRAINING SEMINAR/WORKSHOP AND TRUST	_____
THE TRAINING SEMINAR/WORKSHOP AND ME	_____
THE TRAINING SEMINAR/WORKSHOP AND GROUP DECISION-MAKING	_____
THE TRAINING SEMINAR/WORKSHOP AND MY JOB	_____
RELEVANT/PRACTICAL/USEFUL AND MBO	_____
RELEVANT/PRACTICAL/USEFUL AND TRUST	_____
RELEVANT/PRACTICAL/USEFUL AND ME	_____
RELEVANT/PRACTICAL/USEFUL AND GROUP DECISION-MAKING	_____

IF MILITARY PERSONNEL AND CIVILIANS
ARE 100 UNITS APART, HOW FAR APART
ARE:

RELEVANT/PRACTICAL/USEFUL AND MY JOB	_____
MBO AND TRUST	_____
MBO AND ME	_____
MBO AND GROUP DECISION-MAKING	_____
MBO AND MY JOB	_____
TRUST AND ME	_____
TRUST AND GROUP DECISION-MAKING	_____
TRUST AND MY JOB	_____
ME AND GROUP DECISION-MAKING	_____
ME AND MY JOB	_____
GROUP DECISION-MAKING AND MY JOB	_____

Section B: Instructions to Respondents

Some people in similar occupational roles such as yours have indicated that the factors and abilities below are important to them in their job. Please indicate how important each factor or ability is to you and your job by placing a checkmark on the scale located below each factor or ability.

TEAMWORK AND COOPERATION

Very Unimportant	_____	_____	_____	_____	_____	_____	_____	Very Important
	1	2	3	4	5	6	7	

MOTIVATING SUBORDINATES

Very Unimportant	_____	_____	_____	_____	_____	_____	_____	Very Important
	1	2	3	4	5	6	7	

TIME MANAGEMENT

Very Unimportant	_____	_____	_____	_____	_____	_____	_____	Very Important
	1	2	3	4	5	6	7	

RESOLVING INTERPERSONAL CONFLICT

Very Unimportant	_____	_____	_____	_____	_____	_____	_____	Very Important
	1	2	3	4	5	6	7	

CONFRONTING REAL ISSUES

Very Unimportant	_____	_____	_____	_____	_____	_____	_____	Very Important
	1	2	3	4	5	6	7	

COMMUNICATING OPENLY WITH OTHERS

Very Unimportant	_____	_____	_____	_____	_____	_____	_____	Very Important
	1	2	3	4	5	6	7	

MBO

Very Unimportant	_____	_____	_____	_____	_____	_____	_____	Very Important
	1	2	3	4	5	6	7	

FINANCIAL REWARDS CONTINGENT
UPON JOB PERFORMANCE

Very Unimportant	1	2	3	4	5	6	7	Very Important
---------------------	---	---	---	---	---	---	---	-------------------

NON-FINANCIAL REWARDS CONTINGENT
UPON JOB PERFORMANCE

Very Unimportant	1	2	3	4	5	6	7	Very Important
---------------------	---	---	---	---	---	---	---	-------------------

TRUST IN PEOPLE

Very Unimportant	1	2	3	4	5	6	7	Very Important
---------------------	---	---	---	---	---	---	---	-------------------

GROUP DECISION-MAKING

Very Unimportant	1	2	3	4	5	6	7	Very Important
---------------------	---	---	---	---	---	---	---	-------------------

APPENDIX B

QUESTIONNAIRE ITEMS, SCALE INTERCORRELATIONS, AND FINAL SCALE RELIABILITIES

APPENDIX B: QUESTIONNAIRE ITEMS, SCALE INTERCORRELATIONS,
AND FINAL SCALE RELIABILITIES

Note: Following is the key to be used in the "Scale Intercorrelation
and Loading Matrix" sections throughout Appendix B:

501	Job Satisfaction
502	Job Involvement
503	Trust
504	Intrinsic Motivation
505	Commitment
506	Utility of Team Work
507	Teamwork Norms
508	Perf-Reward Association
509	Openness
510	Feedback
511	Role Clarity
512	Goal Setting
513	Hi Order Need Strength
514	Mood
515	Centrality of Work

SCALE 501: JOB SATISFACTION

<u>Item</u>	<u>Description</u>
1	I am satisfied with the opportunity on my job for participation in setting goals and objectives.
5	I am satisfied with the opportunity for independent thought and action in my job.
13	I am satisfied with the extent of my feelings of worthwhile accomplishment on my job.
14	I am satisfied with the degree of self-fulfillment I actually get from being on my job.
19	I am satisfied with the opportunity on my job for personal growth and development.

SCALE INTERCORRELATION AND LOADING MATRIX

	14	13	5	19	1	T
14	(60)	61	44	50	30	78
13		(52)	47	43	25	72
5			(42)	19	52	65
19				(27)	25	52
1					(25)	50
T	78	72	65	52	50	
502	47	43	44	23	29	
503	37	24	16	55	05	
504	39	57	27	39	04	
505	39	47	42	43	16	
506	-05	08	-12	-12	-36	
507	20	27	12	23	-03	
508	33	35	33	60	32	
509	26	08	31	14	22	
510	44	40	46	28	26	
511	40	41	44	46	34	
512	47	53	66	50	44	
513	17	24	27	12	-03	
514	27	40	15	36	-06	
515	18	35	23	27	02	

Scale 502: Job Involvement

<u>Item</u>	<u>Description</u>
2	The major satisfaction in my life comes from my job.
6	Most things in life are more important than work.
9	The most important things that happen to me involve my job.
12	I am very much involved personally in my work.
16	I live, eat, and breathe my job.
20	I am a perfectionist about my work.
43	To me, work is only a small part of who I am.

SCALE INTERCORRELATION AND LOADING MATRIX

	2	9	16	6	12	43	20
2	(45)	40	27	22	29	38	17
9		(39)	34	35	33	22	03
16			(33)	27	22	20	12
6				(22)	26	16	-07
12					(21)	18	14
43						(20)	-03
20							(02)
T	67	63	58	47	46	44	14
501	47	49	02	23	41	29	02
503	16	11	-26	09	29	-09	-21
504	40	11	01	06	18	04	21
505	42	42	14	11	49	26	-08
506	-20	01	-11	-04	30	-15	-14
507	16	29	23	22	45	03	-14
508	18	25	-11	05	23	11	-13
509	24	33	35	04	40	-03	-11
510	28	37	19	15	41	05	-07
511	46	43	16	27	42	14	-10
512	34	39	06	15	44	26	-03
513	19	19	-02	11	49	-05	20
514	20	20	12	06	59	04	17
515	38	10	29	27	34	37	08

Scale 503: Trust

Item	Description
4	One must protect himself when dealing with other people.
8	Generally speaking, most people can be trusted.
10	It does not pay to trust people in the organization I work in.
11	Most people I deal with on the job would try to take advantage of me if they got the chance.
15	In my job, it definitely pays not to "stick your neck out" on important decisions.
17	Superiors, at times, must make decisions which seem to be against the interest of subordinates. When this happens to me, I trust my superior in protecting my career interests.
18	I am free to discuss with my superior the problems and difficulties I have on my job without jeopardizing my position or having it "held against me" later on.
21	My superior takes advantage of opportunities that come up to further my career interests by his actions and decisions.
22	The people I work with can be trusted.
24	It does not pay to trust people in the organization I work for.

SCALE INTERCORRELATION AND LOADING MATRIX

	10	8	24	22	18	15	11	17	4	21
10	(83)									
8		(71)								
24			(69)							
22				(63)						
18					(34)					
15						(30)				
11							(30)			
17								(20)		
4									(16)	
21										(14)
T	91	84	83	79	58	55	54	45	40	37
501	36	26	27	19	41	23	03	47	10	41
502	00	-13	-03	10	33	11	-20	15	05	22
504	33	31	31	29	26	21	22	18	03	26
505	47	44	43	33	55	33	17	37	16	34
506	-06	-01	06	-07	-09	-22	12	-13	15	-24
507	17	07	11	23	08	20	-04	03	-07	-07
508	39	34	21	20	42	25	03	47	05	48
509	38	19	28	34	16	20	23	10	07	02
510	41	26	28	32	34	37	12	37	03	25
511	36	21	38	37	48	36	14	48	11	25
512	28	23	13	17	47	25	-03	53	11	41
513	26	18	07	00	16	18	10	28	16	14
514	33	22	17	-01	03	06	16	21	14	-02
515	36	26	20	36	17	24	13	08	07	14

Scale 504: Intrinsic Motivation

<u>Item</u>	<u>Description</u>
3	I feel a great sense of personal satisfaction when I do my job well.
7	When I do work well, it gives me a feeling of accomplishment.
23	Doing my job well increases my feelings of self-esteem.
25	When I perform my job well, it contributes to my personal growth and development.
45	How well I perform on my job is extremely important to me.

SCALE INTERCORRELATION AND LOADING MATRIX

	23	45	7	3	25
23	(56)	45	41	41	51
45		(53)	56	32	42
7			(48)	54	17
3				(27)	08
25					(19)
T	75	73	69	52	44
501	36	24	38	17	44
502	15	19	28	08	07
503	27	24	20	02	48
505	36	42	27	16	44
506	-06	33	13	06	06
507	27	38	34	16	31
508	34	18	15	-02	43
509	13	42	28	00	03
510	40	32	25	09	34
511	26	28	32	09	29
512	29	21	35	14	21
513	03	20	16	00	12
514	16	36	34	12	26
515	32	48	48	25	31

Scale 505: Commitment

<u>Item</u>	<u>Description</u>
26	I have a strong personal commitment to the organization I work for.
27	If I could do it all over again, I would work for this organization.
28	I would advise a good friend to take a job with this organization.
29	I enjoy discussing my work with people outside the organization.
30	I enjoy talking about my work with my friends.

SCALE INTERCORRELATION AND LOADING MATRIX

	27	28	30	26	29
27	(65)	79	29	55	12
28		(46)	20	47	08
30			(38)	14	80
26				(22)	-01
29					(15)
T	81	68	61	46	38
501	45	46	21	41	21
502	39	34	38	28	28
503	57	62	17	28	05
504	26	32	35	35	28
506	07	-03	12	15	03
507	17	18	47	21	38
508	58	52	20	48	12
509	27	27	33	36	21
510	43	38	29	61	12
511	46	53	29	49	15
512	43	48	19	46	16
513	32	32	22	10	14
514	38	38	11	17	-09
515	29	28	56	07	47

Scale 506: Utility of Teamwork

Item	Description
39	Teamwork is the best way to accomplish tasks especially where problem-solving work is concerned.
41	In my job, teamwork is important.
42	Working together as a team leads to more effective decisions than working in isolation.
90	In my job, there is a need for people to work together and resolve problems.
91	The people I work with should be more oriented towards teamwork.
92	At work, I try to use group decision-making procedures more than to rely solely on my own decisions.
93	In my job, it is necessary for me to work with others in order to accomplish my work goals and objectives.
95	My job is structured so that one must engage in teamwork to get the job done.

SCALE INTERCORRELATION AND LOADING MATRIX

	41	42	39	93	92	90	91	95
41	(60	72	46	45	34	25	16	22
42		(56)	65	87	31	22	11	06
39			(34)	21	25	24	09	-01
93				(29)	47	23	10	49
92					(23)	09	15	13
90						(18)	43	05
91							(09)	-02
95								(06)
T	78	75	58	54	48	42	29	24
501	04	09	04	02	-07	09	-50	35
502	05	17	07	07	-19	17	-24	-01
503	21	13	16	-11	-13	13	-45	29
504	24	24	29	-05	-01	24	-12	16
505	26	32	05	15	-14	32	-40	25
507	56	62	41	29	31	62	22	23
508	00	-05	-06	-06	-06	-05	-54	15
509	28	25	21	41	28	25	-30	21
510	17	22	09	07	09	22	-35	14
511	14	23	24	15	05	23	-32	29
512	03	03	06	10	06	03	-54	30
513	26	08	17	25	20	08	-11	15
514	33	19	34	23	26	19	05	13
515	22	41	21	-07	10	41	01	26

Scale 507: Effective Teamwork Norms

Item	Description
46	Teamwork proceeds best when all members speak freely or "level" with each other, as opposed to "sparring" or hiding opinions or feelings.
47	In an effective work team, members should encourage disagreement rather than "smother" differences in opinion.
48	Strong feelings, including anger, if expressed will aid teamwork in the long run.
49	In effective teamwork, it is important that decisions should be made by talking things through--achieving consensus--rather than by majority vote or by a unilateral decision by the boss.
50	In effective teamwork, group members give each other support, recognition, encouragement, and earned praise easily and freely.
51	In effective teamwork, silent members should be drawn into discussions so that everyone's ideas are secured & no one feels left out.
52	In effective teamwork, it is important that group work contributes to all members feeling good about themselves & one another.
53	In effective teamwork, leadership roles (e.g. initiating, clarifying, summarizing) should be shared among each member so that all grow and learn from group experiences.
54	In effective teamwork, feedback to team members should be given freely so that people will know when they are helping or hurting the group's progress.
55	The effective work team stops the action now and then and evaluates how it is functioning.

SCALE INTERCORRELATION AND LOADING MATRIX

	48	47	51	49	52	43	50	46	44	45
48	(63)	47	37	40	44	45	33	44	39	21
47		(45)	51	53	32	35	42	28	17	01
51			(42)	52	40	31	25	19	21	19
49				(36)	26	17	31	37	04	14
52					(28)	30	32	15	20	07
43						(25)	22	10	31	11
50							(20)	22	02	04
46								(19)	08	23
44									(11)	21
45										(06)
T	79	67	65	60	52	50	45	43	34	24
501	03	21	29	09	12	22	20	-21	26	10
502	08	33	34	27	18	06	23	29	28	15
503	12	07	17	04	02	15	-01	-37	27	12
504	23	17	35	10	29	54	37	-08	34	11
505	19	42	24	20	37	29	31	-07	39	15
506	66	47	24	14	44	48	26	29	25	10
508	04	17	24	09	23	11	32	-27	00	-03
509	37	40	55	25	36	39	19	-07	28	22
510	24	32	43	17	40	36	33	-13	22	08
511	26	36	43	17	16	27	22	-06	28	08
512	-09	17	21	-05	17	31	00	-20	08	-05
513	13	28	23	23	32	18	25	03	28	-01
514	37	38	40	21	36	28	26	12	47	06
515	35	32	53	24	41	61	-03	22	47	11

Scale 508: Performance-Reward Association

Item	Description
40	Time-off and other non-financial rewards should be given only when performance merits rewards.
56	People are rewarded in proportion to the excellence of their job performance.
57	People with ability have a promising future.
60	It's worth the time and effort to offer suggestions on how to improve things.
61	Future grade increases depend on my actual job performance.
62	I am recognized and appreciated for doing high quality work.
63	If I perform well, my chances for career advancement are good.
66	There is sufficient reward and recognition for doing good work.
69	In my command/agency, promotion system helps best person for a job rise to the top.
71	A person's pay increase is an accurate reflection of that person's job performance.
77	I know what opportunities for advancement or promotion exist for me.
80	Performance appraisals are based upon accomplished results.

SCALE INTERCORRELATION AND LOADING MATRIX

	69	63	56	57	80	62	71	61	60	77	66	40
69	(68)	58	53	66	58	58	56	58	35	28	35	23
63		(59)	50	65	60	75	45	75	44	23	14	03
56			(57)	56	60	42	53	44	52	45	29	15
57				(54)	54	48	39	48	33	38	28	14
80					(50)	51	36	47	53	43	09	01
62						(47)	36	54	39	32	20	18
71							(44)	41	53	25	51	09
61								(43)	43	28	08	12
60									(33)	30	35	-06
77										(23)	28	11
66											(15)	10
40												(02)
T	83	77	75	74	71	68	66	66	58	48	38	15
501	48	38	30	41	48	60	41	33	48	31	27	04
502	07	02	09	11	35	14	10	00	18	32	08	-26
503	33	38	33	31	31	58	22	34	30	18	-01	09
504	29	21	23	23	17	31	31	21	28	26	26	-01
505	49	48	46	37	52	61	40	40	34	45	12	11
506	-18	-16	-15	-08	-06	-12	-12	-13	-24	12	-38	-04
507	10	16	15	16	22	09	01	15	05	24	-12	06
509	28	32	28	42	56	51	27	28	34	41	14	19
510	50	58	54	48	69	62	48	42	52	52	24	00
511	39	55	30	45	56	61	28	40	36	45	05	06
512	53	52	43	56	61	76	41	42	41	51	23	04
513	27	28	37	43	44	28	11	08	10	24	01	-04
514	29	36	38	61	41	20	12	18	21	23	13	-07
515	09	17	20	11	30	17	16	23	21	20	04	06

Scale 509: Openness

<u>Item</u>	<u>Description</u>
65	In my command/agency, I make sure that my superior gets accurate and comprehensive information about work problems.
79	Generally speaking, the people I work with keep each other well informed about important events and situations related to their work.
94	Communications among the people I work with are very candid.
96	It is easy to talk openly and candidly to all members of my work group.
97	It is often necessary for me to go back and check the accuracy of information I receive in my job.
98	I find it easy and non-threatening to ask advice from any member of my work group.

SCALE INTERCORRELATION AND LOADING MATRIX

	79	96	98	65	94	97
79	(52)	36	26	29	34	39
96		(48)	57	27	39	01
98			(29)	17	23	09
65				(19)	16	20
94					(16)	-09
97						(05)
T	72	70	53	43	40	22
501	46	20	18	07	-03	53
502	42	26	28	08	14	05
503	36	09	27	03	13	59
504	36	-02	04	13	00	42
505	55	27	09	24	20	53
506	12	13	15	35	19	-04
507	40	23	22	30	41	-01
508	46	12	09	24	13	56
510	77	35	28	35	25	41
511	58	36	32	38	24	41
512	58	27	22	32	-10	54
513	28	19	10	28	21	13
514	29	27	32	42	28	13
515	37	24	28	21	25	28

Scale 510: Feedback

<u>Item</u>	<u>Description</u>
64	The info I get is adequate to my needs for successful job performance.
75	I'm given necessary info and feedback to perform my job effectively.
78	The feedback I get assists me in accomplishing my performance goals.
84	I get enough facts and info to work my best.

SCALE INTERCORRELATION AND LOADING MATRIX

	75	78	64	84
75	(77)	66	68	62
78		(57)	53	58
64			(54)	53
84				(53)
T	88	75	73	73
501	47	49	44	41
502	38	30	38	34
503	41	37	33	25
504	37	55	15	34
505	54	61	40	48
506	06	17	-04	08
507	34	38	35	37
508	66	67	47	54
509	63	61	69	56
511	80	66	59	60
512	76	64	55	57
513	30	39	31	31
514	28	40	27	31
515	40	38	20	35

Scale 511: Role Clarity

Item	Description
59	My boss lets me know what he expects or wants of me in terms of job performance.
67	I do not receive conflicting orders and instructions from different people above me.
68	I know what policies, rules, and procedures I must follow to successfully perform my job.
70	My boss and I have a mutual understanding about what I should be doing or how I should perform my job.
76	I have a clear understanding of what others expect of me in terms of job performance.
81	The priorities of my job are well established.
82	I can predict what others will expect of me on the job tomorrow.
83	On my job, there are procedures for handling situations as they arise.
85	I am clear on what others expect of me on the job.

SCALE INTERCORRELATION AND LOADING MATRIX

	85	76	82	81	70	59	68	83	67
85	(63)	56	67	51	34	30	64	57	35
76		(55)	42	51	56	48	44	45	31
82			(53)	56	47	36	46	41	35
81				(50)	38	44	33	47	37
70					(38)	61	22	21	42
59						(34)	17	24	45
68							(32)	46	23
83								(30)	06
T	79	74	73	71	62	59	57	55	48
501	32	40	47	56	51	51	18	20	58
502	48	42	46	46	34	09	33	39	25
503	23	23	30	42	41	40	09	20	61
504	13	50	05	47	41	30	-03	21	26
505	37	46	39	58	57	39	13	34	51
506	25	12	17	01	09	08	14	07	08
507	43	36	31	42	17	10	22	26	14
508	39	53	35	47	43	47	16	33	35
509	65	52	57	47	43	44	46	35	54
510	65	72	49	69	47	48	43	67	36
512	46	63	53	63	68	63	25	37	55
513	45	05	21	32	12	22	09	36	21
514	60	28	26	36	05	16	24	31	28
515	35	35	29	54	36	26	19	31	44

Scale 512: Goal Setting

<u>Item</u>	<u>Description</u>
58	My superior is receptive and listens to my ideas and suggestions on how to improve my work.
72	My superior solicits my opinion of major decisions affecting my work.
73	I have final say about the goals and objectives I must accomplish on my job.
74	People have a major say or influence in major decisions affecting their job.

