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THE CONTRIBUTION OF COMPLEXITY OF MENTAL PROCESSING AND STAGE OF EGO DEVELOPMENT TO TRANSFORMING LEADERSHIP

A dissertation submitted to the Graduate Faculty of North Carolina State University in partial fulfillment of the requirements for the Degree of Doctor of Education

by Glenn W. Mehlretter Jr.

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ABSTRACT

MEHLTRETTER, GLENN WILLIAM, JR. The Contribution of Complexity of Mental Processing and Stage of Ego Development to Transforming Leadership. (Under the direction of Robert Emery Wenig.)

The purpose of this research was to determine if a manager's performance as a transforming leader is related to that manager's method of interpreting information. The emerging term "meaning-making" was operationally examined using two variables: stage of ego development and relative complexity of mental processes. Relative complexity of mental processing is the difference between the manager's complexity of mental processing and the complexity of his or her assigned role when transformation is not required. As an ancillary issue, the relationship between stage of ego development and complexity of mental processing was also examined.

The variable, performance as a transforming leader, was determined by identifying each subject as having, or as not having, brought about a successful organizational transformation. Stage of ego development was measured using a written sentence completion test developed by Jane Loevinger. Complexity of mental processing was determined by applying a method developed by Elliott Jaques to observe the structure of thought in persons dealing with the complexities associated with doing work. Role complexity was measured using a methodology called time-span measurement also developed by Dr. Jaques.

The study showed strong evidence that transforming leaders possess complexity of mental processing at least one stratum above that required to operate at the level of complexity of their role were transformation not required. No evidence was found to indicate that a transforming leader must operate at a post-formal stage of ego development. Little evidence was found that the distribution of stage of ego development among transforming leaders was any different than the distribution among managers in general. Some evidence was found to support prior findings that there is a relationship between stage of ego development and complexity of mental processing.

This study provides a robust methodology for future research. A number of fertile avenues are indicated: relationship between stage of ego development and complexity of mental processing among post-formal individuals, minimum levels of complexity of mental processing associated with successful transformation of organizations, and the character of transformation associated with the stage of ego development of a leader.



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by
GLENN W. MEHLTRETTER, JR.

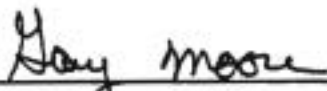
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1995


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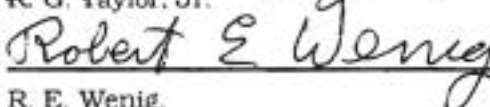
G. E. Moore



R. W. Shearon,
Minor Representative



R. G. Taylor, Jr.



R. E. Wenig,
Chairman of Advisory Committee

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DEDICATION

To my Lord Jesus Christ
Whose I am and whom I serve.

BIOGRAPHY

Glenn William Mehlretter Jr.

Born in Bayonne, New Jersey, November 26, 1942, to Glenn William Sr., and Eileen (Carroll). Married Betsy-Jo, the joy of my life, in June of 1965, and graduated Carnegie Mellon University two days later, with a Bachelor of Science degree in Mechanical Engineering. Began professional employment in Jones & Laughlin's integrated steel mill in Pittsburgh, Pennsylvania. Left J&L to fulfill a two year ROTC commitment. Received an Honorable discharge after two years of service in the U. S. Army during the Viet Nam era. Joined Piper Aircraft as a project engineer. After three years, left Piper to pursue studies at the Amos Tuck School of Business Administration at Dartmouth College. Received MBA degree from Amos Tuck School in 1972.

Joined Corning Glass Works after Amos Tuck graduation, and held a variety of manufacturing, production, and engineering management positions until 1981. In 1981 left Corning to pursue independent consulting activities focusing on the issues of manufacturing competitiveness. Through the present time these consulting interests have broadened beyond manufacturing to issues of overall organizational efficiency and effectiveness.

Up to this point in time there have been a number of adventures. The chief began with raising three wonderful children, Heidi, Glenn III, and Daniel. Some of the other adventures are evidenced by various certifications, or activities (some of which are no longer current): Eagle Scout; Scabbard and Blade military honor society (ROTC); member of National Ski Patrol; private pilot; registered professional engineer (for over 20 years); ran a marathon; Dale Carnegie Instructor; trained trainers for clients of Corning International in Baldrige Self Assessment, and in all aspects of Total Quality Management; 4-Mat® Instructor; ordained minister; delivered seminars for the North Carolina State Industrial Extension Service; appointed to the academic Honor Society of Phi Kappa Phi.

ACKNOWLEDGMENTS

As this dissertation has come to completion it has been a humbling, as well as gratifying experience, to recall the support, encouragement, and concrete help that has been enthusiastically given by a lot of people. Chief among these has been the sage and patient guidance of my advisor Dr. Robert Wenig.

My dissertation saga started with a growing desire to understand why it was that so many of the firms that were attempting to transform themselves were falling flat, while a few were achieving, as Juran says, "stunning results." I still remember the assignment that Dr. Linda Dillon gave to read through the 1987 version of Craig's Training & Development Handbook. It was during that time that I discovered for the first time, on page 155, the work of Dr. Elliott Jaques. While the discovery laid dormant for a year, it turned out to be an occasion that has literally changed the direction of my life. Around that same time, in the Summer of 1989 I came across an article by Kerry Bunker in *Issues & Observations*, a quarterly publication of the Center for Creative Leadership. I visited Kerry and he introduced me to the Center's research into how managers face difficult learning demands. I was taken by the title of the program "going against the grain," or simply "GAGGING!"

Shortly after that Kerry transferred from research to training delivery and Dr. Palus took over responsibility for the Center's developmentally based research. Dr. Palus, has been a continuous supporter, encourager, and expert resource during the full course of this work. He also provided the link that led to my first contact with Dr. Jaques. In addition to Dr. Palus a number of others at the Center for Creative Leadership provided invaluable support. Wilfred Drath, described developmental learning in an exemplary way—each of the many times that were needed to shoot the information video that was used in seeking research partners. Along the way Jill Pinto, John Fleenor, and David Horth along with the Leading Creatively design team were supportive in material ways.

At this point I must express my deepest professional, and personal gratitude to Dr. Elliott Jaques, whom history will acknowledge as having changed the course of organizational design through his insight into the nature of work and complexity. After our initial contact, Dr. Jaques has guided me in the field application of his work. After applying his model in six widely varying organizations, and involving over 500 different roles and individuals, I am convinced that he has contributed powerful, practical, and robust methodologies that will greatly enhance the effectiveness of management into the future.

Tom Carter, Sr. Vice President for Quality at ALCOA played a critical role in the success of the research: he caught the vision and provided the first opportunity to test the emerging design in the field. Tom is a brilliant model builder and has continued to provide a willing ear to test theory against his years of pragmatic management experience.

Patrick Norauski, Vice President for Quality at Dresser-Rand, provided very concrete help on a number of critical junctures as well as needed encouragement during some difficult times.

Jack Powers, director of Human Resources for Criovac division of the W. R. Grace Co., was my first close encounter with a transforming leader. Jack demonstrated to me the power that can be loosed in an organization through the practical (he prefers "pragmatic") application of theory grounded practices in operating organizations.

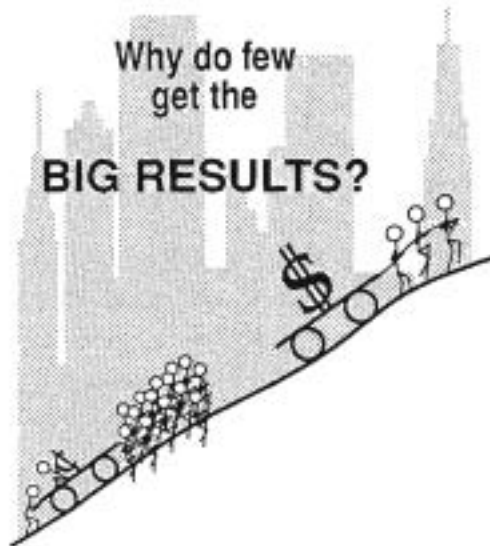
Two others invested many hours in their thoughtful review of both early and later drafts: my good friend and associate Dr. Neal Kenny, and my always supportive dad, Glenn Sr. Dr. Kenny, as my kids know him, always provided insight into writing style and clarity, and sometimes issued challenges that cut to core issues. My dad was the critical test. Having retired as Executive Vice President of a division of International Nickel, he was a "hard sell." If he bought it, I knew I had something worthwhile. Neal and Dad were not the only ones who contributed excellent suggestions and feedback through their many readings. Thanks also goes to Dr. Robert Beckley, my father-in-law, Brian and Rebecca Wilkie, and Ceri Usmar for their careful proofing the final drafts.

Dr. Owen Jacobs, retired Chief of the Strategic Leadership Technical Area, of the U. S. Army Research Institute for the Behavioral and Social Sciences, provided invaluable insight on the relationship between complexity of mental processing and stage of ego development.

Dr. William Torbert, Professor of Organizational Behavior at Boston University, contributed greatly through his participation in the informational video, his excellent research and insight into the relationship between leadership and stage of ego development, and his patience when I challenged aspects of work.

Dr. Kenneth Clark, Emeritus from the Center for Creative Leadership provided encouragement at a critical point by confirming that the research direction was indeed an important one.

Special thanks to Heidi, my daughter, for her help in putting together the early materials used in seeking research partners, for capturing the essence of the problem in a single illustration, and for her professional execution of the informational video.



Thanks also to Scott Rucci for his help on the 7 am to 3 am production shoot.

I also express my appreciation to the members of my graduate advisory committee, Doctors, Gary Moore, Ron Shearon, and Ray Taylor. Dr. Moore had a great influence on my thinking through introducing me to the philosophy of education. I want to thank Dr. Shearon, one of the finest facilitators of learning I have met, for introducing me of the work of Bolman & Deal. Dr. Taylor's knack of cutting to the quick and asking the difficult questions, proved quite helpful in focusing the research questions.

Finally, thanks to Betsy-Jo, my faithful wife, who patiently postponed her current desires for a longer term goal. For her unwavering support I will be forever grateful.

TABLE OF CONTENTS

	Page
LIST OF TABLES	X
LIST OF FIGURES	XII
CHAPTER I INTRODUCTION.....	1
The problem.....	2
The problem statement	3
Objective	3
Questions to be answered.....	3
Research questions.....	3
Outline of the dissertation.....	4
Justification.....	7
Limits of the study	7
Assumptions	7
Definitions.....	8
Chapter summary.....	9
CHAPTER II REVIEW OF THE LITERATURE.....	11
Leaders who transform organizations	11
Meaning-making and leadership	12
Meaning-making processes.....	15
Piaget and cognitive development.....	15
General guidelines for identifying Piagetian cognitive stages.....	18
"Hard" and "soft" stage theories.....	18
Kohlberg's theory of moral development.....	19
Ego development	19
Ego or self development vs. Kohlberg's moral development.....	20
Loevinger's theory of ego development.....	23
Stage transitions.....	24
Kegan and the evolution of the self.....	25
Subject, object, and embeddedness.....	26
Developmental stages as a clusters of values.....	27
Complexity of mental processing	29
Jaques and the concept of complexity of mental processing.....	29
A model for the mental processing of complexity	30
Description of four types of "complexity mental processing".....	30
Explanation of four "orders of information complexity"	31
The maturation of complexity of mental processing	33
A summary of meaning-making.....	34

TABLE OF CONTENTS (CONTINUED)

	Page
Research relating leadership and meaning-making	35
Ego development	35
The institutional manager and empowerment	35
On development and transforming leadership	36
Torbert's stage descriptions.....	38
The developmental stage of organizational development consultants	41
Complexity of mental processing	43
Complexity of mental processing—necessary but not sufficient.....	43
Complexity of organizational roles	43
Research on both factors.....	44
Strategy formulation among practicing professionals.....	44
Individual differences in strategic leadership capacity	47
Chapter summary.....	48
CHAPTER III DESIGN OF THE STUDY.....	51
The research model	51
The variables	52
Successful transformation vs. stage of ego development	52
Successful transformation vs. complexity of mental processing.....	54
Operational measures.....	55
Question 3a. Performance as a transforming leader	55
Question 3b. Stage of ego development.....	56
Question 3c. Complexity of mental processing.....	56
Question 3d. Relationship between complexity of mental processing and complexity of assigned role	57
Complexity of assigned role.....	57
Relative complexity of mental processing	57
Question 3e. Relationship between stage of ego development and complexity of mental processing.....	58
Sampling plan.....	62
Statistical analysis.....	62
Managing the study.....	63
Phase 1: Preparation.....	64
Choice of psychometric methods and data analysis plan.....	64
Design and testing of interview protocol & validation of assessor.....	65
Testing of the time-span measurement methodology.....	65
Phase 2. Partner & funding.....	66
Phase 3. Data collection, analysis, & conclusions.....	67
The total sample.....	67
Collection of site data	67
Scoring of the written responses	67
Conducting the interviews and verifying the assessments.....	67
The engagement interview.....	67
Time-span interviews.	68
Chapter summary.....	68

TABLE OF CONTENTS (CONTINUED)

	Page
CHAPTER IV DATA AND ANALYSIS.....	69
Abalone site data and analysis.....	70
Abalone data 1: Identification of transforming performance.....	70
Abalone data 2: Stage of ego development.....	71
Abalone data 3: Time span of role.....	71
Abalone data 4: Complexity of mental processing.....	72
Abalone data 5: Relative complexity of mental processing.....	72
Abalone site data and Question 4.....	73
Transforming success vs. stage of ego development (Abalone data).....	73
Transforming vs. relative mental processing (Abalone data).....	73
Summary (Abalone data).....	74
Preliminary & combined data & analysis.....	74
Transforming vs. stage of ego development (preliminary & combined data).....	75
Transforming vs. relative mental processing (preliminary data).....	76
Relationship between stage of ego dev. and complexity of mental processing.....	77
Minimum requirements for transforming performance.....	78
Minimum stage of ego development.....	78
Minimum relative complexity of mental processing.....	79
Minimum complexity of mental processes.....	80
Minimum stratum of organizational role.....	80
Summary of minimum indicators.....	81
Chapter summary.....	81
CHAPTER V, SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS.....	83
Summary.....	83
The problem being studied.....	83
The problem statement.....	83
Review of the Literature.....	83
Leaders who transform organizations.....	84
Meaning-making processes.....	84
Choice of ego development and complexity of mental processing.....	85
Ego development.....	85
Complexity of mental processing.....	86
Combining and contrasting the two.....	87
Research relating leadership and meaning-making.....	87
Design of the study.....	89
Choice of measures.....	90
Stage of ego development.....	90
Relative complexity of mental processing.....	90
Performance as a transforming leader.....	90
Criterion for the sample.....	91
Data collection.....	91
Data and analysis.....	92
Conclusions.....	92
Implications.....	94
Based on this study it is the authors opinion.....	95
Recommendations.....	95
Apply Requisite Organization principles.....	95
Further research.....	95

LIST OF TABLES

Table II-1. Kohlberg's six moral stages.....	21
Table II-2. Classification of moral judgments	22
Table II-3. Kegan's subject object transitions.....	27
Table II-4. Hall's values associated with two stages.....	27
Table II-5. Hierarchy of mental processing, from most to least complex.....	32
Table II-6. Typical managerial strengths and weaknesses related to the institutional stage of	36
Table II-7. Distribution of Loevinger stages among various groups	37
Table II-8. Torbert's stage descriptions.....	39
Table II-9. Torbert's stage descriptions	40
Table II-10. Stages of personal and organizational development.....	41
Table II-11. Bushe's propositions about commitment based organizations and developmental level.	42
Table II-12. Hirsch's stage and revenue data with assessments of mental processing.....	46
Table III-1. Transforming performance vs. stage of ego development.....	53
Table III-2. Transforming performance vs. relative mental processing.....	54
Table III-3. Multitrait-multimethod matrix for comparing stage of ego development and complexity of mental processing.....	60
Table III-4. Expected correlations if stage of ego development and complexity of mental processing are related constructs	62
Table IV-1. Abalone site data.....	70
Table IV-2. Abalone complexity of mental processing, inter-rater correlation.....	72
Table IV-3. Abalone data: Transforming performance vs. stage of ego development.....	73
Table IV-4. Abalone data: Transforming performance vs. relative mental processing.....	74
Table IV-5. Preliminary data.....	75
Table IV-6. Abalone plus preliminary data Question 4a: Transforming performance vs. stage of ego development.....	76
Table IV-7. Preliminary data Question 4b: Transforming performance vs. relative mental processing.....	77
Table IV-8. Combined data: Transforming performance vs. relative mental processing..	78
Table IV-9. Correlation matrix: Ego development, mental processing, and time span	78
Table IV-10. Combined data: Distribution of ego development stage among transforming performers.....	79
Table IV-11. Distribution of complexity of mental processing (combined data).....	70

Table IV-12. Distribution of organizational roles by stratum (combined data)	81
Table A-1. Relevant managerial competencies in private sector organizations.	104
Table A-2. Ten skills most frequently reported by senior executives	105
Table A-3. Sixteen managerial skills and perspectives.....	106
Table E-1. Abalone site summary of data.....	122
Table E-2. Abalone site nominations for successful transformations.....	123
Table E-3. Abalone site complexity of mental processing.....	124
Table E-4. Preliminary data summary.....	125
Table E-5. Inter-rater correlations for complexity of mental process observations.....	126
Table E-6. Abalone correlations.....	127
Table E-7. Full data set correlation matrix.....	128
Table E-8. Significance of correlation values.....	129
Table E-9. Distribution of ego development among transforming leaders. Four & five with transforming results	130
Table E-10. Fisher exact probability for ego stage vs. transforming For Table 4-3.....	131
Table E-11. Fisher exact probability for ego stage vs. transforming For Table 4-6.....	132
Table E-12. Fisher exact probability for complexity of mental processing vs. transforming For Table 4-4, 7 & 8	133

LIST OF FIGURES

Figure I-1. Variables and their measurement	5
Figure I-2. Flow chart of methodology	6
Figure II-1. Developmental stage theory: Roots related to managerial leadership	16
Figure II-2. Loevinger's stage characteristics.....	24
Figure II-3. The maturation of complexity of mental.....	34
Figure IV-1. Number of exemplary nominations received by individuals.....	71
Figure B-1. Protocol scoring sheet	114

CHAPTER I INTRODUCTION

At this time in history, we face formidable economic and political change (Drucker, 1989). Leaders of organizations from small business to national governments are seeking strategies to allow their organizations to adapt to the changing competitive environment (Magaziner & Patinkin, 1989).

The 20th century has seen a significant evolution in the principles of management. The century began with Frederick W. Taylor's introduction of scientific management to improve productivity (Kreitner, 1992, p. 45). By the 1930's, the human relations movement was seeking to counteract the harshness of the control and command elements found within scientific management (Kreitner & Kinicki, 1989). In 1960, Douglas McGregor encouraged a management environment that would give employees an opportunity to do "great things," which he called Theory Y. Today ideas like high-involvement management (Lawler, 1986), learning organizations (Senge, 1990), and delighting the customers (Peters, 1987) appear frequently within the management literature.

Paralleling the evolution in management theory has been an equally significant advance in the understanding of leadership. Throughout history, studies had adopted a trait view of leaders (Kreitner, 1992). In the late 1940's, the famed Ohio State studies of leadership behavior initiated a movement away from the trait-based view of leadership. By 1951 studies had begun at the University of Illinois which led to Fiedler's work on situational leadership in the late 1960's and 1970's (Hampton, Summer, & Webber, 1982). James MacGregor Burns focused the next major shift in leadership thought with his introduction of the concept of transforming leadership (1978). As the knowledge of leadership was growing, so also was the evidence that there was a shortage of effective leaders who could bring about desired change. Bennis (1989) for one, in describing "Why Leaders Can't Lead," expressed our need as a society for leaders who can transform their organizations.

With the current emphasis on the need for leaders who can transform organizations, there is also a resurgence of interest in leadership traits (Kirkpatrick & Locke, 1991) and behaviors (Kouzes & Posner, 1987). A number of well executed studies (Boyatzis, 1982; Bragar, 1990; Kouzes & Posner, 1987) provided descriptions of the leadership behaviors that are needed to transform organizations.

However, with all the research knowledge describing how transforming leaders should behave, there is still a shortage of transforming leaders. Burn's stated that, "One

of the most universal cravings of our time is a hunger for compelling and creative leadership" (1978, p. 1). Eight years later, Bennis & Nanus (1985) reiterated that this need for effective leaders is still evident in all aspects of society in the United States. This year John Kotter (1995) reviewed one hundred transformation attempts since Bennis & Nanus wrote—and the shortage is still painfully evident.

During the preceding decade attempts at organizational transformation have appeared under a progression of titles: total quality management, empowerment, participative management, and self-managed teams. More recently we read of process re-engineering and continuous learning organizations. Whatever the title, organizations desiring to transform themselves and their value structure require leaders who can transform.

Quantifiable data on the shortage of transforming leaders is difficult to gather. But there are some indicators. For example, among the managers attempting to implement Total Quality Management, Juran (1991 a & b) found that only a few were effective at achieving the significant improvements that are available. Kotter (1995) stated:

A few of these corporate change efforts have been very successful. A few have been utter failures. Most fall somewhere in between, with a distinct tilt toward the lower end of the scale.

In this author's contact with managers responsible for change in two of large management consulting firms, the consensus was that the number of successful transformation attempts is about 20%. Why do so few achieve the big results?

The problem

Organizations in the United States need more managers who can lead change in their organizations—a specific kind of change—change that results in a culture built on customer satisfaction (Peters, 1987), systematic management of processes (Jaques, 1989), and a high level of employee involvement (Lawler, 1986). Research has identified many of the leadership behaviors that would facilitate the desired change. However, little is understood to explain why otherwise competent managers are unable to bring about transformation in their organization.

In recent years much has been said about the role played by the interpretation of information in determining leadership success. Senge (1990), for one, devoted considerable attention to what he calls mental models. He defined these models in terms of the way that people interpret reality based upon ingrained beliefs and assumptions. Senge examines the ability of these mental models to cause poor performance by preventing "brilliant strategies" from getting "translated into action" (p. 172). Joel Barker provides another look at the same topic which he calls paradigms.

Barker demonstrated the power of paradigms to prevent people from “even seeing” the data that opposes their paradigm. De Pree expanded the idea further when he stated “The first responsibility of a leader is to define reality” (1989, p. 11). From De Pree’s viewpoint, defining reality is the essential act of interpreting the meaning of information and thereby providing the “reality” that will be acted upon by the organization. Each of these authors recognized that the way a manager interprets information will have a significant influence on his or her performance, particularly when transforming change is required.

In the United States many organizations are pursuing significant change in response to pressures created by increasing competition (Dertouzos, Lester & Solow, 1989). Successful transforming change results in an organization in which the people adopt new behaviors. Waitley (1979) links behavior to a person’s perception of reality. He states that, “individuals behave, not in accordance with reality, but in accordance with their perception of reality” (p. 130). Yet a person’s perception of reality results from the way that person interprets the information which he or she has received (Kegan, 1982). How a person interprets information is influenced by a number of things. Two of these are the focus of this study: stage of ego development (Loevinger & Wessler, 1970), and complexity of mental processes (Jaques & Cason, 1994).

A possible reason for a manager’s failure to exhibit transforming behaviors is that the person’s stage of ego development prevents the manager from perceiving that those behaviors would be effective (Torbert, 1991). A second reason may be that the manager’s complexity of mental processing falls short of the level needed to deal with the information complexity associated with the task of transformation (Jaques & Clement, 1991).

The problem statement

Therefore, the problem of major concern is to gain greater understanding of the influence that stage of ego development and complexity of mental processing have on a manager’s ability to transform his or her organization.

Objective

The objective of this study is to assess the influence of these two variables—stage of ego development and complexity of mental processing—on the ability of a manager to bring about transformation.

Questions to be answered

Research questions

1. What is the relationship between a manager’s performance as a transforming leader, and his or her stage of ego development and complexity of mental processing?

2. What does existing research show concerning:
 - a. the relationship between a manager's success in transforming an organization and his or her stage of ego development?
 - b. the relationship between a manager's stage of ego development and his or her complexity of mental processing, and/or
 - c. the relationship between a manager's complexity of mental processing and his or her success in transforming an organization?
3. What operational methods can be used to:
 - a. measure performance as a transforming leader,
 - b. measure stage of ego development,
 - c. observe complexity of mental processing,
 - d. measure the complexity of work associated with a given organizational role, and/or
 - e. examine the relationship between stage of ego development and complexity of mental processing?
4. Does performance as a transforming leader require that a manager:
 - a. be above stage four of ego development,
 - b. possess complexity of mental processing above that which would be required to operate successfully in the same role if transformation were not required, and/or
 - c. possess some minimum stage of ego development and relative complexity of mental processing?
5. Can the success rate of efforts to transform organizations be increased through selection of individuals that takes into account stage of ego development, complexity of mental processing, and time span of organizational role?

Outline of the dissertation

The five chapter format of the dissertation is outlined below. Figure I-1. Variables and their measurement, provides a pictorial view of the variables, their relationship, and the methods that will be used to measure them. Figure I-2. Flow chart of methodology, outlines the methodology used in the study. A detailed discussion of that methodology is included in Chapter III.

Chapter	Content
I. Introduction	Introduces the problem and identifies the dependent and independent variables
II. Review of the literature	Addresses research question 2 by providing a review of the related literature.
III. Design of the study	Addresses research question 3 by describing the methods used to measure the variables being studied. The chapter then describes the design of the study which is being used to answer questions 4 & 5.
IV. Data & Analysis	Provides an analysis of the data that will be used to answer questions 4 & 5.
V. Findings & conclusions	Addresses research questions 4 & 5 based on the data analysis provided in Chapter IV. Then, using question 1 to provide focus, summarizes the study.