SCALE INTERCORRELATION AND LOADING MATRIX

	72	73	58	74
72	(62)	53	79	28
73		(58)	47	55
58			(57)	29
74				(24)
T	79	76	76	49
501	60	63	55	53
502	42	43	21	22
503	29	19	35	32
504	24	31	23	37
505	55	39	44	26
506	06	-23	10	-05
507	12	11	05	03
508	40	59	47	60
509	43	57	33	39
510	51	68	42	66
511	60	63	51	56
513	28	40	27	32
514	15	43	21	31
515	22	28	24	25

Scale 513: Higher Order Need Strength

<u>Item</u>	<u>Description</u>
99	The opportunity you have on your job to accomplish something worthwhile.
100	The opportunity you have on your job to do something that makes you feel good as a person.
101	The opportunity you have on your job to do the things you do best.
102	The opportunity you have on your job to develop your skills and abilities.
103	The opportunity you have on your job to decide for yourself how your job should be done.
104	The opportunity you have on your job to set your own pace while working.
105	The opportunity you have to see the finished results of your work.

SCALE INTERCORRELATION AND LOADING MATRIX

	103	102	101	104	105	100	99
103	(76)	72	59	47	62	41	44
102		(60)	64	35	44	44	35
101			(52)	48	40	45	23
104				(36)	49	28	32
105					(32)	12	21
100						(30)	49
99							(25)
T	87	77	72	60	57	54	50
501	26	20	18	09	04	14	20
502	29	14	37	19	19	26	36
503	22	25	09	12	23	08	12
504	12	14	10	17	13	-10	04
505	37	28	09	25	17	19	35
506	11	23	-12	15	24	17	39
507	26	29	10	18	33	22	31
508	25	35	29	18	08	18	24
509	23	33	05	21	09	37	52
510	33	30	22	30	17	14	47
511	22	17	07	38	19	11	47
512	35	23	20	42	15	26	48
514	63	70	57	39	64	62	48
515	18	04	-11	-03	17	15	27

Scale 514: Mood

<u>Item</u>	<u>Description</u>
86	All in all, today I'm in a good mood.
87	Considering everything, I'm spending my life and time in satisfying ways.
88	Today, I don't feel irritable for some reason or other.
89	Taking all things, I'm hopeful about the future.

SCALE INTERCORRELATION AND LOADING MATRIX

	86	87	89	88
86	(61)	41	40	50
87		(45)	46	30
89			(26)	10
88				(22)
T	79	67	50	46
501	28	22	09	27
502	42	40	06	28
503	05	10	25	12
504	25	22	30	13
505	26	11	17	25
506	28	24	29	25
507	40	35	29	31
508	27	24	25	24
509	46	18	23	53
510	23	31	23	22
511	32	30	24	21
512	23	24	15	33
513	54	54	58	48
515	25	35	38	14

Scale 515: Work Centrality

Item	Description
31	When the work day is finished, a person should forget his job and enjoy himself.
32	Hard work makes a man or woman a better person.
33	The principal purpose of a person's job is to provide that person with the means for enjoying free time off the job.
34	Wasting time is as bad as wasting money.
35	Whenever possible, a person should relax and accept life as it is, rather than always striving for unreachable goals.
36	A good indication of a person's worth is how well that person does his job.
37	Assuming all other things are equal, it is better to have a job with a lot of responsibility rather than one with little responsibility.
38	People who do things the easy way are the smart ones.
44	I would probably keep working even if I didn't need the money.

SCALE INTERCORRELATION AND LOADING MATRIX

	44	37	31	34	32	36	35	33	38
44	(26)	13	28	22	25	11	03	16	07
37		(23)	12	36	33	23	18	-09	07
31			(21)	21	11	04	20	12	-01
34				(21)	21	15	09	-01	-13
32					(15)	06	10	08	07
36						(11)	03	04	09
35							(10)	06	-02
33								(00)	-44
38									(01)
T	51	48	46	46	32	32	32	05	-08
501	27	30	07	17	01	06	01	10	00
502	24	14	20	11	24	37	24	-31	29
503	41	22	19	07	00	03	00	21	17
504	19	54	04	36	15	07	15	10	06
505	43	31	21	24	21	00	21	03	07
506	00	04	-13	18	37	-02	37	08	00
507	06	36	-07	27	33	22	33	-13	31
508	27	27	-06	-03	-04	04	-04	02	13
509	36	33	00	28	08	16	08	-20	20
510	32	36	-06	05	14	10	14	-10	25
511	39	28	04	24	03	27	03	-03	16
512	16	37	03	11	08	14	08	-08	00
513	23	-07	-18	-02	06	17	06	-02	11
514	41	23	-08	06	21	27	21	-01	12

Final Scale Reliabilities and Items

Scale	Title	Time 1	Time 2	Time 3	No. of Items	Final Scale Items
501	Job Satisfaction	.76	.89	.89	5	1, 5, 13, 14, 19
502	Job Involvement	.71	.72	.77	6	2, 6, 9, 12, 16, 13
503	Trust	.85	.84	.86	10	4, 8, 10, 11, 15, 17, 18, 21, 22, 24
504	Motivation	.74	.81	.82	5	3, 7, 23, 25, 45
505	Commitment	.72	.69	.74	5	26 to 30
506	Importance Teamwork	.75	.73	.80	6	39, 41, 42, 90, 92, 93
507	Teamwork Norms	.75	.91	.91	10	46 to 55
508	Instrumentality	.85	.89	.89	11	40, 56, 57, 60, 61, 62, 66, 69, 71, 77, 80
509	Openness	.69	.70	.72	5	65, 79, 94, 96, 98
510	Feedback	.86	.88	.88	4	64, 75, 78, 84
511	Role Clarity	.86	.89	.90	9	59, 67, 68, 70, 76, 81, 82, 83, 85
512	Goal Setting	.79	.85	.81	4	58, 72, 73, 74
513	Higher Order Needs	.84	.85	.88	7	99 to 105
514	Mood	.69	.69	.60	4	86 to 89
515	Work Centrality	.56	.30	.27	7	31 to 37, 44

Cluster Analysis
Scale Intercorrelation Matrix^a

Scales	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515
501	1.00														
502	.59	1.00													
503	.44	.09	1.00												
504	.53	.25	.38	1.00											
505	.59	.57	.57	.53	1.00										
506	-.18	-.06	-.08	.17	.07	1.00									
507	.25	.43	.11	.47	.48	.64	1.00								
508	.61	.22	.45	.34	.64	-.26	.17	1.00							
509	.32	.41	.32	.28	.48	.31	.57	.37	1.00						
510	.58	.45	.44	.45	.65	.05	.47	.76	.72	1.00					
511	.64	.58	.50	.39	.65	.11	.42	.60	.68	.86	1.00				
512	.82	.50	.41	.38	.59	-.12	.11	.74	.47	.81	.82	1.00			
513	.24	.28	.25	.17	.37	.23	.37	.35	.38	.42	.35	.46	1.00		
514	.36	.37	.21	.40	.32	.43	.56	.42	.57	.41	.44	.40	.88	1.00	
515	.33	.54	.32	.59	.56	.25	.62	.12	.47	.33	.45	.32	.04	.34	1.00

^aAll off-diagonal correlations have been corrected for attenuation. N = 69 for each coefficient.

APPENDIX C

PAIRWISE SAMPLE SIZES: TIME 1

APPENDIX E

PAIR-WISE SAMPLE SIZES: TIME 3

[illegible]

APPENDIX F

DESCRIPTIVE STATISTICS FOR PAIRWISE COMPARISONS, TIME 1

APPENDIX F: DESCRIPTIVE STATISTICS FOR PAIRWISE COMPARISONS

Table 1

Comparisons Row	Col	Mean	Standard Deviation	Skewness	Kurtosis	Percent Error
2	1	37.46	35.61	1.10	3.96	11.4
3	1	44.29	40.83	1.07	3.44	11.2
3	2	48.58	46.86	1.07	3.70	11.6
4	1	40.57	38.83	1.14	3.94	11.4
4	2	43.04	42.76	1.28	4.14	11.9
4	3	59.50	42.86	.51	2.51	8.6
5	1	41.13	41.46	1.00	3.08	12.0
5	2	56.14	47.54	.68	2.55	10.1
5	3	55.36	46.20	.57	2.31	10.0
5	4	55.76	49.29	.86	2.71	10.6
6	1	29.54	39.04	1.56	4.80	15.8
6	2	42.21	45.21	1.29	4.24	12.7
6	3	49.41	44.33	.93	3.23	10.7
6	4	38.89	40.69	1.27	4.18	12.5
6	5	39.20	45.48	1.18	3.52	13.9
7	1	96.53	50.49	.18	2.39	6.3
7	2	67.11	56.42	.47	2.06	10.0
7	3	86.26	54.08	.35	2.14	7.5
7	4	93.63	55.29	.35	2.20	7.1
7	5	92.96	50.75	.25	2.43	6.5
7	6	96.73	57.73	.63	3.96	7.2
8	1	37.97	42.53	.88	2.51	13.4
8	2	56.44	45.65	.84	3.09	9.6
8	3	55.65	43.29	.72	3.37	9.4
8	4	60.96	46.77	.66	2.99	9.2
8	5	65.70	53.40	1.50	6.89	9.7
8	6	47.52	45.03	1.01	3.56	11.4
8	7	101.02	77.17	2.18	11.72	9.3
9	1	35.75	37.09	1.20	3.84	12.7
9	2	45.44	45.57	1.24	4.19	12.1
9	3	45.53	42.04	1.09	4.17	11.2
9	4	45.62	39.63	.78	2.91	10.5
9	5	44.87	41.31	.90	3.34	11.2
9	6	42.73	43.04	1.18	3.81	12.4
9	7	90.28	73.78	2.59	14.87	10.0
9	8	49.02	43.80	.92	3.66	10.8
10	1	50.74	53.75	1.06	3.16	12.7
10	2	67.40	50.15	.63	2.75	8.9
10	3	53.97	44.66	.87	3.55	10.0
10	4	73.36	48.93	.41	2.61	8.0
10	5	64.55	53.12	.63	2.62	9.9
10	6	77.03	122.21	6.23	47.18	19.1
10	7	120.96	129.48	4.88	31.94	12.9
10	8	48.73	48.64	1.22	4.19	12.0
10	9	66.29	71.71	3.39	20.29	13.1

APPENDIX F, Table 1 (Continued)

Comparisons Row	Col	Mean	Standard Deviation	Skewness	Kurtosis	Percent Error
11	1	26.73	31.76	1.13	3.05	14.2
11	2	33.48	42.31	1.37	4.27	15.0
11	3	63.77	45.20	.44	2.84	8.5
11	4	35.24	39.89	1.01	2.68	13.5
11	5	41.91	43.56	.92	2.87	12.4
11	6	26.86	34.97	1.42	4.40	15.7
11	7	94.79	77.61	2.29	12.17	9.9
11	8	58.10	52.07	.78	2.92	10.8
11	9	44.52	45.61	1.28	4.53	12.4
11	10	72.48	54.65	.41	2.67	9.1
12	1	41.00	39.21	.83	2.78	11.4
12	2	37.70	39.82	1.01	3.49	12.5
12	3	43.13	39.99	.98	3.56	11.2
12	4	43.29	40.23	.78	2.69	11.1
12	5	34.27	36.89	1.03	3.06	12.9
12	6	33.19	34.56	.78	2.20	12.5
12	7	83.91	76.27	2.70	14.30	10.9
12	8	44.68	43.41	1.01	3.84	11.7
12	9	35.16	39.11	1.64	6.51	13.5
12	10	59.87	74.53	3.23	18.36	15.0
12	11	25.45	30.46	1.28	3.50	14.4
13	1	23.60	33.46	1.42	3.75	16.9
13	2	47.73	41.29	1.01	3.60	10.3
13	3	55.19	40.10	.55	2.32	8.7
13	4	50.33	43.18	.61	2.36	10.3
13	5	51.53	43.89	.81	2.79	10.2
13	6	40.46	44.29	1.25	3.76	13.2
13	7	109.49	75.85	2.18	11.49	8.4
13	8	38.44	41.90	1.43	5.20	13.1
13	9	49.12	45.63	1.08	4.01	11.3
13	10	72.67	133.30	5.34	35.49	22.1
13	11	52.04	121.00	6.97	54.58	28.0
13	12	41.70	40.94	1.18	4.04	11.8
14	1	49.64	47.44	1.02	3.41	11.4
14	2	34.09	42.32	1.49	4.70	14.7
14	3	41.22	44.52	1.32	4.28	13.0
14	4	43.23	43.16	.92	2.97	11.9
14	5	43.57	45.29	.98	3.55	12.4
14	6	42.61	44.61	1.13	3.69	12.6
14	7	87.42	79.45	2.35	11.87	10.9
14	8	55.30	47.96	.98	3.74	10.4
14	9	36.75	41.50	1.22	3.93	13.8
14	10	58.83	52.35	1.13	3.94	10.7
14	11	38.22	43.10	1.58	5.60	13.6
14	12	31.49	39.16	1.53	5.62	15.0
14	13	45.64	43.08	1.34	4.89	11.4

APPENDIX G

DESCRIPTIVE STATISTICS FOR PAIRWISE COMPARISONS, TIME 2

APPENDIX G: DESCRIPTIVE STATISTICS FOR PAIRWISE COMPARISONS

Table 2

Comparisons Row	Col	Mean	Standard Deviation	Skewness	Kurtosis	Percent Error
2	1	31.71	36.22	1.30	4.33	13.8
3	1	37.44	43.25	1.94	7.24	13.9
3	2	45.94	45.53	1.26	4.08	11.9
4	1	31.30	38.94	1.34	3.92	15.0
4	2	35.36	38.56	1.38	4.21	13.1
4	3	49.58	37.67	.76	2.67	9.0
5	1	32.87	40.27	1.60	5.43	14.7
5	2	40.59	41.71	1.34	4.75	12.4
5	3	42.58	36.26	.56	2.21	10.1
5	4	35.85	40.97	1.47	5.35	13.6
6	1	22.80	32.51	1.69	5.01	17.2
6	2	28.24	32.93	1.43	4.71	13.8
6	3	42.68	41.94	1.21	4.36	11.7
6	4	23.66	31.84	1.44	3.87	16.0
6	5	23.10	32.93	1.81	5.66	16.9
7	1	87.61	61.96	.81	3.49	8.5
7	2	68.24	54.15	.53	2.05	9.4
7	3	80.56	56.44	.50	2.14	8.3
7	4	94.65	64.74	1.03	3.94	8.1
7	5	90.35	59.01	.78	3.72	7.8
7	6	85.63	62.94	.79	3.61	8.7
8	1	29.32	36.94	.99	2.36	15.2
8	2	39.62	46.34	2.33	10.73	13.9
8	3	42.51	45.99	2.20	10.31	12.8
8	4	49.79	61.34	2.92	15.79	14.6
8	5	44.79	42.84	1.47	5.34	11.4
8	6	28.28	34.82	1.48	4.38	14.6
8	7	96.48	78.54	2.17	11.12	9.7
9	1	30.15	37.68	1.33	3.90	15.0
9	2	29.51	34.79	2.09	9.44	14.0
9	3	32.25	33.50	1.11	3.62	12.3
9	4	34.79	40.66	1.16	3.23	13.9
9	5	30.14	32.94	1.31	4.33	13.0
9	6	23.87	30.84	1.46	4.01	15.3
9	7	72.54	70.10	.99	3.57	11.5
9	8	35.78	40.00	1.72	6.46	13.3
10	1	31.86	40.94	1.63	4.95	15.5
10	2	41.03	39.60	1.68	6.53	11.5
10	3	33.59	33.18	1.23	4.68	11.7
10	4	53.24	47.83	.73	2.83	10.7
10	5	41.73	43.96	1.28	4.33	12.5
10	6	33.80	38.73	1.77	6.64	13.6
10	7	84.01	62.99	.82	3.74	8.9

APPENDIX G, Table 2 (Continued)

Comparisons Row	Col	Mean	Standard Deviation	Skewness	Kurtosis	Percent Error
10	8	31.52	38.27	1.85	6.53	14.4
10	9	36.97	50.24	2.76	12.87	16.1
11	1	25.91	33.17	1.37	3.75	15.4
11	2	28.80	33.16	1.62	5.99	13.7
11	3	59.79	51.55	.88	3.25	10.2
11	4	26.76	33.82	1.52	4.62	15.0
11	5	32.96	36.20	1.12	3.64	13.0
11	6	22.61	32.50	1.77	5.63	17.1
11	7	81.48	65.87	1.16	4.55	9.6
11	8	44.14	45.71	1.24	4.12	12.4
11	9	30.57	39.41	1.98	7.59	15.4
11	10	50.92	47.61	.80	2.95	11.1
12	1	28.23	30.81	1.62	5.69	13.1
12	2	28.66	29.59	1.33	4.25	12.3
12	3	33.31	32.17	1.10	3.40	11.5
12	4	24.86	27.83	1.46	4.54	13.3
12	5	24.51	28.20	1.53	4.96	13.7
12	6	20.99	23.79	1.47	4.71	13.5
12	7	69.93	65.54	1.49	5.46	11.1
12	8	31.17	34.19	1.55	5.31	13.0
12	9	27.29	37.46	2.31	9.03	16.4
12	10	39.37	36.22	.81	2.95	10.9
12	11	20.35	26.46	1.56	4.60	15.4
13	1	15.84	24.76	2.00	6.61	18.8
13	2	34.41	35.20	1.29	4.64	12.1
13	3	41.27	37.28	1.37	5.19	10.7
13	4	38.80	47.16	2.74	14.45	14.4
13	5	33.52	33.76	1.51	6.28	12.0
13	6	22.65	29.33	1.89	7.11	15.4
13	7	101.34	77.32	2.29	11.61	9.1
13	8	24.34	32.99	1.99	6.71	16.1
13	9	26.48	36.42	2.65	11.41	16.3
13	10	31.87	36.20	1.17	3.54	13.5
13	11	26.34	30.11	1.45	4.89	13.6
13	12	30.63	33.12	1.87	7.61	12.8
14	1	34.90	43.27	1.81	5.90	14.9
14	2	28.78	34.66	1.74	5.71	14.3
14	3	34.72	38.89	1.58	5.28	13.3
14	4	27.82	35.78	1.87	6.22	15.3
14	5	33.24	40.89	1.84	6.53	14.6
14	6	26.27	33.97	1.89	6.35	15.3
14	7	77.75	63.66	1.32	5.25	9.7
14	8	40.11	43.19	1.48	4.98	12.8
14	9	33.07	45.73	2.05	6.88	16.5
14	10	41.48	38.08	.75	2.79	10.9
14	11	30.00	38.88	2.03	7.58	15.4
14	12	22.96	31.97	2.22	8.28	16.5
14	13	39.27	46.30	2.15	8.55	14.0

APPENDIX H

DESCRIPTIVE STATISTICS FOR PAIRWISE COMPARISONS, TIME 3

APPENDIX H: DESCRIPTIVE STATISTICS FOR PAIRWISE COMPARISONS

Table 3

Comparisons Row	Col	Mean	Standard Deviation	Skewness	Kurtosis	Percent Error
2	1	27.65	35.69	1.51	4.47	15.3
3	1	30.32	36.19	1.23	3.33	14.2
3	2	30.78	33.89	1.38	4.46	13.1
4	1	31.03	44.88	3.35	18.85	17.2
4	2	27.54	32.96	1.45	3.98	14.2
4	3	41.36	38.59	1.08	3.80	11.2
5	1	28.28	35.49	1.67	5.18	14.9
5	2	33.45	37.96	1.64	6.51	13.5
5	3	34.29	36.09	1.10	3.40	12.6
5	4	31.62	35.40	1.22	3.91	13.3
6	1	19.62	29.46	1.94	6.01	17.8
6	2	23.19	27.86	1.57	5.05	14.1
6	3	33.07	34.65	1.22	3.90	12.5
6	4	21.76	29.11	1.48	4.03	15.9
6	5	24.16	32.97	1.24	3.03	16.2
7	1	81.06	74.71	2.60	14.68	10.9
7	2	62.12	53.95	.67	2.53	10.2
7	3	76.21	54.46	.57	2.54	8.5
7	4	77.47	55.53	.47	2.38	8.5
7	5	79.44	59.54	.91	4.14	8.9
7	6	78.59	60.42	.98	4.14	9.1
8	1	31.52	43.01	1.58	5.28	16.2
8	2	31.37	35.48	1.46	4.73	13.2
8	3	31.83	34.34	1.11	3.53	12.9
8	4	31.73	38.48	1.32	3.84	14.4
8	5	39.93	44.09	1.44	4.82	13.1
8	6	27.04	34.23	1.30	3.80	15.0
8	7	69.59	61.73	1.17	4.46	10.5
9	1	25.00	34.51	1.59	4.83	16.4
9	2	26.93	34.41	1.60	4.89	15.3
9	3	23.36	31.96	1.64	4.73	16.4
9	4	30.28	39.50	1.24	3.21	15.5
9	5	25.70	31.85	1.36	3.71	14.7
9	6	23.52	31.37	1.44	3.94	15.8
9	7	67.18	56.29	.46	2.31	9.9
9	8	27.75	33.67	1.30	3.90	14.4
10	1	25.58	40.72	1.91	6.75	17.5
10	2	37.19	43.74	1.41	4.61	14.1
10	3	27.29	33.16	1.21	3.21	14.5
10	4	36.48	42.57	1.28	4.46	13.8
10	5	29.65	39.08	1.85	6.83	15.6
10	6	24.44	30.98	1.33	3.53	15.0
10	7	72.39	61.70	.97	4.08	10.1

APPENDIX H, Table 3 (Continued)

Comparisons		Mean	Standard Deviation	Skewness	Kurtosis	Percent Error
Row	Col					
10	8	24.90	32.95	1.25	3.36	15.7
10	9	31.13	46.58	3.03	16.35	17.8
11	1	22.93	32.53	1.73	5.58	16.8
11	2	26.69	35.16	1.33	3.65	15.7
11	3	44.37	42.59	1.03	4.00	11.4
11	4	22.25	30.79	1.60	4.72	16.4
11	5	30.92	35.40	1.07	2.86	13.6
11	6	18.45	27.76	1.63	4.56	17.9
11	7	77.04	70.78	1.78	8.08	10.9
11	8	40.21	48.25	1.66	5.65	14.2
11	9	28.93	35.46	1.09	2.83	14.6
11	10	31.76	40.17	1.55	5.67	15.0
12	1	23.43	31.09	1.83	6.25	16.1
12	2	23.90	31.98	1.68	5.14	16.0
12	3	23.85	29.72	1.44	4.12	14.8
12	4	22.11	28.60	1.70	5.43	15.4
12	5	24.65	30.23	1.35	3.79	14.6
12	6	19.79	25.04	1.53	4.69	15.0
12	7	66.55	60.33	1.18	4.77	10.8
12	8	28.73	33.43	1.34	3.98	13.8
12	9	24.14	30.94	1.55	4.48	15.3
12	10	30.56	33.54	.96	2.65	13.0
12	11	18.17	25.79	1.83	5.57	16.8
13	1	17.32	28.00	1.74	4.83	19.6
13	2	28.93	32.83	1.67	6.40	13.6
13	3	30.85	33.79	1.23	3.84	13.0
13	4	22.89	28.96	1.69	5.88	15.0
13	5	30.70	41.36	1.89	6.60	16.0
13	6	18.73	27.55	1.83	5.73	17.5
13	7	89.51	81.27	2.23	10.81	10.8
13	8	23.24	32.55	1.64	4.89	16.6
13	9	24.01	32.35	1.91	6.66	16.0
13	10	24.72	32.95	1.35	3.84	15.8
13	11	23.80	32.78	1.42	3.88	16.3
13	12	23.45	28.87	1.74	6.76	14.6
14	1	31.81	39.96	1.80	6.62	15.2
14	2	24.69	32.61	1.44	4.05	15.8
14	3	29.93	37.57	1.81	7.20	14.9
14	4	27.68	33.59	1.44	4.42	14.4
14	5	28.10	37.73	2.02	7.78	15.9
14	6	23.03	34.31	2.61	11.65	17.7
14	7	69.01	63.28	1.50	5.98	10.9
14	8	35.00	41.07	1.68	6.06	13.9
14	9	26.48	38.70	2.25	8.51	17.3
14	10	33.31	34.52	.99	3.07	12.3
14	11	25.63	35.58	2.31	9.70	16.5
14	12	22.11	33.73	2.60	12.16	18.1
14	13	33.80	46.95	2.93	15.50	16.5

APPENDIX I

COMMUNALITY ESTIMATES FOR DIFFERENT TYPES OF FACTOR ANALYSIS PROCEDURES--TIME 1

APPENDIX I: COMMUNALITY ESTIMATES FOR DIFFERENT TYPES OF FACTOR ANALYSIS PROCEDURES--TIME 1

	Principle Factor With Iterations	Varimax	RAO's	Average
1	.58	.58	.58	.58
2	.88	.72	.85	.82
3	.31	.41	.26	.33
4	.50	.62	.74	.62
5	.64	.52	.84	.67
6	.52	.56	.82	.63
7	.29	.25	.13	.11
8	.25	.16	.03	.15
9	.09	.22	.03	.11
10	.61	.58	.60	.59
11	.48	.42	.41	.44

APPENDIX J

COMMUNALITY ESTIMATES
FOR DIFFERENT TYPES OF
FACTOR ANALYSIS PROCEDURES--TIME 2

APPENDIX J: COMMUNALITY ESTIMATES FOR DIFFERENT TYPES OF FACTOR
ANALYSIS PROCEDURES--TIME 2

	Principle Factor With Iterations	Varimax	RAO's	Average
1	.75	.78	.76	.76
2	.54	.77	.81	.70
3	.41	.48	.40	.43
4	.51	.69	.76	.65
5	.60	.65	.61	.62
6	.78	.75	.71	.75
7	.38	.50	.31	.40
8	.55	.49	.23	.42
9	.39	.41	.21	.34
10	.69	.77	.78	.75
11	.68	.71	.65	.68

APPENDIX K

COMMUNALITY ESTIMATES FOR DIFFERENT TYPES OF FACTOR ANALYSIS PROCEDURES--TIME 3

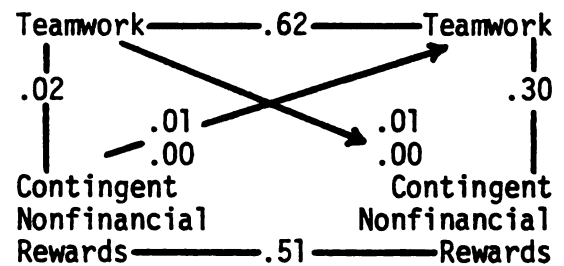
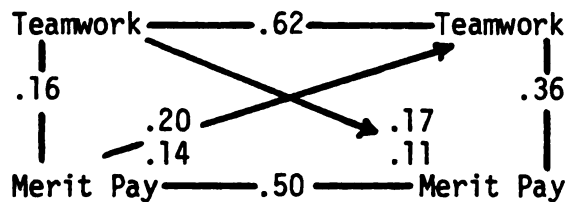
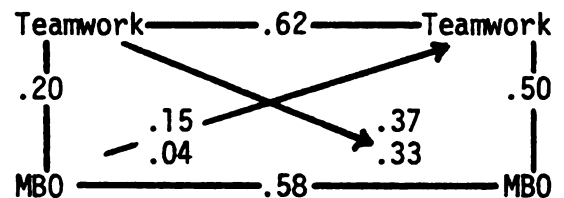
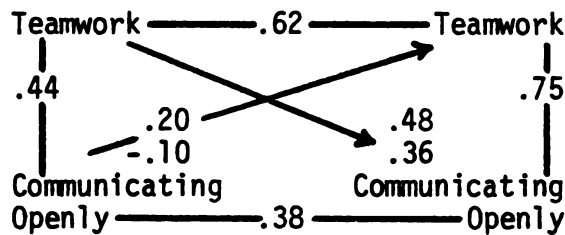
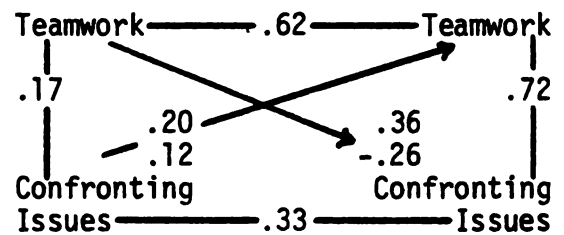
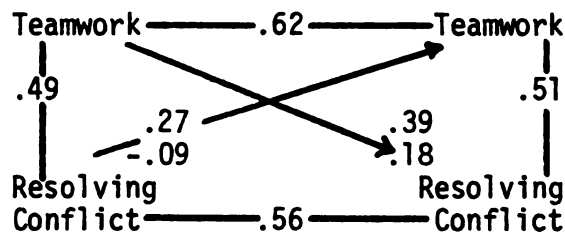
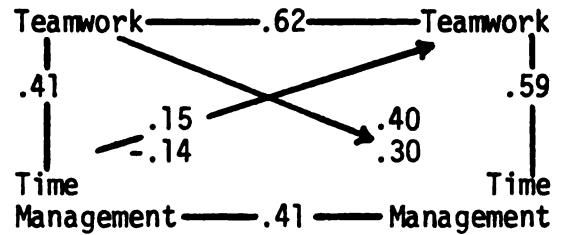
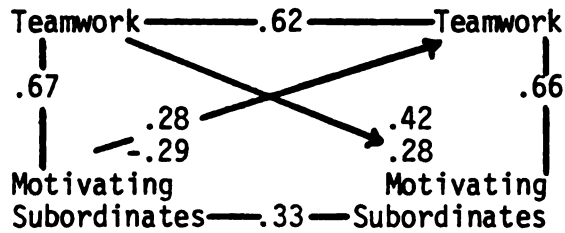
APPENDIX K: COMMUNALITY ESTIMATES FOR TYPES OF FACTOR
ANALYSIS PROCEDURES--TIME 3

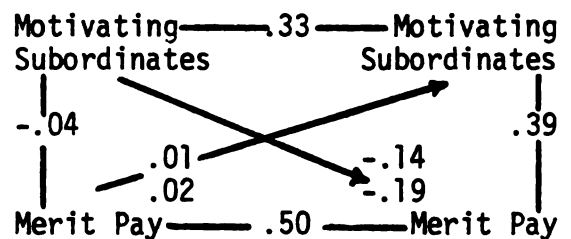
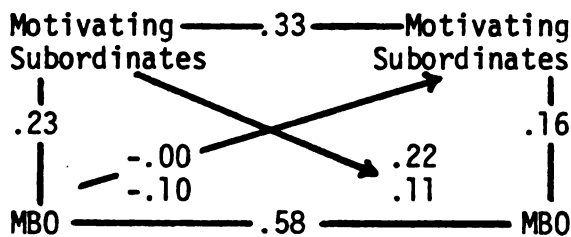
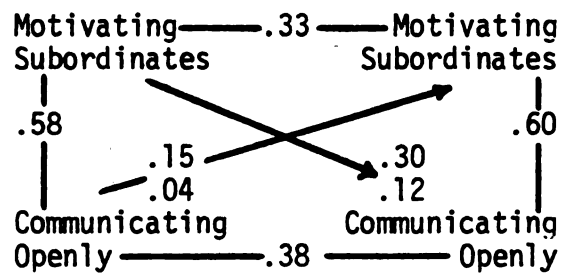
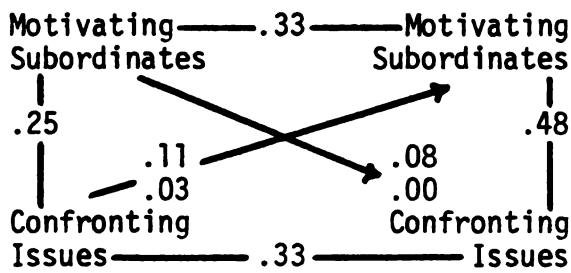
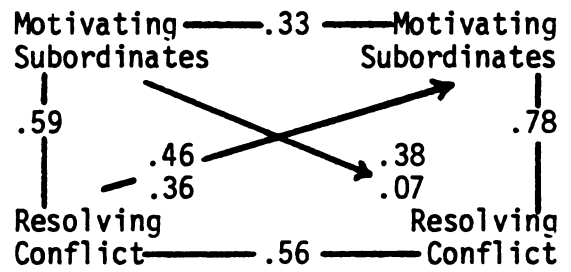
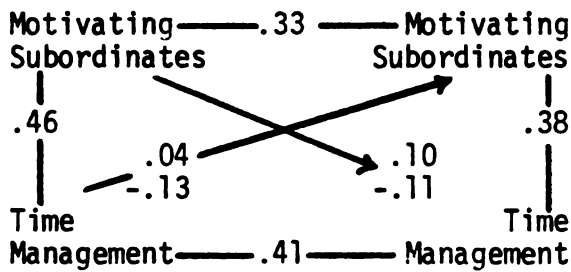
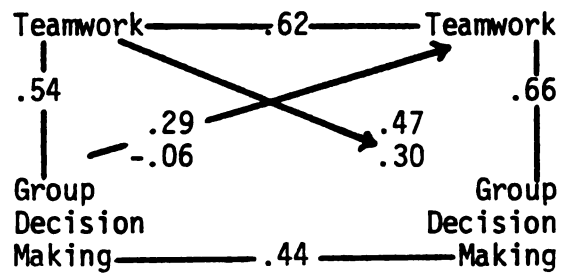
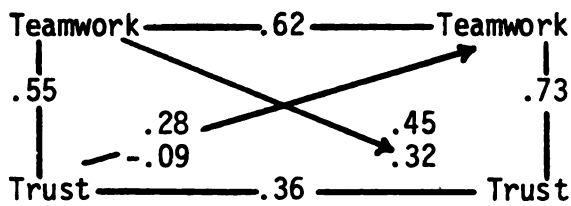
	Principle Factor With Iterations	Varimax	RAO's	Average
1	.87	.82	.86	.85
2	.60	.76	.68	.68
3	.42	.50	.40	.44
4	.64	.69	.66	.66
5	.59	.77	.55	.63
6	.72	.70	.69	.70
7	.33	.38	.33	.35
8	.81	.70	.78	.77
9	.57	.55	.62	.58
10	.45	.61	.42	.49
11	.66	.74	.67	.69

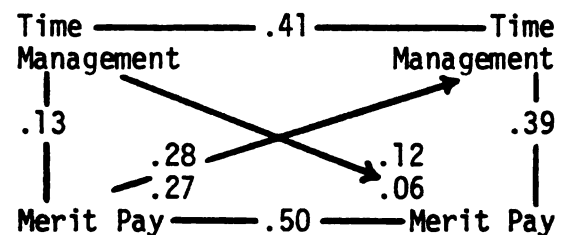
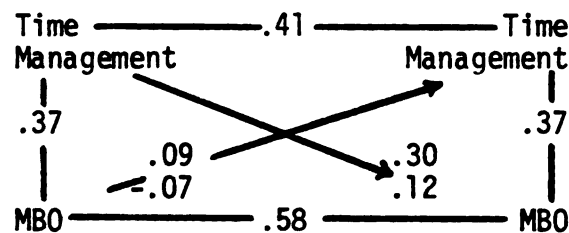
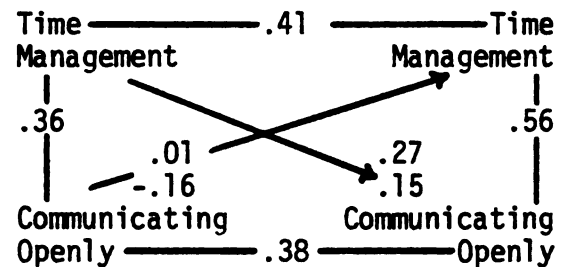
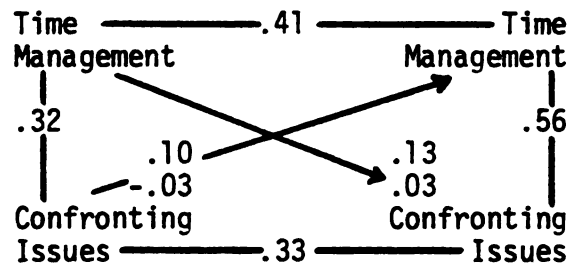
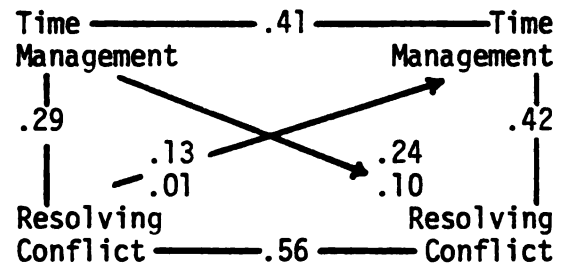
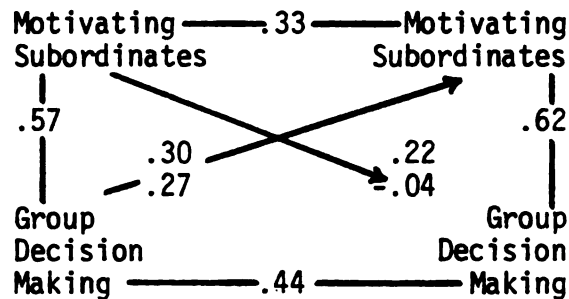
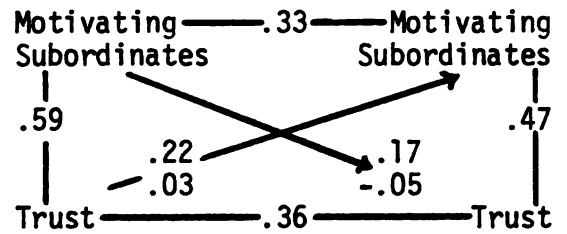
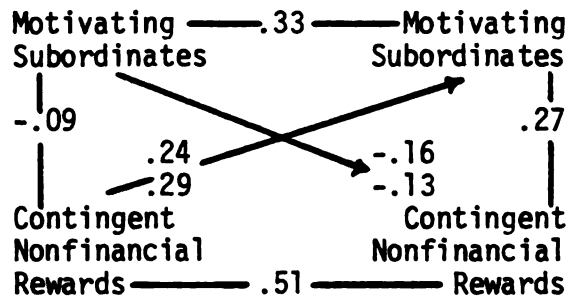
APPENDIX L

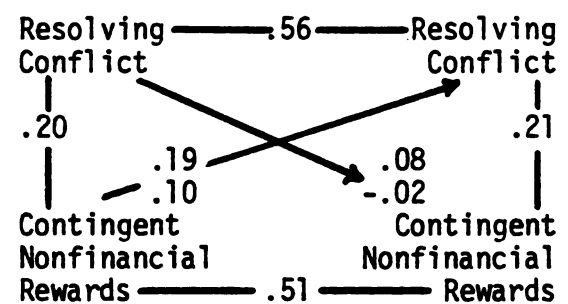
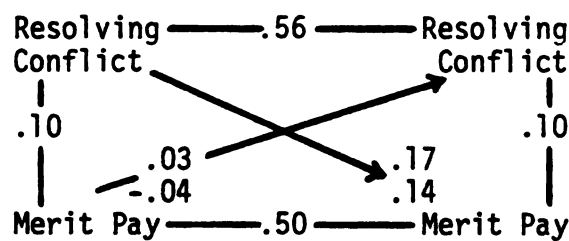
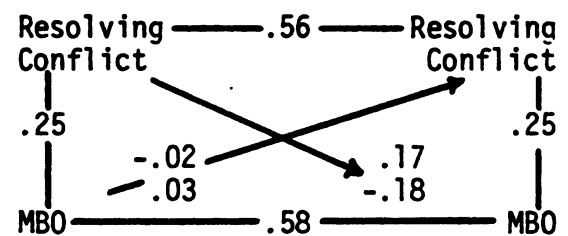
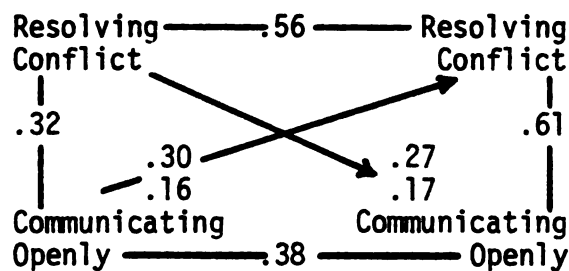
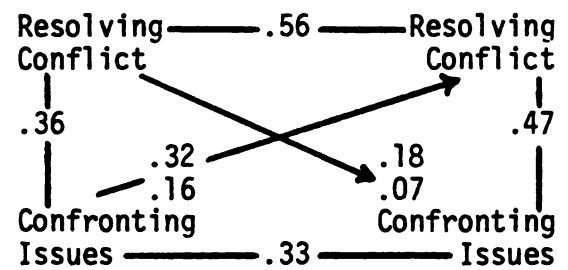
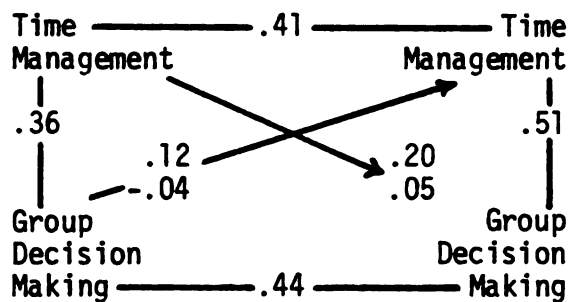
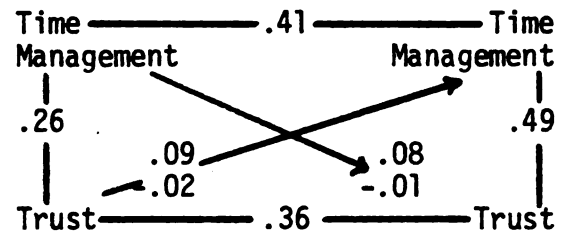
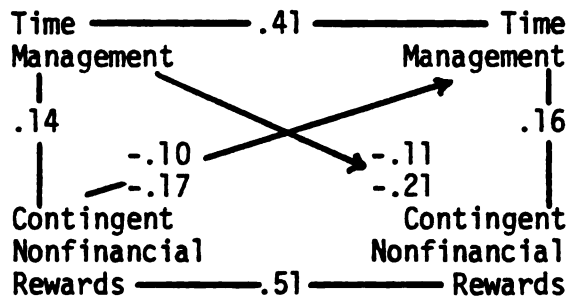
CROSS-LAGGED CORRELATION ANALYSIS DIAGRAMS FOR TIME 1 AND TIME 2