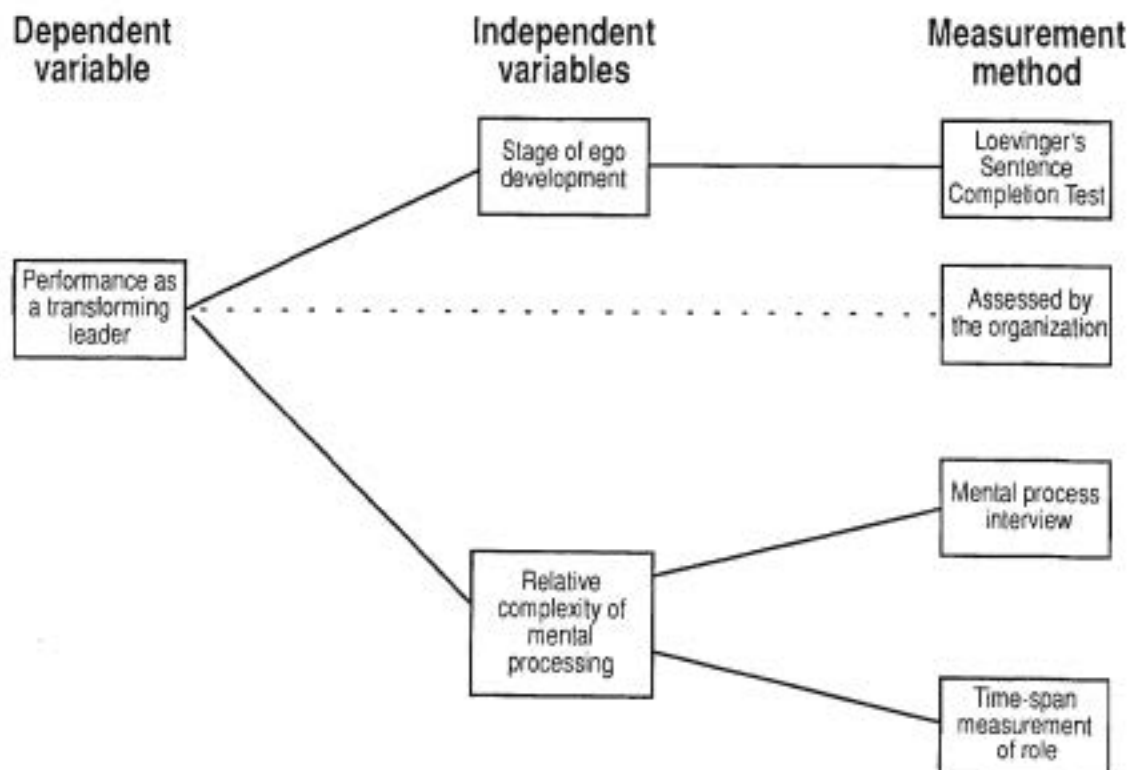


Figure 1-1. Variables and their measurement

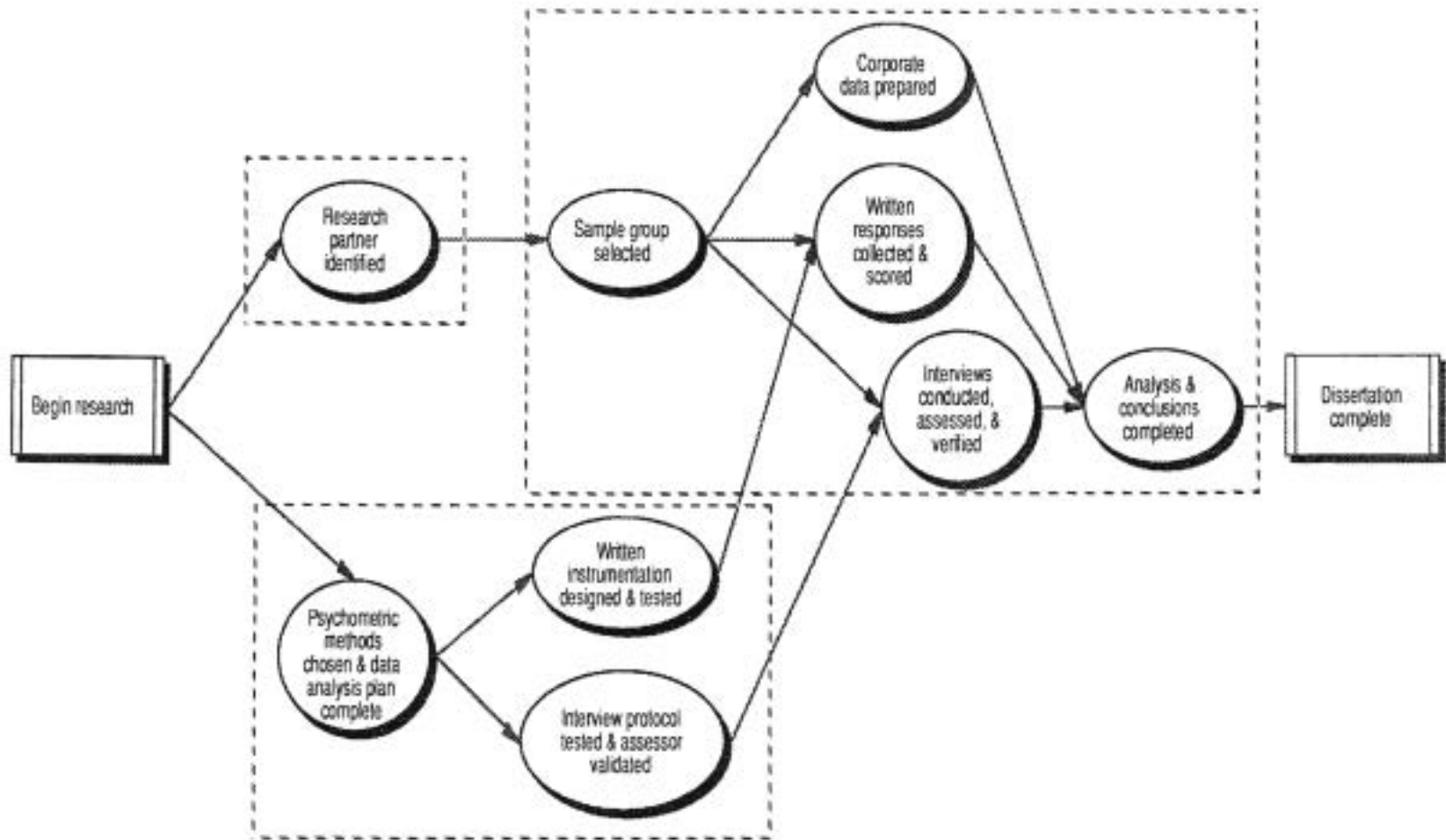


Figure I-2. Flow chart of methodology

Justification

There is a critical need for leaders who can bring about effective organizational change. "Something must be done—and soon—to unleash the potential effectiveness of leaders in America" (Nanus, 1989, p. 7). While a systematic understanding of transforming leadership has been accumulated, "there is no organized technology for converting knowledge into the attitudes and skills required for effective leader performance" (Olmstead, 1980, p. 88).

A number of researchers have stated that a manager's performance is related to his or her stage of ego development (Drath 1990; Hirsch 1988; Torbert 1987, 1992). Theories built around the concepts of complexity of mental processing and role complexity have also been shown effective in matching individual capabilities to role requirements (Ross, 1992; Rush, 1987). However, little work has been found which examines, in a comparative fashion, the core assumptions of the two schools of thought. It is clear that stage of ego development and complexity of mental processing are related to leadership performance. However, further understanding is needed concerning the contribution made by these two characteristics to success at transforming organizations.

The findings of this study could: 1) improve the organization's ability to match managers to role assignments, 2) identify those managers within a group who would be more likely to succeed in leading transformation within an existing organization, and 3) effect major changes in the popular approaches to leadership development, leadership training, and succession planning.

Limits of the study

This study will not address processes that may facilitate ego development or accelerate increases in the complexity of mental processes.

Assumptions

1. That the research model can provide the necessary data to assess the impact of stage of ego development and the role of complexity of mental processing in a managers ability to bring about organizational transformation.

2. That the process of implementing cultural change, such as the change required to achieve significant results through total quality management, re-engineering or the like, will provide a suitable medium in which to study the research problem.

3. That the form of leadership required to successfully implement cultural change is described by Burns' (1978) transforming leadership model.

Definitions

Jaques (1989; Jaques & Clement, 1991; Jaques & Cason 1994) has sought to provide a set of organizational related definitions that are both internally consistent and precise. For this reason, Jaques' definitions have been chosen when available. In any case, the citation for each definition has been identified except when the source is this author.

- Complexity:** "determined by the number of factors, the rate of change of those factors, and the ease of identification of the factors in a situation" (Jaques & Cason, 1994, glossary). In the context of this study, the factors referred to are those that must be considered when performing work in an organization.
- Complexity of mental processing:** Four specific forms of mental processes that have been observed in persons as they deal with the complexity associate with doing work. Jaques' has identified the four as Declarative, Cumulative, Serial, and Parallel (Jaques & Cason, 1994). (Chapter III provides a discussion of the forms).
- Orders of information complexity:** Four orders of increasing complexity of information — Concrete, Symbolic, Abstract Conceptual, Universal (Jaques, 1989, Jaques & Clement 1991, Jaques & Cason, 1994) (Chapter III provides a discussion of the four orders).
- Ego development stage:** a stage of ego development "characterized by a more or less coherent structure of thought, feelings, and perceptions" (Loevinger, 1979, p. 282).
- Exemplary manager:** A manager who is recognized by key insiders as being significantly above his or her peers in success at bringing about cultural change within the portion of the organization reporting to him or her.
- Meaning-making:** The very essence of a human organism is "the activity of meaning-making. There is thus no feeling, no experience, no thought, no perception, independent of a meaning-making context in which it *becomes* a feeling, an experience, a thought, a perception, because we *are* the meaning-making context" (Kegan, 1980, p. 11). Stated another way, meaning-making refers to the mental processes that a person uses in interpreting feelings, thoughts, experiences and the like, to determine what they will "mean" to that person.
- Organizational culture:** "the social glue that binds members of the organization together through shared values, symbolic devices, and social ideals. An organization may be strong or weak, depending on variables such as cohesiveness, value consensus, and individual commitment to collective goals. . . . The nature of the culture's values is more important than its strength" (Kreitner & Kinicki, 1992, p. 706).
- Organizational culture change:** A change in the fundamental value system and processes of an organization which results in a significant improvement in the organization's ability to accomplish its objectives. (In the context of this research, "culture change" refers to a change of the type characterized by effectively implementing Total Quality Management.)
- Performance:** For the purpose of this study, performance refers to a manager's ability to bring about a significant and effective cultural change.

Relative mental process: The difference between a person's complexity of mental processes and the complexity of that person's role.

Role: "The position occupied in the organization" (Jaques, 1989, p. 15).

Role complexity: The maximum complexity that an incumbent manager must deal with in order to successfully carry out a given role.

Stratum: "An organizational layer in an accountability hierarchy : the work is characterized by a given level of complexity" (Jaques, 1989, glossary).

Task: "An assignment to produce specified output (including quantity and quality) within a targeted completion time, with allocated resources and within specified limits (policies, procedures, etc.)" (Jaques, 1989, p. 15).

Task-complexity: "The complexity of the information which has to be handled in carrying out a task within a particular technology" (Jaques, 1989, glossary).

Time-span: The maximum amount of time that a person has been allotted to complete a task or series of tasks (Jaques, 1964).

Work: "The use of discretion and judgment in making decisions, in carrying out a task, backed by knowledge, skills, temperament, and wisdom, and driven by values" (Jaques, 1989, p. 15).

Chapter summary

A few managers can transform their organizations through positive cultural change, while most of their peers demonstrate lesser results. What enables these transforming leaders to deliver results beyond those achievable by their peers? This study looks at the influence on transforming leadership played by the way that managers interpret information.

The behavioral school of leadership (Kreitner & Kinicki, 1992) expounds that effective leadership is ultimately the result of effective leadership behavior (Boyatzis, 1982; Forum Corporation, 1990; Kouzes & Posner, 1987). However, it is the leader's way of interpreting the meaning of information that greatly influences his or her ability to behave effectively (Drath, 1990; Torbert, 1991). Waitley tells us that "individuals behave, not in accordance with reality, but in accordance with their perception of reality" (1979, p. 130). It is the way a person interprets information that largely determines his or her perception of reality—and therefore, his or her behavior as a leader.

Two constructs will be used to examine the process of interpreting information: stage of ego development and complexity of mental processing. The study seeks to better understand the relationship between these constructs and transforming leadership. It also seeks to identify the differences in effect on leadership related to each of the two constructs.

CHAPTER II

REVIEW OF THE LITERATURE

A theoretical framework is needed to examine the influence of stage of ego development and complexity of mental processing on a leader's ability to transform his or her organization. This chapter builds that framework. First is a review of the concepts of transformational leadership. This is followed by a discussion of the choice of stage of ego development and complexity of mental processing as the independent variables. The idea of "meaning-making" is then introduced. Stage of ego development and complexity of mental processing are reviewed in depth, and then combined and contrasted. Finally, the prior research relating meaning-making to managerial leadership is presented. Research Question 2, introduced in the preceding chapter, then serves as an outline for summarizing the chapter.

Leaders who transform organizations

Current literature has much to say regarding leadership and organizational change. Burns (1978) writes of two forms of leadership, transactional and transformational. He affirms that the core difference between transactional and transformational leadership derives from the nature of the goals. He states that "Leaders can . . . shape and alter and elevate the motives and values and goals of followers through their vital *teaching* role of leadership. This is *transforming* leadership" (p. 425). Where transactional leadership brings people together for the satisfaction of their independently held goals, transforming leadership seeks the establishment and attainment of mutually held goals. With Burns' definitions, "The nature of the goals is critical" (p. 425).

Success in bringing about the type of change of interest in this study requires a transformation of the values system of the organization. Changes associated with achieving high employee involvement (Lawler, 1986), or executing process re-engineering (Hammer, 1990), or creating a continuous learning organization (Garvin, 1993), or implementing Total Quality Management would be representative of transformational change. For example, in implementing Total Quality Management (TQM) values are affected in three areas: customer satisfaction, systems thinking, and employee involvement. Tom Peters captured the essence of TQM: "the customer, in spirit and flesh, must pervade the organization—every system in every department, every procedure, every measure, every meeting, every decision" (1987, p. 226). To succeed at implementing TQM, the leader must behave in a manner that will cause the members of the

organization to adopt “mutually held goals” consistent with the TQM value system. Adoption of these TQM values requires a transformation of the system of values for most organizations.

Meaning-making and leadership

The literature on leadership and organizational change is voluminous and spans centuries. Existing schools of leadership have focused on “what leadership is” and have largely ignored the issue of how to facilitate the development of leaders. Olmstead (1980), in a study sponsored by the Office of Naval Research, “Leadership Training: The State of the Art,” captured the situation:

. . . few have focused directly on the issues involved in leadership training, and certainly, none have provided guidance to trainers. Under these conditions, the individual required to design a program intended to develop leaders is forced to resort to tradition, hunch, and, perhaps, a few educated guesses. (p. 5).

Since Olmstead’s report in 1980 a number of well grounded models have come forth—all describing leadership behavior. Some examples are:

- The Competent Manager (Boyatzis, 1982)
- The Leadership Practices Inventory (Kouzes & Posner, 1987)
- The Form Corporation Leadership model (1990)
- Campbell Skills Survey (Clark & Clark, 1990)
- Benchmarks (Lombardo & McCauley @ The Center for Creative Leadership, Greensboro, NC)
- Skillscope (Kaplan @ The Center for Creative Leadership, Greensboro, NC)
- Cognitive and temperament predictors of executive ability: Principles for developing leadership. (Mumford, Zaccaro, Harding, Fleisham, and Reiter-Palmon, (1993). U.S. Army Research Institute Technical Report 977).

(Appendix A, Competency Models, includes listings of the factors in four of the preceding models, and comments on competency modeling in general.)

Yet, with all the excellent trait models there is still a dearth of information on why it is that some leaders can bring about change while others — seemingly equally committed — cannot. If the trait models are valid then the leaders who are unable to bring about the required results, by extension, must also be unable to adopt the effective behaviors. Argyris & Schön (1984) describe these managers who cannot seem to adopt the desired behaviors, as lacking congruence: the manager’s “espoused theory” does not match her or his “theory-in-use” (p. 110). In an operating organization, the people on the shop floor see these managers as the ones who “talk the talk” but who do not “walk the walk” (Rose, 1991).

Drath (1990, p. 483) stated, "I have seen this pattern often: Managers have a sincere commitment to be participative and empower subordinates, yet cannot follow through on their commitment. Why is this so?" Drath then provided a compelling argument. He stated that the very mental process a manager uses to interpret his or her surroundings, the same mental process that facilitated the manager's advancement in the corporate hierarchy through the choice of appropriate behavior, will hinder that manager from adopting behaviors conducive to bringing about the transformational change required to implement empowerment.

Psychologists refer to the study of how people interpret, or "know" things as epistemology. The term deals with how people "make-meaning" of their life and surroundings. In this study we will refer to the functioning of a person's epistemological structures as "meaning-making." A person's meaning-making processes change over time and developmental stage theory provides a framework to study those changes. Drath and Palus (1994) have extended the concept from the individual to the collective by suggesting that leadership be viewed as "meaning-making in a community of practice."

While Burns (1978) introduced the idea of transformational leadership, others have added their support to his conceptualization (Bennis & Nanus, 1985, Peters & Waterman, 1982, and Kouzes & Posner, 1987). In 1990, Joan Bragar, working with the Forum Corporation, developed a behavioral model of leadership. She identified Burns, Zaleznik, and Bennis & Nanus with the school of transforming leadership. Some of the quotes she chose to synthesize their thoughts follow. (As you read these, note the words which have been *italicized*. These words are common topics of developmental stage inquiry):

The transformational leadership theorist mapped out a domain of leadership which focused on the ability of leaders to *transform themselves*, their followers, and their organizations through *mutually* empowering *relationships*.

We must see *power*—and leadership—not as things but as *relationships*.
(quoting Burns, 1978, p. 11)

... leadership must be an *ethical process* between leaders and followers.

Leadership, unlike naked power-wielding, is thus inseparable from followers' *needs and goals*.

[Bennis & Nanus] include a *moral or ethical value* of leadership, saying it can "move followers to *higher degrees of consciousness*, such as *liberty, freedom, justice* and *self-actualization*." (quoting Bennis & Nanus, 1985, p. 218)

They see a leader's primary strength as the *ability to conceive of and communicate* a vision.

Leaders seek out methods of making change,

(p. 14-19)

Burns (1978, p. 425) describes transforming leaders as those who can “shape and alter and elevate the motives and values and goals of followers.” To accomplish that, the transforming leader must move with ease in the realm of the needs and goals of others. The leader must properly assess the interpretation that followers will give to his or her behavior. Transforming leaders behave differently from transactional leaders in a given situation. Torbert (1991) attributes the transforming leader’s difference in behavior to the leader’s ability to “reframe” the situations—where reframing involves seeing the situation from a fresh and different point of view.

Bolman & Deal (1991) explore significant changes in behavior that accompany four specific ways of framing organizations: structural, human resource, political, and symbolic. These four frames are built on the assumptions embodied in four disciplines of study: sociology, social and organizational psychology, political science, and social and cultural anthropology. They contend that people who can view situations from two or more frames avail themselves of a considerably broader range of possible actions than persons who make meaning through a single set of assumptions.

Olmstead (1980) connects the need for a wide range of possible behaviors with the ability to correctly assess the needs of situations:

Regardless of whose leadership theory one embraces or which approach to leadership is most attractive to a trainer, one fact seems to apply universally. This is that, in any formal organization, a leader faces a variety of situations which demand a wide repertoire of behaviors if he is to be successful. Therefore, a leader must be able to assess the needs of constantly shifting situations and adapt his behavior so as to produce desired results. (p. 65)

The leader must ascribe meaning to situations which guide him or her to respond with effective behavior. A manager could conceivably, through training, attain the required “repertoire of behaviors.” Yet, that same manager may be ineffective at assessing meaning, which results in the choice of inappropriate behavior, and from that, ineffective leadership.

The Forum Corporation model captures the meaning-making idea in the leadership category they entitled “Interpreting” (1990). Interpreting is described as the “set of actions [which] helps leaders interpret the conditions, internal and external to their organization, that affect them and their work group” (p. 10). As with other behavioral school models, this model tells what behaviors a leader might use to interpret his or her surroundings. But, this model does not explain why one leader might be able to interpret effectively while another interprets ineffectively. The why is related to the meaning-making processes of specific individuals.

Meaning-making processes

The theoretical framework that will be used to examine the "meaning-making" of leaders has two facets: stage of ego development and complexity of mental processing. Both facets are developmental stage theories which stem from the work of Jean Piaget (Kohlberg, 1984, ch. 3). Figure II-1. Developmental stage theory: Roots related to managerial leadership, provides a schematic view of the relationships among the various sources that are included in this review.

Kohlberg's (1984, ch. 3) distinction between "content" and "structure," is a useful place to begin. In the realm of thought, content is straight forward. It is the content, or subject matter, that is the object being processed by the mental activities. Structure, on the other hand, refers to the framework and workings of the mental processes themselves, independent of the content being processed. For example, the same structure could be suitable for comparing an apple with an orange, a car with a truck, a man with a child, or anger with love. The same mental process, or structure can be used for a variety of tasks, operating on varying content. With this distinction made we will now look at several aspects of Piaget's work.

Piaget and cognitive development

Piaget was a biologist turned psychologist. He brought the systems oriented viewpoint of the biologist to the field of psychology. Piaget laid the ground work for a systematic and structured approach to stage development (Ginsburg & Opper, 1969). Working with children he observed that their mental processes developed from the manipulation of concrete objects to the construing of abstract ideas. He found that "the thought of younger children was *qualitatively different* from that of older ones" (p. 3). This caused him to reject the idea that intelligence was a quantitative issue (increasing in increments as a quantity of the same substance would increase). Once he decided that an increase in intelligence was a qualitative rather than a quantitative issue, he sought "to discover the different methods of thinking used by children of various ages" (p. 3). By 1930 he had "become convinced that it was necessary to conceive of intellectual development in terms of an evolution through qualitatively different stages of thought" (p. 6).

Piaget's work centered on changes in childhood, later findings show that changes in mental processes continue into adulthood (Loevinger & Wessler, 1970; Kohlberg, 1984; Kegan, 1980). The following reflects Piaget's ideas on the character of intelligence, against the same ideas restated in an adult, managerial context.

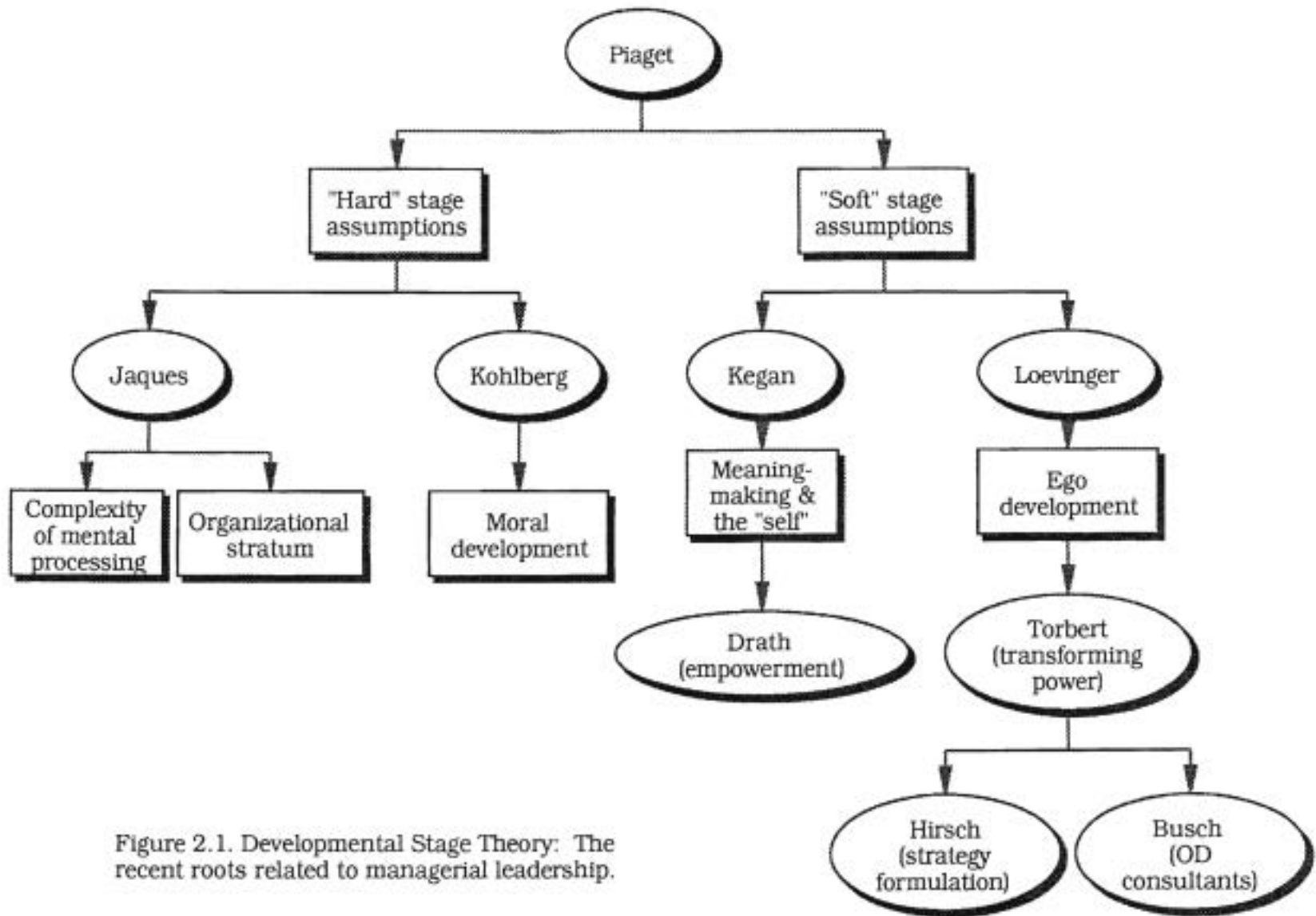


Figure 2.1. Developmental Stage Theory: The recent roots related to managerial leadership.

Piaget's ideas on intelligence (Ginsburg & Opper, 1969, p. 14)

Piaget's ideas restated in an adult, management context

... intelligence is one kind of biological achievement which allows the individual to interact effectively with the environment at a psychological level.

- As a manager grows in intelligence, he or she becomes more effective psychologically in interacting with the organizational environment.

... intelligence "is the form of equilibrium toward which all the [cognitive] structures ... tend" equilibrium ... implies a balance, a harmonious adjustment between at least two factors; in this case between the person's mental actions (the cognitive structures) and his environment.

- Managerial intelligence deals with the growth of harmony between a manager's thought processes and the demands of the environment within the organization.

Although the environment may disturb the equilibrium, the individual can perform mental actions to restore the balance. The definition also states that equilibrium is not immediately achieved: the cognitive structures only gradually "tend" toward equilibrium. It is of special interest to the biologist to study this evolution and the dynamic processes underlying it.

- As business conditions change and disturb the manager's stability, he or she can take mental actions to restore that stability. However, time is required for the manager to readjust his or her thought processes after a change in the business environment occurs: it is the study of the evolution and the dynamics of that re-adjustment that is of interest.

Piaget's primary goal, then could be defined as the study of children's gradual attainment of increasingly effective intellectual structures.

- Of particular interest is the study of manager's gradual attainment of increasingly effective intellectual structures.

... intelligence is "a system of living and acting operations." ... knowledge is not given to a passive observer; rather, knowledge of reality must be discovered and constructed by the activity of the child.

- Managers will not grow in practical knowledge if they approach their job passively: to learn on the job they must act, and through that action discover the reality of their organizational environment.

The preceding statements, using Piaget's model for intelligence, express how a manager might develop his or her effectiveness to function within the changing organizational environment. Piaget (Ginsburg & Opper, 1969) argues that real learning occurs when a person develops new structures of mental operations. Without the development of these new structures the person is limited to acquiring over time "new responses restricted to a specific situation" (p. 175). This "narrow learning" leaves the person without understanding why a solution works, and unable to generalize novel situations to discover their underlying principles. Piaget's explanation could be applied to the manager who learns an effective response to one situation, but does not gain the deeper learning that allows application of the principal in a different situation.

Piaget focused on structure while studying a range of content areas. He published three volumes on epistemology which covered such content areas as mathematics, physics, psychology, and logic (Ginsburg & Opper, 1969, p. 10). He provided four general guidelines for identifying cognitive stages. Note that each of these guidelines focus on structure rather than content.

General guidelines for identifying Piagetian cognitive stages

1. Stages imply a distinction or qualitative difference in structures (modes of thinking) that still serve the same basic function (for example, intelligence) at various points in development.
2. These different structures form an invariant sequence, order, or succession in individual development. While cultural factors may speed up, slow down, or stop development, they do not change its sequence.
3. Each of these different and sequential modes of thought forms a "structural whole." A given stage response on a task does not just represent a specific response determined by knowledge and familiarity with that task or tasks similar to it; rather, it represents an underlying thought organization. The implication is that various aspects of stage structures should appear as a consistent cluster of responses in development.
4. Stages are hierarchical integrations. As noted, stages form an order of increasingly differentiated and integrated structures to fulfill a common function. Accordingly, higher stages displace (or, rather, integrate) the structures found at lower stages.

(Kohlberg, 1984, p. 238)

These four principles can be used to distinguish between two types of stage theories.

"Hard" and "soft" stage theories

Kohlberg provides an extensive discussion of the topic (1984, ch. 3). Hard stage theories apply rigorously Piaget's four guidelines for identifying cognitive stages. Hard stage theories focus on the structure of the cognitive processes. Kohlberg's work on "moral" development follows the hard stage approach. In analyzing a person's response to an ethical dilemma, Kohlberg was concerned with the structure of the response rather than the specific choices that were made. For example, did the person choose to act in accordance with a moral principle or an organizational rule? The person whose structure gave them the ability to recognize a conflict between a moral principle and an organizational rule is at a higher stage of moral development than the person who sees the dilemma only in terms of organizational rules. The content, consisting of the specific rules and principles that the person considered, is not taken into account in determining the stage of moral development. The relevant thing is the structure that is used to evaluate, weigh, and balance the content.

By using this structural approach, Kohlberg argues that the stage determinations will be free of cultural bias. Edwards (1985) reviewed studies from 22 nations representing The Americas, Asia, Africa, Europe, and New Zealand, and found that most supported Kohlberg's assertion.

Kohlberg's theory of moral development

Kegan believes that "Lawrence Kohlberg's study of the development of moral reasoning has represented the single most significant extension of the Piagetian framework" (1980, p. 50). Kohlberg has identified six stages of moral development and grouped them in three categories: preconventional, conventional, and postconventional or principled (1984, p. 174-176). In describing each stage he examines what a person believes to be the "right thing to do" and the reasoning behind that determination. Given what a person believes to be right along with their reasoning, Kohlberg identifies that person's "social perspective."

At the lowest stage of moral development a person sees the "right" thing to do is to avoid breaking rules that are backed by punishment. This is right because the authority has superior power and the person wants to avoid punishment. This viewpoint leads to an egocentric perspective—"all I can see is my own interest."

At a higher stage of moral development, stage 4 for example—akin to the "achiever" stage that Torbert (1991, p. 43) reported as representing over a third of senior managers and executives—the "right" thing has become "fulfilling the actual duties to which you have agreed." The manager does this to "keep the institution going as a whole, to avoid breakdown in the system." A manager at this stage looks from the perspective of an institution that defines roles and rules—he or she differentiates social relationships from interpersonal agreements. A manager at this stage might describe his or her behavior by saying, "I do what needs to be done for the sake of the organization, even if it involves some tough personnel decisions."

A complete description of Kohlberg's "right," reasons, and social perspective at each stage is given in Table II-1. His basis for classification of moral judgments is given in Table II-2.

Ego development

Ego or self development vs. Kohlberg's moral development

Kohlberg (1984, p. 236-249) makes a distinction between his focus on moral reasoning and that of a number of others who are examining a more "totalistic" meaning-making which includes self-reflection. The thinking of two of those others, Kegan (1982) and Loevinger & Wessler (1970), is relevant to this study and will be reviewed later.

Kohlberg, in commenting on these more totalistic views states:

An ethical philosophy is more than a structure of moral reasoning defined by justice and conflict resolution. It also includes a conception of human nature, of society, and of the nature of ultimate reality. Classics such as Aristotle's *Ethics* or Spinoza's *Ethics* represent total world views within which moral reasoning is embedded. (p. 237)

It is at this point that the difference between hard and soft stage concepts becomes relevant. Kohlberg (1984) believes that those seeking to examine a more totalistic meaning-making find it necessary to mix structure and content in their analysis—a violation of the Piagetian guidelines for identifying cognitive stages.

Kohlberg (1984, p. 241-243) describes Loevinger's approach as conforming closely to the Piagetian guidelines, except regarding the issue of content over structure.

... it is only the formal organization of reasoning operations that defines a structure. . . .

In contrast, Loevinger's scheme considers structure less as a form of thinking and more in terms of fairly stable personality functions and contents. . . . Structure in Loevinger's terms is a hypothetical, underlying entity of personality, like that entity defined by the psychoanalytic concept of the ego. Because structure is an underlying hypothetical construct, it can never be directly observed. . . . Loevinger's actual assessment measure is based on categories of content, or mixtures of content and structure, as probabilistic signs of an underlying structure. (p. 242)

In responding to Kohlberg, Loevinger (1985a) states that "Kohlberg's conception of the moralization of judgment has been hedged about almost from the beginning by the larger issue of maturation of personality generally" (p. 183). Further, "Kohlberg's model assumes a formal and rigid structure appropriate, if anywhere, only to a narrowly conceived concept" (p. 183).

Based on Kohlberg's and Loevinger's arguments, a structured approach has the advantage of precision, while a softer approach can look at the more general case of personality development. Because both strengths are desirable, this study will apply Loevinger's soft model for measuring personality (ego) development (the first independent variable), and a hard, structural model, developed by Elliott Jaques (Jaques & Cason 1994), for measuring complexity of mental processing (the second independent variable).

Table II-1. Kohlberg's six moral stages (1984, p. 174-176)

Level and Stage	What Is Right	Reasons for Doing Right	Social Perspective of Stage
Level I: Preconventional Stage 1—Heteronomous Morality	To avoid breaking rules backed by punishment, obedience for its own sake, and avoiding physical damage to persons and property.	Avoidance of punishment, and the superior power of authorities.	<i>Egocentric point of view.</i> Doesn't consider the interests of others or recognize that they differ from the actor's; doesn't relate two points of view. Actions are considered physically rather than in terms of psychological interests of others. Confusion of authority's perspective with one's own.
Stage 2—Individualism, Instrumental Purpose, and Exchange	Following rules only when it is someone's immediate interest; acting to meet one's own interests and needs and letting others do the same. Right is also what's fair, what's an equal exchange, a deal, an agreement.	To serve one's own needs or interests in a world where you have to recognize that other people have their interests, too.	<i>Concrete individualistic perspective.</i> Aware that everybody has his own interest to pursue and there conflict, so that right is relative (in the concrete individualistic sense).
Level II: Conventional Stage 3—Mutual Interpersonal Expectations, Relationships, and Interpersonal Conformity	Living up to what is expected by people close to you or what people generally expect of people in your role as son, brother, friend, etc. "Being good" is important and means having good motives, showing concern about others. It also means keeping mutual relationships, such as trust, loyalty, respect, and gratitude.	The need to be a good person in your own eyes and those of others. Your caring for others. Belief in the Golden Rule. Desire to maintain rules and authority which support stereotypical good behavior.	<i>Perspective of the individual in relationships with other individuals.</i> Aware of shared feelings, agreements, and expectations which take primacy over individual interests. Relates points of view through the concrete Golden Rule, putting yourself in the other person's shoes. Does not yet consider generalized system perspective.
Stage 4—Social System and Conscience	Fulfilling the actual duties to which you have agreed. Laws are to be upheld except in extreme cases where they conflict with other fixed social duties. Right is also contributing to society, the group, or institution.	To keep the institution going as a whole, to avoid the breakdown in the system "if everyone did it," or the imperative of conscience to meet one's defined obligations. (Easily confused with Stage 3 belief in rules and authority; see text.)	<i>Differentiates social point of view from interpersonal agreement or motives.</i> Takes the point of view of the system that defines rules and roles. Considers individual relations in terms of place in the system.
Level III: Postconventional, or Principled Stage 5—Social Contract or Utility and Individual Rights	Being aware that people hold a variety of values and opinions, that most values and rules are relative to your group. These relative rules should usually be upheld, however, in the interest of impartiality and because they are the social contract. Some nonrelative values and rights like life and liberty, however, must be upheld in any society and regardless of majority opinion.	A sense of obligation to law because of one's social contract to make and abide by laws for the welfare of all and for the protection of all people's rights. A feeling of contractual commitment, freely entered upon, to family, friendship, trust, and work obligations. Concern that laws and duties be based on rational calculation of overall utility, "the greatest good for the greatest number."	<i>Prior-awareness perspective.</i> Perspective of a rational individual aware of values and rights prior to social attachments and contracts. Integrates perspectives by formal mechanisms of agreement, contract, objective impartiality, and due process. Considers moral and legal points of view; recognizes that they sometimes conflict and finds it difficult to integrate them.
Stage 6—Universal Ethical Principles	Following self-chosen ethical principles. Particular laws or social agreements are usually valid because they rest on such principles. When laws violate these principles, one acts in accordance with the principle. Principles are universal principles of justice: the equality of human rights and respect for the dignity of human beings as individual persons.	The belief as a rational person in the validity of universal moral principles, and a sense of personal commitment to them.	<i>Perspective of a moral point of view from which social arrangements derive.</i> Perspective is that of any rational individual recognizing the nature of morality or the fact that persons are ends in themselves and must be treated as such.

Table II-2. Classification of moral judgments (Kohlberg, 1984, p. 44)

<i>Levels</i>	<i>Basis of Moral Judgment</i>	<i>Stages of Development</i>
I	Moral value resides in external, quasiphysical happenings, in bad acts, or in quasiphysical needs rather than in persons and standards.	<p>State 1: Obedience and punishment orientation. Egocentric deference to superior power or prestige, or a trouble-avoiding set. Objective responsibility.</p> <p>Stage 2: Naively egoistic orientation. Right action is that instrumentally satisfying the self's needs and occasionally others'. Awareness of relativism of value to each actor's needs and perspective. Naive egalitarianism and orientation to exchange and reciprocity.</p>
II	Moral value resides in performing good or right roles, in maintaining the conventional order and the expectancies of others.	<p>Stage 3: Good-boy orientation. Orientation to approval and to pleasing and helping others. Conformity to stereotypical images of majority or natural role behavior, and judgment by intentions.</p> <p>Stage 4: Authority and social-order maintaining orientation. Orientation to "doing duty" and to showing respect for authority and maintaining the given social order for its own sake. Regard for earned expectations of others.</p>
III	Moral value resides in conformity by the self to shared or sharable standards, rights, or duties.	<p>Stage 5: Contractual legalistic orientation. Recognition of an arbitrary element or starting point in rules or expectations for the sake of agreement. Duty defined in terms of contract, general avoidance of violation of the will or rights of others, and majority will and welfare.</p> <p>Stage 6: Conscience or principle orientation. Orientation not only to actually ordained social rules but to principles of choice involving appeal to logical universality and consistency. Orientation to conscience as a directing agent and to mutual respect and trust.</p>

SOURCE: Kohlberg, 1967, p. 171.

Loevinger's theory of ego development

Loevinger & Wessler (1970) differentiate among stages by examining a person's responses to a series of 36 sentence stems. Figure II-2 Loevinger's stage characteristics, provides a synthesis of the characteristics of the various ego stages that she has identified. The stage entitled "conscientious" corresponds to Kohlberg's stage 4, and Torbert's "achiever" stage that were referred to earlier as being common among managers. Her more totalistic view of meaning-making enriches Kohlberg's description. Kohlberg would say that the "conscientious" manager can separate moral issues from rule issues. Loevinger would add that the manager: values achievement, is capable of perceiving multiple possibilities, tends to be reflective, and is able to vividly describe individual differences (from Figure II-2.).

The stage evaluation process itself is somewhat complex. Loevinger (Loevinger & Wessler, 1970) provides 700+ pages of instruction for the scoring of "The Sentence Completion Test" (SCT) which she developed to assess stage of ego development. In spite of the complexity, this test has been widely used. The SCT appears to be the only well established, validated, pencil and paper test for the measurement of ego development (Loevinger, 1979). A copy of the version of the test used appears as Appendix B.

Stage transitions

Up to now we have spoken of stages, their identification and the characteristics of two theories of stage development. Stages can be thought of as positions of equilibrium, or perhaps as places of rest between changes (Perry, 1981). A person at a given stage finds that their view of the world allows them to function effectively within the world as they see it. In effect, a person can be considered well adjusted at any particular stage (Loevinger & Wessler, 1970). When a person begins to encounter issues that are not satisfactorily dealt with using their present perspective, they are faced with changing their perspective, or ignoring the dilemma (Kegan, 1982; Kohlberg, 1984, Loevinger & Wessler, 1970; Perry, 1981). If they choose to address the dilemma they will enter into a transition.

Figure II-2 Loewinger's stage characteristics

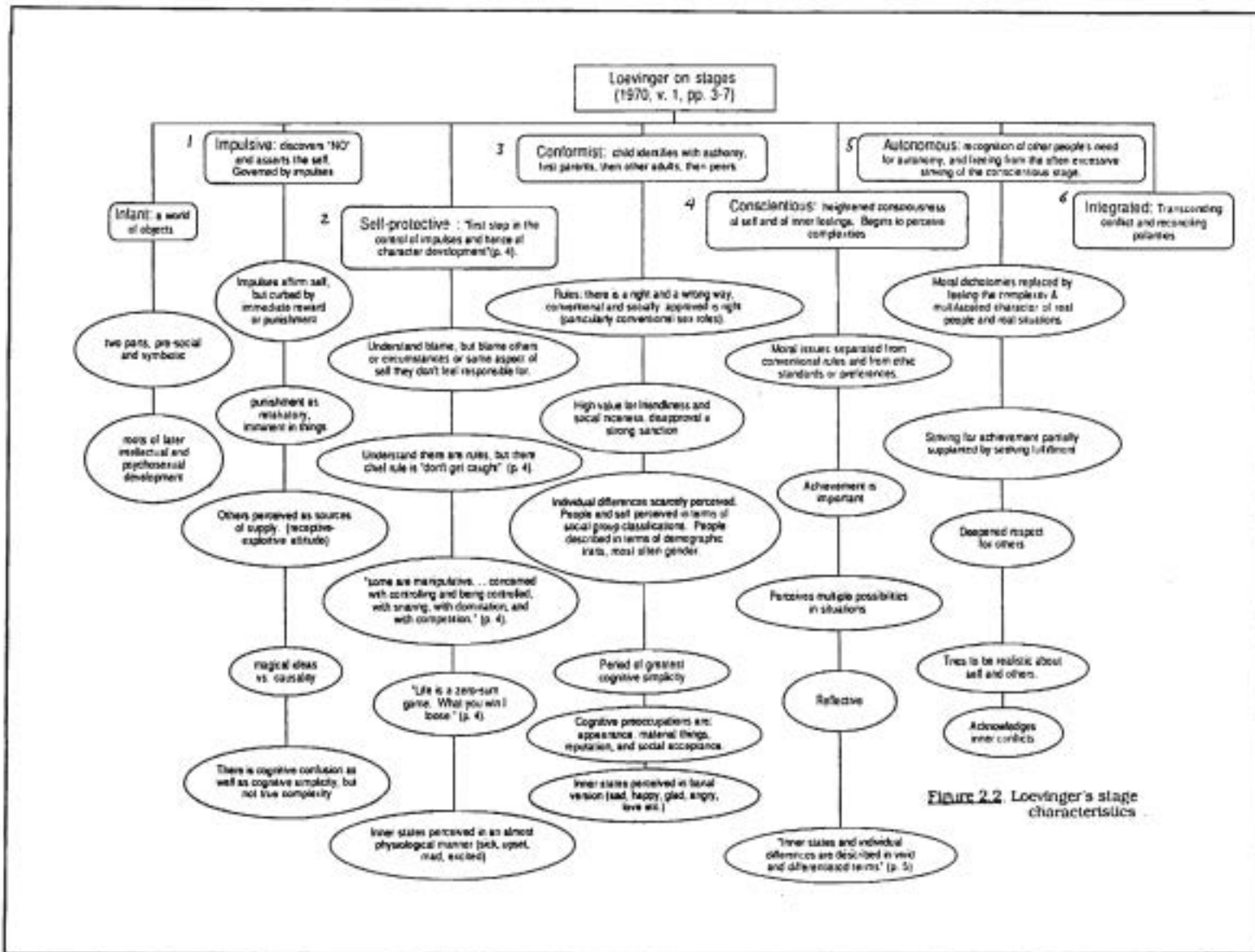


Figure 2.2 Loewinger's stage characteristics

Transitions from one world view to a new world view, or from stage to stage, tend to span several years, and are marked with considerable discomfort on the part of the person experiencing the change. Perry (1981) describes some of the emotions that can accompany stage transitions:

in the process of growth. . . Each of the upheavals of cognitive growth threatens the balance between vitality and depression, hope and despair. It may be a great joy to discover a new and more complex way of thinking and seeing; but yesterday one thought in simpler ways, and hope and aspiration were embedded in those ways. Now that those ways are to be left behind, must hope be abandoned too? (p. 108).

Transitions are not a lot of fun! Yet, developmental growth requires transition. For that reason it is relevant to look at the work of Robert Kegan (1982) who has developed a theory which rationalizes the evolution from stage to stage.

Kegan and the evolution of the self

Kegan (1982) conceives of a person's personality development as resulting from the balancing of tension between two poles: the desire for independence and the desire for inclusion. He is particularly interested in the tensions that occur leading to and during the transitions between the stages.

For illustration let us return to the previously discussed manager who is at Kohlberg's stage 4 (Loevinger's conscientious, Torbert's achiever). Kegan calls this stage institutional. Not because the person sees from the institution's point of view, but because the person sees himself or herself as an institution. Institutions run by rules: they make treaties and agreements with other institutions; they are self-sustaining entities within a world of other self-sustaining entities. The institutional person does the same.

Kegan states that "the strength of the institutional balance is its autonomy" (p. 223). The institutional person has found a stable place near the pole defined by the desire for independence. It is this very view of the world that allows the institutional manager to make the statement cited earlier: "I do what needs to be done for the sake of the organization, even if it involves some tough personnel decisions." The institutional manager can take this position because relationships are akin to agreements between institutions, they can be changed when business conditions warrant, just as nations can dissolve treaties as they desire—even unilaterally.

The interindividual stage is Kegan's next developmental step—it deals with issues of mutuality and interdependence. When the institutional manager, who values autonomy and control, is faced by the issues of mutuality brought about by talk of empowerment, or strategic alliances, it can be a fear inducing experience (Kegan 1982, p. 223). To examine Kegan's thoughts on the transition from the institutional stage to the

interindividual stage it is necessary to introduce three additional terms, those of: subject, object, and embeddedness.

Subject, object, and embeddedness

To develop his model, Kegan (1982) changes the terms mentioned earlier, structure and content, to subject and object. He does this because of a third concept called embeddedness. Simply put, embeddedness refers to the idea that we cannot perceive that in which we are embedded. For purpose of illustration, suppose a tadpole does not perceive water until it is removed from the water.

A person is embedded in the particular structure they use for interpreting their environment. The institutional manager is embedded in concerns of "personal autonomy" and "self-system identity" (p. 191). Kegan would refer to these items as "subject."

"Object" refers to things that the "subject" can examine. Back to the tadpole. In the water, the tadpole can examine a pebble on the bottom. The weight of the pebble (object) is perceived in terms of its presence in the water (subject). When the tadpole develops to a frog the water changes from subject to object. The pebble can now be examined from a different structure (subject = out of the water). The perception of the pebble changes in a number of ways: heavier with buoyancy removed, possibly more clearly defined than if the water were cloudy etc. The tadpole can now examine the water (object) and see what influence the water had on its prior perceptions of the pebble. In Kegan's terms the water, which was "subject," has now become "object." The water has been "objectified" by the tadpole.

Let us return to the institutional manager for another illustration. For a person at the institutional stage, the self is inseparable from performance of commitments. Performance can not be viewed impersonally and studied as an "object." Performance of agreed upon commitments is the self—it is "subject." Criticism which challenges performance is seen as feedback which attacks the person's self. It is likely to produce self-anger, self-shame, and fear, as a reaction. As the person begins to move to the next stage they will begin to "objectify" their performance on agreed-upon commitments. They will begin to examine their performance as an object, separated from—no longer a part of—themselves. As they can objectify performance, they can become more rational in their examination. Criticism can be seen as feedback, and not as a personal attack. More will be said about this when we look at Drath's (1990) comments on the institutional manager.

The complete sequence of the subject object transitions outlined by Kegan appear as Table II-3.

Table II-3. Kegan's subject object transitions (content from 1982, p. 86)

	<i>Stage 0 Incorporative</i>	<i>Stage 1 Impulsive</i>	<i>Stage 2 Imperial</i>
Underlying structure (self vs. other)	S – Reflexes, (sensing, moving) O – None	S – Impulses, perceptions O – Reflexes (sensing, moving)	S – Needs, interests, wishes O – Impulses, perceptions
	<i>Stage 3 Interpersonal</i>	<i>Stage 4 Institutional</i>	<i>Stage 5 Interindividual</i>
	S – The interpersonal, mutuality O – Needs, interests, wishes	S – Authorship, identity, psychic administration, ideology O – The interpersonal, mutuality	S – Interindividuality, interpenetrability of self systems O – Authorship, identity, psychic administration, ideology

Developmental stages as a clusters of values

Brian Hall (1994) provides another insight into developmental stage change by identifying the stages with clusters of values. In effect, developmental growth describes a predictable progression in the evolution of a person's system of values. Stage of development affects the values that are currently foremost in a person's consciousness. Hall provides a list of 125 value definitions that are inclusive of all human values. These are divided into two classes: goals values and means values (p. 45). Goal values "develop at specific points in our lives, and continue from that point." Means values, "are skill-related — values that help us achieve our goal."

The 125 values are then grouped by developmental stage. Table II-4. provides a listing of the goal values associated with the two stages focused on by this study. Note that an individual, at any given time, is dealing with perhaps a dozen of the total set of 125. The values currently of importance to that person may also be drawn from a number of different stages.

Hall's insight adds another significant finding. The means values identify skills that are needed to meet the goals values at any specific stage. For example, a manager at stage four may begin to develop the goals value "construction/new order." The formal definition is:

Construction/new order. The ability to develop and initiate a new institution for the purpose of creatively enhancing society. This assumes technological, interpersonal, and managerial skills. (p. 227)

In seeking to fulfill this new goal value the manager may see "collaboration" as the means value of relevance.

Collaboration. The ability of an organizational leader to cooperate interdependently with all levels of management to ensure full and appropriate delegation of responsibility. (P. 226)

Collaboration is a skill that can be developed through training, on-the-job assignments, and mentoring.

Table II-4. Hall's values associated with two stages (1994, p. 176)

<p>Stage names Hall-Vocation Kegan - Institutional Loevinger - Conscientious Torbert- Achiever This study - 4</p>	<p>Stage names Hall-New Order Kegan-Interindividual Loevinger-Autonomous Torbert-Magician This study - 5</p>
<p>Goal values equality/liberation integration/wholeness self-actualization service/vocation</p>	<p>Goals values art/beauty being self construction/new order contemplation faith/risk/vision human dignity justice/social order knowledge/insight presence ritual/communications</p>

Hall's work extends further, moving beyond the individual to the organization. He has devised a process of values analysis that provides a profile of the distribution of

development within a company. In addition an organization's documents can be "scanned" to determine the values that are being communicated through the documentation.

Complexity of mental processing

Jaques and the concept of complexity of mental processing

Jaques provides a hard stage theory of mental development that will be used as a contrast to Loevinger's soft stage theory. The first step in exploring Jaques' concept of mental processing is to examine his description of "work." Work is, "The exercise of judgment and discretion in making decisions in carrying out goal directed activities [or tasks]" (Jaques & Cason, 1994, p. 153). (Note that this definition does not include as work "the traversing of known paths. . . . work is to choose pathways or construct new ones, and to adapt them as you encounter unanticipated difficulties in traversing them." By Jaques' definition "Obeying known rules and regulations is not work. . ." (1989, p. 23)) The effort that we experience as "work" is associated with the mental processes that we used to weigh alternative courses of action and to choose the direction to take—it is the effort involved in exercising discretion. Jaques & Clement (1991) continue by saying that the level of work associated with a given role—the perceived size of the job, the weight of the responsibility—are all functions of the complexity that must be dealt with in exercising judgment to make the required decisions.

Let us look at an example. This construct would argue that the level of work required of a professor to prepare a mid-term exam would be less than the level of work required to plan a semester course. Both of these tasks would represent lower levels of work than say, changing the core curriculum for the College of Education. For a person in a role accountable for all three tasks, the level of work for the role would be determined by the task requiring the highest level of work. Recall that work is defined in terms of the exercise of discretion in carrying out a task. Developing the mid-term would clearly involve less discretion than designing the whole semester's program. Changing the college curriculum would involve the exercise of greater discretion than either preparing a mid-term or designing a semester program.

Each role within an organization has a number of associated responsibilities or tasks; each task requires a different level of discretion to accomplish. The incumbent in each role must exercise discretion to solve the problems encountered during the fulfillment of the role. The work experienced in solving a problem is related to the difficulty of that problem. Jaques (1989) states that "The true source of difficulty in any problem lies in its complexity" (p. 23).