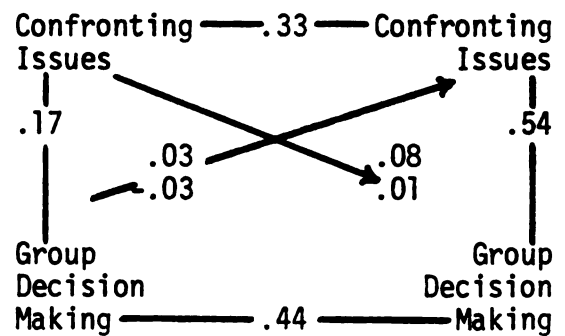
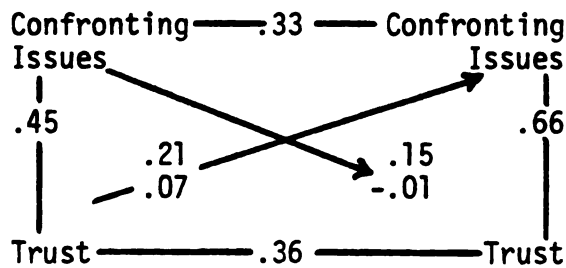
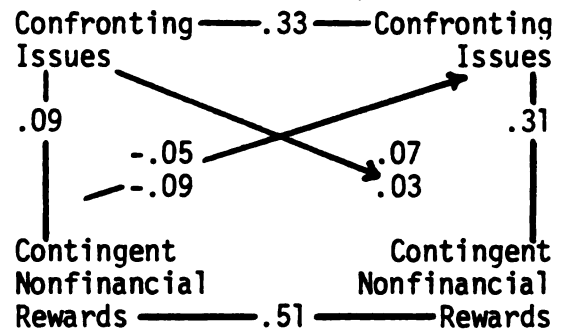
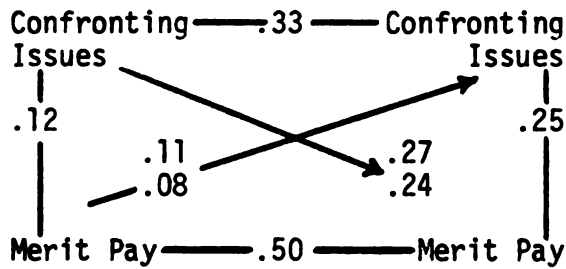
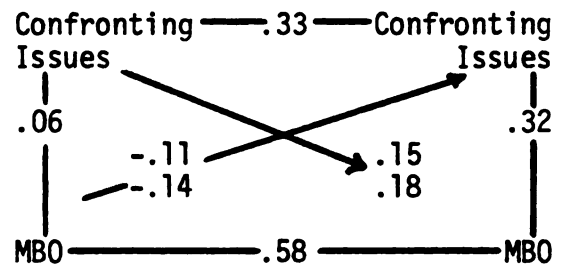
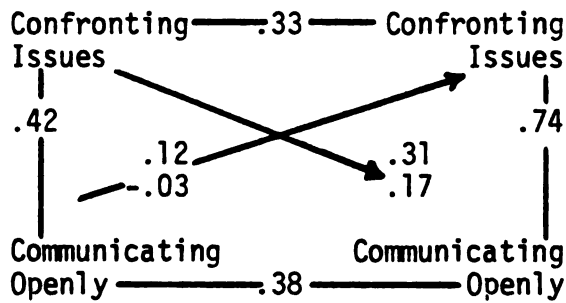
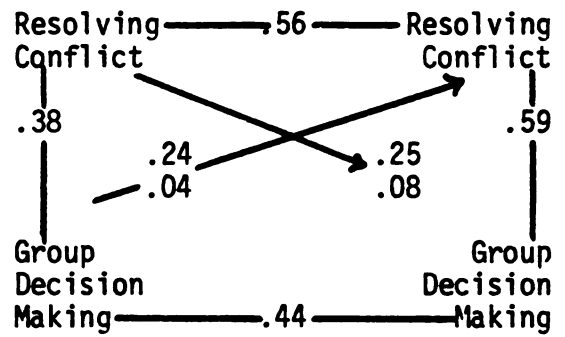
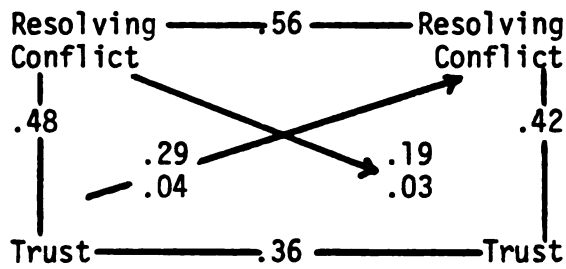
APPENDIX L: CROSS-LAGGED CORRELATION ANALYSIS DIAGRAMS FOR
TIME 1 AND TIME 2

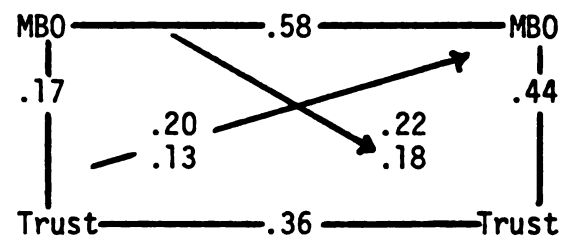
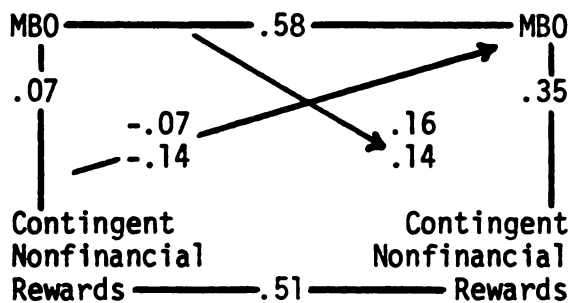
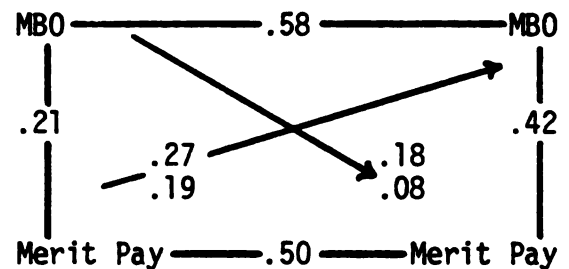
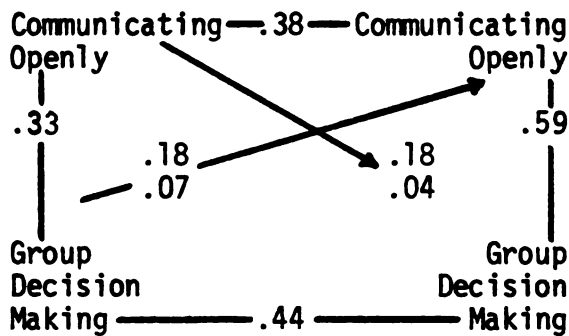
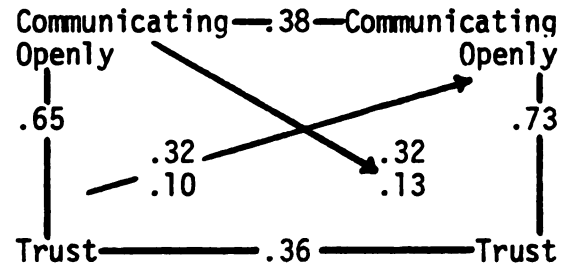
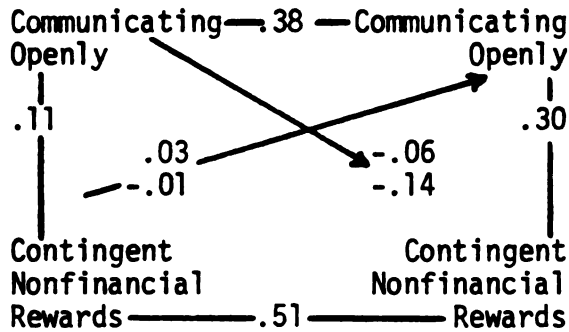
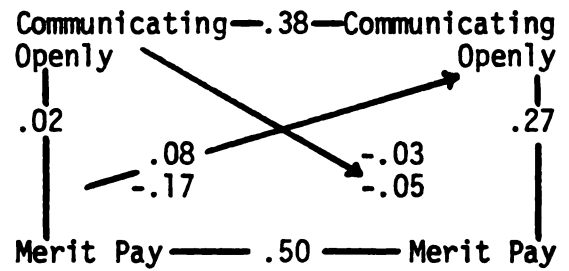
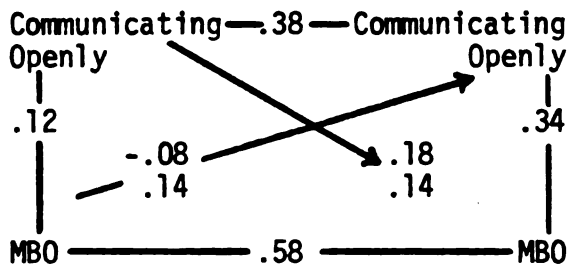


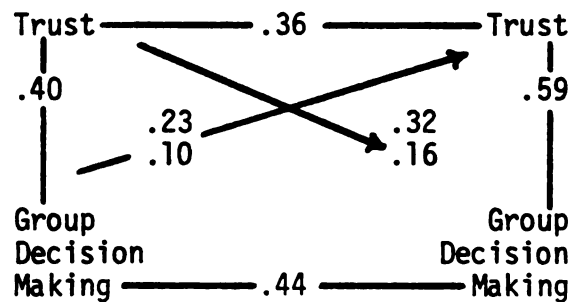
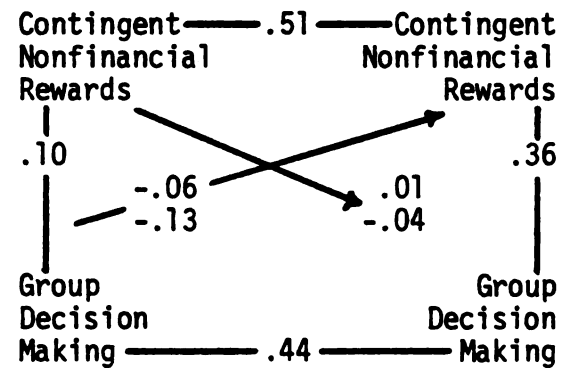
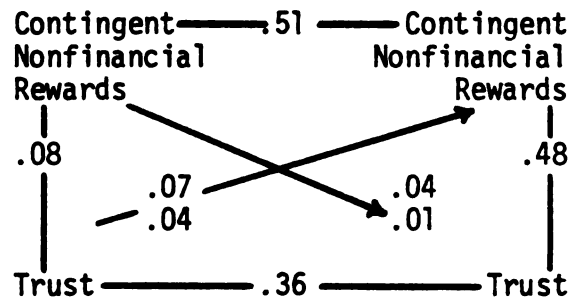
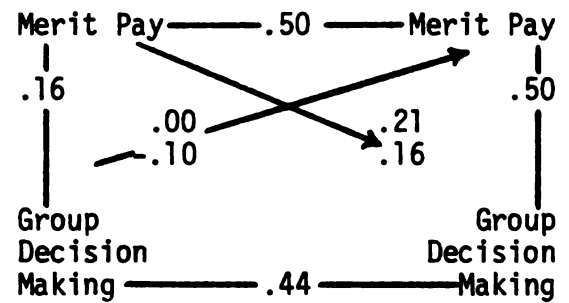
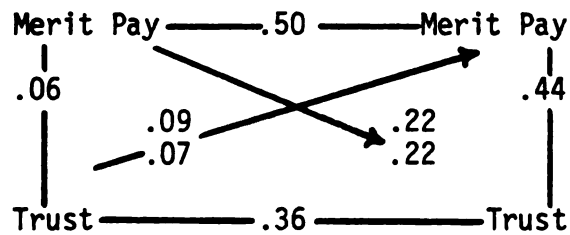
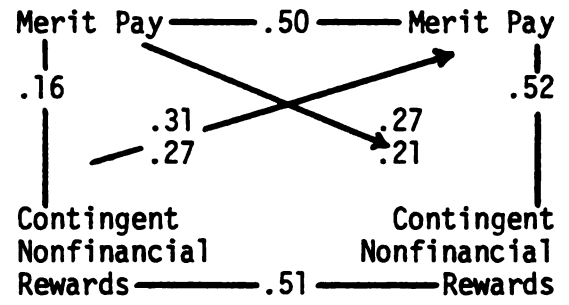
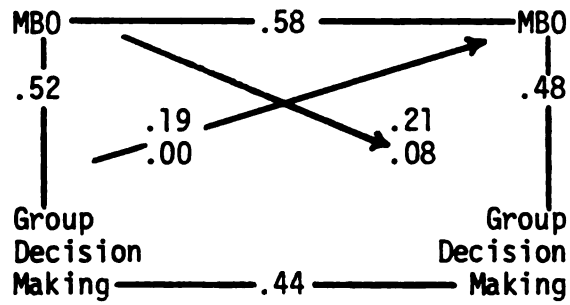








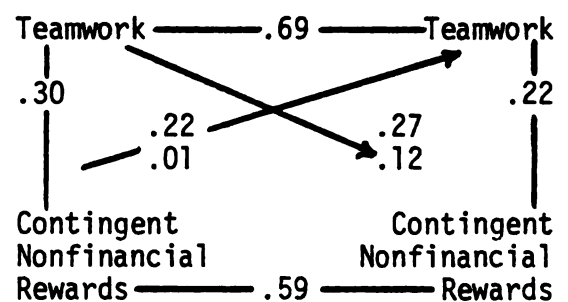
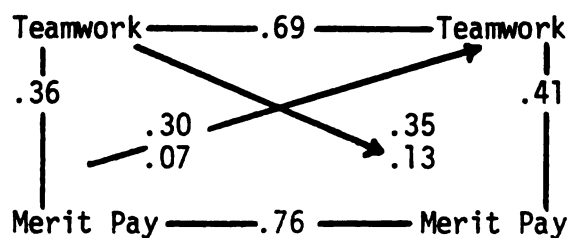
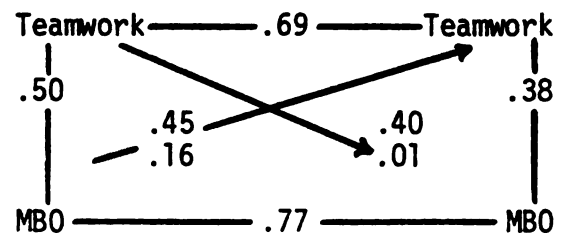
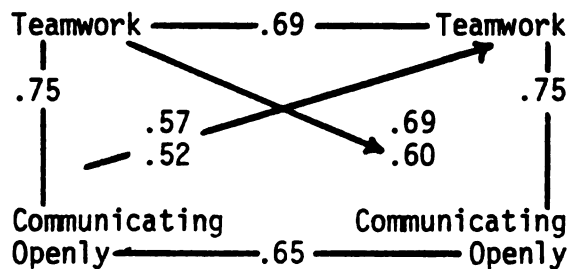
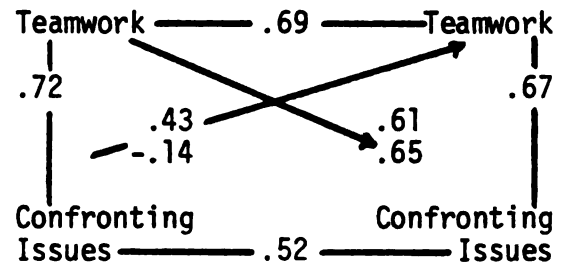
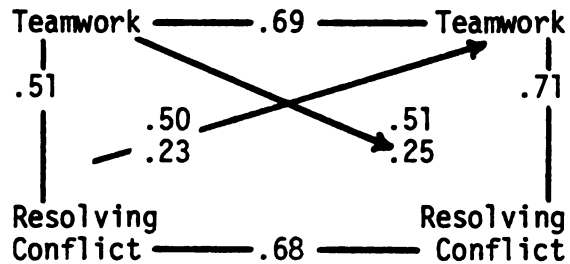
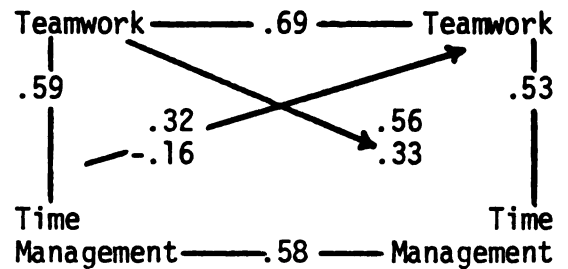
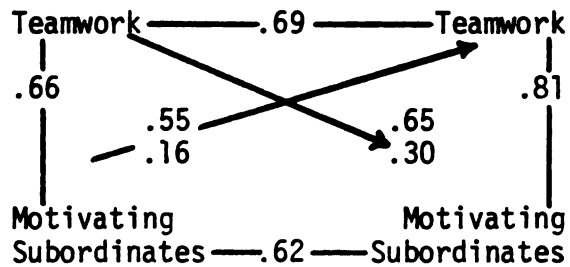