"Complexity may be defined in terms of the number of variables operating in a situation, the clarity and precision with which they can be identified, and their rate of change." (1989, p. 23)

Refer back to our example of the professor. Consider the progression from the development of a mid-term, to the development of a single course, to the development of a full curriculum. The mid-term might be aimed at measuring the level of understanding of—what should be—a well-defined range of content. In designing a course, the issues of content broadens—greater discretion is left to the designer so long as the course fulfills its purpose within a total curriculum. In designing a curriculum fuzzier issues are faced, such as the positioning of the curriculum within the range of curriculum offered by the university as well as by other competing universities. With each step in the preceding progression, the number of variables increases and at the same time the variables become less clearly defined and harder to measure. By Jaques' definition, complexity increases as we progress from the mid-term to the full curriculum.

A model for the mental processing of complexity

Jaques' model is a hard structural model. It is based on two components: the first, complexity of mental processing ; the second, orders of information complexity. Each of the two components has four levels. In combination they form 16 hierarchical mental structures which enable the processing of successively higher levels of complexity.

Description of four types of "complexity mental processing"

An evolution of Jaques' description of these cognitive processes can be seen between his books in 1989 (Jaques), 1991 (Jaques & Clement), and 1994 (Jaques & Cason). The later book provides the following descriptions (pp. 30, 31):

1. *Declarative processing.* A person explains his or her position by bringing forward a number of separate reasons for it. The reasons are separate in the sense that each is brought forward individually, on its own, and no connection is made with any of the other reasons. . .
2. *Cumulative processing.* A person explains his or her position by bringing together a number of different ideas, none of which is sufficient to make the case, but taken together, they do. . .
3. *Serial processing.* A person explains his or her position by constructing a line of thought made up of a sequence of reasons, each one of which leads on to the next, thus creating a chain of linked reasons. . .
4. *Parallel processing.* A person explains his or her position by examining a number of other possible positions as well, each arrived at by means of serial processing (see above). The several lines of thought are held in parallel and can be linked to each other.

Explanation of four "orders of information complexity"

Each day we are exposed to a vast array of data that we must "process" into information. To simplify processing we group things together by using various levels of abstraction: that car, a car, vehicles, motor transport, mass transit system, freedom of movement. "That car" is not abstract at all, it refers to a specific concrete thing that can be touched. Jaques describes this as concrete verbal expression, a specific object to which one can point. From concrete verbal the next step is symbolic verbal. In "a car," the word "car" is used as a symbol— "car" symbolizes A or H or G. If a speaker were to say to a group, "picture a car," most would have a different mental picture. We can go directly (in one step) from the symbol of "a car" to a specific, concrete, car. In the list given earlier, "vehicle" and "motor transport" also represent symbolic verbal information. Within a group of vehicles a single concrete car can be identified. Within the symbol of motor transport, a specific truck can be touched.

However, when we move to a "mass transit system" we lose the direct connection to concrete things—we have moved to abstract conceptual information—we have to go through another order of complexity to get to the concrete.

Mass transit system (abstract conceptual)
 → vehicle (symbolic verbal)
 → that car in the car pool lane (concrete verbal).

There is a higher order of complexity that Jaques refers to as universals. "Freedom of movement" is an example of the universal order of information complexity.

Freedom of movement (universal)
 → mass transit system (abstract conceptual)
 → vehicle (symbolic verbal)
 → that car in the car pool lane.
 (or, better still, my son's low rider
 truck). (Concrete verbal)

In each case, the concrete items are members of sets defined by the higher order abstractions. My son's low rider is certainly his image of freedom of movement. Yet the same "freedom of movement" includes a European Common Market with open borders, or a hitchhiking student going home for spring break.

Here are Jaques and Cason's definitions of the four orders of information complexity based on the level of abstraction of the information.

A. First order information complexity: Concrete verbal (pointing) —
 . . . a world in which ideas and their expression in language are concrete in the sense that they are conducted in relation to specific objects that can be pointed to, (or could be pointed to, if they happened to be at some other place at the time). . . (1994, pp. 32, 33).

B. Second order information complexity: Symbolic verbal —

Concrete things are chunked into verbal information as used in the everyday world of symbolic discourse. We deal with each other in symbolic, verbal terms without having to point to specific examples of concrete things that we may have in mind. This order of information complexity allows us, for example, to discuss our work, and to issue instructions in a manner that makes it possible to run factories, to design new products, to discuss orders with customers, to record data . . . and to carry out all the activities necessary to manage day-to-day work from shop floor (Stratum I) to middle management levels (Stratum IV). (1994, pp. 32, 33).

C. Third order information complexity: Abstract conceptual —

Ordinary second order information is chunked into the more complex conceptual order of information as used in the conceptual world of the corporation by the CEO and EVP.

. . . for example, balance sheet values pull together a wide range of recorded accounting categories and assumptions, which in turn can be translated into specifics of a very large array of concrete items of expenditure, revenue, assets and liabilities. (Jaques & Clement, 1991, p. 55).

D. Forth order information complexity: Universals —

Third order concepts are chunked into the universal ideas and language that are required for handling the problems of whole societies, social movements, ideologies and philosophies (Jaques & Clement, 1991, p. 55).

Jaques has found that with maturation, complexity of mental processing moves sequentially through each process (1. declarative, 2. cumulative, 3. serial, 4. parallel) beginning at the lowest level of abstraction and continuing to successively higher levels. The sequence that applies to the realm of managerial leadership, from greatest complexity to least complexity, is:

Table II-5. Hierarchy of mental processing, from most to least complex

	Second order information complexity	Third order information complexity
Term	Symbolic verbal	Abstract conceptual
C4		Parallel Processing
C3		Serial Processing
C2		Cumulative Processing
C1		Assertive Processing
B4	Parallel Processing	
B3	Serial Processing	
B2	Cumulative Processing	
B1	Assertive Processing	

With each increase, the person is capable of exercising judgment which involves the processing of more complex information. Stated another way the person's "complexity of mental processing " has increased.

Cognitive power. The maximum scale and complexity of the world which an individual is able to pattern and construe, including the amount and complexity of the information that must be processed in doing so. (1989, glossary)

For all but the largest corporate organizations, all business activities can take place within 7 levels of complexity mental processing (B1 through C3).

The maturation of complexity of mental processing

Jaques & Clement (1991) make an important distinction between the "maturation" of cognitive development and the development of other components that contribute to a manager's overall capability.

. . . [complexity of mental processing] . . . unlike the other components of [a manager's] capability, grows by true maturation; that is to say, it grows in a regular and predictable manner toward full maturation in old age. It is this maturation process that makes possible the evaluation of where a person is going in potential capability, and where that person's potential is likely to be in, say, 3, 5, or 10 years' time. (p. 86)

Curves showing the maturation of complexity of mental processing with age are shown in Figure 2-3. Jaques' "Progression Handbook" (1968) describes his early work which led to the identification of those relationships. Rush (1987) reports that "validation of the stratified systems theory has, to date, taken place in almost 30 countries with populations in excess of 250,000 individuals, in manufacturing, religious, educational, and military organizations, among others" (p. 155).

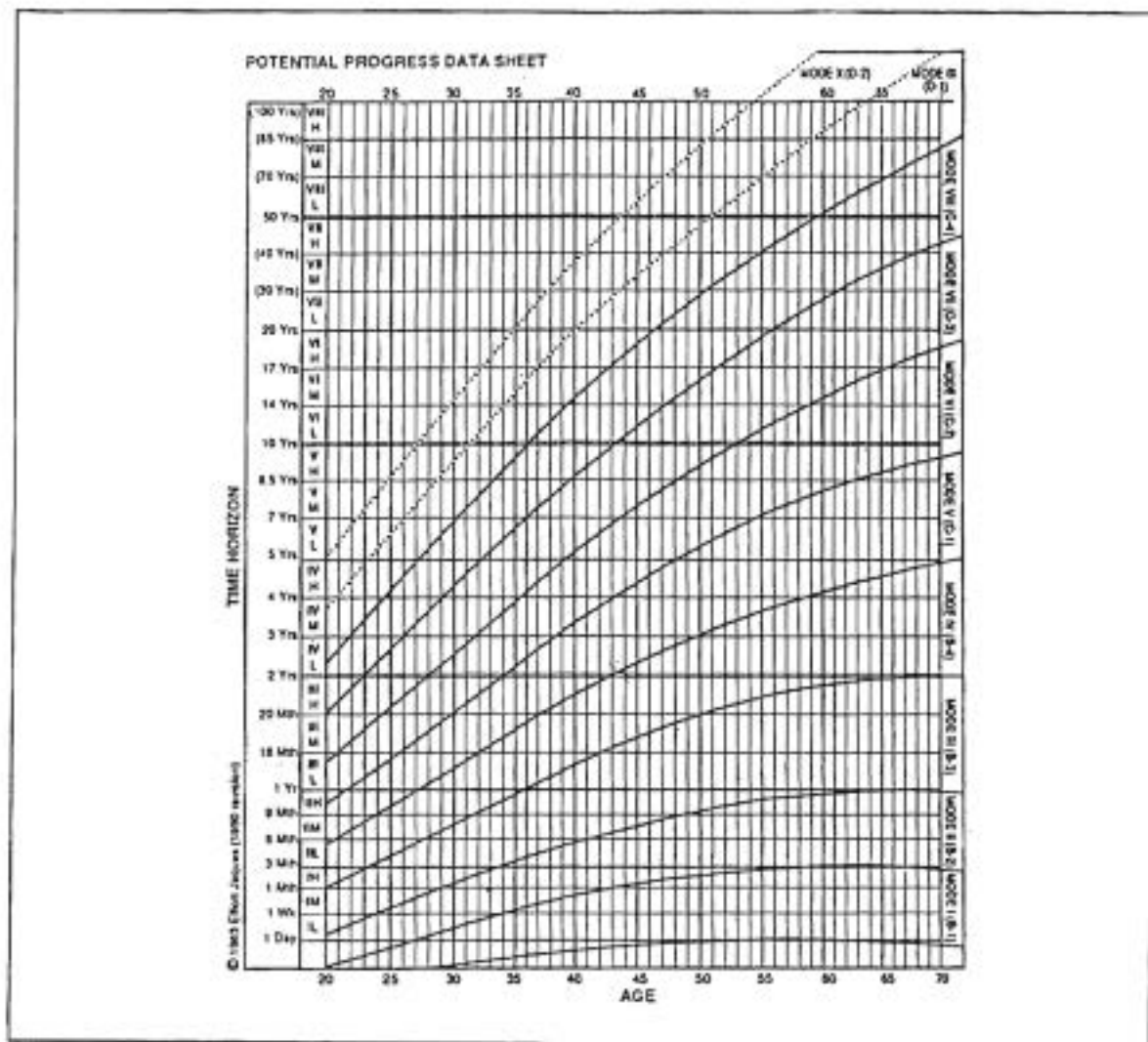


Figure II-3. The maturation of complexity of mental processing (Jaques & Clement, 1991, p. 87)

A summary of meaning-making

A leader, a manager, any person, acts in response to their perception of the world around them. That perception is a product of the data that is received through the senses and the meaning-making process that turns the data into information. Piaget showed that intelligence was related to the structure of mental processes, and that those processes changed in sequential, identifiable stages. Kohlberg demonstrated that structural changes were also associated with moral development, and that the sequence of changes appear independent of cultural influences. Loevinger moved away from the rigid structural approach to provide a more totalistic viewpoint of personality development. She also provides a valid pencil and paper instrument which simplifies the

collection of data. Kegan adds a theory which attributes the impulse to move from stage to succeeding stage as arising from the shifting balance between the desire for independence and the desire for inclusion. Jaques furnishes a hard structural view by proposing that a manager's potential is ultimately limited by his or her mental processes and the maximum complexity that those processes can integrate. Finally, Hall (1994) ties the progression of development to changes in a person's value structure. He also provides a method for mapping both individual and organizational values.

For this study, Loevinger's content oriented model of ego development and Jaques' structural model of complexity of mental processing, will be used to provide two contrasting operational definitions for measuring meaning-making processes. These two models provide the measures needed to examine the effect of a manager's meaning-making processes on leadership performance.

Research relating leadership and meaning-making

The preceding portion of this chapter develops a framework for meaning-making relevant to this study. This next portion reviews what has been learned by applying that framework in the managerial environment.

Ego development

The more totalistic view of meaning-making as developed by Loevinger and Kegan, will be examined first.

The institutional manager and empowerment

Drath (1990) identified the strengths and weaknesses of managers at Kegan's institutional stage of development (Table II-6). He then examined how these characteristics match those that would be needed to foster empowerment within the organization. He made this observation (underlining added):

Enlisting others to one's cause and making that cause a coordinating purpose is the essence of effective leadership in an organization structured and managed by people in the institutional stage of development.

The institutional manager's weakness lie in that person's inability to find a context of meaning for herself or himself and the organization that includes more than just the manager's own identity. Her or his cause and identity are isomorphic [cause and identity have a one-to-one correspondence]. Thus threats to her or his identity are threats to the cause, and vice versa. In the current environment of the institutional organization, these limitations and their related weaknesses are seen as unimportant. (p. 495)

A weakness related to the institutional manager's need to accomplish the cause committed to, is "not delegating well, which is being unable to trust subordinates to do important work for which the manager is responsible and accountable" (p. 493). Drath provided an example of the resulting behavior:

... one high-level manager I worked with recently told me flatly, "I'm a participative manager. I believe in empowering people." Yet this manager's subordinates (who were managers themselves) gave the following descriptions of him: "[He's] insensitive to others." "He's not a good listener to the ideas of subordinates." "He's so focused on what he wants." "He gives direction all the time." (p. 483)

Table II-6. Typical managerial strengths and weaknesses related to the institutional stage of development (Drath, 1990, p. 495)

	<i>Related typical managerial strengths</i>	<i>Related typical managerial weaknesses</i>
<i>Capacity (limit) of the institutional stage</i>		
Ability to take interpersonal relationships as object (difficulty with intimacy)	Forms good working relationships in organizations as now constituted Comfort with instrumental relationships "Head" over "heart" in decision making	Difficulty confronting or resolving conflicts Difficulty with feelings of affection or affiliation Difficulty being aware of or expressing emotion
Internal system of self-regulation; internal self-government (the ultimacy of the self system; no appeal from the demands of self-government)	Adds drive and focus to ambition Willingness to assume large responsibilities Willingness to be held accountable Comfortable managing and working in a hierarchical system of authority and accountability	Difficulty letting up, relaxing, making judgments about drive, ambition Difficulty accepting criticism Difficulty appreciating and accepting others

Another product of the institutional world view "is a marked difficulty in appreciating the ideas and feelings of others" (p. 494), a characteristic which leads to a difficulty in respecting others: particularly those of a different race, culture, or gender. Drath observes that "If work relationships are indeed based on respect, the inability to respect another person should have serious negative consequences for such relationships." (p. 494).

With both of the weaknesses described, the manager—being "subject" to the institutional "structure"—cannot see his or her own incongruent behavior. They can not see that they are talking the talk but not walking the walk.

On development and transforming leadership

Fisher, Merron, & Torbert (1987), site a number of sources that profess that "Organizations, like individuals, are observed to grow through clearly discrete stages of development. Greiner (1972) identifies this developmental sequence as: birth, direction, delegation, coordination, and collaboration" (p. 265).

Table II-7. Distribution of Loevinger stages among various groups

Stage ⁰	Numbers are percents (%)				
	Study 1 ¹	Study 2 ²	Study 3 ³	Study 4 ⁴	Study 5 ⁵
<u>Names</u>	<u>(n=1640)</u>	<u>(n=177)</u>	<u>(n=170)</u>	<u>(n=64)</u>	<u>(n=29)</u>
Impulsive (2)	3.1%	0.0%	0.0%	0.0%	0.0%
transitional	1.5			0.0	0.0
Opportunist (Δ)	3.8	5.0	0.0	0.0	0.0
transitional	3.5			0.0	0.0
Diplomat (3)	32.8	9.0	4.1	3.1	0.0
Technician	24.6	43.5	44.7	35.9	6.9
Achiever (4)	22.8	40.0	37.1	43.7	27.6
sub-total	92.1%	97.5%	85.9%	82.8%	34.5%
Strategist	5.4	2.5	14.1	15.6	37.9
Magician (5)	1.8	0.0	0.0	1.6	24.1
Integrated (6)	0.7				

⁰ Stage names are from Torbert (1991, p. 43, Table 2.1). Numbers in parentheses are Loevinger's shorthand designations, a complete list is given in Appendix C of this dissertation. The indented names are transitional stages.

¹ Diverse Sample. Used by Loevinger & Wessler (1970, v. 2, p. 28) in constructing the test scoring manual.

² Junior & Middle Managers. Torbert (1991, p. 43, Table 2.2, Study 3).

³ Senior Managers and Executives. Torbert (1991, p. 43, Table 2.2) a combination of Study 4 and 5. Note that a correction was made to the table based upon a personal contact with Torbert.

⁴ Engineers and Managers. Bushe (1990) reporting on Bushe (1989), citation not given.

⁵ Certified Organizational Development Consultants. Bushe (1990) reporting on Bushe (1988) citation not given. Total for column is 96.5%, no explanation given.

Torbert argues that each organizational stage tends to reward a managerial style and worldview specific to one of the stages of adult development. He contends managers must undergo developmental change if they are to remain effective in an organization that transforms from one stage of growth to another. Moreover, only managers who have already developed beyond the goal-oriented (Kegan's institutional) stage can successfully lead individual managers and the organization as a whole through developmental change. (Fisher, Merron, & Torbert, 1987, p. 266)

The data available on the distribution of stage levels among various groups of people (Table II-7.) indicate that a relatively low percentage of managers within organizations are at the higher stages of development. Because of this, Fisher, Merron,

& Torbert (1987) suggest that "the linkage between organizational development and human development explains why relatively few organizations reach the highest stages of development" (1987, p. 266).

Torbert's stage descriptions

Torbert (1987b) has provided, in managerial language, descriptions of Loevinger's ego development stages and of the transitions between those stages. In writing them he has also coined his own terms for each of the stages and transitions. Some of the elements of his description of the "Achiever" manager's style (Kegan's institutional stage) include: long-term goals, strives for excellence, future is vivid, seeks causes, blind to own shadow, seeks mutuality in relationships, and experiences guilt if own standards are not met.

The complete set of Torbert's stage descriptions are included in Tables II-8 & II-9. The distribution of stages among 497 managers found by Torbert and Fisher (1992), along with brief characteristics of personal and organizational development, appear as Table II-10.

Table II-8. Torbert's stage descriptions (1987b)

<u>Elements of the opportunistic managerial style (Stage 2):</u>	
Short time horizon	Flaunts power, sexuality
Focuses on concrete things	Rejects feedback
Fragile self-control	Stereotypes
Hostile humor	Rules = loss of freedom
Deceptive	Punishment = eye for eye
Manipulative	Legal = what can get away with
Views luck as central	Right = even trade
Externalizes blame	Distrustful
<u>Elements of the diplomatic managerial style (Stage 3):</u>	
Observes protocol	Speaks in clichés, platitudes
Avoids inner and outer conflict	Feels shame if violates norms
Works to standard	Right = nice, cooperative, follow the rules
Suppresses own desires	Sin = hurting others
Loyalty to in-group	Punishment = disapproval
Seeks membership, status	Saving face essential
Conforms	
<u>Elements of the technician's managerial style (Stage 3/4):</u>	
Interested in problem solving	Wants to stand out, be unique
Perfectionist	Critical of others and self
Longer time horizon	Torn between loyalty to self and group
Seeks causes, motives	Ambivalent about receiving feedback
Values decisions based on merit	Dogmatic
Sense of obligation to wider moral order (not just current in-group norms)	
<u>Elements of the Achiever's managerial style (Stage 4):</u>	
Long-term goals	Results-oriented
Strives for excellence	Welcomes behavioral feedback
Future is vivid, inspiring	Feels like initiator, not pawn
Chooses ethical system	Distinguishes ethics from manners
Appreciates complexity, systems	Works conscientiously
Respects individual differences	Seeks mutuality in relationships
Seeks generalizable reasons for action	Guilt if does not meet own standards
Blind to own shadow, to subjectivity behind objectivity	
<u>Elements of the Strategist's managerial style (Stage 4/5):</u>	
Awareness of paradox and contradiction	Recognizes importance of principle, contract, theory, and judgment—for making good decisions
Process oriented as well as goal oriented	Fascinated by complex interweaving of emotional dependence in relationships
High value on individuality, unique market niches, particular historical moments	Creative conflict resolution
Aware that what one sees depends upon one's world view, relativistic	Aware of dark side, of profundity of evil, and tempted by its power
Enjoys playing a variety of roles	

Table II-9. Torbert's stage descriptions - in application
(Boston college Magazine, Spring 1987)



The stages of management

Just as it analyzes corporate progressions, "Managing the Corporate Dream" also outlines the stages managers reach as they mature in ability and style.

IMPULSIVE

While some sort of impulse motivates every dream, says Bill Torbert, only the most primitive managers act on impulse, and they don't last long. "An impulsive style of management is a contradiction in terms," he notes, which is not to say that certain very successful managers don't seem to act impulsively. Apollo Computer founder Bill Poduska, says Torbert, left MIT to co-found Prime Computer, then left Prime to start Apollo, only to found yet another company later. But, said Torbert, all his moves were calibrated to take advantage of technological breakthroughs.

OPPORTUNIST

The manager at this stage is a manipulator of things and people. Distrustful and secretive, he doesn't look within for the answers and tends to blame others.

Less than 5 percent of managers, Torbert found, are Opportunists. Corporate raider Irwin Jacobs, who "couldn't

successfully manage his own business but made millions buying and selling other companies," might fit this category, he notes.

DIPLOMAT

Some 10 to 15 percent of managers are Diplomats, Torbert found. Family, work or national loyalties determine the Diplomat's world. Diplomats "conform to group norms and protocol, avoid conflict, and suppress their own desires," according to Torbert.

The behavior of Henry Ford II when he sacked Lee Iacocca was typical of the Diplomat. Unwilling to risk a confrontation, he went so far as to pay a consultant \$2 million for a study critical of his second-in-command. The Diplomat's "smoothing-over, conflict-avoiding style can be expensive," says Torbert.

TECHNICIAN

The Technician is "a late adolescent rebelling against all forms of authority other than that of his craft and craft heroes," says Torbert. Technicians are "perfectionists," consumed by the "internal logic of their expertise, obsessed with efficiency at the cost of effectiveness," he added.

He found the greatest proportion of managers, some 50 percent at this stage.

Former Reagan budget director David Stockman is an example of the Technician, says Torbert. While a whiz at numbers, he "sacrificed effectiveness for efficiency."

ACHIEVER

The Achiever is addicted to work-related goals. Unlike Technicians, Achievers no longer simply identify with an expertise, but with accomplishing results. They welcome feedback if it helps them achieve their goals. Some 30 percent of managers are Achievers, Torbert found.

The Achiever's basic limitation, said Torbert, "is that while he can accept feedback in support of his goals, he cannot accept criticism that questions his goals."

STRATEGIST

Less than 5 percent of managers become Strategists, Torbert found. Typified by former Secretary of State Henry Kissinger, the Strategist, says Torbert, is able to understand the worlds of other people. "articulate and enact long-term strategies, manipulate others subtly, and focus on crucial moments in history to transform a frightening situation into an opportunity."

Achievers may become Strategists, Torbert found, "when they are moved from the middle manager's orderly world of following policy to the senior manager's fiery world of making it."

MAGICIANS & IRONISTS

As the label implies, Magicians are a rare breed. Unlike

the Strategist, who believes he or she is on the side of good, the Magician, says Torbert, recognizes the inherent nature of evil in ourselves and our surroundings, and understands it cannot be permanently defeated, but at best only kept at bay by means of continual attention.

And if Strategist Kissinger was the managerial hero of the early 1970s, said Torbert, Chrysler chief Lee Iacocca has become the Magician of the 1980s.

According to Torbert's study, moving from Strategist to Magician can be "traumatic." When Ford fired Iacocca, for example, Iacocca said at the time that he went from feeling as if he were "on top of the world" to "total humiliation," and used such terms as "suicide," "murder," and "rising from the ashes," to describe his situation. And what Magicians do is just that—rise from the ashes, and not through safe jobs, says Torbert, but "public, redefining action." In Iacocca's case, he brought Chrysler up with him.

When the Magician "begins to mask" himself in order to transform an organization or culture, he becomes an Ironist, who moves on and off the "historical stage deliberately," says Torbert. His power comes from detachment.

Possible examples are Charles de Gaulle and Mahatma Gandhi. De Gaulle resigned the leadership of France three times and returned twice to take it up; and the result, says Torbert, "is the legitimacy of republican government and executive power in France today." Gandhi wore both a lawyer's suit and loincloth to "transform India from colony to nation."

—*Jim Brindley*

Table II-10. Stages of personal and organizational development (Torbert & Fisher, 1992, p. 185)

<u>Managers (n=497) at stage</u>	<u>Loevinger¹ term</u>	<u>Personal development</u>	<u>Organizational development</u>
0%	I-2	Impulsive Impulses rule reflexes	Conception Dreams about creating new organization
2%	Δ	Opportunist Needs rule impulses & commitments	Investments Spiritual, network, and financial
8%	I-3	Diplomat Norms rule needs	Incorporation Products or services satisfy market or political constituency
46%	I-3/4	Technician Craft logic rules norms	Experiments Alternatives structures and strategies tested
34%	I-4	Achiever System effectiveness rules craft logic	Systematic productivity Single structure/strategy institutionalized
10%	I-4/5	Strategist Principle rules system	Collaborative inquiry Self-amending structure to match dream/mission
0%	I-5	Magician Process (interplay of principle/ action) rules principle	Foundational community Structure fails, spirit sustains
0%	I-6	Ironist Inter-systemic development rules process	Liberating disciplines Widen members' awareness of splits or alignments among mission/structure/ operations/ outcomes

¹From Loevinger & Wessler (1970).

The developmental stage of organizational development consultants

Bushe & Gibbs (1990) tested 64 members of a corporate quality staff along with 29 professional organizational development (OD) consultants. The distribution of the stages among the quality staff "closely matched that reported for a national sample of 804 adults by Loevinger (1985b)" (Bushe & Gibbs, 1990, p. 347). Over 95% of the of the quality staff scored at the achiever stage or below. However, for the OD consultants,

over 65% scored above the achiever stage (Bushe, 1990). The detailed distributions are given in Table II-7, Study 5.

Bushe (1990, p. 8) provides six "Propositions about commitment based organizations and developmental level" (Table II-11). In these propositions he theorizes that leadership of transformations to commitment-based organizations require leaders above the achiever stage. He also suggests that:

Many OD consultants are people who develop past the achiever stage, get frustrated living in control based-systems, and leave. Then, as consultants, they try to change control-based systems to be like the kind of organizations they (in the next sequential stage) would like to work in. (p. 8)

Bushe, like Torbert & Fisher, appears to be convinced that ego development is, in fact, related to a leader's ability to lead the transformation of an organization.

Table II-11. Bushe's propositions about commitment based organizations and developmental level. (Bushe, 1990, p. 8)

1. Leadership qualities required for managing high commitment work organizations are not widely found in business organizations. In fact, traditional organizing principles "support" psychological development at a stage (achiever) that is not suited to the requirements and challenges of commitment based organizing.
2. Successful commitment based worked systems require leaders who are at or beyond the strategist stage of development, who can function in ambiguity, hold the paradoxes such structures create, don't project their internal world onto the organization, and can see and work with social processes.
3. Many people are not at a level where operating in a commitment based work system is comfortable. If given the opportunity, they will seek to recreate a more comfortable control based system, especially one that clarifies roles and responsibilities and provides clear boundaries for individual actions and achievement.
4. The reason many successful sociotechnically designed greenfield sites regress after 6 years or so is that the original leaders leave and new leaders who are at the achiever stage of development take over. Though they may be able to talk about and understand the needs of managing commitment based systems, they cannot actually live it.
5. Transition toward high commitment work organizations contains a chicken and egg problem: we need them to enable people to develop to the strategist stage but we can't run them without people who are already at the strategist stage.
6. Many OD consultants are people who develop past the achiever stage, got frustrated living in control based systems, and left. Then, as consultants, they try to change control based systems to be like the kind of organizations they, as strategist or magicians, would like to work in.

Complexity of mental processing

Complexity of mental processing—necessary but not sufficient

Jaques and Cason (1994) present the idea of "current applied capacity." They provide a strategy for assessing "the capability someone has to do a certain kind of work in a specific role at a given level at the present time" (p. 150). Current applied capacity is made up of three factors:

Current Actual Capacity (CAC) = a function of

CP = Complexity of mental processing

V = Values (How much the person values the work of the role)

K/S = Skilled use of knowledge

They add a fourth factor "-T":

(-T) = the absence of serious personality defects
(T for Temperamental) that would prevent the person from
working to his or her current capacity.
(pp. 20, 21)

Jaques and Cason hypothesize that "the complexity of mental process of any person is an indicator of that person's current potential capacity (p. 21)." That is complexity of mental processing determines the maximum capacity that a person could apply in any problem solving situation.

Jaques and Clement (1991) assert that "leadership competency is a function of role competency" (p. 45). Their definition of current actual capacity indicates that role competency requires something in each of the areas. It is a necessary, but not sufficient, condition for role competency that the incumbent's mental processing match or exceed the complexity of the role. Of the other factors required for role competency, ego-development relates to each one: values, the skilled use of knowledge, and what could be seen as freedom from temperamental tendencies. By choosing to examine stage of ego development and complexity of mental processing, this study touches on all aspects of role competency as defined by Jaques.

Complexity of organizational roles

Role competency requires that the mental processing of the incumbent manager match the complexity of the role (Jaques 1989). Role complexity is a measure of the maximum level of complexity that an incumbent manager must deal with in order to successfully carry out a given role. A short history of the development of the concept will help explain how it will be used.

Between 1948 and 1964 Jaques (1964, 1968) conducted an extensive amount of empirical research into the nature of work, responsibility, and equitable pay. That same effort led to the principles of Stratified Systems Theory (1989). Jaques began by accumulating and plotting wage progression data for individuals. He corrected the data for inflation. As the progression data accumulated he discovered that the curves described characteristic families of parabolic curves. He also found a direct correlation between "equitable" pay (a level of pay felt to be "fair" for the work required in a given role) and the "time-span" of that role. The graph in Figure II-3. is an outgrowth of Jaques' equitable pay and time-span research. Time-span of a role was found to be a measure of the level of discretion that a person could exercise in satisfying the requirements of the role as seen by that person's manager. In effect, time-span was a measure of role complexity. (Jaques provides a comprehensive summary of this work in "Measurement of Responsibility," 1972.)

Time-span may also be called "Time-span of Discretion" indicating that it measures the time that a manager allows a subordinate to perform a task or series of tasks before that manager takes back ownership of the task. It is important to note that only the manager of a role can determine the time-span for that role.

Here is a simple, single task example. Suppose a manager asks a subordinate to prepare a market survey for review in 3 months. If this is the longest term assignment for that subordinate, then the time-span would be 3 months. Suppose the manager says that he wants to review progress in 1 month. If the manager intends to check the work and redirect the effort if necessary, then the time-span is 1 month. However, if the content of the 1 month review is determined at the discretion of the subordinate, and the intended purpose of the review is only to inform the manager of the projects status, then the time span is still 3 months. In effect the time-span hinges on the transfer of discretion back to the manager. The ultimate determinate of time-span is the manager's perception of the time-span at the time the assignment was made.

Time-span will serve as the measure of role complexity. Appendix C describes an operational method for determining time-span. An extensive discussion of the topic appears in the "Time-Span Handbook" (Jaques, 1964).

Research on both factors

Strategy formulation among practicing professionals

Hirsch (1988), perhaps unintentionally, uncovered a particularly interesting bit of evidence. He examined the business practices of thirteen ophthalmologists. He sought to relate their approach to business strategy formulation to their stage of ego development. When the physicians were grouped by developmental stage, their medical practice revenues fell into three clearly separated groups (p. 334):

<u>Stage</u>	<u>n=</u>	<u>Average annual revenues</u>
Technician	5	\$320,000
Achiever	5	\$1,250,000
Strategist	3	\$4,200,000

Although this finding is of significant interest, there is another aspect of Hirsch's work that is particularly relevant to this study. Hirsch used two methods for determining developmental stage. His primary method was through content analysis of the interviews with the physicians. Hirsch also administered Loevinger's sentence completion test. The results of the two methods for determining developmental stage did not correspond. Concerning this inconsistency, Hirsch comments:

One explanation for this discrepancy between the SCT (sentence completion test) scores and the in-depth interviews is that the two procedures were measuring different things. The primary focus of this research effort was a study of strategy formulation among practicing ophthalmologists. Strategy formulation is almost by definition, a conscious, rational process within a fairly specific knowledge domain. Alternatively, ego-development measures take into account one's overall view of the world. . . . ego development. . . may be too broad an assessment tool for studying the comparatively narrow domain of strategy formulation. (p. 266)

In an effort to understand better what Hirsch observed, this researcher reviewed the interview segments that Hirsch had included with his study. Each interview segment was examined using the complexity of mental processing observational method defined and validated by Jaques and Cason (1994). The results, although not perfectly matched to Hirsch's interview results were considerably closer than the Loevinger SCT results. Hirsch's findings along with this researcher's complexity of mental processing assessments are shown in Table II-12. Because of the limited interview content available to assess complexity of mental processing, the results should be taken only as an indication that complexity of mental processing may be more closely related to strategy formulation than ego development.

Secondly, Hirsch describes each successively higher revenue business group as an increasingly complex business. It may be that the business results measured in terms of revenues are more closely related to the physician's complexity of mental processing (ability to construe complexity) than to his or her stage of ego development.

Table II-12. Hirsch's stage and revenue data with assessments of mental processing (Hirsch, 1988, p. 334 modified)

Name	Ego development stage		Mental ¹ Processing	1987 Annual Gross Revenues
	From (interview)	From (Loevinger SCT)		
M. D.	Technician	5	too little data	\$275,000
J. F.	Technician	4	B2L	\$300,000
H. D.	Technician	4	B1	\$240,000
S. W.	Technician	3/4	B2	\$420,000
M. C.	Technician	4/5	B1	\$365,000
P. E.	Achiever ²	3	B3H	\$880,000
B. K.	Achiever	4	B3	\$1,100,000
B. A.	Achiever	3/4	B2M	\$1,400,000
K. K.	Achiever	5/6	B2H	\$1,250,000
B. R.	Achiever	3/4	too little data	\$1,600,000
G. V.	Strategist	3/4	B3H	\$3,200,000
S. H.	Strategist	4	B3M	\$5,000,000
B. S.	Strategist	4	B4M	\$4,400,000

$r_{(SCT, \text{gross income})} = -0.05$ $r_{(\text{mental processing, gross income})} = 0.82$

¹Appendix D provides a description of these stage designations.
²Hirsch's table uses "Manager," Torbert is currently using "Achiever" as a more descriptive name for this stage.

Individual differences in strategic leadership capacity

Note that the term used here is "strategic" leadership. The research cited was focused on leadership which impacts the long term outcome of an enterprise. Although this is not the same as transforming leadership, there is a similarity in that the long term outcome of the enterprise is a common thread. Strategic leadership does not specify that the goals be shared among the members of the organization, as transformational leadership does.

A considerable amount of research into senior level strategic leadership has been conducted by the US Army. The work was contracted through the Strategic Leadership Technical Area, Dr. Owen Jacobs being the Area Chief (Lucas and Markessini, 1993; Mumford, Zaccaro, Harding, Fleisham, and Reiter-Palmon, 1993). One overall conclusion was that cognitive and conceptual skills are among the most critical for effective performance in general officer assignments. In a longitudinal study which used an earlier method of assessing complexity of mental processing to predict future level within an organization, predictive validities of 0.7 and 0.9 were found over 4 to 13 years time (Stamp, 1988).

Lewis and Jacobs (1992), reported on measures of stage of ego development and complexity of mental processing for 28 Army War College Students. They found the following distribution of scores:

Stage of ego development	Complexity of mental processing	
	Below Stratum IV	At or Above Stratum IV
At or above ego Stage 4	1	13
Below ego stage 4	11	3
	12	16

Based on these scores they suggest that achieving higher stages of ego development may be related to possessing a higher complexity of mental processing. They believe that both are important and state that "no amount of motivation will make up for a lack of conceptual grasp (p. 122)."

It is important to note that the Lewis and Jacobs sample contains no one above stage 4. Torbert argues that that the ability to transform organizations begins during the transition out of 4 and into 5. The design of this research is focused on Torberts assertion, but will provide data that can be compared to the findings of Lewis and Jacobs.

Chapter summary

Research Question 2 will be used to provide an outline for the summary of the review of literature.

Question 2. What does existing research show concerning:

- a. the relationship between a manager's success in transforming an organization and his or her stage of ego development,
- b. the relationship between a manager's stage of ego development and his or her complexity of mental processing, and/or
- c. the relationship between a manager's complexity of mental processing and his or her success in transforming an organization?

The focus of the research question is the relationship between the various factors more so than information about each of the factors. The review of the literature provided: 1) considerable research based information about transforming leadership, stage of ego development, and complexity of mental processing, 2) a number of logic based hypotheses on the relationship between the stage of ego development and transforming leadership, and between stage of ego development and the complexity of mental processing, but 3) with very little confirming research data.

The idea of transformational leadership has been well developed by a number of respected experts in the field of leadership: Burns, Zaleznik, Bennis, and Nanus. The concept of stage development has been confirmed by many under different names: moral (Kohlberg), ego (Loevinger), self (Kegan), values (Hall). Torbert & Fisher, provide a distribution of the stage of ego development among managers. Bushe shows that on average the stage of ego development for organizational development consultants is above that of managers. Bushe, Drath, and Marrion, Fisher and Torbert all provide arguments that the characteristics of a person having ego development above stage four are more conducive to transformational leadership than the characteristics of a person at stage four. In supporting his argument Drath sites interview data including comments by subordinates: Torbert provides detailed case studies of individual managers (1987b). No quantitative data was found relating successful transformation of organizations and the leaders stage of ego development.

With a limited sample (n=28) Lewis and Jacobs (1992) indicate that there is a positive correlation between complexity of mental processing and stage of ego development. They argue that both factors, in combination, support strategic leadership. Their sample contains no individual above stage four of ego development.

The information on complexity of mental processing provided by Jaques, Jaques & Cason, Jaques & Clement, Lewis and Jacobs, all focused on leadership of existing organizations, and performance of specific organizational roles. They make no

assertions specifically concerning the relationship between complexity of mental processing and successful transformation of organizations. No quantitative data was found relating successful transformation of organizations and the leaders complexity of mental processing.

Hirsch's study, unintentionally but fortuitously, provided data relating both stage of ego development and complexity of mental processing to gross income through strategy implementation. The correlation between stage of ego development and gross income ($r = -0.05$) was essentially zero, while the correlation with complexity of mental processing ($r = 0.82$) was quite high.

The objective of this study is to assess the influence of ego development and mental processing on a manager's effectiveness as a transforming leader. Existing literature indicates that it is highly likely that these two factors do impact on leadership effectiveness. However, the interaction of the two factors is not clear. Based on the information presented in this chapter, it is likely that stage of ego development will indicate a manager's effectiveness in dealing with people, values, relationships, commitments and the like. His or her complexity of mental processing is likely to relate to the size of the role that the manager can effectively occupy.

CHAPTER III
DESIGN OF THE STUDY

The objective of this study is to assess the influence of stage of ego development and relative complexity of mental processing on a person's ability to transform his or her organization. Chapter I posed the research questions that provide focus for the study. Chapter II contained a review of the relevant literature. This Chapter will describe: 1) the variables and the research model, 2) how the model will be used to address the objective of the study, 3) the methods that will be used to measure the variables of interest, and 4) the procedures planned for managing the study.

The research model

Three variables are of primary interest: performance as a transforming leader, stage of ego development, and relative complexity of mental processing. Performance is the dependent variable; stage of ego development and relative complexity of mental processing are the two independent variables. The performance variable is concerned with whether or not a person has succeeded in achieving significant results associated with cultural change within the organization -- cultural change characterized by the acceptance of the same goals among the members of the organization. Stage of ego development is a reflection of a person's frame of reference (Loevinger, 1979). "Relative complexity of mental processing" is a measure of how closely a manager's complexity of mental processing matches the requirements of his or her assigned role.

Relative complexity of mental processing is defined for this study as the difference between a person's complexity of mental processing and the complexity associated with his or her assigned role. Stage of ego development (Torbert, 1991) and complexity of mental processing (Jaques, 1989) are characteristics of the person. Role complexity is a characteristic of the role or assignment for which a person is accountable (Jaques, 1989).

For this model, the relationship among the variables can be stated as:

Transforming performance is a function of the person's stage of ego development, and complexity of mental processing relative to the complexity of his or her assigned role.

This formulation was chosen to focus the study and is recognized as a partial model of leadership performance. Research in the areas of trait, behavior, and

competency modeling have identified "other things" which also influence effective leadership (Kreitner, 1992). However, these "other things" are not the subject of this study. The contribution to the field being sought is a clarification of the influence of stage of ego development on transforming leadership and a determination of whether stage of ego development and relative complexity of mental processing are independent constructs which need to be studied side-by-side.

The model was chosen first because the "other things" that have been examined have not been able to explain why one person can adopt known effective behaviors while another, seemingly equally capable, can not. Second, because Torbert, Drath, Bushe, and others have indicated that higher stage of ego development levels are likely to be required for managers to adopt transforming behaviors. Third, because Jaques' model of complexity of mental processing and role complexity provides an alternative view of the reasons behind transforming performance. Fourth, because a review of the Hirsch study, (1988; Torbert, 1991, p. 55-56) by this researcher indicates that the results attributed to stage of ego development may be more closely related to complexity of mental processing. Finally, only limited prior research has been found which examines concurrently the premises of Stratified System Theory and the more recent findings relating stage of ego development to transforming behaviors.

The variables

The research model can be viewed simply as three variables, each being examined at two states:

- Performance
 - transforming or
 - not-transforming
- Stage of ego development
 - high stage (above stage 4, Achiever)
 - not-high stage (at or below stage 4)
- Relative complexity of mental processing
 - high mental processing (At least one stratum over role)
 - not-high mental processing (Less than one stratum over role)

These three variables, having two levels each, provide for two 2x2 data matrixes that correspond to part a & b of Question 4. The two matrixes are shown as Tables III-1, and III-2.

Successful transformation vs. stage of ego development

Question 4a springs from the work of Torbert (Fisher, Merron, & Torbert, 1987) and Bushe (1990). In terms of Table III-1, the question asks whether someone could be located in the "transforming/not-high stage" cell. For this question, only two of the

variables are involved: performance and stage of ego development. Each person in the sample will be located in one of the four cells of Table III-1.

Table III-1. Transforming performance vs. stage of ego development

Question 4a: Does performance as a transforming leader require that a manager be above stage four of ego development?		
	Transforming	not-Transforming
high stage (>4)		
not-high stage (<=4)		
totals		

In interpreting the data it is of particular interest to know whether (or even more importantly—how frequently) transforming results occur when a person's stage of ego development moves beyond the achiever stage (Stage 4). If transforming results increase with stage of ego development then we could conclude that organizations desiring to promote transformation should seek to facilitate developmental growth in their people. The model would support this proposition if it were found that most of the successful transformations were lead by people who are above the achiever stage, while few, if any, of the not-transforming managers were above the achiever stage.

However, if most of those bringing about transformation were found to be above stage 4, but many of the non-transformers were also above stage 4, the strength of the findings would be weakened. In that case, the most that could be said is that the higher stage of ego development is a necessary but not a sufficient condition which facilitates transformation.

In summary, the logic for examining Table III-1, transforming vs. stage of ego development, is:

	Description	Cell
IF:	There are essentially no individuals who brought about successful transformation and are at stage 4 or below. . .	Transforming, not-high stage =0
AND:	There are a significant number of successful transformations by individuals above stage 4.	Transforming, high stage >>0
THEN:	The stage of ego development above 4 and transforming performance are related.	Correlation $r_{(transforming, ego\ stage)} > 0$

For the purpose of testing for statistical significance the null hypothesis is:

H_0 = stage of ego development has no influence on transforming performance.

The null hypothesis will be rejected if the probability that the data are random is less than 5% (e.g. $p <= 0.05$)

Successful transformation vs. complexity of mental processing

The relationship between successful transformation and complexity of mental processing is an extension of Jaques' findings (1989). The data table is similar to the preceding one, except that the two ego stage rows are replaced by relative complexity of mental processing: "high mental processing" and "not-high mental processing."

Table III-2. Transforming performance vs. relative mental processing

Question 4b: Does performance as a transforming leader require that a person possess complexity of mental processing above that which would be required to operate successfully in the same role if transformation were not required?

	Transforming	not-Transforming
high mental processing		
not-high mental processing		
totals		

¹Where high mental processing means that the person's complexity of mental processing is at least one stratum higher than the complexity of his or her role.

The logic outline for Table III-2 is:

	<u>Description</u>	<u>Cell</u>
IF:	There are essentially no successful transformations by individuals whose complexity of mental processing is less than one stratum above that required by their role without transformation.	Transforming, not-high mental processing =0
AND:	There are a significant number of successful transformations by individuals who have complexity of mental processing at least one stratum higher than that required for the role without transformation.	Transforming, High-mental processing >>0
THEN:	The relative complexity of mental processing and successful transformation are related.	Correlation $r(\text{transforming, complexityof mental processing}) > 0$

For the purpose of testing for statistical significance the null hypothesis is:
 H_0 = complexity of mental processing has no influence on transforming performance.
The null hypothesis will be rejected if the probability that the data are random is less than 5% (e.g. $p \leq 0.05$)

Operational measures

To apply the research model, data must be collected on each of three variables: performance (the dependent variable), stage of ego development, and relative complexity of mental processing (the two independent variables).

Question 3a. Performance as a transforming leader

Burns (1978) provided the concept of transforming leadership; he also suggested how it might be measured.

My own measurement of power and leadership is simpler in concept [than a number of research approaches] but no less demanding of analysis: *power and leadership are measured by the degree of production of intended effects*. This need not be a theoretical exercise. Indeed, in ordinary political life, the power resources and the motivations of presidents and prime ministers and political parties are measured by the extent to which presidential promises and party programs are carried out. Note that the variables are the double ones of *intent* (a function of motivation) and of *capacity* (a function of power base), but the test of the extent and quality of power and leadership is the degree of *actual accomplishment* of the promised change. (p. 22, italic in original)

The "degree of actual accomplishment" of a transforming change is the measure that is being sought. During the early preparations for this study, over ten "savvy insiders" (managers in high position who have good insight into the operations and politics of their organizations) were asked the following question: "In your company's efforts to implement TQM, have you seen a number of managers who have been significantly more effective than others at changing the culture of their subordinate organization while continuing to deliver effective results?" In every case, they answered yes, and brought several specific people forward. In each case those identified were few, and their performance was perceived as clearly differentiated from their peers. Based on this sample it appears that the transforming performance desired is visible and recognizable by members of the organization.

In the course of the study two approaches were used to identify individuals who brought about successful transformations. Two individuals were identified through prior contact with this researcher. Three were identified through nominations received from members of their organization. In both cases those identified demonstrated contributions that were clearly recognized as successful transformational change.

Question 3b. Stage of ego development

Loevinger's (Loevinger & Wessler, 1970) sentence completion test (SCT) for assessing stage of ego development was designed for use with the general population. The standard test format consists of 36 sentence stems and has both male and female versions. Torbert (telephone conversation, June 4, 1993), has been using a shortened, 24 question version in his research. Hirsch (1988, p. 304) also used the shorter version in his study.

Susanne Cook-Greuter (personal communication, June 1992), who has scored over 3,500 SCT's, expressed concern for using a standard form of the test with subjects who are at higher stage of ego developments.

During the last five years, I have observed a distinct negative reaction by high scoring subjects toward the standard form 81. Many have responded with annoyance to the repetitiveness, narrow focus and gender separation (mother-father, wife-husband, man-woman) of that form, within the test itself. Sometimes there is a distinct drop in the quality of responses in the second half of the test. Other times, the subjects refer to previous similar items and just write "see above," thus refusing to repeat themselves. Postformal subjects often object to the gender based role distinctions and to the items with "should." These objections are, of course, symptomatic for postconventional understanding. It is also in line with the theory that postformal subjects are likely to react to the instrument as a whole, rather than to separate items as isolated stimuli.

With these comments in mind, she suggested a number of changes to the standard form. Charles Palus (July 20, 1993) provided an experimental version of the test which he developed with Susanne Cook-Greuter and Sharon Rogolsky. The experimental version includes the 24 questions used by Torbert along with 12 new items developed by the trio. Palus and Rogolsky are using this version in experimental work being done by the Center for Creative Leadership in Greensboro, North Carolina. This experimental version, reproduced as Appendix B, was chosen for use in this study. Scoring of all sentence completion instruments was done by Susanne Cook-Greuter. The specific score that will be used in this study is called the "total protocol score." A complete scoring sheet is included with the SCT in Appendix B.

Question 3c. Complexity of mental processing

Jaques (Jaques & Cason, 1994) describes a method of observing a person's complexity of mental processing by analyzing the structure of the language that the person uses in arguing his or her position on an issue of importance. Cason Hall & Co. publishes a cassette recording, titled Complexity of Human Processing (1992), which gives examples of arguments at each level of complexity of mental processing. By definition complexity of mental processing is a measure of the maximum level of

complexity of mental processing that a given person is capable of performing. It is critical that the person being observed function at their maximum capability during the observation process. Stated another way, the subject must be fully engaged during the observation process. For this reason the process of assessing complexity of mental processing will be referred to as an "engagement interview."

Question 3d. Relationship between complexity of mental processing
and complexity of assigned role

Complexity of assigned role

Role complexity is measured using an indirect technique involving the determination of the "time-span" of each role. Jaques (1964) reporting on an extensive body of empirical data, established a relationship between the time-span of a role and the complexity encountered in performing that role. A portion of the relationship between time-span and complexity (expressed as stratum level) follows:

<u>Time-span</u>	<u>Stratum level</u>
10 to 14 years	VI L (for stratum 6, low)
8.5 to 10 years	V H (for stratum 5, high)
7 to 8.5 years	V M (for stratum 5, medium)
5 to 7 years	V L (for stratum 5, low)
4 to 5 years	IV H (for stratum 4, high)

The entire scale for stratum 1 through 8, appears as the left vertical axis of Figure II-3, and in tabular form in Appendix D.

Jaques provided the following "General Procedure" for assessing time-span (from Appendix C):

Interview the immediate manager to explore the actual assignments that the manager is holding the subordinate accountable for achieving. It is the manager, and only the manager, who decides the (time span) of these assignments. The immediate manager's decision about (time-span) for any particular assignment is an objective fact, however the manager might have to arrive at that decision.

This method was applied to determine the time-span for each of the participants roles. The table in Appendix D was then used to convert time-span to stratum level.

Relative complexity of mental processing

Relative complexity of mental processing is defined as the difference between the complexity of mental processing resulting from the engagement interview and the stratum level determined by the time-span measurement of the role. Since time-span is

determined by the incumbent's manager, it can be considered an objective characteristic of the role—the manager decides (is ultimately responsible for) the “by when” to which the subordinate must respond. Time-span can be directly converted to the level of complexity of a role, in units of stratum, using the relationships given in Appendix D.

The basics of Stratified Systems Theory (Jaques, 1968, 1989), as applied to performance, require that an incumbent's complexity of mental processing match the complexity of the role occupied. Complexity of mental processing marginally lower than that required will result in marginally sub-standard performance. What we are seeking in this study is to determine if significantly higher complexity of mental processing than the manager's superior views as required for the role is likely to result in transforming behavior.

Question 3e. Relationship between stage of ego development and complexity of mental processing

Although stage of ego development and complexity of mental processing are called independent variables, there may be a relationship between the two. Loevinger and Wessler (1970) say that “conceptual complexity has proved to be an important clue to” stage of ego development (v. 1, p. 115).

In psychological terms, stage of ego development and complexity of mental processing are “constructs.” In light of the earlier comments on the trait school of leadership it should be noted that a construct can also be called a trait. Borg & Gall define a construct as “a concept that is inferred from observed phenomena” (1989, p. 26). “Constructs are usually defined in operational terms, that is, in terms of the ‘operations’ needed to measure them” (p. 54). In this study the operational measure of stage of ego development is the “total protocol score” from Loevinger's Sentence Completion Test (STC). For complexity of mental processing two measures are available: a direct measure obtained by observing complexity of mental processing through the engagement interview, and an indirect measure of the time-span of the role translated into stratum level of the role. These measures were discussed earlier in the chapter.

Anastasi (1988) asserts that a construct “can be adequately defined only in light of data gathered in the process of validating that test [or measurement methodology]” (p. 162). Before comparing the two variables it would be worthwhile to ask if the operational tests are “valid.” That is, does each test measure what it is purported to measure?

Loevinger examined the validity of her sentence completion test (SCT) in 1979. She reviewed research which allowed a comparison of SCT data with data from measures of other related constructs. Based on the details of her analysis, and wide

usage of the test by others, the SCT appears to be a valid measure of a construct which she has called ego development.

The engagement interview—the first method of direct observation of complexity of mental processing— is relatively new, appearing first in the form used in this study, in 1991 (Jaques & Clement). In 1994, during the course of this study, Jaques and Cason published the results of a validation experiment comparing his method for directly observing complexity of mental processing with a methodology used by managers to judge the current potential of subordinates in terms of stratum. The reported correlations were in excess of $r = 0.9$ ($n=72$). Because of the newness of the direct observational approach to assessing complexity of mental processing, it will be important to further replicate the validation of the approach.