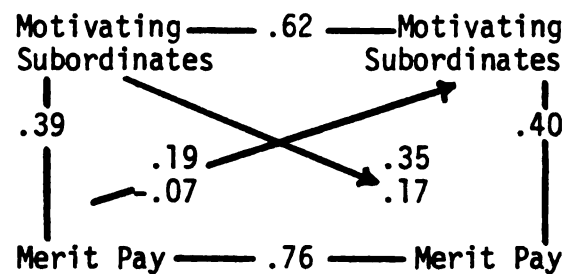
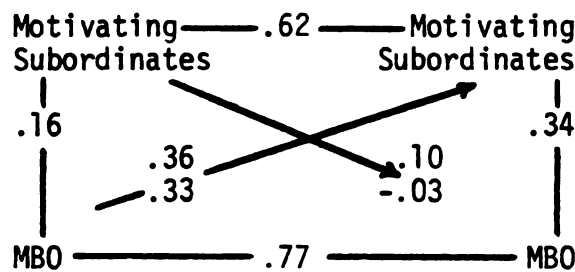
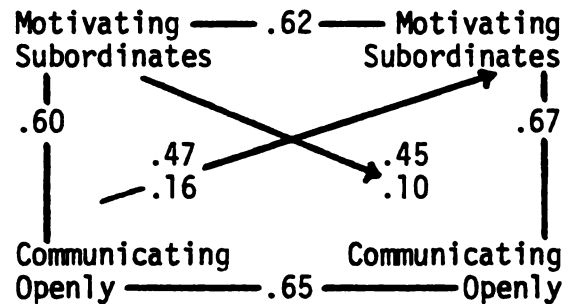
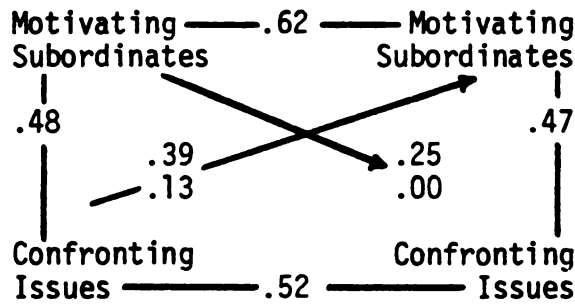
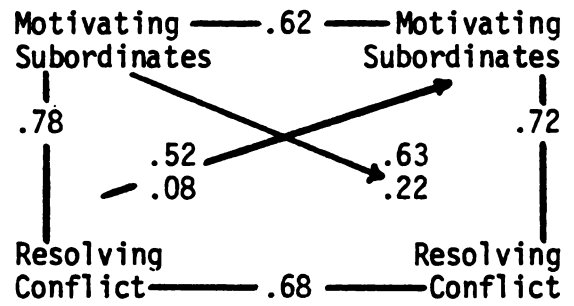
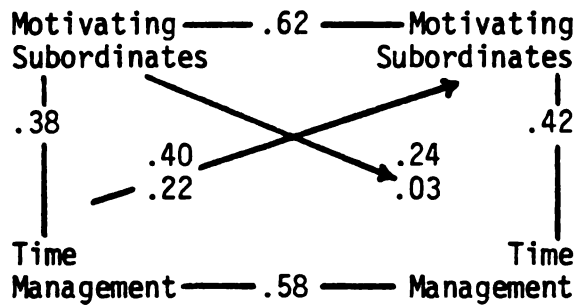
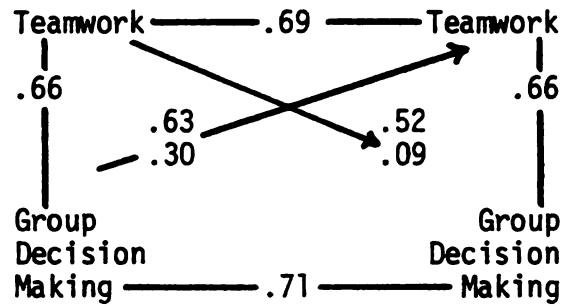
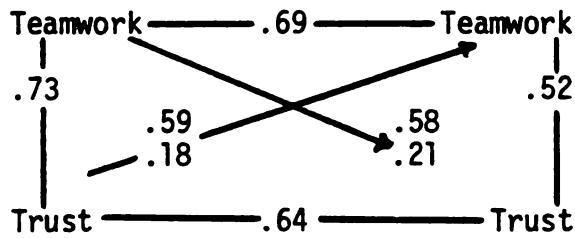


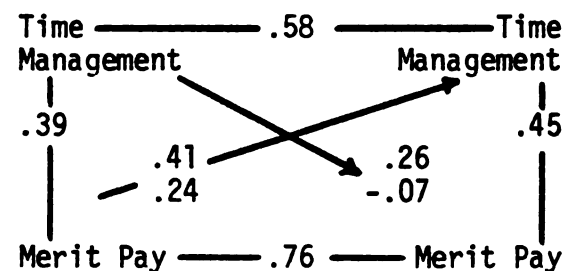
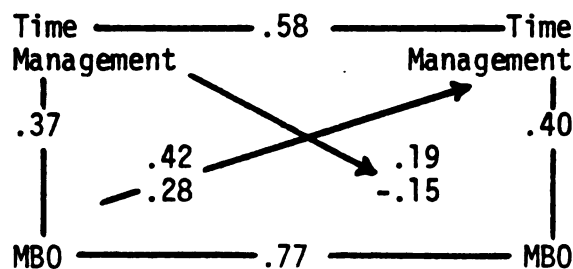
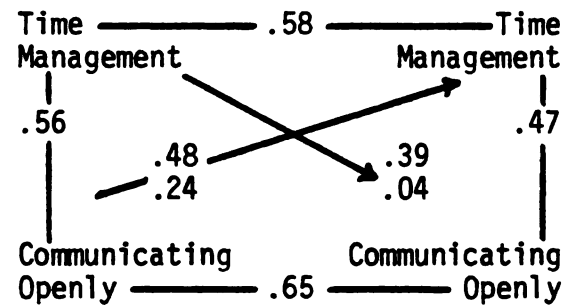
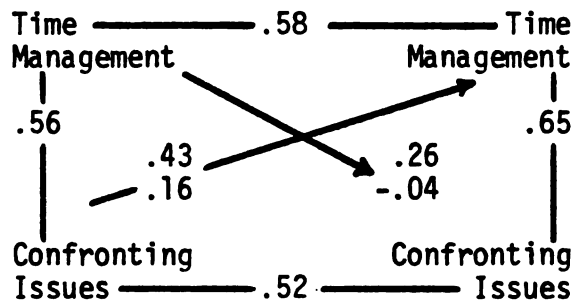
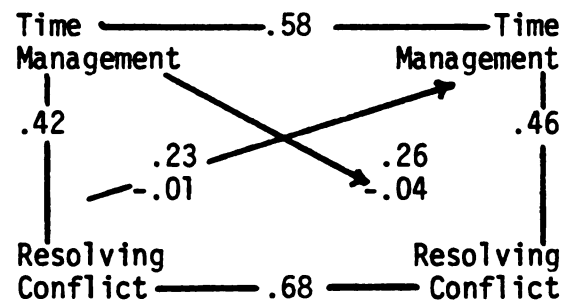
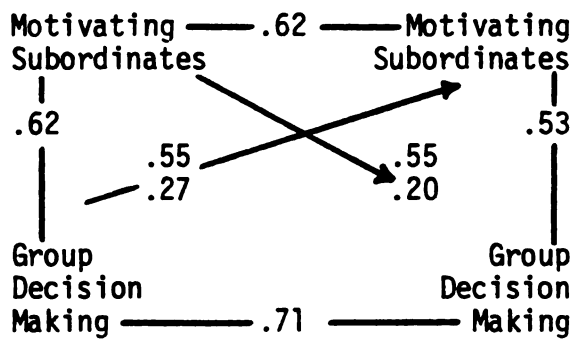
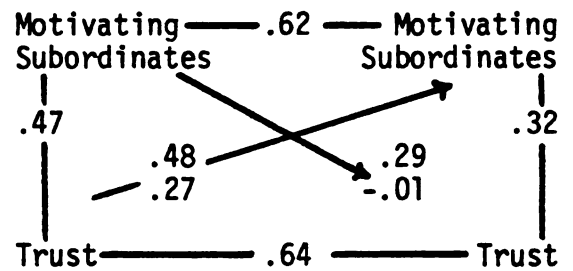
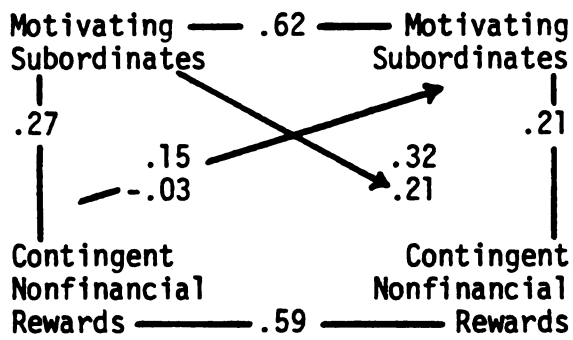
APPENDIX M

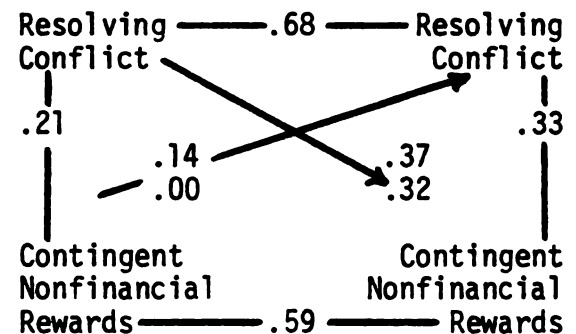
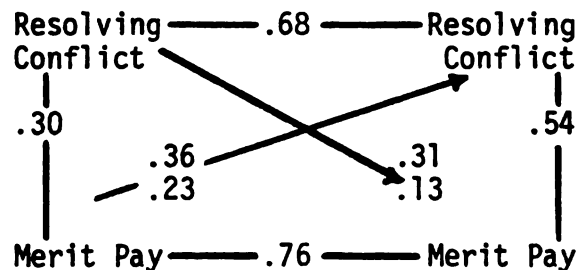
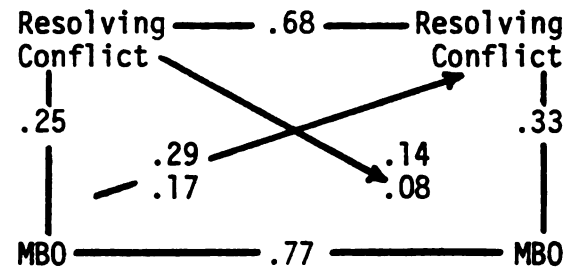
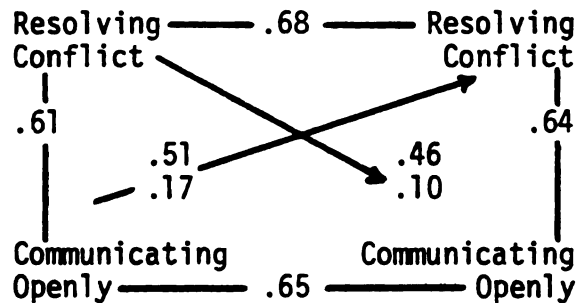
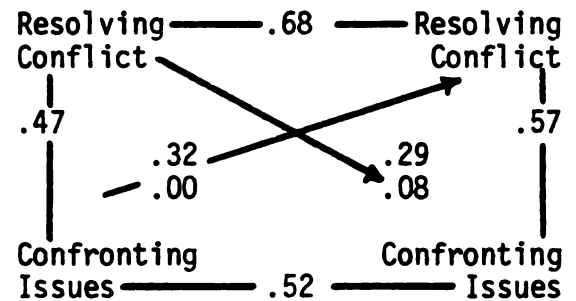
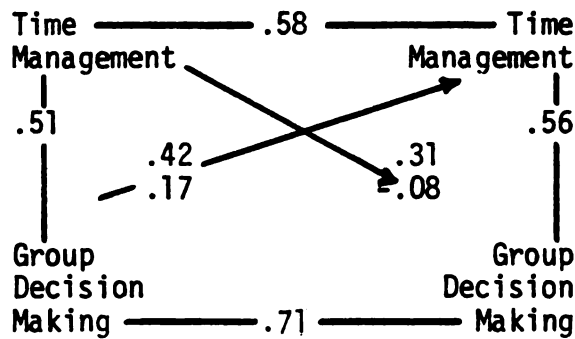
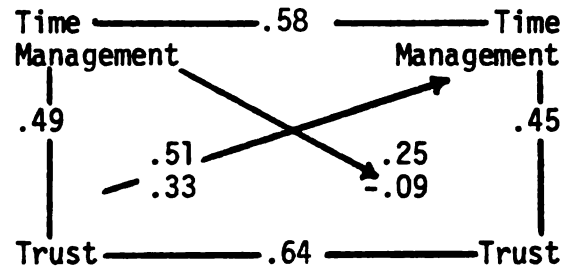
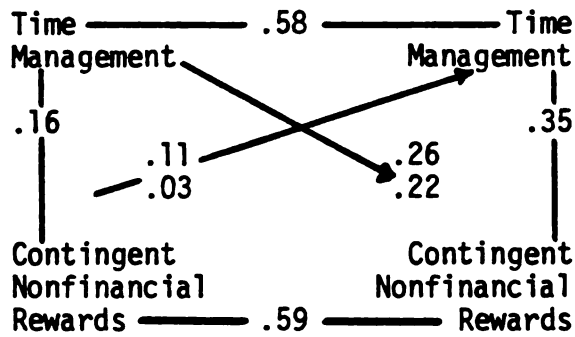
CROSS-LAGGED CORRELATION ANALYSIS DIAGRAMS FOR TIME 2 AND TIME 3

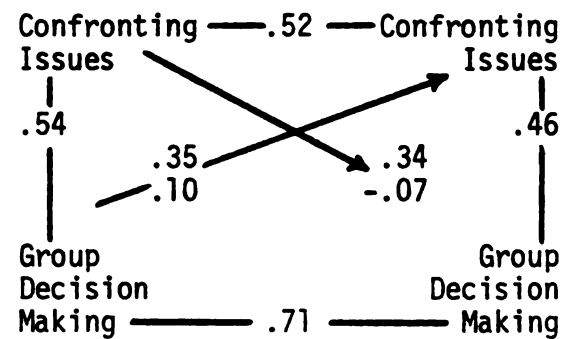
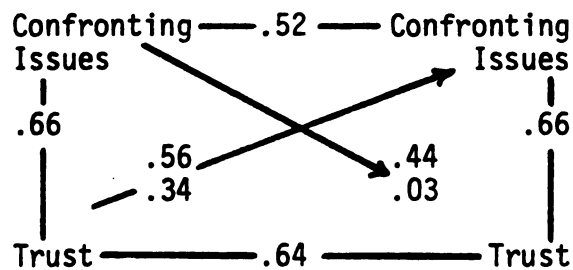
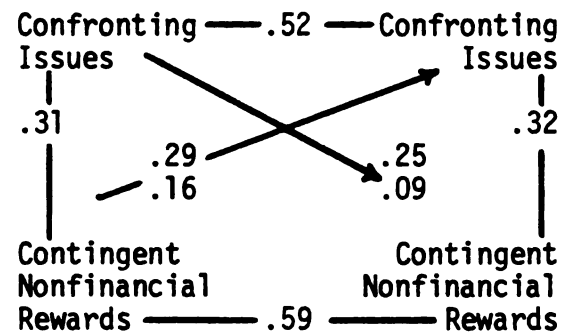
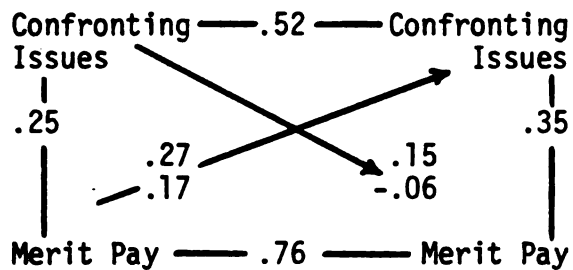
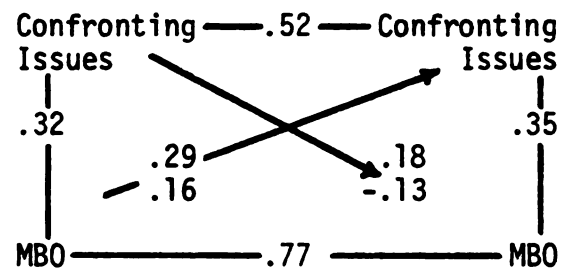
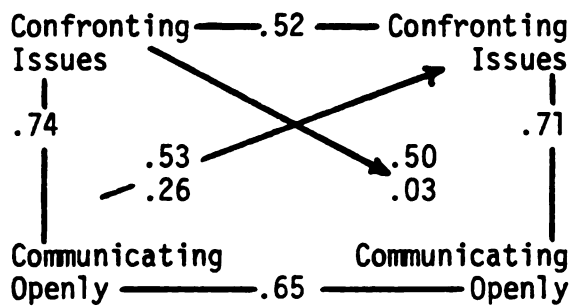
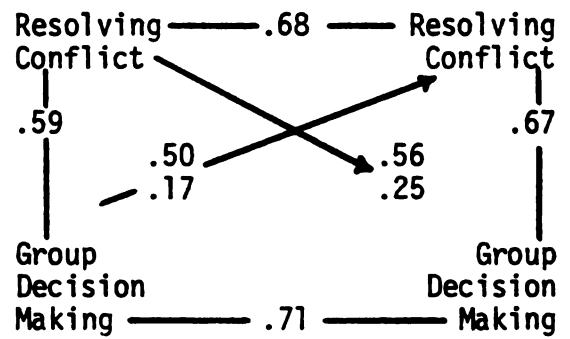
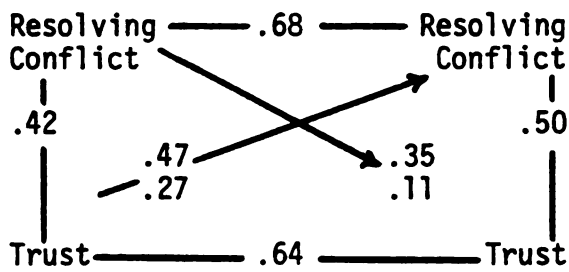
APPENDIX M: CROSS-LAGGED CORRELATION ANALYSIS DIAGRAMS FOR
TIME 2 AND TIME 3

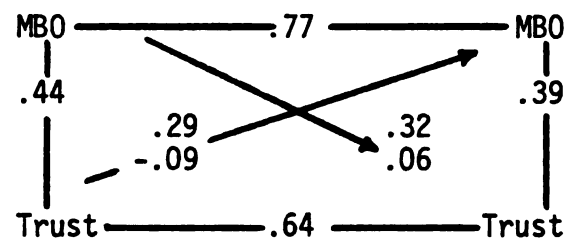
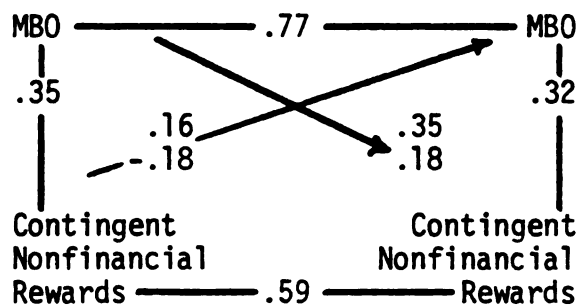
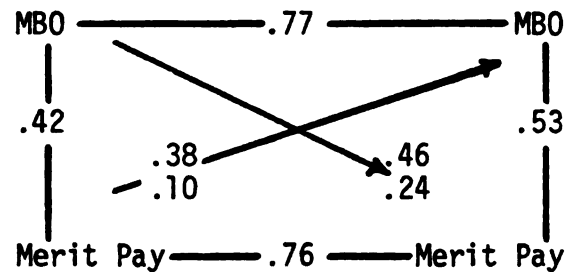
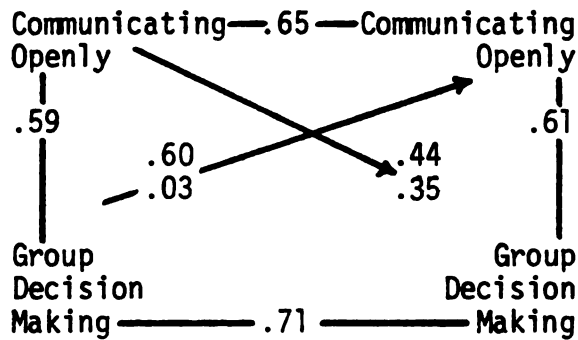
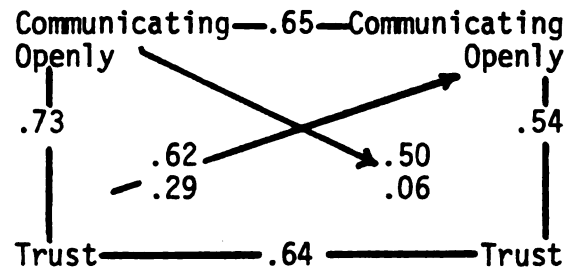
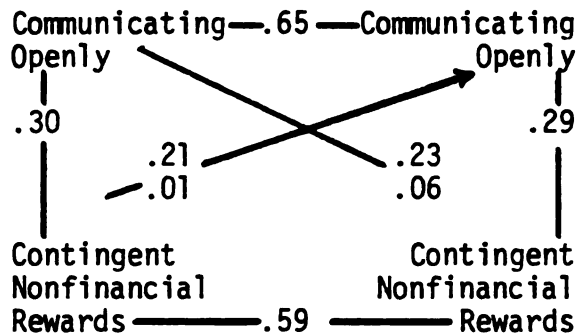
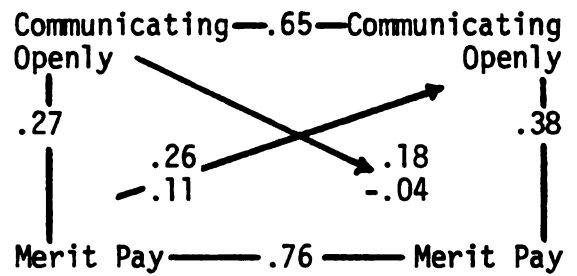
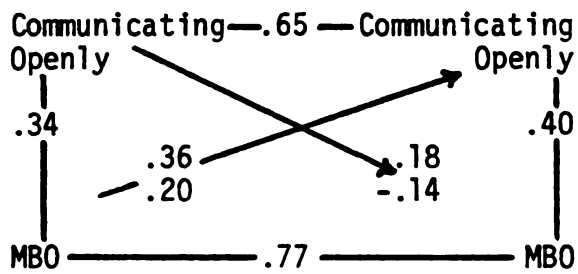


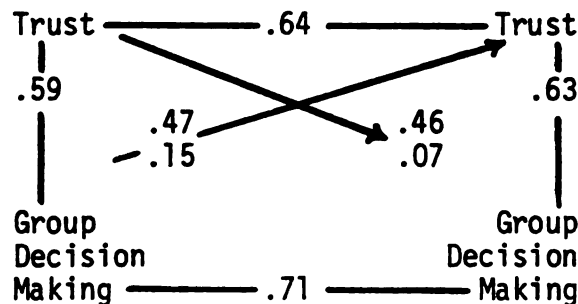
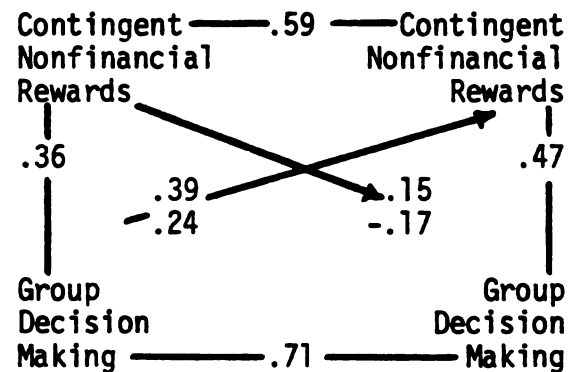
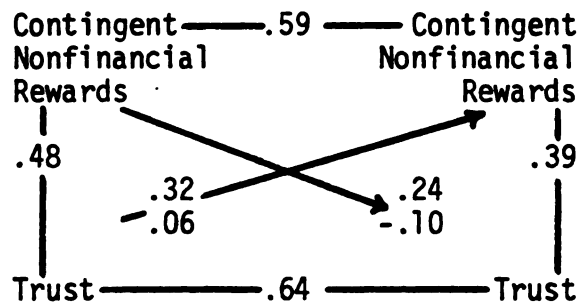
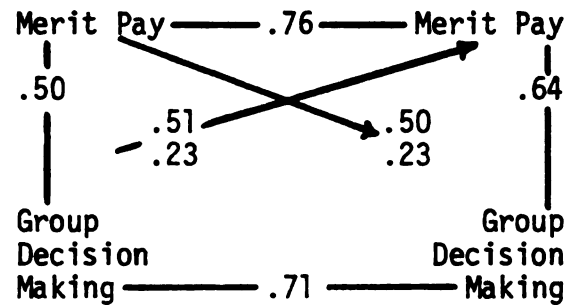
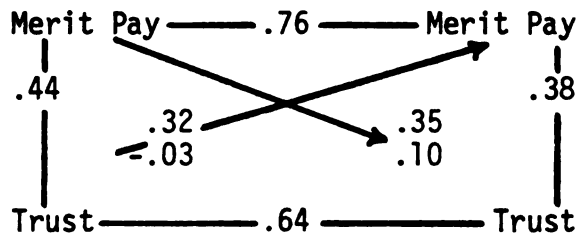
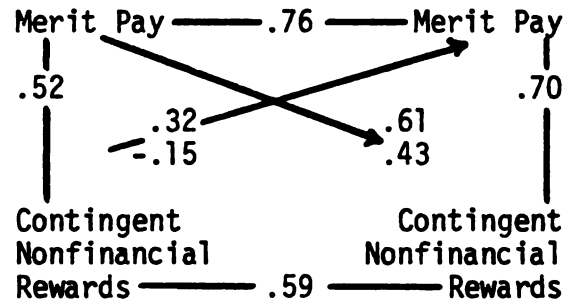
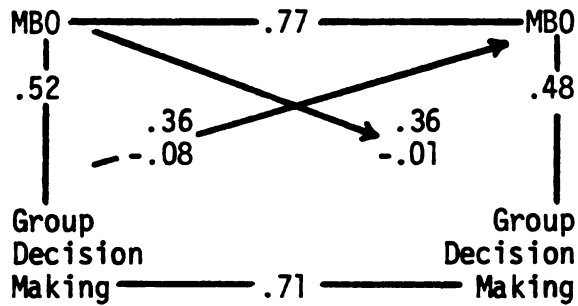








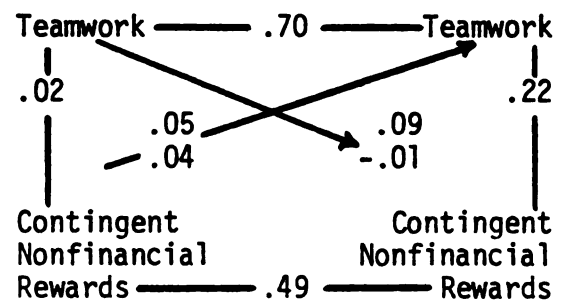
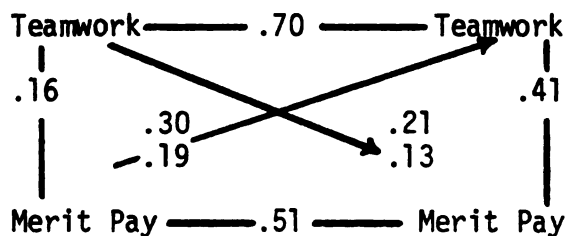
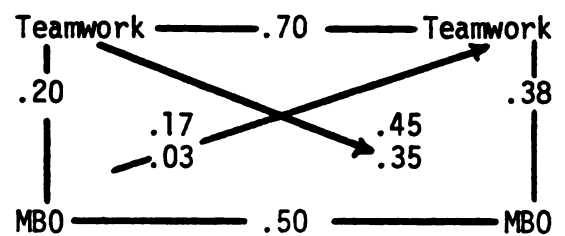
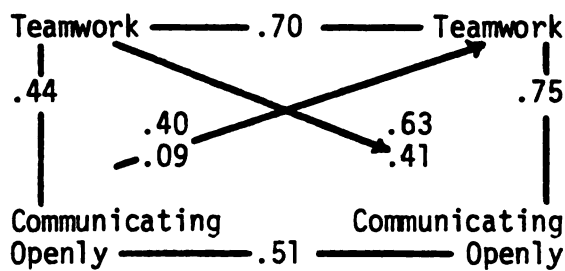
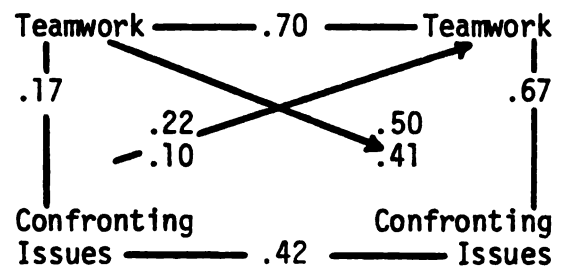
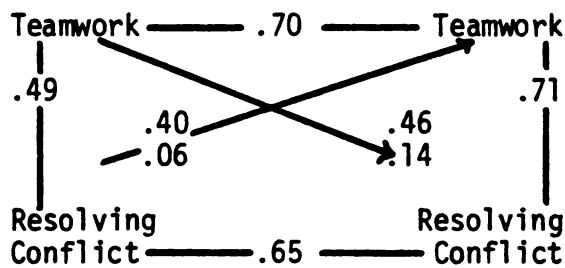
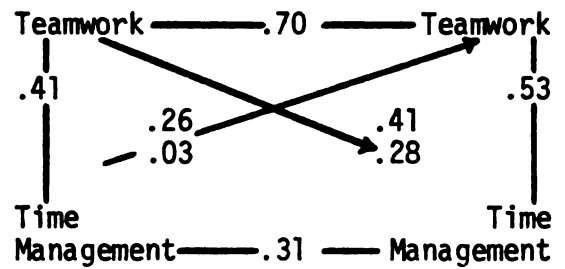
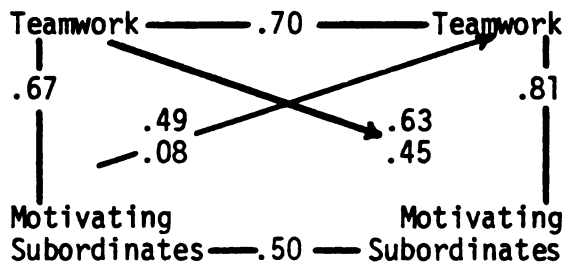


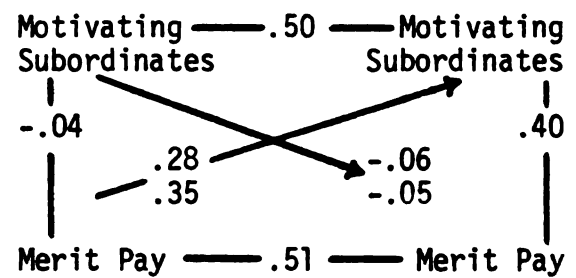
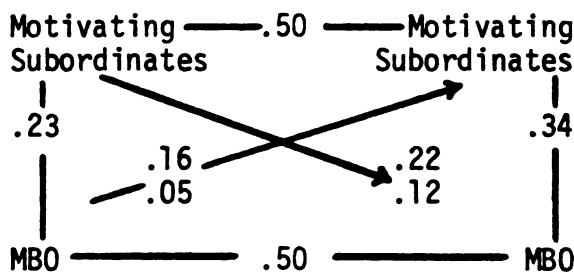
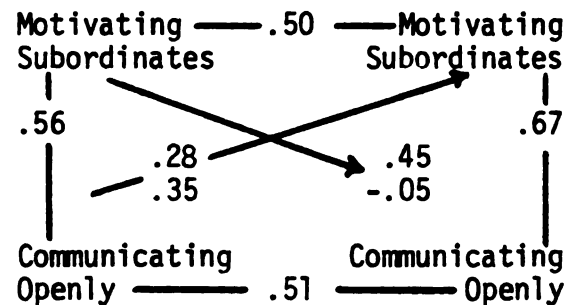
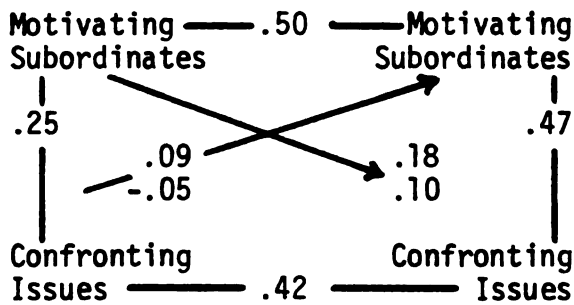
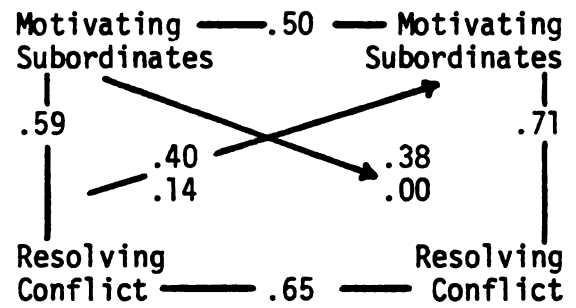
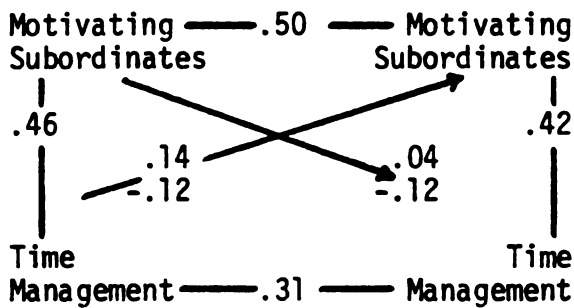
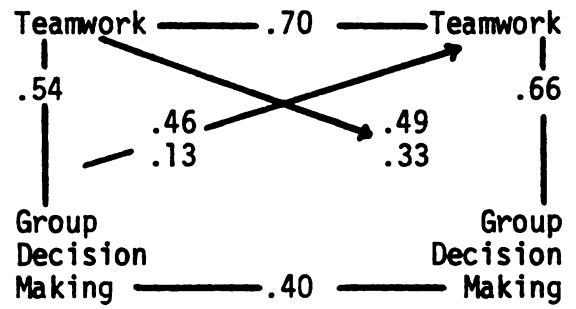
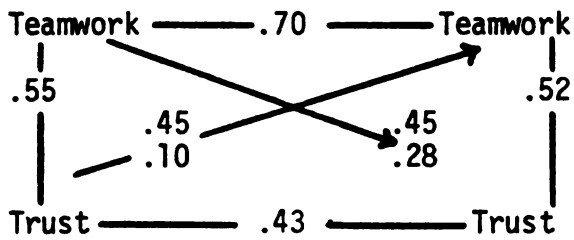


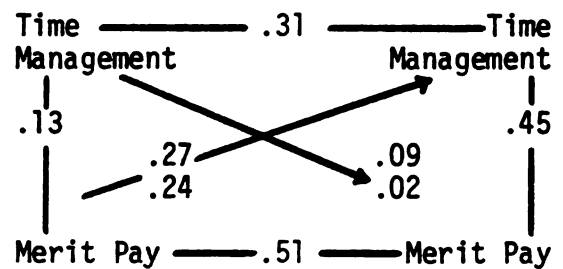
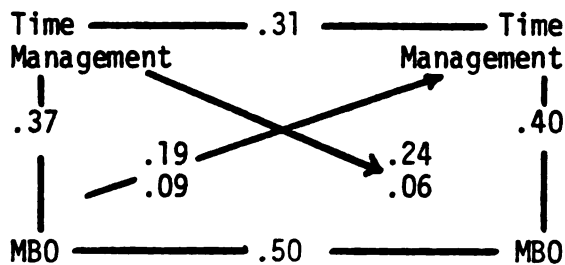
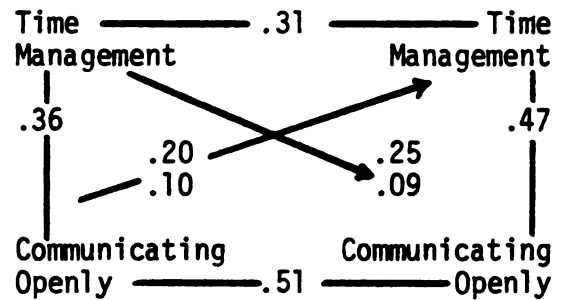
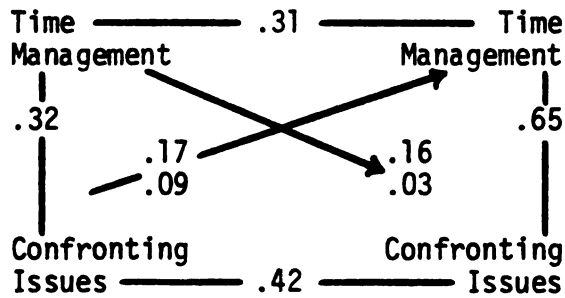
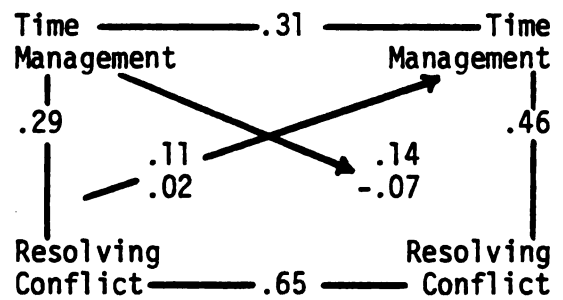
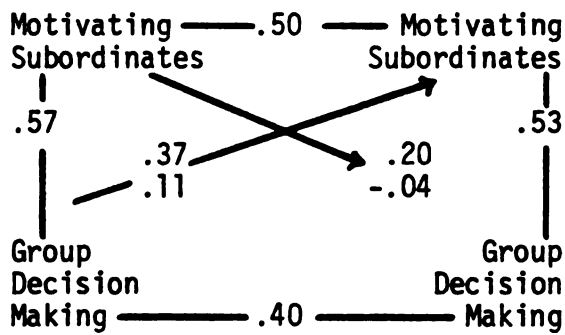
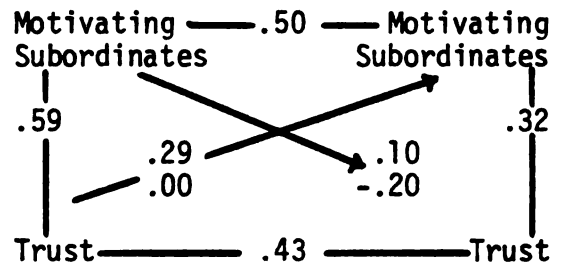
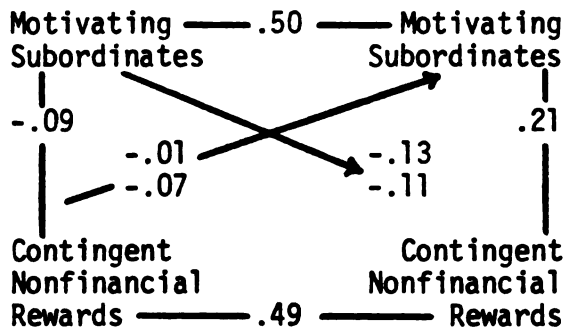
APPENDIX N

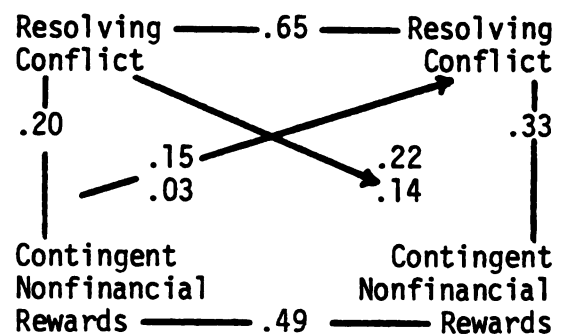
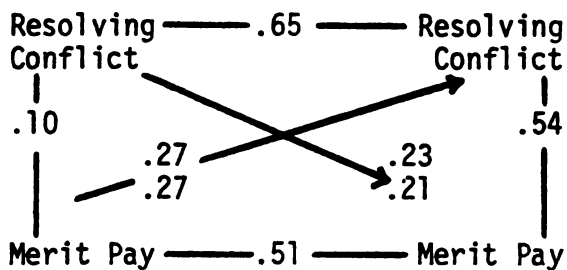
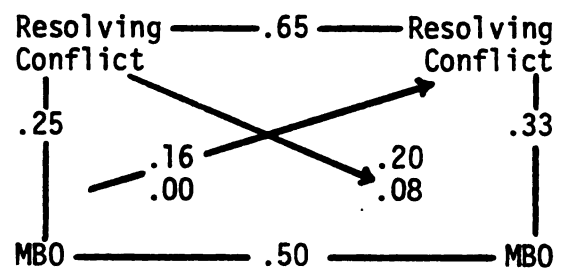
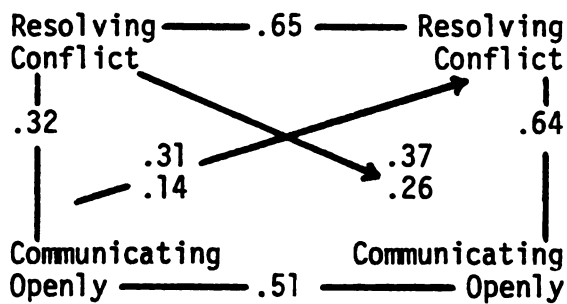
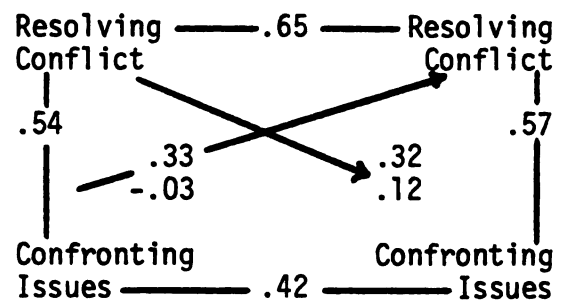
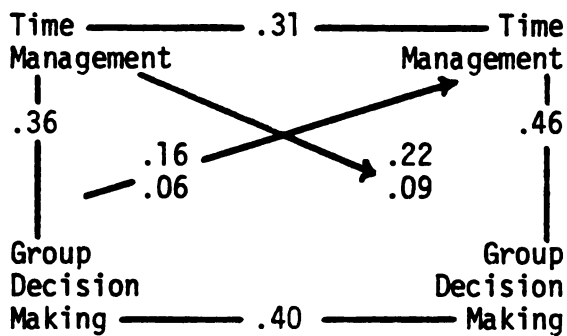
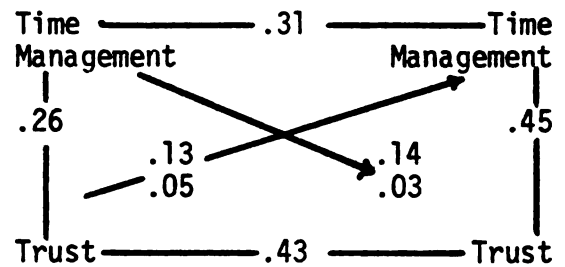
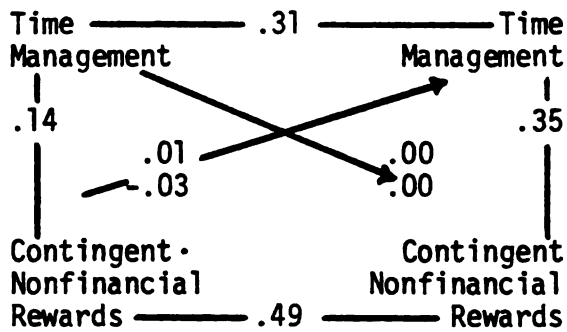
CROSS-LAGGED CORRELATION ANALYSIS DIAGRAMS
FOR TIME 1 AND TIME 3