One way that the validity of new tests can be examined is by comparing the results of that new test with the results of an existing test for the same construct (Anastasi, 1988). Another way is by comparison with the results of a test for a related construct. Complexity of mental processing and time-span are related constructs. Considerable data has been amassed supporting time-span as a valid measure of the complexity of a role (Jaques, 1964, 1968). For a person who is in a role that requires a complexity equivalent to his or her level of complexity of mental processing, both time-span and complexity of mental processing will locate that individual at the same stratum (in Figure 2-6.). In essence time-span is an indirect measure of complexity of mental processing, and the engagement interview is a direct measure. A test of the validity of the engagement interview as a method of measuring complexity of mental processing would also have a high correlation with time-span.

With the validity of ego development construct established, and with a method to test the validity of complexity of mental processing construct outlined, the next step is to compare the two constructs. Anastasi (1988), indicates that Campbell (1960) "pointed out, in order to demonstrate construct validity, we must show not only that a test correlates highly with other variables with which it should theoretically correlate, but also that it does not correlate significantly with variables from which it should differ" (Anastasi, 1988, p. 156). With this in mind, Anastasi (1988, p. 156-158) describes the multitrait-multimethod matrix approach to convergent and discriminate validation developed by Campbell & Fiske (1959). The idea is to assess two or more traits (constructs) by two or more methods.

The data from the Hirsch (1988) study appearing in Table II-12 provides an opportunity to apply the multitrait-multimethod matrix approach to the sentence completion test and the method for observing complexity of mental processing used in

the engagement interview. In Hirsch's (1988) study, stage of ego development was measured using two methods: 1) the SCT, and 2) an analysis of the content of interviews in which the participants described the evolution of their business strategy. Complexity of mental processing was measured by this researcher first using the model described in Chapter II. A second assessment of cognitive capacity was then made by applying Jaques' findings (1968) showing a relationship between the log of income and the complexity of a person's role. This second assessment assumes that the relationship between role, complexity, and income is the same for a business owner in Hirsch's study as for an employee within an organization as studied by Jaques (this is an untested assumption).

Correlations calculated from the Hirsch data in Table II-12 were used to construct the multitrait-multimethod matrix appearing in Table III-3. (Note: The multitrait-multimethod enters test reliability coefficients on the diagonal of the matrix, that data is not available, therefore $r_{xx}=1$ values were substituted for the diagonal of the multitrait-multimethod matrix (Anastasi, 1988, p. 157)).

Table III-3. Multitrait-multimethod matrix for comparing stage of ego development and complexity of mental processing

	Method 1		Method 2	
	ego (SCT)	cp (interview)	ego (interview)	cp (income)
Method 1 ego (SCT)	1	-.30	-.10	-.05
cp (interview)		1	.85	.82
Method 2 ego (interview)			1	.98
cp (income)				1

* non-diagonal values are calculated Pearson product moment correlations using the data in Table II-12.

In reading the matrix in Table 3-3, note that two methods were used to assess stage of ego development: the SCT, and an interview. The correlation between the two was $r = -.10$, indicating that the measures were not correlated. However, the correlation between stage of ego development measured using the interview, and complexity of

mental processing measured using the interview was .85. It appears that the interview for stage of ego development may have measured a construct closer to complexity of mental processing than to stage of ego development as defined by the SCT. It is also interesting to note that the correlations between stage of ego development (from the interview), complexity of mental processing (from the interview) and log of income all exceed 0.80.

The results of this analysis are not what would be expected if the SCT were related to complexity of mental processing. The results are however supportive of Jaques' conclusions (1968) that income and complexity of mental processing are closely related among those working in an organizational framework which rewards decision-making involving complex information.

What of Loevinger & Wessler's statement that "conceptual complexity has proven to be an important clue to (ego) level. . ." (1970, vol. 1, p. 115)? In scoring the SCT for conceptual complexity they look for "True compounds. . . defined as those responses containing two or more contrasting ideas or alternative aspects of a situation" (p. 115). It may be that the ability to recognize complexity is not the same as the ability to process complex information.

If complexity of mental processing and the SCT were related constructs (but not the same construct) correlations in the range of .3 to .5 would be expected. This range is typical of the correlations Loevinger reported in her 1979 review. Jaques, prior to developing the engagement interview, defined complexity of mental processing in terms of time-span. Therefore, high correlations would be expected between the two, perhaps .7 to .9. Since time-span is an indirect measure of complexity of mental processing, the correlation between SCT and time-span would be expected to be lower than between a direct measure of complexity of mental processing and the SCT, perhaps .2 to .4. Based on the information available, and postulating that the SCT and the complexity of mental processing are measures of the same construct, the correlations shown in Table III-4 might be expected. Data from the Hirsch study indicates that this will not be the case, and that the two variables are indeed measures of different constructs.

Table III-4. Expected correlations if stage of ego development and complexity of mental processing are related constructs

	<u>ego stage</u>	<u>cognitive power</u>	<u>time-span</u>
stage of ego development	1	.3 to .5	.2 to .4
complexity of mental processing		1	.7 to .9
time-span			1

Sampling plan

A particular challenge in this study is that exemplary leadership performance occurs in small numbers within the total population of managers. Higher stages of ego development also occur in small numbers, particularly in the organizational environment. Torbert (Table II-9) reports 10% of the 497 managers he tested to be at the Strategist level, with none higher.

If leaders of successful transformations occur at the 5% level among all organizational members, then a random sample of 30 managers would be expected to contain only 1.5 ($30 \times .05$). Furthermore the probability is 21% ($.95^{30}$) that a purely random sample would fail to contain a single example. Because the objective of the study requires that individuals that have successfully transformed organizations be examined as a group, and that they be compared with those that have not demonstrated successful transformation, a purely random sampling plan was rejected.

A two-step sampling plan was chosen. First, 5 individuals who have successfully brought about transformation were identified. Then the plan called for a random selection of 25 other managers (Borg & Gall, 1989, p. 224). In executing the study it was necessary to modify the sampling plan to be consistent with the objectives of the two organizations that provided the experimental site. The final sample consisted of five individuals who successfully facilitated transformation, and 34 others who provided varying amounts of data. Greater detail of the sample is the topic of Chapter IV and the full set of data that was collected appears in Appendix E.

Statistical analysis

The choice of statistical methods depends on the nature of the data and the specific questions that are being asked. For this study two basic statistical questions are being asked. First, are the distributions among cells of 2x2 matrixes significantly

different from random distributions? Second, is there a statistically significant correlation between various sets of bivariate data?

The data in the 2x2 matrixes is ordinal in nature, and at that, vary course: transforming vs. not transforming, high stage vs. not high stage, high mental processing vs. not high mental processing. The total sample size was planned to be $n=30$ with an expectation that the cell of interest will have $n \leq 5$. It would be desirable to minimize the assumptions concerning the distribution of the data. The Fisher Exact Probability Test is a nonparametric method which Siegel (1956, p. 96-111) asserts is "the most powerful one-tailed test for data in a 2 X 2 table" and a test that is well suited to small sample sizes and small cell sizes. In both Question 4a and 4b the direction of the outcomes are specified thus making the one-tailed test appropriate. The Fisher test did not require any of the assumptions made by the parametric test (at least interval scale measures, populations that are normally distributed and with equal variance). The Fisher test was used in this study to test the null hypothesis (that the distribution within the cells of the 2x2 matrixes is not significantly different from chance).

In a number of places in this study, measures of correspondence were needed. For example: correlations between SCT, time-span, complexity of mental processing; also interrater correlations for observers of complexity of mental processing had to be calculated. Time-span and complexity of mental processing were converted to numbers that are interval in nature (See Appendix D for the conversion scheme). The SCT results provide two ratings: the total protocol score (an ordinal ranking from 1 to 11), and a total weighted score (essentially an interval scale from 24 to 264). Pearson's product moment correlation, a parametric test, was used. Significance for those measures were calculated using Fisher's r-to-z transformation (McGee, 1971, pp. 256-261).

Managing the study

Figure I-1. provides a flow chart of this study. In its simplest form the study can be divided into three major phases:

- Phase 1. Preparation
Development and testing of the psychometric instruments, interview techniques, scoring methods, and analysis protocols.
- Phase 2. Partner & funding
Location of an organization that would provide funding, and whose managers would participate in the study.
- Phase 3. Data collection, analysis, & conclusions
The research itself including the collection and analysis of data and subsequent formation of conclusions.

Phase 1: Preparation

By the time the decision was made to pursue this study the major conceptual aspects were defined. These included choice of stage of ego development and complexity of mental processing as the constructs of interest, and the identification of individuals who had successfully led an organizational transformation as the measure of leadership. A number of discussions had taken place with Kenneth Clark, Wilfred Drath, Owen Jacobs, Charles Palus, William Torbert, and Elliott Jaques concerning the potential worth of the proposed direction of inquiry. Over 10 director and vice presidential level corporate managers had also been consulted concerning the practicality of identifying individuals who had successfully led transformations—all agreed that the approach was practical.

When the decision was made to initiate the study, the conceptual framework was set. The remaining portion of the preparations consisted of developing the specific details of how the study would be executed.

Choice of psychometric methods and data analysis plan

For this study, the choice of psychometric methods was limited. The SCT was chosen for two reasons: first, because of the large amount of existing data that is available for the general population (Loevinger, 1979), for organizational managers (Torbert, 1991), and for organizational development consultants (Bushe, 1990). Second, because there is evidence to suggest that Loevinger's test measures a "unitary dimension" (1979, p. 286). That is, it measures a unique construct, which she calls ego development. Third, because it is a pencil and paper test with a validated scorer available to score the instruments. A pencil and paper test for stage of ego development was preferred because of the requirement of using an interview method for assessing both complexity of mental processing and time-span. From a purely logistical standpoint (time, cost, travel, and scheduling considerations) it was impractical to consider having two trained interviewers meet with each participant. Once the study was under way, and preliminary testing had been completed, another effective pencil and paper measure of development was uncovered, the Hall-Tanna Values Inventory. Developmental data on one of the "transforming" individuals was taken from the Hall-Tanna instrument.

The method for assessing complexity of mental processing was predetermined. The protocol was developed by Jaques (Jaques & Cason, 1994) who originated the Stratified Systems Theory (SST) framework which gives the construct of complexity of mental processing its usefulness.

To provide a measure of relative complexity of mental processing, it is also necessary to determine time-span of each manager's role. That method is discussed at length in the "Time-Span Handbook" (Jaques, 1968). A short version of that process appears in Appendix C.

After each of the psychometric methods was identified, the approach to data analysis (which appeared earlier in this chapter) was outlined.

Design and testing of written instrumentation

The SCT instrument used in this study was included in a packet with a cover letter and "Important Overview" page. These are included as Appendix F. Three volunteer managers, all with interest in organizational leadership and leadership development, were given the SCT. The completed SCT's were sent to Susanne Cook-Greuter for scoring. The packet, instructions, and scoring arrangements worked smoothly.

Design and testing of interview protocol & validation of assessor

Development of the final interview and assessment protocol required several iterations. First, Jaques & Clement (1991) and the audio recorded examples (Cason Hall & Co., 1992) were studied and outlined. After that, several practice interviews were conducted. Each interview was recorded and then transcribed. The interviews were observed from the transcriptions. The transcriptions and assessments were then sent to Dr. Jaques for his review. This assessment and review process was done three times until Dr. Jaques and this writer were consistently agreeing on the assessments.

Testing of the time-span measurement methodology

Time-span measurements were obtained for all members of a 22 person department. Of these, 10 were assessed for complexity of mental processing using the engagement interview. The department's manager confirmed the reasonableness of the time-span measures and the complexity of mental processing assessments. The correlation between time-span and complexity of mental processing assessment for the 10 individuals measured was 0.81. This indicated that the department (when defined in terms of role assignments, and measured using time-span) is working near the full mental capacity of the individuals.

The process used to assess the engagement interviews provided a check on the validity of the scoring procedure. Each of the ten interviews was transcribed, then scored independently by the writer and Dr. Jaques. Of the 10 interviews scored, 9 were scored in the same stratum. The correlation between the independent scorings, based on 1/3 stratum steps, was 0.84. After the independent scores were identified, differences in scoring were discussed and an agreement reached on the score to be assigned.

Phase 2. Partner & funding

Phase 2, locating a company who would financially support and participate in the research, turned out to be the single greatest challenge of the work. Initial efforts to enlist a research partner began in August of 1992. The strategy was to contact major industrial organizations seeking those who might have interest in supporting research in the area of transforming leadership. Before the initial contacts were made, two items of promotional material were prepared: a video and a brochure. These items were sent to interested individuals to provide information on the reasons for the study and the procedural aspects.

The video, entitled "Why do few get big results?" was promotional in nature. Glenn Mehlretter was the principle narrator. Dr. Charles Palus and Mr. Wilfred Drath, from the Center for Creative Leadership appeared on the video. Dr. Elliott Jaques and Dr. William Torbert provided comments via telephone. Over 50 of these short, 11 minute, videos were sent to company executives and to others who might be in a position to locate potential participating companies.

Initial contacts were made by telephone to each company's quality officer. These contacts led in different directions, but frequently ended up in a human resource-related function responsible for executive development, executive resourcing, or executive training. Later contacts were made directly to the president's office seeking the name of the person concerned with "executive development, succession planning, competency modeling" and the like. The second approach to locating the right internal contact proved more effective than the first.

When the individual was located whose role responsibilities related to the research, a request was made to visit the location and present a "technical review" of the state of the art. The organizations were asked to provide the travel expenses and a fee for the presentation. The technical reviews led to a series of further contacts: however, while some led to consulting arrangements, none led to execution of the research as designed.

In the spring of 1995, Charles Palus, the scientist responsible for developmental research at the Center for Creative Leadership, provided the opportunity to collect data for this study as part of another project relating to leadership and creativity.

Phase 3. Data collection, analysis, & conclusions

The total sample

By the completion of the study various forms of data had been collected from 39 individuals (Appendix E includes the full set of data):

- 2 successful transformers identified by this researcher.
- 1 successful transformer discovered during the process, and confirmed by nomination from associates.
- 2 successful transformers nominated by their associates.
- 4 other volunteers (2 professors, one VP, and one retired VP).
- 10 members of one successfully transformed organization.
- 21 members of another successfully transformed organization.

Collection of site data

Final site data was collected two ways. The target population consisted of 32 individuals that had been identified by the organization's vice president. The people were chosen because they either operated the process which was transformed or were impacted by the output of that process. The Center for Creative Leadership testing department prepared instrumentation packets which included the SCT used for this study. A number of other instruments (which were not part of this study), including a 360° leadership instrument were also included. For the sake of confidentiality the letters and instructions included with the packet are not included in this report.

Of the 32 SCTs distributed, responses were received for 18. Three of the 32 were nominated by their associates as having successfully facilitated the transformation that had taken place in the organization (Chapter IV provides details of the nomination process and its specific results). Of these, two of the successful transformers had not returned their SCT. These two were contacted, and later returned their completed SCT.

Scoring of the written responses

Completed SCTs were sent to Susanne Cook-Greuter for scoring. She returned the scores on the form included in Appendix B.

Conducting the interviews and verifying the assessments

The interview consisted of two concurrent interview procedures. An engagement interview was held with each participant, and a time-span interview was held with each participant's direct manager.

The engagement interview.

Each interview was recorded. The tape was then duplicated (to reduce risk of loss) and the original sent for transcription. Observation of complexity of mental processing were made by the researcher. During the full course of the study 36

engagement interview transcripts were assessed by the writer. Of these 20 were verified by Dr. Jaques. These included the first 15, and then 5 later ones to ensure that the high inter-rater correlation had been maintained. The inter-rater correlation was $r=0.944$. This is consistent with the $r=0.95$ reported by Jaques & Cason (1994). Dr. Jaques verified the assessment of each of the five individual's classified as transforming; those results are given in Chapter IV, Table IV-2.

Time-span interviews.

Time-span interviews were also recorded but not transcribed. The actual time-span judgment was made by the manager, facilitated by the researcher. The sessions were recorded to allow a review if questions on interpretation were to arise later.

Chapter summary

The research model states that leadership performance is a function of minimum stage of ego development and the relative complexity of mental processing. Where relative complexity of mental processing is the difference between a person's complexity of mental processing (a personal characteristic), and the complexity of his or her assigned role as determined by the time span measurement.

In its simplest state the study examined three variables, each at two levels. Transforming and not-transforming individuals were identified by their associates. Transforming individuals were defined as those individuals who had achieved significant results which successfully transformed their organization.

Stage of ego development was measured using a projective sentence completion test. Participants were grouped as having a high stage of development (over stage 4) or not having a high stage of development (at or below stage 4).

Relative complexity of mental processing is the difference between two measures: complexity of mental processing and role complexity. Assessment of complexity of mental processing required interviewing each participant and transcribing the interviews. Observation of the structure of the arguments demonstrated in the transcript determined the complexity of mental processing. Role complexity was measured using the time-span of discretion technique which includes an interview with each participant's direct manager.

Two sets of data were collected: a preliminary set and a final set of site data. The purpose of the preliminary set was to test the various methodologies. Data was consistent between the two sets and allowed them to be combined in arriving at the study's findings.

CHAPTER IV DATA AND ANALYSIS

A greater understanding is being sought as to why so few leaders are able to bring about successful transformation of their organizations. Chapter I proposed that a leader's ability to successfully transform his or her organization is related to the leader's stage of ego development and relative complexity of mental. Chapter II developed a theoretical framework for that thesis. Chapter III described the research design and methodology to carry out the study, including the collection of two sets of data: Abalone site data and preliminary data. Chapter IV presents the data that was collected along with analysis appropriate to research Question 4. Question 4 deals with identifying minimum requirements for leaders who have been successful at transforming their organization in terms of stage of ego development and relative complexity of mental processing. For Question 4 a & b, the data and analysis are organized into two major groupings: Abalone site data, and preliminary and combined data. Following that, Question 4c will be addressed by examining the relationship between stage of ego development and complexity of mental processing, and then by looking at the individual variables.

Abalone site data and analysis

Four independent measurements and one calculated measure are required to fulfill the design of the study in addressing Question 4. These five items were introduced in Chapter I as Figure 1-1. They are: 1) identification of transforming success, 2) stage of ego development, 3) time span of role, 4) complexity of mental processing, and 5) relative complexity of mental processing (calculated by subtracting time span from complexity of mental processing). The data for each of these five items will be introduced separately. The combined information will then be applied to Question 4. Table IV-1 gives the five items of data that will be discussed. (See Appendix E for expanded data tables which include all data collected in both raw and reduced form).

Data were collected at the Abalone site from 24 individuals, yielding 18 complete sets of data and 6 partial sets. Between April 18 and 21, 1995 interviews were held with 21 individuals. Later in June, the 22nd interview was held via telephone. The in-person interviews varied from 75 to 90 minutes in length, the telephone interview was somewhat shorter. Of the 22 people interviewed, 14 were actively engaged in the process

under transformation, the 8 others were in roles impacted by the process but were not directly involved in the process.

Table IV-1. Abalone site data

Serial number of data	1: Exemplar nominations	2: Stage of Ego Development	3: Time Span of role (in stratum)	4: Complexity of mental processing (in stratum)	5: Relative complexity of mental processing (4)-(3)
A01	16 †	5.5 *	5.5	7	1.5 •
A02	15 †	4.0	4.5	5.5	1 •
A03	10 †	3.5	4	5	1 •
A04	6	3.5	4	4.62	0.62
A05	6	3.5	4.37	4.62	0.25
A06	5	4	4.62	4.25	-0.37
A07	3	4	5	4.5	-0.5
A08	2	4.25 *	4	3	-1
A09	1	4	3.25	no data	
A10	1	3.75	4.25	3.75	-0.5
A11	1	3.5	4.65	4.5	-0.15
A12	1	3.5	2.37	3.25	0.88
A13	1	no data	4	no data	
A14	0	4	3.37	5	1.63 •
A15	0	4	4	3.88	-0.12
A16	0	4	2	no data	
A17	0	4	4	3.62	-0.38
A18	0	4	3.5	5.38	1.88 •
A19	0	3.5	4	3.75	-0.25
A20	0	3.5	3.5	3.55	0.05
A21	0	3	4	4	0
A22	0	no data	3	3.5	0.5
A23	0	no data	3.62	3.5	-0.12
A24	0	no data	no data	3.5	

† exemplary * high stage • high MP

Abalone data 1: Identification of transforming performance

At the Abalone site, transforming performers were identified through nomination by their associates. Each of the 22 persons interviewed was asked to identify any number of individuals who he or she felt had contributed to the organization's transformation in an exemplary way, a way of contribution significantly above that made by others. Of the 22, 21 made nominations of from 1 to 8 people. Fifteen members of the current organization received at least 1 nomination. The distribution of nominations is shown as Figure 4-1. Two individuals each received 4 nominations, those individuals were not in the group interviewed, for that reason they are not included in the data shown in Table IV-1.

The exemplary nominations appears to group in three natural sets:
 Low: 12 people with 6 or fewer nominations (1,1,1,1,1,2,3,4,4,5,6,6).
 Medium: 1 individual with 10 nominations.
 High: 2 individuals with 15 & 16 nominations respectively.

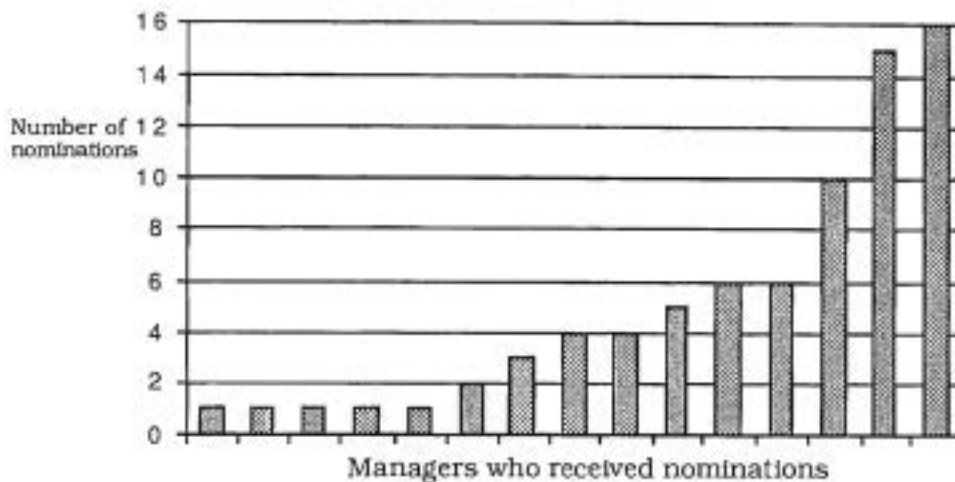


Figure IV-1. Number of exemplary nominations received by individuals.

Because this study is specifically seeking characteristics of transforming leaders, the first examination of the data treats only the two highest individuals as exemplary. The impact of placing the middle individual in either group is also examined. The two (or possibly three) who received the highest number of nominations as exemplary contributors are the ones that have been considered the “transforming leaders.”

Abalone data 2: Stage of ego development

As described in Chapter III, measures of ego development were received from the Center of Creative Leadership in the form of “Individual Protocol Scoring Sheets” (Appendix B, Figure B-1). The total protocol score (TPS) is shown in Table IV-1 (column 2, stage of ego development). The sentence completion test were scored by Susanne Cook-Greuter. At the time of this scoring, she had completed the scoring of over 4,000 of these instruments (personal contact, July 26, 1995). The two individuals who received a total protocol score greater than 4 have been identified as the “high stage” individuals.

Abalone data 3: Time span of role

Time span measures were received as part of the interview protocol (Appendix C). Measures were obtained directly from the managers of 21 of the 24 roles evaluated.

Sufficient information was available to estimate the time span of two of the remaining positions based on Jaques' theories of Requisite Organization (1989). The remaining position was not evaluated since the individual received neither an exemplary nomination, nor submitted a sentence completion test.

Time span measures were then transformed from units of time to units of stratum using the relationships given in Appendix D. The time span data appears in column 3, Table IV-1.

Abalone data 4: Complexity of mental processing

Twenty-one of the 22 interviews were transcribed. The complexity of mental processing exhibited during each interview was observed as described in Chapter III. The results are shown in column 4, Table IV-1. Seven of the interviews were then sent to Dr. Jaques for verification. Five of the seven were the highest levels observed including the interviews of the three individuals who received 10, 15, & 16 nominations as exemplary contributors. The Pearson correlation between the 5 ratings given by Dr. Jaques with the ratings given by the author is $r= 0.987$ (Table VI-2).

Table IV-2. Abalone complexity of mental processing, inter-rater correlation

Observer 1	7.0	5.5	5.38	5.0	5.0
Observer 2	7.5	5.25	5.5	5.0	5.0
Pearson correlation $r=0.978$					

The remaining two (AO4, and A11 in Table IV-1) of the seven observations were referred to Dr. Jaques because this author found them difficult to rate. One was a non-native English speaker. The other exhibited an unusual assemblage of thought. Neither of the two was designated as an exemplar. The complete set of data for all observations, including the ratings of both raters and the raw coding appears as Appendix E, Table E-5.

Abalone data 5: Relative complexity of mental processing

Relative mental processing was calculated by subtracting time span of the role from the individual's complexity of mental process exhibited in the interview transcript. For five of 20 individuals the relative complexity of mental processing was 1 or greater. These five were identified as "high MP" in Table IV-1.

Abalone site data and Question 4

Research Question 4 has three parts. Question 4a relates transforming performance with stage of ego development, Question 4b relates transforming performance with relative complexity of mental processing, and Question 4c relates to the combined effect of the two.

Transforming success vs. stage of ego development (Abalone data)

Question 4a: Does performance as a transforming leader require that a person be above stage 4 of ego development?

The following 2 x 2 table of cells can be constructed from the data in Table IV-1. (The assignment of the specific individuals to the table cells is shown in Appendix E, Table E-1)

To reject the null hypothesis (that high ego stage has no influence on transforming performance) a $p \leq 0.05$ would be desirable. In either case in Table IV-3, the Abalone data fails to support the premise that transforming behavior requires ego development greater than stage 4.

Table IV-3. Abalone data: Transforming performance vs. stage of ego development

	Transforming	not-Transforming
high stage	1	1
not-high stage	1 or 2 2 or 3	14 or 15 15 or 16

Fisher exact probabilities:
with 2 transforming leaders $p=0.994$
with 3 transforming leaders $p=0.980$

Transforming vs. relative mental processing (Abalone data)

Question 4b: Does performance as a transforming leader require that a person possess complexity of mental processing above that which would be required to operate successfully in the same role if transformation were not required?