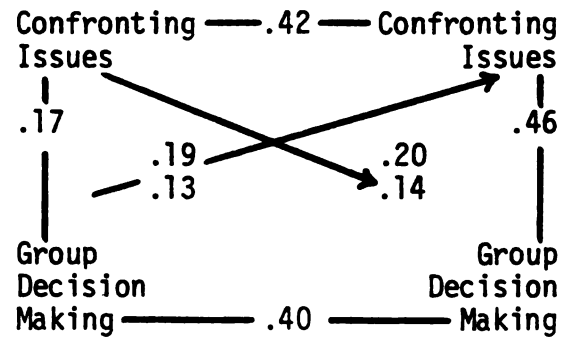
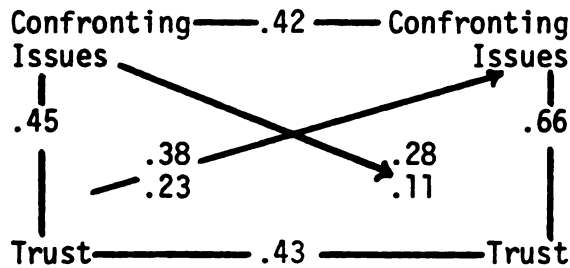
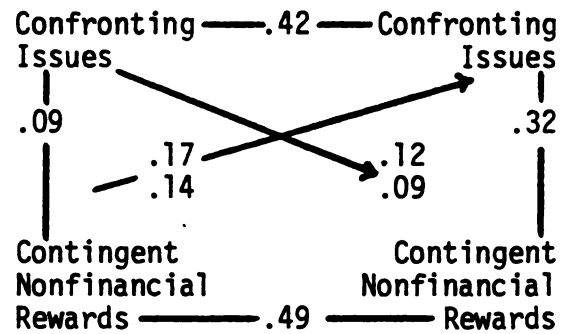
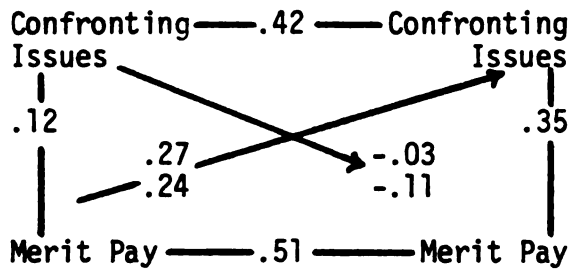
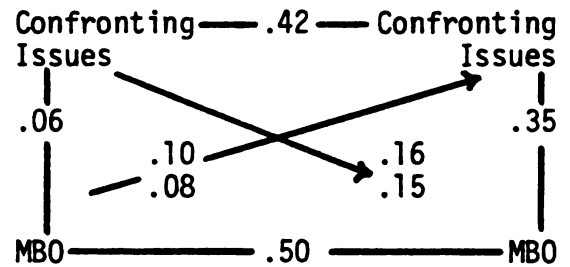
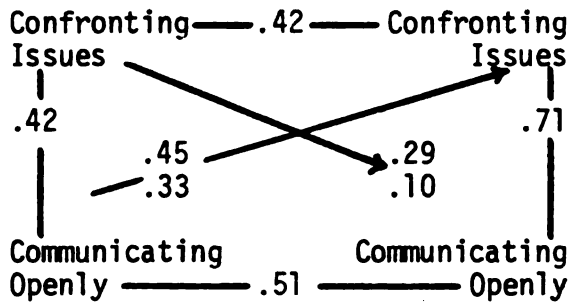
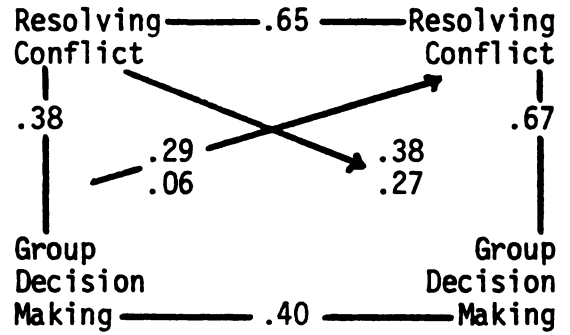
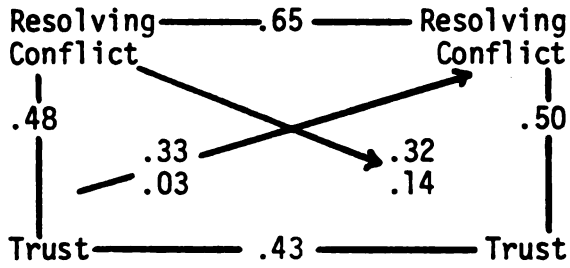
APPENDIX N: CROSS-LAGGED CORRELATION ANALYSIS DIAGRAMS FOR
TIME 1 AND TIME 3

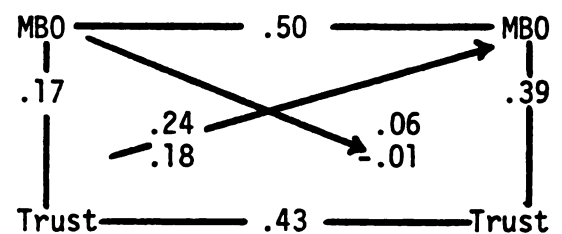
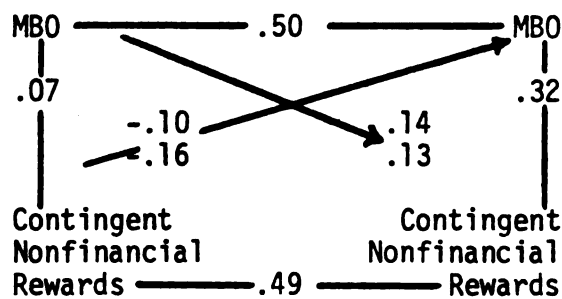
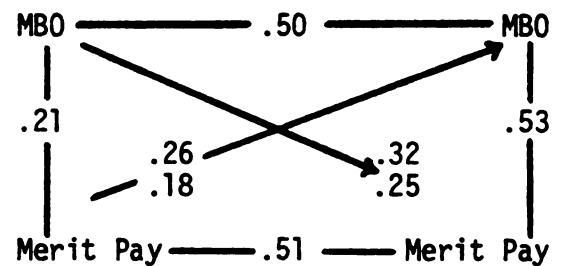
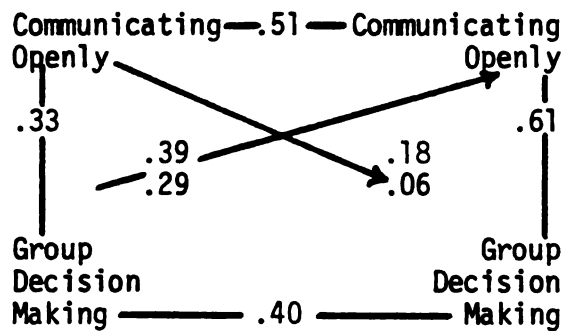
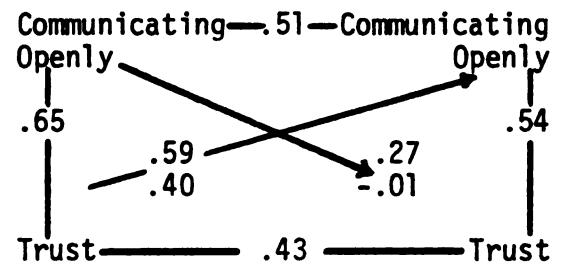
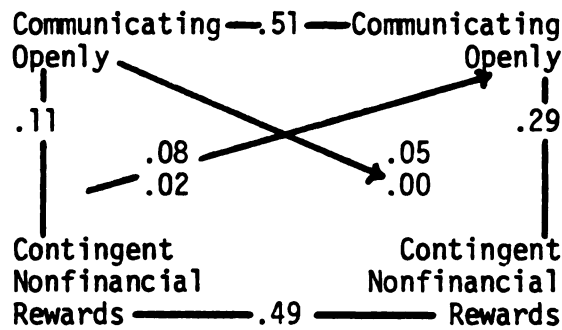
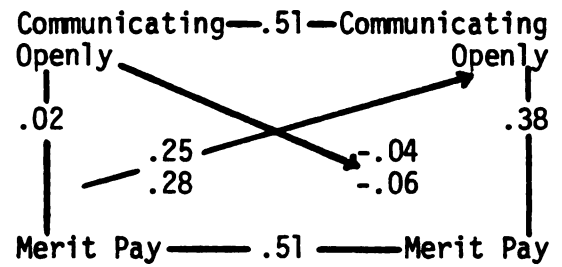
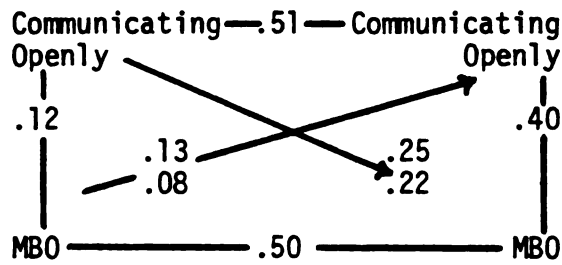


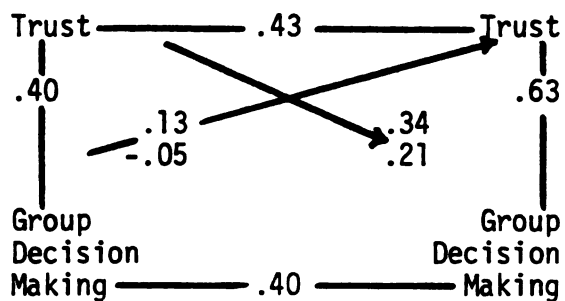
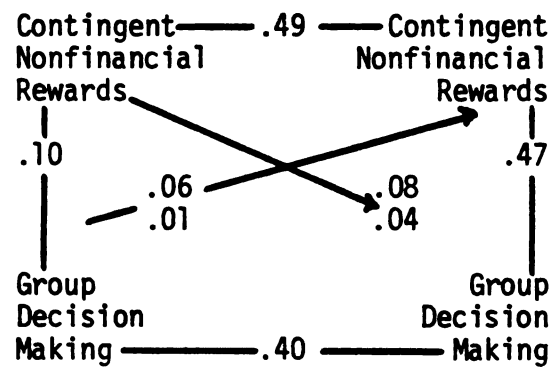
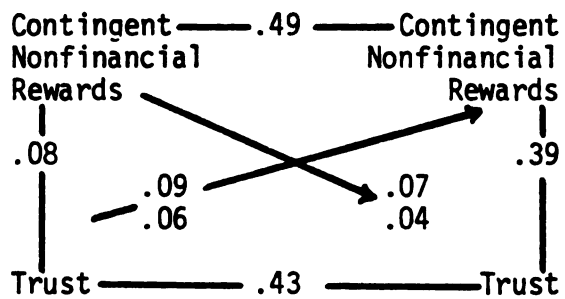
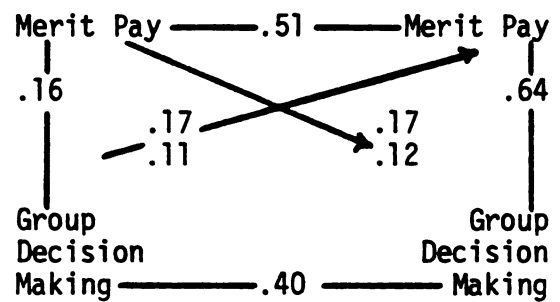
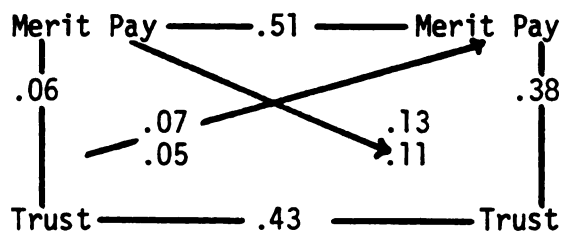
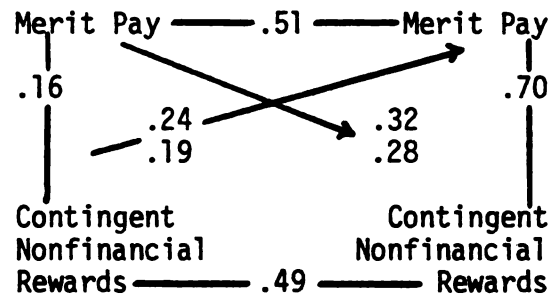
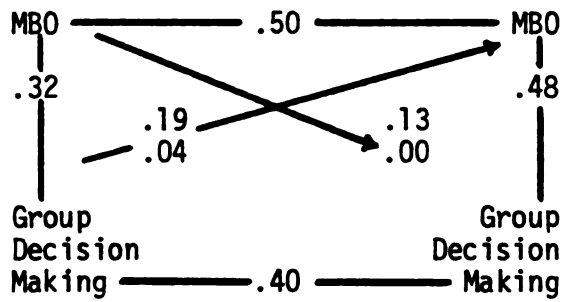












BIBLIOGRAPHY

BIBLIOGRAPHY

- Ahmavaara, Y. "Transformation Analysis of Factorial Data," Annals of the Academy of Science Fennicae, Series B, Vol. 881, No. 2, (1954): 54-59.
- Albrecht, T. L. "Communication and Perceptions of Organizational Climate: An Empirical Analysis." Unpublished doctoral dissertation, Michigan State University, 1978.
- Alderfer, C. P. "Organization Development." Annual Review of Psychology, Vol. 28, (1977): 197-223.
- Alston, F. W. "Training course explains the managerial function." The magazine of bank administration, Vol. 53, (July 1977): 54-55.
- Anderson, N. H. "Averaging model analysis of set size effect on impression formation." Journal of Experimental Psychology, Vol. 75, (1967): 158-165.
- Argyris, C. Intervention theory and method: A behavioral science view, Reading: Addison-Wesley Publishing Co., 1970.
- Ashen, M. "Executive Development, In-Company vs. University Programs." Harvard Business Review, (Sept.-Oct. 1954): 83-91.
- Bandura, A. Principles of Behavior Modification. New York: Holt, Rinehart, and Winston, Inc., 1969.
- Bare, A. C. "Staffing and training: Neglected supervisory functions related to group performance." Personnel Psychology, Vol. 31, (1978): 107-118.
- Barnard, C. The functions of the executive. Cambridge: Harvard University Press, 1938.
- Barnett, G. A.; Serota, K. B.; and Taylor, J. A. "A method for political communication research." Paper presented at the annual convention of the Association for Education in Journalism, 1974.
- Beckhard, R. "Optimizing team-building efforts." Journal of Contemporary Business, Vol. 1, (1972): 23-32.
- Beer, M. "The technology of organization development." In M. D. Dunnette (ed.), Handbook of industrial and organization psychology. Chicago: Rand McNally College Pub. Co., (1976): 937-993.

- Bell, C. H., and Rosenzweig, J. "Highlights of an organization improvement program in a city government." In French, W. L.; Bell, C. H. Jr.; and Zawacki, R. A. (eds.) Organization development: Theory, practice, and research, Dallas: Business Publications, Inc., (1978): 380-394.
- Bennis, W. Organization development: Its nature, origins, and prospects. Reading: Addison-Wesley, 1969.
- Bennis, W. G.; Benne, K. D.; and Chin, R. The planning of change. New York: Holl, Rinehart and Winston, Inc., 1969.
- Berrien, F. K. General and social systems. New Brunswick: Rutgers University Press, 1968.
- Blake, R. R., and Mouton, J. S. The managerial grid. Houston: Gulf Publishing Co., 1964.
- Blake, R. R., and Mouton, J. S. Building a dynamic corporation through grid organization development. Reading: Addison-Wesley, 1969.
- Blau, P. M. On the nature of organizations. New York: John Wiley and Sons, 1974.
- Bohrnstedt, G. W. "Observations on the measurement of change." In E. F. Borgatta (ed.), Sociological Methodology, San Francisco: Jossey-Bass, (1969): 113-133.
- Brandon, M. "Communicating along the right lines." Personnel Management, Vol. 8, (October 1976): 37-40.
- Brown, K. R. "Job analysis of multidimensional scaling." Journal of Applied Psychology, Vol. 51, (1967): 469-475.
- Burke, R. J., and Weir, T. "Teambuilding for more effective work groups." The Canadian banker and ICB review, Vol. 83, (1976): 40-45.
- Burke, W. W., and Schmidt, W. H. "Management and organization development: What is the target of change." Personnel Administration, (March-April 1971): 44-57.
- Butterfield, D. A., and Farris, G. F. "The likert organization profile." Journal of Applied Psychology, Vol. 59, (1974): 15-23.
- Campbell, D. T. "From description to experimentation: Interpreting trends as quasi-experiments." In C. W. Harris (Ed.), Problems in measuring change. Madison: University of Wisconsin Press, (1963): 212-242.

- Campbell, D. T., and Fiske, D. W. "Convergent and discriminant validation by the multitrait-multimethod matrix." Psychological Bulletin, Vol. 56, (1959): 81-105.
- Campbell, D. T., and Stanley, J. C. Experimental and quasi-experimental designs for research. Chicago: Rand McNally, 1963.
- Campbell, J. P. "Personnel training and development." Annual Review of Psychology, Vol. 22, (1971): 565-602.
- Campbell, J. P.; Dunnette, M. D.; Lawler, E. E. III; and Weick, K. E. Jr. Managerial behavior, performance, and effectiveness. New York: McGraw Hill Book Co., 1970.
- Caplow, T. Principles of Organization. New York: Harcourt, Brace and World, 1964.
- Carroll, J. D., and Wish, M. "Models and methods for three-way multidimensional scaling." In D. H. Krantz, R. C. Atkins, R. D. Luce, and P. Suppes (Eds.), Contemporary developments in mathematical psychology, Vol. 2. San Francisco: W. H. Freeman, (1974): 57-105.
- Chambers, P. "A rubber company taps its human resources." International Management, Vol. 29, (August 1974): 45-49.
- Cherrington, D. L.; Reitz, H. J.; and Scott, W. E. Jr. "Effects of reward and contingent reinforcement on satisfaction and task performance." Journal of Applied Psychology, Vol. 55, (1971): 531-36.
- Clegg, C. W.; Jackson, P. R.; and Wall, T. D. "The potential of cross-lagged correlation analysis in field research." Journal of Occupational Psychology, Vol. 50, (1977): 177-196.
- Cohen, S. L., and Turney, J. R. "Intervening at the bottom: Organization development with enlisted personnel in an Army work setting." Personnel Psychology, Vol. 31:4, (1978): 715-730.
- Crane, D. P. Personnel: The management of human resources. Belmont: Wadsworth Publishing Co., Inc., 1978.
- Cronbach, L. J., and Furley, L. "How should we measure 'change'-- or should we?" Psychological Bulletin, Vol. 4:1, (1970): 68-80.
- Cyert, R. M., and March, J. G. A behavioral theory of the firm. Englewood Cliffs: Prentice-Hall, 1963.
- DeCotiis, T. A., and Koys, D. J. "A theory of the determinants, content, and consequences of organizational climate." Unpublished paper, Ithaca: Cornell University, 1978.

- Dewey, J. Theory of valuation. Chicago: University of Chicago Press, Internal Encyclopedia of Unified Science, 1966.
- Drucker, Peter F. The concept of corporation. New York: The New American Library, 1964.
- Drucker, Peter F. Management: Tasks, responsibilities, practices. New York: Harper and Row, Publishers, 1974.
- Drucker, Peter F. The Practice of management. New York: Harper and Row, Publishers, 1954.
- Farace, R.; Monge, P.; and Russell, H. Communicating and organizing. Reading: Addison-Wesley, 1977.
- Filley, A. G., and House, R. J. Managerial process and organizational behavior. Glenview: Scott, Foresman and Company, 1969.
- Filley, A. G.; House, R. J.; and Kerr, S. Managerial process and organizational behavior. Glenview: Scott, Foresman and Co., 1976.
- French, W. L. The personnel management process. Boston: Houghton Mifflin Co., 1978.
- French, W. L., and Bell, C. H. Organization Development, Englewood Cliffs: Prentice-Hall, 1973, 1978.
- French, W. L., Bell, C. H. Jr.; and Zawacki, R. A. Organization development: theory, practice, and research. Dallas: Business Publications, Inc., 1978.
- French, W. L., and Bell, C. H. Jr. Organization development. Englewood Cliffs: Prentice-Hall, Inc., 1978.
- French, W. L., and Hollman, R. W. "Management by objectives--the team approach." California Management Review, Vol. 17, (Spring 1975): 13-22.
- Friedlander, F. "The impact of organizational training laboratories upon effectiveness and intervention of ongoing work groups." Personnel Psychology, Vol. 20, (1967): 289-308.
- Gagne, R. M. "Military training and principles of learning." American Psychologist, Vol. 17, (1962): 83-91.
- Gagne, R. M. The conditions of learning. New York: Holt, Rinehart and Winston, 1963.
- Galbraith, J. R. Organization design. Reading: Addison-Wesley, 1977.
- Gibb, Jack R. "TORI theory, consultantless team-building." Journal of Contemporary Business, Vol. 1, (Summer 1972): 33-41

- Glass, G. V., and Stanley, J. C. Statistical methods in education and psychology. Englewood Cliffs: Prentice-Hall, Inc., 1970.
- Gleuck, William F. Personnel: A diagnostic approach. Dallas: Business Publications, Inc., 1974.
- Golembiewski, R. T.; Billingsley, K.; and Yeager, S. "Measuring change and persistence in human affairs." Journal of Applied Behavioral Science, Vol. 12, (1975): 133-157.
- Green, P. F., and Carmone, F. J. Multidimensional scaling and related techniques in marketing analysis. Boston: Allyn and Bacon, 1970.
- Green, P., and Carmone, F. "Marketing research application of non-metric scaling methods." In K. Romney, R. Shepard, and S. Nerlove (Eds.), Multidimensional scaling, Vol. 2. New York: Seminar Press, 1972.
- Green, P. E., and Rao, V. R. Applied multidimensional scaling: A Comparison of approach and algorithms. New York: Holt, Rinehart and Winston, 1972.
- Green, P.; Maheshwari, A., and Rao, V. "Self concept and brand preferences: An empirical application of multidimensional scaling." Journal of the Market Research Society, Vol. 11, (1969): 343-360.
- Guilder, G. "Public sector productivity." Public Productivity Review, Vol. 1, (1975): 4-8.
- Guttman, L. "A basis for scaling qualitative data." American Sociological Review, Vol. 9, (1944): 139-150.
- Hackman, J. R., and Oldham, G. R. "Development of the job diagnostic survey." Journal of Applied Psychology, Vol. 60, (1975): 159-170.
- Hamblin, A. C. "Evaluation of training." Industrial Training International, Vol. 5:11, (1970): 33-36.
- Hand, H. H.; Estafen, B. D.; and Sims, H. P. Jr. "How effective is data survey and feedback as a technique of organization development? An experiment." Journal of Applied Behavioral Science, Vol. 11, (1975): 333-347.
- Harris, C. W. (Ed.) Problems in measuring change. Madison: University of Wisconsin Press, 1963.
- Hebb, D. O. "What psychology is about." American Psychologist, Vol. 29, (1974): 71-79.

- Herman, S. M. "A Gestalt orientation to organization development." In W. W. Burke (Ed.), Contemporary Organization Development: Conceptual Orientations and Interventions. Washington: NTL Institute for Applied Behavioral Science, (1972): 69-89.
- Herzberg, F. Work and the nature of man. Cleveland: World Publishing, 1966.
- Hill, R. "Changing attitudes to achieve company objectives." International Management, Vol. 31, (July 1976): 23-25.
- Hinrichs, John R. "Personnel training." In Marvin D. Dunnette (Ed.), Handbook of Industrial and Organizational Psychology. Chicago: Rand McNally College Publishing Co., (1976): 829-860.
- Homme, L. E. "Perspectives in psychology: XXIV. Control of coverants, the operants of the mind." Psychological Record, Vol. 15, (1965): 501-511.
- House, R. J. Management development: Design, implementation and evaluation. Bureau of Industrial Relations, University of Michigan, 1967.
- Hovland, C.; Janis, I.; and Kelley, H. Communication and persuasion. New Haven: Yale University Press, 1953.
- Howe, R. J. "Building teams for increased productivity." Personnel Journal, Vol. 56, (Jan. 1977): 16-22.
- Hunter, J. E., and Cohen, S. H. "PACKAGE: A system of computer routines for the analysis of correlational data." Educational and Psychological Measurement, Vol. 29, (1969).
- Ivancevich, J. M. "A study of a cognitive training program: trainer styles and group development." Academy of Management Journal, Vol. 17, (1974): 428-439.
- James, L. R.; Hater, J. J.; Gent, M. J.; and Bruni, J. R. "Psychological climate: Implications from cognitive social learning theory and interactional psychology." Personnel Psychology, Vol. 31:4, (1978): 783-814.
- Johnson, M. "Teamwork pays off for a French company." International Management. Vol. 28, (January 1973): 32-34.
- Karni, E., and Levin, J. "The use of smallest space analysis in studying scale structure: An application to the California psychological inventory." Journal of Applied Psychology, Vol. 56, (1972): 341-346.
- Katz, D. "The functional approach to the study of attitudes." Public Opinion Quarterly, Vol. 24, (1960): 163-204.

- Katz, E.; Levin, M.; and Hamilton, H. "Traditions of research on the diffusion of innovation." In G. Zaltman, P. Kotler, and I. Kaufman (Eds.), Creating Social Change. New York: Holt, Rinehart and Winston, 1972.
- Kelman, H. "Processes of opinion change." Public Opinion Quarterly, Vol. 25, (1961): 57-58.
- Kenny, D. A. "Cross-lagged panel correlation: A test for spuriousness." Psychological Bulletin, Vol. 82, (1975): 887-903.
- Kiessler, K. "Power and participation in two school environments." International Studies of Management and Organization, Vol. 7, (Spring 1977): 33-46
- Kimberly, J. R., and Nielson, W. R. "Organization development and change in organizational performance." Administrative Science Quarterly, Vol. 19, (1975): 191-206.
- King, D. Training within the organization. London: Tavistock, 1964.
- Knorr, K. The war potential of nations. Princeton: Princeton University Press, 1956.
- Krantz, D. H.; Luce, R. D.; Atkinson, R. C.; and Suppes, P. (Eds.), Contemporary developments in mathematical psychology. Measurement, psychophysics, and neural information processing, Vol. II. San Francisco: W. H. Freeman and Company, 1974.
- Kraut, A. I. "Predicting turnover of employees from measured job attitudes." Organizational Behavior and Human Performance, Vol. 13, (1975): 223-243.
- Kruskal, J. B., and Wish, M. Multidimensional scaling. Beverly Hills: Sage Publications, 1978.
- La Follette, W. R., and Sims, H. P. Jr. "Is satisfaction redundant with organizational climate?" Organizational Behavior and Human Performance, Vol. 13, (1975): 257-278.
- Landis, D.; Hayman, J. L. Jr.; and Hall, W. S. "Multidimensional analysis procedures for measuring self-concept in poverty area classrooms." Journal of Educational Psychology, Vol. 62, (1971): 95-103.
- Lasswell, H. Power and Personality. New York: Norton, 1948.
- Lawler, E. E.; Hall, D. T.; and Oldham, G. R. "Organizational climate: Relationship to organizational structure, process, and performance." Organizational Behavior and Human Performance, Vol. 11, (1974): 139-155.

- Leavitt, H. "Some effects of certain communication patterns on group performance." Journal of Abnormal and Social Psychology, Vol. 46, (1951): 38-50.
- Lerda, L. W. "Conference Methods." In R. L. Craig and L. R. Bittel (Eds.), Training and Development Handbook. New York: McGraw-Hill Book Co., (1967): 154.
- Levinson, H. "Asinine attitudes toward motivation." Harvard Business Review, Vol. 51, (1973): 70-76.
- Lewin, K. "Field Theory of Learning." Yearbook of the National Society for the Study of Education, Vol. 41, Part II, (1942).
- Lewin, K. "Defining the field at a given time." Psychological Review, Vol. 50, (1943): 292-310.
- Lewin, K. "Frontiers in group dynamics." Human Relations, Vol. 1, (1947): 5-41.
- Lewis, J. W. III. "Management team development: Will it work for you?" Personnel, (July-August 1975): 10-25.
- Likert, R. New patterns of management. New York: McGraw-Hill Book Co., 1961.
- Likert, R. A. "A technique for the measurement of attitudes." Archives of Psychology, Vol. 140, (1932): 44-53.
- Locke, E. A. "Nature and causes of job satisfaction." In M. D. Dunnette (Ed.), Handbook of Industrial and Organizational Psychology. Chicago: Rand McNally College Publishing Co., (1976): 1297-1349.
- Lord, F. "Elementary models for measuring change." In C. W. Harris (Ed.), Problems in measuring change. Madison: University of Wisconsin Press, (1963).
- Mahler, W. R. "MBO--The Achilles' Heel of most OD efforts." Unpublished paper. New York: National Conference of the American Society for Training and Development, 1971.
- Mahoney, T. A. Building the Executive Team. Englewood Cliffs: Prentice-Hall, Inc., 1961.
- Maier, N. M. "Assets and liabilities in group problem solving: The need for an integrative function." Psychological Review, Vol. 74, (1967): 239-249.
- Mann, R. D. "A review of the relationships between personality and performance in small group." Journal of Personality and Social Psychology, Vol. 22, (1972): 171-93.

- March, J. G., and Simon, H. A. Organizations. New York: Wiley and Sons, Inc., 1958.
- Marion Kellogg. "Executive development." In Dale Yoder and Herbert G. Heneman, Jr. (Eds.), Training and development, ASPA Handbook of Personnel and Industrial Relations. Washington: The Bureau of National Affairs, Inc., Vol. 5, (1977): 5-105/5-135.
- Maslow, A. "A theory of human motivation." Psychological Review, Vol. 50, (1943); 370-396.
- McClelland, D. D. The achieving society. Princeton: D. Van Nostrand Co., Inc., 1961.
- McCormick, E. J. "Job and task analysis." In M. D. Dunnette (Ed.), Handbook of Industrial and Organizational Psychology. Chicago: Rand McNally College Publishing Company, (1976): 651-696.
- McGregor, D. The professional manager. New York: McGraw-Hill Book Co., 1967.
- McGuire, W. "Inducing resistance to persuasion." In L. Berkowitz (Ed.), Advances in experimental social psychology, Vol. 1. New York: Academic Press, (1964): 191-229.
- Mosvick, R. K. "Human relations training for scientists, technicians, and engineers: A review of relevant experimental evaluations of human relations training." Personnel Psychology, Vol. 24, (1971): 275-292.
- Motowidlo, S. J., and Borman, W. C. "Behaviorally anchored scales for measuring morale in military units." Journal of Applied Psychology, Vol. 62, (1977): 177-183.
- Osgood, C. E.; Suci, G. J.; and Tannenbaum, P. H. The measurement of meaning. Urbana: University of Illinois Press, 1957.
- Patten, T. H., Jr. "OD, MBO, and the R/P system: The new foundation in personnel administration." Personnel Administration, Vol. 35, (March-April 1972).
- Patten, T. H., Jr. "OD, MBO and the reward system." In T. H. Patten, Jr. (Ed.), OD-Emerging dimensions and concepts, American Society for training and development, (1973): 9-32.
- Patten, T. H. "Time for organization development." Personnel, Vol. 54, (March-April 1977): 177-183.
- Patten, T. H., Jr., and Dorrey, L. E. "Long range results of a teambuilding OD effort." Public Personnel Management, (January-February 1977).
- Pearse, R. F. Manager to manager: What managers think about management development, AMA Survey Report. New York: American Management Associations, 1974.

- Pheysey, D. C. "Managers' occupational histories, organizational environments, and climates for management development." Journal of Management Studies, Vol. 14, (1977): 58-79.
- Pizer, V. The United States Army. New York: F. A. Praeger Publishers, 1967.
- Plovnick, M., and Fry, R. Rubin, I. "New developments in OD technology." Training and Development Journal, (April 1975): 19-25.
- Posner, B. Z. "Sustaining healthy organizations in unhealthy economic times." Management Review, Vol. 65, (March 1976): 11-17.
- Pritchard, R. D., and Karasick, B. W. "The effects of organizational climate on managerial job performance and job satisfaction." Organizational Behavior and Human Performance, Vol. 9, (1975): 126-246.
- Rand, A. "Concepts of consciousness." The Objectivist, Vol. 5:9, (1966): 1-8.
- Ritchie, J. B., and Miles, R. E. "An analysis of quantity and quality of participation as mediating variables in the participative decision making process," Personnel Psychology, Vol. 23, (1970): 347-359.
- Roberts, D. "The nature of communication effects." In W. Schramm and D. F. Roberts (Eds.), The Process and Effects of Mass Communication. Chicago: University of Illinois Press, 1972.
- Rogers, E., and Shoemaker, F. Communication of innovation. New York: The Free Press, 1972.
- Rotondi, T. Jr. "Organization identification: Issues and implications." Organizational Behavior and Human Performance, Vol. 13, (1975): 95-109.
- Rubin, I.; Plovnik, M.; and Fry, R. "Initiating planned change in health care systems." Journal of Applied Behavioral Science, Vol. 10, (1974): 107-124.
- Schein, E. H. "Management development as a process of influence." In A. C. Bartlett and T. A. Kayser (Eds.), Changing Organizational Behavior. Princeton: Prentice-Hall, Inc., 1973.
- Schramm, W. Men, messages and media. New York: Harper and Row, 1973.
- Schutz, W. FIRO: A three-dimensional theory of interpersonal behavior. New York: Holt, Rinehart and Winston, 1958.

- Serota, K. B. "Directions in metric multidimensional scaling: Conceptual history and programming of the new Galileo technique." Unpublished M.A. thesis, Michigan State University, 1974.
- Shaw, M. E. "Communication networks." In L. Berkowitz (Ed.), Advances in experimental social psychology. New York: Academic Press, (1964): 111-147.
- Shaw, M. E., and Wright, J. M. Scales for the measurement of attitudes. New York: McGraw-Hill Book Co., 1967.
- Shepard, R. N. "Analysis of proximities as a technique for the study of information processing in man." Human Factors, Vol. 5, (1963): 33-48.
- Shepard, R. N.; Romney, A. K.; and Nerlove, S. (Eds.), Multidimensional scaling: Theory and applications in the behavioral sciences. New York: Seminar Press, 1972.
- Sherif, M., and Sherif, C. Attitude, ego involvement, and change. New York: Wiley and Sons, Inc., 1967, pp. 105-139.
- Simon, H. A. "Information processing theory of human problem solving." C.I.P. Working Paper No. 324. Carnegie-Mellon University, 1976.
- Solomon, L. N. "Team development: A training approach." In J. W. Pfeiffer and J. E. Jones (Eds.), The 1977 Annual Handbook for Group Facilitators. San Diego: University Associates, 1977, pp. 181-193.
- Spielberger, C. D., and DeNike, L. D. "Descriptive behaviorism versus cognitive theory in verbal operant conditioning." Psychological Review, Vol. 72:4, (1966): 306-325.
- Strauss, G. "Organization development." In R. Dubin (Ed.), Handbook of Work, Organization, and Society. Chicago: Rand McNally College Publishing Co., (1976): 617-685.
- Stogdill, R. M. "Group productivity, drive, and cohesiveness." Organizational Behavior and Human Performance, Vol. 8, (1972): 26-43.
- Subkoviak, M. J. "The use of multidimensional scaling in education research." Review of Educational Research, Vol. 45:3, (1975): 387-423.
- Suppes, P., and Zins, J. L. "Basic measurement theory." In R. D. Luce, R. R. Bush, and E. Galanter (Eds.), Handbook of Mathematical Psychology, Vol. 1. New York: Wiley and Sons, Inc., 1963, pp. 1-76.

- Tartar, J. L. "Mathematical models of attitude change in a longitudinal study of large organizations." Unpublished Doctoral dissertation. Michigan State University, 1972.
- Taylor, J. A. "Communication and organizational change: A case study and empirical analysis." Unpublished Doctoral dissertation. Michigan State University, 1977.
- Taylor, J. A.; Farace, R. V.; and Monge, P. R. "Communication and the development of change among educational practitioners." Paper presented to the World Education Conference. Honolulu, Hawaii, 1976.
- Terreberry, S. "The evolution of organizational environments." Administrative Science Quarterly, Vol. 12:4, (1968): 590-613.
- Thomas, J. "Government accountability for what?" Public Productivity Review, Vol. 1:2, (1976): 2-8.
- Thurstone, L. L. "Attitudes can be measured." American Journal of Sociology, Vol. 33, (1928): 529-554.
- Tosi, H.; Hunter, J.; Chesser, R.; Tarter, J. R.; and Carroll, S. "How real are changes induced by management by objectives." Administrative Science Quarterly, Vol. 21, (1976): 276-306.
- Traub, R. E., and Hambleton, R. K. "The effect of instruction on the cognitive structure of statistical and psychometric concepts." Canadian Journal of Behavioral Science, Vol. 6, (1974): 30-44.
- Turney, J. R., and Cohen, S. L. "Organizational Implications for practicing OD in the Army." Personnel Psychology, Vol. 31:1, (1978): 731-738.
- Tyron, R., and Bailey, D. Cluster Analysis. New York: McGraw-Hill Book Co., 1970.
- Van de Geer, J. P. Introduction to multivariate analysis for the social sciences. San Francisco: Freeman, 1971.
- Van Maanen, J. "Breaking in: Socialization to work." In R. Dubin (Ed.), Handbook of Work, Organization, and Society. Chicago: Rand McNally College Publishing Co., 1976, pp. 67-130.
- Varney, G. "Building an effective management team." The Business Quarterly, Vol. 41, (Spring 1976): 38-45.
- Vroom, V. H. Work and motivation. New York: John Wiley and Sons, 1964.
- Wanous, J. P., and Lawler, E. E. III. "Measurement and meaning of job satisfaction." Journal of Applied Psychology, Vol. 56 (1972): 95-105.

- Warren, M.W. Training for results: A systems approach to the development of human resources in industry. Reading, Mass.: Addison-Wesley Publishing Co., 1969.
- Whyte, W.F. Money and Motivation. New York: Harper and Row Publishing Co., 1955.
- Wigland, R.T., and Barnett, G.A. "Multidimensional scaling of cultural processes." Paper presented to the Association for Education in Journalism, 1975.
- Winn, A. "Social change in industry: from insight to implementation." Journal of Applied Behavioral Sciences, Vol. 2, (1966): 170-184.
- Woelfel, J. "Galileo: A non-technical introduction." Unpublished paper. Communication Research Services: Michigan State University, 1976.
- Woelfel, J. "Foundations of cognitive theory." Unpublished paper. Michigan State University, 1976.
- Woelfel, J. "Procedures for the precise measurement of cultural processes." Unpublished paper. Michigan State University, n.d.
- Woelfel, J., and Barnett, G.A. A paradigm for mass communication research." Paper presented at the Annual Meeting of the International Communication Association, New Orleans, 1974.
- Woelfel, J., and Saltiel, J. "Inertia and cognitive processes: the role of accumulated information and attitude change." Human Communication Research. Vol. 1, (Summer 1975).