As in the preceding case, the 2 x 2 table of cells can be constructed from the data in Table IV-1. (The assignment of the specific individuals to the table cells is shown in Appendix E, Table E-1)

Table IV-4. Abalone data: Transforming performance vs. relative mental processing

	Transforming	not-Transforming
high mental processing	2 or 3	2 or 3
not-high mental processing	0	13
	2 or 3	15 or 16

Fisher exact probabilities:
 with 2 transforming leaders $p=0.065$
 with 3 transforming leaders $p=0.012$

In this case the Fisher probabilities bracket the $p \leq 0.05$ desired to reject the null hypothesis (that high mental processing has no influence on transforming performance). If we judge the person who received 10 nominations for exemplary as exhibiting transforming behavior, then the Abalone data would support the premise that transforming behavior requires a high complexity of mental processing. This issue will be treated further in the discussion of the preliminary and combined data.

Summary (Abalone data)

In summary, the Abalone strongly suggest that stage of ego development beyond stage 4 is not required for transforming leadership. The Abalone data indicates that transforming performance may be related to a person having excess capacity of mental processing. That is, that a person who exhibits transforming performance is likely to possess complexity of mental processing at least one stratum above the level required to perform his or her assigned role were transformation not required.

Preliminary & combined data & analysis

Early in the design of this study preliminary data was obtained to help focus the study and to become familiar with the various measurement methodologies. This preliminary data collection is described in Chapter III. Although the measures were taken for familiarization, and to test the research idea, they were as rigorous as the measures made at the Abalone site.

There was a slight difference in the sentence completion instrument used to measure ego development between the preliminary sample and the Abalone sample. The preliminary ego development measure employed a 36 question version of the sentence completion test: for the Abalone site 36 questions were included, but only 24 were used for scoring. The remaining 12 were new questions for which normative data is being collected. Twenty-two of the 24 questions used for scoring were included in the 24 question test used by Torbert in collecting data for 467 managers (Table A-11). The same

person, Susanne Cook-Greuter, scored the instruments for Torbert, Abalone, and the preliminary data.

Preliminary data was collected on 15 individuals. Complexity of mental process data was available for the 15, time span data for 13, and developmental stage data for 4. For three the stage of ego development was at 4, the other was at 4.5. The latter measurement using the Hall-Tanna values inventory as described in Chapter III.

Two of the 15 individuals demonstrated transforming results. The following sections organize the data from Table IV-5 into 2 x 2 cell matrixes and relate the results to research Question 4.

Table IV-5. Preliminary data

Serial number of data	1: Transforming results	3: Time Span of role (in stratum)	4: Complexity of mental processing (in stratum)	5: Relative complexity of mental processing (4)-(3)
P1	1	4.75	6.75	2 •
P2	1	4	5.5	1.5 •
P3	0	2.75	5.5	2.75 •
P4	0	2	2.75	0.75
P5	0	3	3.5	0.5
P6	0	2.38	2.75	0.37
P7	0	2.5	2.75	0.25
P8	0	3.25	3.5	0.25
P9	0	5.5	5.62	0.12
P10	0	2.5	2.5	0
P11	0	4	3.75	-0.25
P12	0	3	2.75	-0.25
P13	0	2.62	2.5	-0.12
P14	0	no data	6.5	
P15	0	no data	4.5	

• high MP

Transforming vs. stage of ego development (preliminary & combined data)

The preliminary data contained three ego development measures, all stage 4. Later a measure was received on a fourth individual at 4.5. Of the four, two had achieved transforming results. Because the total sample size for the preliminary data was small at n=4, no statistical analysis was made. However, the data was added to the Abalone sample to create the larger combined sample that appears as Table IV-6.

Table IV-6. Abalone plus preliminary data
Question 4a: Transforming performance vs. stage of ego development

	Transforming	not-Transforming
high stage	2	1
not-high stage	2 or 3	16 or 17
	4 or 5	17 or 18

Fisher exact probabilities are:
with 4 transforming leaders $p=0.073$
with 5 transforming leaders $p=0.117$

Combining Abalone with the four preliminary points moves the probability closer to a significant value (from $p=0.9$ to $p=0.1$), but does not change the results. The combined data still does not indicate that stage of ego development above stage 4 is required to achieve successful organization transformation.

Transforming vs. relative mental processing (preliminary data)

The preliminary data in Table IV-5 is sufficient to construct the 2 x 2 cell matrix in Table IV-7. The resulting Fisher probability, $p=0.038$, being $<.05$ indicates that the association of transforming performance with high mental process may not be a random finding.

Table IV-7. Preliminary data Question 4b: Transforming performance
vs. relative mental processing

	Transforming	not-Transforming
high mental processing	2	1
not-high mental processing	0	10
	2	11

Fisher exact probability $p=0.038$

Combining the preliminary data with the Abalone site data results in the 2 x 2 matrix in Table IV-8. This yields combined data probabilities of $p=0.0022$ and $0=0.0003$ which are much less than $p=0.05$, our criterion for significance and a strong rejection of the null hypothesis (that high mental processing has no influence on transforming performance). The combined data supports the conclusion that transforming performance requires that the leader possess relative complexity of mental processing at least one stratum higher than the complexity of mental processing needed to function in

his or her assigned role if transformation were not required. This is true whether or not the person who received 10 nominations is judged as being exemplary.

Table IV-8. Combined data: Transforming performance vs. relative mental processing

	Transforming	not-Transforming
high mental processing	4 or 5	3 or 4
not-high mental processing	0	23
	4 or 5	26 or 27

Fisher exact probabilities:
with 4 transforming leaders $p=0.0022$
with 5 transforming leaders $p=0.0003$

Relationship between stage of ego development and complexity of mental processing

Chapter III contains an extensive discussion concerning whether stage of ego development and complexity of mental processing are related or independent constructs. This has a bearing on how these factors might be used for the prediction of transforming performance. Table IV-9 gives the correlation matrix for stage of ego development, complexity of mental processing, and time span of role. In parenthesis, under each correlation, are the correlation values that would be expected if the two constructs were related (the parenthetical values are from Table III-4).

Table IV-9. Correlation matrix: Ego development, mental processing, and time span

	<u>ego stage</u>	<u>mental processing</u>	<u>time span</u>
ego stage	1	0.487 (.3 to .5)	0.284 (.2 to .4)
mental processing		1	0.663 (.7 to .9)
time span			1

Parenthetic values are from Table III-4. They represent values that would be expected if ego stage and mental processing were the related construct. Sample sizes for the three correlations are: $n(\text{stage, mp}) = 21$, $n(\text{stage, ts}) = 21$, and $n(\text{mp, ts}) = 34$. Using Fischer's r -to- z transformation, the one-tailed probabilities that the true correlation is zero are: $p(\text{stage, mp}) = 0.012$, $p(\text{stage, ts}) = .107$, and $p(\text{mp, ts}) < 0.0000$. (See Table E-8)

The statistical significance associated with the correlation between complexity of mental processing and stage of ego development ($r=0.487$, $p=0.11$) does not meet our criterion ($p<0.05$) for rejection of the null hypothesis (that no relationship exist). However, each value in the correlation matrix is close to what would be expected if complexity of mental processing and stage of ego development were related constructs. Correlations close to the predicted values for the full matrix provides some evidence for concluding that stage of ego development and complexity of mental processing are related. The fact the significance of the correlation between the two is not statistically significant, may have resulted from the limited number of high stage individuals in the sample. The need for further research is indicated in this area.

Minimum requirements for transforming performance

Questions 4a & 4b asked about performance relative to very specific limits: must the leader be higher than stage 4, and must the leader possess relative complexity of mental processing greater than one stratum above his or her role. Question 4c invites a more detailed examination of the data for the transforming performers.

Question 4c: Does performance as a transforming leader require that a person possess some minimum level of stage of ego development and relative complexity of mental processing?

This question presents four distinct possible "minimums:" stage of ego development, relative complexity of mental processing, absolute level of complexity of mental processing, and time span of role (a measure of the level of a role in the organization).

Minimum stage of ego development

Of the five transforming performers, four were measured using Loevinger's sentence completion test. The resulting stages were: 3.5, 4, 4, and 5.5. For the fifth one, a member of the preliminary data group, a Loevinger sentence completion test was not available. However, on the Hall-Tanna values inventory, another measure of ego development, that individual responded at 4.5. (No direct correlation data is available between the two measures: however, the Hall's model can be laid over both Loevinger's and Kegan's models to determine the equivalent stage.) The distribution of ego stage measures among the five transforming performers is given in Table IV-10. Neither the distribution using five transforming individuals or the one using four individuals is significantly different from the distribution of stage of ego development among managers in general. The distribution of successful transformers in the combined sample mirrors the distribution of stage of ego development in the managerial population. Based on the data in Table IV-10 the strongest inference that can be made is that a person who

exhibits transforming performance is likely to have developed to at least stage 3.5. Stage 3.5 describes the transition from stage three to stage four.

There is one item of interest here. The transforming individual with the 3.5 stage of ego development is also the person who received the middle range of nominations. That person is the one that was alternately included and not included with the other four.

Table IV-10. Combined data: Distribution of ego development stage among transforming performers

	using four	using five	Distribution of five transforming performers	% of managerial population at or below(1)
below stage 3.5				10%
at stage 3.5		1	20% at or below	56%
at stage 4	2	2	60% at or below	90%
above stage 4	2	2	100% at or below	100%

(1) Managerial population data from Torbert & Fisher, 1992, p. 185.

Applying the Kolmogorov-Smirnov one-sample test (Siegel & Castellan, 1988, p. 51-55) indicates that the distribution of the sample cannot be considered different from the distribution of the population even at the 20% (n=5, or the 15% for n=4) confidence level. (See Table E-9)

Minimum relative complexity of mental processing

The Abalone and preliminary data revealed 8 individuals who possessed relative complexity of mental processing at or above 1. These individuals demonstrated complexity of mental processing at least one stratum higher than required to perform in the role which they occupied if transformation were not required. Of these eight, 5 delivered transforming results. The analysis presented earlier in this chapter indicated that having relative complexity of mental processing greater than 1 is a requirement for transforming performance. However, three of the 8 did not deliver transforming results. The indication is that while transforming performance may require relative complexity of mental processing greater than 1 (e.g. high mental processing), that high level of mental processing does not guarantee transforming results. This study indicates that high mental processing is a necessary but not a sufficient condition for transforming results. There are three other factors listed in Jaques' model for current capability: knowledge & skills, values, and the absence of temperamental dysfunction's that hinder a person from working to his or her potential. It would be worthwhile to revisit the trait or

competency based explanations for transforming success with relative complexity of mental processing as a clearly factor, independent from the other trait constructs.

Minimum complexity of mental processes

Complexity of mental processing for the 5 transforming performers ranged from 5 to 7. These numbers relate to just entering stratum 5 and just entering stratum 7 (Appendix C). The distribution of complexity of mental processing is shown in Table IV-11.

As discussed in Chapter II, a person whose complexity of mental processing is transitioning out of stratum four and into stratum five, begins to move from being limited to abstract thought (one order removed from the concrete) to having the capacity to think in terms of conceptual ideas (two orders removed from the concrete). Typical role titles associated with stratum five are: business unit president, large corporation staff VP, major general, Federal Civil Service of GS 16-18 and SES 2 to 6 (Jaques, 1989, p. 134). It may be that transforming performance requires thinking processes that are needed for persons in roles equivalent to those mentioned above to succeed.

Table IV-11. Distribution of complexity of mental processing (combined data)

Stratum	II	III	IV	V	VI	VII
Transforming	0	0	0	3	1	1
not-Transforming	6	13	7	4	1	0

Minimum stratum of organizational role

The complexity of an organizational role is measured with time span and expressed in stratum. The distribution of roles by stratum appears in Table IV-12. Stratum 4 corresponds to a task with an expected completion two years after it is assigned. The data indicate that those identified as exhibiting transforming results were in roles that would be expected to be able to accomplish tasks that require two or more years to complete.

Table IV-12. Distribution of organizational roles by stratum (combined data)

Stratum	II	III	IV	V	VI	VII
Transforming	0	0	4	1	0	0
not-Transforming	8	9	12	2	0	0

Summary of minimum indicators

The following minimum levels were associated with the transforming leaders:

- Stage of ego development at stage 3.5.
- Relative complexity of mental processing at least 1 stratum above role.
- Complexity of mental processing entering stratum 5
(Capable of delivering task => 5 years in expected duration).
- Role in organization entering stratum 4
(Longest task required by role => 2 years) .

Chapter summary

The purpose of chapter four was to present and analyze the data resulting from the study. Two sets of data were presented. First data that were collected within an organization that had undergone a successful transformation. That organization was referred to as the Abalone site. Second, data that was collected during the design stage of the study. This data was referred to as the Preliminary data. The Abalone and Preliminary data sets were also examined in combination.

The chapter summary responds to research Question 4.

Question 4. Does performance as a transforming leader require that a person:

- a. be above stage four of ego development?
- b. possess complexity of mental processing above that which would be required to operate successfully in the same role if transformation were not required?
- c. possess some minimum level of stage of ego development and relative complexity of mental processing?

Question 4a was very specific in asking whether transforming performance required a stage of ego development above stage 4. No evidence was found to indicate that this is the case. In fact, in seeking to identify some minimum required stage of ego development, as required by Question 4c, no evidence could be found that the

distribution of ego development among persons who were recognized as having delivered transforming results was any different from the distribution of stage of ego development demonstrated by the general population of managers. However, due to the limited number of transforming performers that were examined it would be desirable to measure a larger population.

Question 4b examined the relationship between a person's complexity of mental processing, the complexity required to perform his or her assigned role, and the delivery of transforming results. The study was designed to test a specific level of excess complexity (one stratum) of mental processing over the complexity of mental processing required by the incumbent's role when transformation was not required.

The Abalone data and the Preliminary data each independently provided support to the premise that excess complexity of mental processing (equal to or above one stratum) is a requirement for transforming performance. The combined data provided strong support for the same conclusion ($p=0.0022$ and $p=0.0003$ to reject the null hypothesis that there is no relationship).

Further, in examining the data concerning role complexity, and that concerning personal capacity, in context of Question 4c, two additional minimums were observed. All those in the samples who delivered transforming results possessed minimum complexity of mental processing entering stratum V, and occupied roles at the entry of stratum IV. Minimum stratum IV roles include tasks with a longest time span of 2 years. Minimum stratum V roles encompass tasks with a time span of 5 years.

CHAPTER V
SUMMARY, CONCLUSIONS, IMPLICATIONS
AND RECOMMENDATIONS

This chapter provides a summary of the study, an explanation of its conclusions, a listing of implications, and finally, a number of recommendations for action.

Summary

The problem being studied

Of the many organizations attempting to transform themselves to greatly enhance both their efficiency and effectiveness, the evidence is that most will fail to meet their goals for improvement. By examining two factors that influence the way organizational leaders interpret information (stage of ego development and relative complexity of mental processing), this study provides greater understanding of why it is that so few leaders are able to achieve the transforming results they desire. And more importantly, this study suggests specific actions that will increase the likelihood of a successful organizational transformation.

The problem statement

The problem of major concern is to gain greater understanding of the influence that stage of ego development and complexity of mental processing have on a manager's ability to transform his or her organization.

Review of the Literature

Research Question 2 provided guidance for the review of the literature. That question states:

Question 2. What does existing research show concerning:

- a. the relationship between a manager's success in transforming an organization and his or her stage of ego development?
- b. the relationship between a manager's stage of ego development and his or her complexity of mental processing, and/or

- c. the relationship between a manager's complexity of mental processing and his or her success in transforming an organization?

Leaders who transform organizations

This study sought to differentiate leaders who can transform an existing organization into a more effective organization from those leaders who can effectively operate an existing organization. Note that this study did not seek to differentiate between leaders who are excellent in operating an existing system from those that are less than excellent. Although a myriad of definitions of leadership exists this study was concerned with the type of leadership that Burns termed "transformational." A transformational leader is able to establish a culture built on mutually held (rather than independently held) goals-- a leadership capable of changing the value priorities held by the group.

Organizations desiring to transform themselves into participative, re-engineered, total quality, continuously learning organizations require leaders who can transform. Although each of these labels for change vary, each requires a shift in the values held collectively by the organization.

Meaning-making processes

Throughout history leaders have been observed for their behavior and for their results. This observance of leader's behavior developed into the trait school of leadership. The trait school attributed the leader's results to specific behaviors, and attributed the behaviors to various traits of personality. The trait school has continued to have a major influence on organizations. Three of the many currently popular trait and behavior-based leadership models include: Hay-McBur's competency based modeling, Kouzes & Posner's Leadership Practices Inventory, and The Center for Creative Leadership's Benchmarks. Considerable work has been done to identify effective leadership behaviors. Yet it has been extremely difficult to change the behavior of those in leadership roles. This presents a paradox when Jaques & Clement insist that "effective managerial leadership can be unequivocally and efficiently taught" (1991, p. 303).

Recent leadership and organizational change literature highlights such concepts as: mental models, paradigms, defining reality, dialogue, interpreting, reframing. These terms have to do with the way people "make sense" out of the world around them. In the context of leadership and organizational change the terms refer to the way that individuals and groups come to their individual and collective understanding of reality. It is this individual and shared reality that determines the future individual and

collective action within an organization. As an outgrowth of these thoughts, Charles Palus and Wilfred Drath of The Center for Creative Leadership have introduced the idea of leadership as "meaning-making in a community of practice."

What, more precisely, is "meaning-making?" A more formal, but related idea is epistemology, the psychologist term for the study of knowledge formation in human persons. Epistemology studies such things as "knowledge structures," or "the way people know" the things that they know. Palus and Drath intend that "meaning-making" represents a more practicable aspect of the epistemological idea. They intend meaning-making to *mean* just what people intend it to *mean* when they apply the word in common usage. In one sense, the simple assignment of meaning to symbols such as: "This *means* this," and "That *means* that." In a second sense, as an expression of value, relationship, or commitment: "It was a *meaningful* experience," or "That relationship *meant* a lot to me," or "I *mean* to do this."

Choice of ego development and complexity of mental processing

Two areas of investigation, related to the practical idea of "meaning-making," show promise for pushing ahead the boundaries of knowledge concerning leadership and organizational change. These are developmental stage theory and stratified systems theory. Each of these investigates a different aspect of a person's meaning-making process. Each provides a model for the orderly change and development of these meaning-making processes over time. Each of these is a "stage" theory. As a person progresses from one stage to the next, they do not lose the understandings of the former stage. Rather the understandings of the new stage encompass and enlarge those of the earlier stage. Stage development is like the child's nested boxes. A larger box not only encompasses the next smaller box, but presents a container with capacity to hold more than the smaller box.

Ego development

Piaget laid the ground work for developmental stage theory by observing that as children develop, not only does their capacity to think increase, but their way of thinking changes. Kolberg, Loevinger, Kegan and others extended Piaget's work into the adult years. Kohlberg focused on the change in the structure of a person's moral judgments that accompany development. Loevinger argued that Kohlberg was too narrow in defining a person solely by one's structure of moral reasoning. She developed an instrument for assessing a person's development in a broader sense. She called it ego development. Loevinger, who had a solid background in psychometrics, provided an effective pencil and paper test to measure broad based developmental changes.

Kegan, the more contemporary of the three, also focuses on a broad definition of the person -- in his words "the evolving self." It is Kegan's work that sheds the greatest light on the process that an adult follows during development from one stage to another. Kegan uses an ever widening helix to describe the ever widening issues that individuals deal with as they struggle to balance their "independence from," with their "inclusion in," the world around them. In addition, Kegan has drawn attention to a shift in the society characterized by a greater number of people moving into what he calls "inter-individual" development, a move in which a person changes his or her view from a "self" defined by a set of self-chosen rules of conduct, into a self defined by relationships with other selves. This shift from a "formal operational" viewpoint to a "post-formal" viewpoint is the shift that some believe supports and motivates such organizational movements as empowerment and participative management.

Brian Hall provides another insight into developmental stage change by identifying the stages with clusters of values. In effect, developmental growth describes a predictable progression in the evolution of a person's system of values. Stage of development affects the values that are currently foremost in a person's consciousness. A process of values analysis can provide a profile of the distribution of development within a company. In addition, an organization's documents can be "scanned" to determine the values that are being communicated through the documentation.

Complexity of mental processing

While Loevinger and Kegan were focusing on the development of a broadly defined "self," Jaques was developing an integrated model of managerial leadership and organizational design. As a part of his work, Jaques was seeking to understand a very specific aspect of a person's meaning-making process -- the development of a person's ability to process complex information. In 1994 Jaques and Cason demonstrated that they were successful in identifying a person's "complexity of mental processing"--a factor which determines the highest level of work that a given person can perform within an organization at that point of maturation of mental processes.

Jaques' understanding integrates the individual complexity of mental processing with relationships among the roles, tasks and layering structure of the organization. Stratified Systems Theory (more recently called "Requisite Organization") identifies certain required, or "requisite," relationships that must exist for efficient and effective functioning of the organization. Jaques' recent breakthrough in observing complexity of mental processing integrates with his Requisite Organization model: a model validated

in 30 countries, in diverse organizations, with a population of more than 250,000 individuals.

Combining and contrasting the two

While the two concepts, ego development and complexity of mental processing, impact the way individuals interpret, or make-meaning, of the information they process, there is evidence that they are distinctly different. Hall shows that ego development deals with the evolution of a person's value structure. If values are defined as "the things we attend to" then traits and values are associated ideas. The trait school of leadership presents an instantaneous time picture of a longer term ego development, or values evolution, process. Defining a leader by a specific set of traits or competencies misses the point that a person's current traits, values, and competencies have a past and a future that is different from the present. Lombardo and Eichinger recognize this by proposing 88 work assignments that can promote development of specific aspects of learning in a leader. Jaques, on the other hand, contends that (barring dysfunctional personality problems) a person's personality, values, and temperament have no bearing on that person's capacity to function effectively in an organizational role. He argues that a person's effectiveness in an organizational role is limited only by his or her complexity of mental processing, willingness to commit to do the required work, and accumulated knowledge and experience.

Developmental stage and complexity of mental processing both appear to be vitally important to determining leadership effectiveness, yet only two authors were found who attempted to relate the two concepts. Lewis and Jacobs (1992) contend that leadership style is overemphasized. The real leadership determinant is what they call "conceptual capacity," which they define as a combination of stage of ego development and complexity of mental processing. This study examined both the individual and the combined contribution of stage of ego development and relative complexity of mental processing.

Research relating leadership and meaning-making

Research into the relationship between leadership and meaning-making is limited and somewhat perplexing. Torbert presents evidence that a person's ability to demonstrate transforming leadership greatly increases as he or she transitions into "post-formal" development. He argues further, that a person's transforming ability continues to enlarge with further ego stage development. Torbert and Fisher found that 90% of the 497 managers they tested fell below post-formal stages of development. This

percentage is likely to be lower than the success rate of transforming projects, but numeric data on the latter is not available.

Busch examined ego development among organizational development consultants. If OD consultants, as a group, are viewed as facilitators of transformation, then Busch's data reinforces Torbert's view. He found that 62% of the 29 OD consultants he tested did exhibit post-formal stages of development.

Hirsh, with Torbert's concurrence, reported that the ability of practicing professionals to formulate and carry out strategic plans, and the gross income of their professional practices, were directly related to their stage of ego development. Although Hirsh focused on strategic plans, he described organizations that progressed from one form to another form built on vastly different value structures and internal operating systems -- clearly organizations that exhibited transformation. Using Hirsch's published data, this researcher found the correlation between stage of ego development, as determined through analysis of interview content, and gross income to be $r=0.98$ -- high correlation indeed.

The perplexity mentioned earlier occurred on examination of another part of Hirsch's data. Hirsch assessed ego development two ways: by analyzing interview content, and by administering the Loevinger sentence completion test. This latter test is the same measure of ego development used by Torbert and Fisher, and used in this study. The correlation between the Loevinger measure of ego development and gross income was $r=-0.05$, a statistically insignificant correlation. The two individuals identified as post formal by the Loevinger instrument, were different from the three individuals identified post formal by the interview content analysis. Hirsh attributed the discrepancy in findings to the linear nature of strategic thinking being different from the ego development construct measured by Loevinger's instrument. Yet both Hirsh and Torbert agreed that the content of the interviews did represent the ego stages that were reported.

During the formulation of this study, the author applied Jaques' method for observing complexity of mental processing to the portions of Hirsch's transcripts published with his results. The observed complexity of mental processing correlated with the interview based determination of ego stage, and with gross income ($r=0.85$, and $r=0.82$ respectively). Both correlations are significant at the 0.005 level. The correlation between the Loevinger measures and the observed complexity of mental processing, $r=0.10$, was not statistically significant. These preliminary findings indicate that the factor affecting strategic leadership is not the same factor being measured by Loevinger's

ego development instrument. The significant factor appears to be more closely related to Jaques' observed complexity of mental processing.

Lewis and Jacobs propose that capacity for strategic leadership depends on a combination of stage of ego development and complexity of mental processing. They call the combined factor "conceptual capacity," and argue that "no amount of motivation (or other trait) will make up for lack of conceptual grasp." In measuring ego development they apply the interview protocol developed by Kegan.

Lewis and Jacobs presented ego development and complexity of mental processing data for 28 Army War College students. This is a similar level to organizational managers approaching the general manager or director rank. The correlation was $r=0.59$ which is significant at the 0.002 level. It is important to note that no individual in their sample measured at a post formal stage of development.

In summary, the literature indicates that stage of ego development and complexity of mental processing impact a person's ability to demonstrate transforming or strategic leadership. Yet, there is evidence that what is being attributed to stage of ego development may be something different from ego development as defined by Loevinger's sentence completion instrument.

Design of the study

The design of the study was guided by Research Question 3.

Question 3. What operational methods can be used to:

- a. measure performance as a transforming leader,
- b. measure stage of ego development,
- c. observe complexity of mental processing,
- d. measure the complexity of work associated with a given organizational role, and/or
- e. examine the relationship between stage of ego development and complexity of mental processing?

The design issues raised by this question fell into three categories:

- 1) choice of measures,
- 2) selection of the sample population, and
- 3) methodology for collecting the data.

Choice of measures

The study examined the impact of two independent variables (stage of ego development and relative complexity of mental processing) on one dependent variable (performance as a transforming leader). These three variables had to be measured.

Stage of ego development

Loevinger's Sentence Completion Test was used to measure stage of ego development. This provided results directly comparable to those published by Torbert and Fisher, Hirsch, and Loevinger. Use of the written test removed the need for a second interview with a second trained interviewer which Kegan's interview based approach would have required. When the study was designed, no other well validated, written measure of ego development had been identified.

Relative complexity of mental processing

Relative complexity of mental processing was coined for this study. It is defined as the difference between an individual's observed complexity of mental processing and the complexity for his or her role. The concept is based on Jaques' Requisite Organization model. The Requisite Organization model states that there is a level of complexity which characterizes each role in an organization. Therefore, in order to be successful in a role, a person's ability to process information must equal or exceed the complexity of the information inherent in that role.

Relative complexity of mental processing is the difference between the complexity that a person processes and the complexity of the person's assigned role. The study applied Jaques' methodology for observing complexity of mental processing, as well as his methodology for determining the complexity of a role. The results were converted into "stratum" units. Subtracting the incumbent's measured complexity of mental processing from the complexity of the role yielded the desired "relative complexity of mental processing."

Performance as a transforming leader

A key issue during the design of the study involved the treatment of transforming leadership, the dependent variable. Should transforming leadership be treated as a continuous measure, or should individuals be classified as having or not-having transformed their organization? The research question focused specifically on leaders who did transform their organization, a group whose performance would locate them at the high end of the distribution of performance for all leaders. Because the study examined differences it seemed more important to differentiate between those who transformed and those that did not transform, than to have a precise measure of the

relative performance within each group. Thus the focus of the study argued for classification of the data rather than for measurement of differences.

A second consideration is that both developmental stage theory and stratified systems theory posit that succeeding stages or stratum represent qualitatively different human capabilities. The two theories suggest that individual data be placed in ordinal groups. For these and other reasons, covered in Chapter III, individuals were classified as having or as not-having transformed their organization, as exhibiting or not-exhibiting a post formal stage of development, and as having or not-having complexity of mental processing at least one stratum above the stratum of their role.

The study applied two approaches to classifying leadership performance. Two individuals in the preliminary sample were classified as transforming. The judgment resulted from evidence given to the author in visits to their organizations. In one case, an account of the leader's accomplishments was published as part of scholarly research on employee advocacy. In the main study classification was based on nominations from individuals involved in, and affected by, the change that took place. In both the preliminary and the main study, the results achieved by those classified as transforming were clearly differentiated from those classified as not-transforming.

Criterion for the sample

The original design for the study called for an enriched random sample. The plan was to identify five transforming leaders within a single large organization, then to randomly select 25 other managers. Five leaders classified as transforming would provide a good level of statistical power using the Fisher exact probability non-parametric test. The total sample size of 30 would provide the minimum size needed for the Pearson correlation parametric test (Borg & Gall, p 233). The actual sample included the five transforming leaders. The total sample size was thirty-nine: thirty-seven from two organizations, plus one individual from each of two other organizations.

Data collection

Data collection was essentially the same for all participants. Each participant received the sentence completion test with instructions and a return envelope. Each person was interviewed. The interviews were then transcribed and evaluated by the author for complexity of mental processing. Mental processing results were measured for 36 individuals. Of those, two groups totaling 22 interviews were evaluated by Dr. Jaques. The interrater correlation was $r=0.94$ ($n=20$).

Time span measurements for 34 of the roles were obtained by interviewing the manager for each of the roles. For two of the roles, time span was estimated based on

the location of the role within the organizational hierarchy. In these two cases where time span was estimated, there was little chance that error in the estimates could have affected the categorization of the incumbents in these roles.

Data and analysis

Details of the data, the analysis of relationships among the data, and the statistical significance of the findings are the topic of Chapter IV. In summary the data:

- 1) Showed no evidence that transforming leaders must exhibit a post-formal stage of ego development.
- 2) Showed no evidence that the distribution of stage of ego development among transforming leaders is different from the distribution of stage of ego development among managers in general.
- 3) Showed strong evidence that transforming leaders possess complexity of mental processing at least one stratum above that required to operate at the level of complexity of their assigned role were transformation not required.
- 4) Showed some evidence that there is a correlation between stage of ego development and complexity of mental processing within the range of values included in this study (e.g. below post-formal levels of development).

In summary the following minimum levels were associated with the transforming leaders that were studied:

- Stage of ego development at Loevinger's stage 3.5.
- Relative complexity of mental processing 1 stratum above role.
- Complexity of mental processing entering stratum 5.
(Capable of delivering task => 5 years in expected duration)
- Role in organization entering stratum 4.
(Longest task required by role => 2 years)

Conclusions

Research question 5 provides a practical focus for the conclusions of the study:

Question 5: Can the success rate of efforts to transform organizations be increased through selection of individuals that takes into account stage of ego development, complexity of mental processing, and time span of organizational role?

The data uncovered in this study supports an answer of yes.

Each of the leaders studied who transformed their organization possessed complexity of mental processing at least one full stratum above the level normally

expected in his assigned role. Combining these results with Jaques' Requisite Organization theory, this researcher concludes:

Conclusion #1: The task of transforming an organization must be assigned to an individual who possesses complexity of mental processing at least one stratum above the role accountable to manage the same organization without transformation.

The choice of one stratum difference comes from the research data. Whether it is one half, one, or one and a half stratum may not be as critical as having mental processes within the next higher stratum. This would ensure that the leader's mental processing is one qualitative step above that required by the operating (e.g. non-transforming) role. A parable will help to explain this reasoning:

An operating vice president approached the general manager of a manufacturing operation employing 400 people and manufacturing an annual sales volume of \$50 million.

The VP said, "GM, your plant has been running well with most of your quality, productivity, and return indicators showing gradual improvement. But we are seeing indications in the marketplace that our customers want faster, more predictable delivery, and a greater level of customization. We have two new competitors who have begun to offer these things and we have already seen two of our marginal customers move to the competition. Marketing feels that requests for customized products will increase from 5% to 20% of our orders, and that we will need to decrease our lead time to 10% of the current level, while meeting promised deliveries 99.5% of the time. If we can achieve this in two years we should maintain our market position. If it takes much longer, there is a good possibility that we will lose half of our volume.

"I would like you to look into some of the approaches we have been hearing about and put together a program that will get us to where we need to be within two years."

Although this is a parable, it is representative of literally thousands of situations that have taken place in American manufacturing and service organizations since the 1970's. Here is an interpretive view of what the general manager heard.

"GM, I know that you know how to run this organization. You know what levers to pull to get the results you want. You keep improving the operation. I appreciate that you have a systems model of this plant in your mind. What I would like you to do is to develop a new systems model based on a new set of assumptions. Then identify the connections between the two models, and figure out how to transition to the new one within two years. Oh yes, make sure that you don't lose your place along the way."

Is this required transformation more complex than effective management of the existing operation? Of course it is. The general manager must continue to process the same information as in the past, process new information of similar complexity, and draw meaningful relationships between the two.

The minimum requirement for a person to function in a general manager role (stratum IV), is that the person must be able to make judgments involving symbolic verbal information using parallel processing (see Chapter III, and Jaques & Cason, 1994). For a person with mental processes suitable to stratum IV to bring about a transformation, the maximum complexity of information that must be processed must be at or below symbolic verbal -- it can not be abstract conceptual. However, at this time, such ideas as empowerment, organizational values, and culture, are abstract and conceptual in nature. This leads to Conclusion #2.

Conclusion #2: The task of transforming an organization requires the processing of abstract conceptual information. Therefore, the person accountable for the task must have complexity of mental processing at least suitable for Stratum V work.

A reinforcement of this conclusion comes by examining the time span associated with Stratum IV and V roles. For Stratum IV the longest task is between two and five years: for Stratum V, between five and ten years. The stratum IV thinker can relate today's action to a result two to five years in the future: the stratum V thinker, to results 5 to 10 years in the future. Although the outward signs of a transformed organization may appear in less than five years, most agree that solidification of the change requires more than five years.

Implications

In the last decade Dr. Jaques' Requisite Organization model has gained increasing recognition for its validity in practice. Frankly, this researcher was startled by how effectively, reproducibly, and robustly the Requisite Organization methodologies worked in five different organizations (four field applications beyond those reported here, involving examination of over 400 roles). Jaques asserts that the wholesale application of his concepts could produce efficiency gains of 20 to 30% in two to five years.

Based on this study it is the authors opinion

- 1) That the Requisite Organization model and associated methodologies provide both valid and practical approaches to organizational management.
- 2) That thorough understanding and application of the concepts of complexity of work and complexity of mental processing will lead to more successful matching of tasks to individual capabilities.
- 3) That the proper selection of managers to carry out tasks to transform organizations can reduce the number of failed attempts far below the present near 80% level, and correspondingly increase the number of "stunning" successes.
- 4) That the failure of trait or competency based modeling to adequately consider the importance of role complexity and mental processing will be corrected through application of requisite organization theories.

Recommendations

Apply Requisite Organization principles

- 1) Train managers in the application of Requisite Organization concepts and methodologies. These methodologies provide sound guidance for effective structuring of hierarchies to carry out a specific mission. They also provide powerful tools for management development and incumbent selection.
- 2) Include the observation of complexity mental processing with other pre-hire screening techniques. Unless a person possesses the minimum level of complexity of mental processes to perform a specific role, he or she will fail in that role. With the knowledge needed to make that judgment available it may be deemed a dereliction of managerial responsibility to allow a failure to occur for this reason.
- 3) Apply conclusions #1 & #2 of this study in designing for successful transformations. A failed transformation attempt is costly, in both economic and human terms.

Further research

- 1) Extend research on managers who transform organizations: particularly, investigate complexity of mental processing in individuals beyond developmental stage four (those exhibiting post-formal development). Neither this study nor the work of Jacobs and Phillips included leaders exhibiting post-formal development. Torbert's work addresses post-formal development but does not treat complexity of mental processing. This author, along with Jacobs, Phillips, Palus, Drath, and others, believes that both factors are important and deserve further investigation.
- 2) Seek ways to measure the complexity of a task. Time span measures the complexity of a role not a task. Time span can be used to determine the weight of a role and from

that, the minimum complexity of mental processes required to perform that role are determined. But, time span cannot be used to determine the complexity of a task. If the complexity of a task can be measured, then the minimum complexity of mental processes that would be required for the performance of that task would be identified. The result would be an effective way of matching individuals to the minimum requirements of a task, giving greater confidence that when the task is assigned it will be successfully completed.

3) Investigate whether a group can perform tasks of higher complexity than the mental processing of any individual group member. Research in the realm of development has shown that a group can operate at a higher stage of development than that achieved by any of its members (Hall, 1994). It is not known at this time whether a group can perform a task of greater complexity than the capacity of any of its members. For example, in the phenomenon of problem solving teams, do teams solve problems beyond the complexity of any of the members, or does the solution come because one or more members are functioning at or above the complexity of mental processing inherent in the problem at hand?

4) Examine the function of tools (models, structured problem solving methods, computer-aided decision methods etc.) in moving complex tasks to lower stratum roles. One impact of evolving technology is to simplify formerly complex issues. The technology, in effect, acts on the problem to reduce its complexity so that it can be managed by a person possessing a lower level of complexity of mental processes. The problem can then be moved lower in the organization. The principles surrounding the movement and re-arrangement of complexity need to be investigated.

5) Revisit the research on transforming success using a trait or competency based approach, but overlaid with measures of relative complexity of mental processing and stage of ego development as specifically identified competencies. Examine the relationship between the various competencies.

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APPENDICES

Appendix A

Competency models of leadership

In recent years there has been a resurgence in "trait" related modeling of leadership (Kirkpatrick & Locke, 1991). The current name for this approach is "competency modeling." Competency models focus on the traits and behaviors of the leader. Descriptions of four of the currently popular models follow.

The McBer and Company model — The competent manager

McBer Company (Boyatzis, 1982), in a study partially funded by the American Management Association, defined competency (p. 21) as "an underlying characteristic of a person which results in effective and/or superior performance in a job." Included in their definition were "traits, skills, aspects of one's self-image or social role, or a body of knowledge" which a person uses. They define competencies more broadly than traits of behaviors.

Twelve managerial competencies were identified that relate to superior performance (Boyatzis, 1982). Also identified were seven "threshold" competencies—competencies "essential to performing a job, but not causally related to superior job performance" (p. 23). Data was analyzed on 2,000 people, functioning in 41 management jobs, and representing 12 organizations. Twenty-one jobs and four organizations were from the public sector and the remainder from the private sector, all Fortune 500 companies.

Table A-1. Relevant managerial competencies in private sector organizations (executive level), (Table 12-1, P. 230):

Cluster:	Competency:	Threshold Competency:
Goal and action management cluster Leadership cluster Human resource management cluster	- Concern with impact - Diagnostic use of concepts - Efficiency orientation - Proactivity - Conceptualization - Self-confidence - Use of oral presentations - Managing group process - Use of socialized power	- Logical thought - Accurate self-assessment - Positive regard
Directing subordinates cluster Focus on others cluster Specialized knowledge	- Perceptual objectivity - Stamina and adaptability	- Developing others - Spontaneity - Use of unilateral power - Self-control - specialized knowledge

Appendix A

Campbell Skills Survey

David Campbell (Clark & Clark, 1990, p. 249) reported early findings on using *The Campbell Work Orientations Surveys* to "capture the characteristics of leaders." He reported the ten most frequently reported skills by senior executives as follows (p. 261):

Table A-2. Ten most frequently reported skills by senior executives

Ten Most Frequently Reported Skills by Senior Executives	% responding "Expert" or "Good"
Leading other people, making things happen	91%
Distinguishing right from wrong	90
Acquiring the necessary resources for your plans	90
Inspiring teammates to superior performance	88
Competing against others in challenging situations	88
Following a plan of action, seeing projects through. . .	86
Delegating authority to others	85
Negotiation compromises between conflicting parties	83
Staying calm in crisis situations	83
Supervising the work of others	83

Lombardo & McCauley – Benchmarkssm

Benchmarks was developed by the Center for Creative Leadership as a 360° feedback instrument. Benchmarks is grounded in research that focuses on "how executives learn, grow, and change." The instrument is based on findings that come from analysis of experiences, on the job, that executives relate to significant personal learning. The target audience includes managers through executives. The following information appears in the "sample" Benchmarkssm Feedback Report distributed with information on the instrument.

BENCHMARKS is based on the critical learnings that often lead to success in management and executive roles. Over five years of research with 800 executives in 13 major corporations has revealed:

- Sixteen fundamental skills and perspectives essential to managerial/executive roles
- Six reasons that otherwise promising careers get sidetracked
- Leadership challenges posed by certain management jobs.
- The appropriateness of various problem-solving approaches and operating styles for management effectiveness.

Here are listings of the 16 skills and perspectives as well as the 6 derailment factors.

Appendix A

Table A-3. Sixteen managerial skills and perspectives

Sixteen Skills and Perspectives	
Resourcefulness	Hiring talented staff
Doing whatever it takes	Building and mending relationships
Being a quick study	Compassion and sensitivity
Decisiveness	Straightforwardness and composure
Leading subordinates	Balance between personal life and work
Setting a developmental climate	Self-awareness
Confronting problem subordinates	Putting people at ease
Team orientation	Action with flexibility
Six Derailment Factors	
Problems with interpersonal relationships	Lack of follow through
Difficulty in molding staff	Overdependence
Difficulty in making strategic transitions	Strategic differences with management

Robert E. Kaplan – SkillscopeSM

Skillscope was developed at the Center for Creative Leadership, using a different approach from Benchmarks. Skillscope is grounded in observations of behavior made during the "Looking Glass" simulation which is conducted as a regular part of center programs and inside client companies. The target audience is broader than Benchmarks and includes supervisors as well as managers and executives. Skillscope is a 360° feedback instrument that includes 98 observable behaviors in 14 categories:

1. Getting information, making sense of it: problem identification
2. Communicating information, ideas
3. Taking action, making decisions, following through
4. Risk-taking, innovation
5. Administrative/organizational ability
6. Managing conflict; negotiation
7. Relationships
8. Selecting, developing, accepting people
9. Influencing, leadership, power
10. Openness to influence; flexibility
11. Knowledge of job, business
12. Energy, drive, ambition
13. Coping with pressure, adversity; integrity
14. Self-management, self-insight, self-development

Appendix A

Observations on competency modeling

The preceding competency models are all built on observed characteristics of effective performers. Each item can be defined. There is considerable commonality among the different models. For example, in a meta study of 65 leadership models, 590 factors were assigned to 13 different behavioral dimensions (Mumford, Zaccaro, Harding, Fleisham, and Reiter-Palmon, 1993). Nevertheless, most of the factors that are included lack purity—the factors are combinations of other psychological factors. Of the 14 factors listed in the preceding section (SkillscopeSM) 11 or 12 can be considered to be combinations of knowledge, values and mental capacity. For example, a person's "risk-taking and innovation" (SkillscopeSM, item 4) is a combination of that person's knowledge, values and mental capacity.

Jaques (Jaques and Cason, 1994, p. 20) proposes that a person's capability to do work be thought of in terms of three factors:

First, the level of complexity of mental processing ;

Second, the extent to which a person values (is interested in) or is committed to the particular work; and

Third, the extent to which a person possesses the necessary skilled knowledge for the particular work. (Underlining added)

For professionals tasked with personnel selection and development, these are more fundamental than the competency model factors. Developmental programs designed to modify values are considerably different from those designed to impart skills. From the standpoint of a person who is responsible for designing a leadership development program, knowing the specific values, skills, and mental processing contributions to "risk-taking" is a more powerful tool than simply knowing that "risk-taking" needs to be developed. Competency modeling is an important tool for defining characteristics needed for success in a given role. However, in the realm of developing leaders, the competency model needs to be augmented with Jaques' thoughts on assessing capability.

Appendix B

Sentence Completion Instrument: Research Version
Developmental Pathways Project
Center for Creative Leadership

Appendix B

SENTENCE COMPLETION FOR ADULTS
RESEARCH VERSION: 1993-WUSCT-CCL-M
Center for Creative Leadership and SRC

Name _____

The following pages contain incomplete sentences. Allow yourself enough uninterrupted time to complete each one to the best of your understanding. There are no right or wrong answers and all your responses will be confidential. Thank you.

1. Raising a family -

2. When they avoided me -

3. If my mother -

4. Being with other people -

5. The thing I like about myself is -

6. Education -

7. What gets me into trouble is -

Appendix B

8. If I had more money -

9. When I am criticized, -

10. Rules are -

11. When I get mad -

12. I feel sorry -

13. When they talked about sex, I -

14. A man's job -

15. At times he worried about -

16. I am -

Appendix B

17. People who step out of line at work -

18. I just can't stand people who -

19. My main problem is -

20. For a woman a career is -

21. Sometimes he wished that -

22. If I can't get what I want -

23. Crime and delinquency could be halted if -

24. A good boss -

25. When people are helpless -

Appendix B

26. Being promoted -

27. When I am attracted to someone -

28. Change is -

29. A child has a right to -

30. Most people -

31. When I hit an obstacle, I -

32. The past -

33. A secretary should -

34. My father and I -

35. I know that -

36. When I've finished working -

Appendix B

24 and 36 item
SCT-test forms

Individual Protocol Scoring Sheet

SC#:.....

Sex: m Age: 42 Education: MA
Profession:

Protocol #: COLA

#	✓	Stage	Cat.	other	#	✓	Stage	Cat.	other
1	✓	4	8		19	✓	4	16	
2	✓	4	1		20	✓	3	4	
3	✓	4	10		21	✓	3/4	UC	31+
4	✓	3	1		22	✓	4/5	3	✓
5	✓	4/5	UC	✓	23	✓	4	5	
6	✓	3/4	1		24	✓	4	3	
7	✓	4/5	1	✓	25		4	UC	
8	✓	3/4	UC	31+	26				
9	✓	3/4	6		27				
10	✓	4/3	1	✓	28				
11	✓	4	UC		29				
12	✓	3	3		30				
13	✓	3/4	13		31				
14	✓	4	10		32				
15	✓	4	3		33				
16	✓	3/4	~10		34				
17	✓	4	1	✓	35				
18	✓	3/4	11		36				

Stage	2	Δ	Δ/3	3	3/4	4	4/5	5	5/6	6
Distribution		1	1	3	7	9	3			
24-items Cum. distr.	4	4	2	12	14	18	20	21	21	24
Weighted distr.	2	3	4	5	6	7	8	9	10	11
%										

R5

Ogive	4
TWS	151
TPR	(4)

Distribution										
36-items Cum. distr.	7	7	6	19	22	27	30	32	32	36
Weighted distr.	2	3	4	5	6	7	8	9	10	11
%										
	preconventional			conventional			postconventional			

Ogive	
TWS	
TPR	

Comments:

FIGURE B-1. PROTOCOL SCORING SHEET
6/20/95

Appendix C

Procedure for measuring "time span" of multiple task roles*

Concept of time-span:

All work requires that the individual doing the work continuously balances the pace at which he or she is working and the quality of the output being produced; i.e. must work just quickly enough and just well enough: not so quickly as to produce sub-standard quality; and not so pre-occupied with quality as to be too slow.

The time-span of a role can be thought of in terms of the longest periods of time during which a subordinate's tasks require him/her to be using his/her discretion in balancing pace and quality against each other, while coping with the inherent complexities of each task.

Multiple-task roles:

A subordinate has two or more tasks on his/her plate at any given time, most of which are discontinuous in the sense that they cannot be completed at one go. The person is faced with the problem of ensuring that all the discontinuous tasks are progressed so that each one is completed to quality standards and on time.

General procedure:

Interview the immediate manager to explore the actual assignments that the manager is holding the subordinate accountable for achieving. It is the manager, and only the manager, who decides the "quality/quantity time requirements" (QQTR) of these assignments. The immediate manager's decision about QQTR for any particular assignment is an objective fact, regardless of how the manager might have arrived at that decision.

Where possible it is useful also to interview the subordinate to get his/her picture of the assigned tasks. Any discrepancies between the manager's stated assignments and the subordinate's understanding of these assignments can be used for further clarification of the role.

An official time-span measurement is complete only when the manager's own manager has agreed that the tasks being reviewed are in fact within the manager's authority (terms of reference) to assign.

Procedure for multiple-tasks roles:

The time-span of a multiple-task role is measured by finding those tasks assigned to the role that have the longest target completion time. Three types of assignments should be explored with the manager:

1. Work for which the role has been established;
2. Special projects, e.g. improvement or development projects
3. Staff development (managerial roles), e.g. target time for induction of new subordinates to the point where they can function independently; or for special staff upgrading projects.

* The procedure for determining time span of a multi-task role was received from Elliott Jaques, in November, 1992.

Appendix C

Problem of establishing target completion time — “review” points: Managers sometimes get confused between their own tasks and those they assign to their subordinates. For example, a manager thinks he has assigned an 18 month project to a subordinate: but it turns out that he has the 18 month target, and has assigned only the first phase of 6 months, at which point he will review the work and if satisfactory will then assign a second 6 month task (and finally if all goes well, a third 6 month task).

It is thus necessary to discover for any task whether there are shorter term true review points or simply in-process review points. A true review point is one in which the manager takes back accountability for the project, and then assigns a next phase (it might even be to another subordinate). An in-process review is one in which the subordinate gives the manager a progress report from time to time, and raises difficulties, but the subordinate is left to go on towards completion of the project without the manager’s having signed off on progress to date.

In the true review situation, the subordinate plans the project development only to the review point; in the in-process review situation, the subordinate plans and progresses the project to the end point.

In establishing a precise target completion time, it is often useful to employ a successive approximation (bracketing) procedure, where the manager is unsure about the target completion time for an assignment, (“can’t tell how long it will take” or “finish it as soon as possible” etc.). Pick a much too low target (e.g. one day) to which the manager will say “much too short”; and then an inordinately long target (e.g. 10 years) to which the manager will say “oh no, you don’t understand, I’ve got to have it completed within at least (say) 2 years!”, and you then refine the discussion around the 2 year mark; for example by asking: 3 years? 2 1/2 years? . . . 1 year? 18 months, etc. until you reach a target time about which the manager feels comfortable as the absolute maximum.

Appendix D

Numerical characteristics of the data

Ego development: Scoring of the Sentence Completion Test (SCT)

Stage theories of ego development propose a series of stable ego states separated by periods of transition. The stages are sequential. Numbering each stage and transition serially yields "ordinal" scale data. However, parametric statistics (t-test, F-test, regression, Persons r, etc.) assume the data to be interval scale measures.

The sentence completion test has 36 items. Each of the 36 items within the sentence completion test can be scored at one of 11 levels. Therefore the range of possible scores is 36 (=36x1) to 396 (=36x11). Loevinger & Wessler (1970, v. 1, ch. 6) provide a series of rules to be used in transforming the distribution of individual item scores into a "total protocol rating." The individual items can also be weighted to yield a "total weighted score." The shorthand terms, the weighting values, and Loevinger's stage names are:

<u>Term</u>	<u>Stage Weight</u>	<u>Loevinger stage name</u>
		<u>Pre-conventional</u>
I-2	.5	Impulsive
2/Δ	1	
Δ	3	Opportunistic (self-protective)
Δ/3	4	Self-protective/opportunistic
		<u>Conventional</u>
I-3	5	Conformist
I-3/4	6	Conformist/conscientious
I-4	7	Conscientious
		<u>Post-conventional</u>
I-4/5	8	Conscientious/autonomous
I-5	9	Autonomous
I-5/6	10	
I-6	11	Integrated

Based on the distribution of ego stages among managers (shown in Tables 2-9), 98% are at or above the I-3 (Conformist) stage level. For that level and above the "stage weights" are equal, integer steps. These equal step stage weights lead to total weighted scores that are interval scale in nature, which satisfies first assumption for the use of parametric statistics.

Appendix D

Parametric statistics also assume the distribution of variables be normal. This assumption was tested using the distribution of ego stages given in Table 2-9. An artificial sample, $n=100$, was created. Each "n" was assigned a stage number based on the Table 2-11 distribution and shown below:

<u>Stage number</u>	<u>Distribution of stages in from Table II-10</u>	<u>Frequency of stage # in sample (n=)</u>
2	2% x 100 =	2
3	8%	8
4	46%	46
5	34%	34
6	10%	10
	<u>100%</u>	<u>100</u>

Applying the Shapiro-Wilk W test for normality (SAS, p. 228), indicated that the distribution was not normal at $p < .0001$.

As a next step each point in the sample described above was modified by adding a random number between + and - 0.5. The idea being to simulate the variation that might be expected if the total weighted scores were used rather than the total protocol scores. The result of the Shapiro-Wilk W test was $p = 0.11$ indicating that the distribution of the sample was not significantly different from normal. Based on these results the total weighted scores will be used in calculating Pearson's r for correlation.

Cognitive power: Scoring the Engagement Interview

The engagement interview is scored at two levels. First the maximum level of mental processing and the level of abstraction are identified. Scoring at this level is "relatively" objective because the judgment is made by examining the structure of the argument presented by the subject. This level of scoring assigns one of the categories from the following ordinal sequence (B1 being the lowest rank, and C4 the highest):

B1, B2, B3, B4, C1, C2, C3, C4

The second level of scoring is more subjective. Within each category, a judgment is made as to the "facility" that is demonstrated in the use of the maximum cognitive process identified. The level of facility is scored as: H (high), M (medium), and L (low). Thus each of the categories mentioned in the preceding paragraph, can have three possible scores (e.g. B1 can be scored as B1L, B1M, or B1H).

Time-span: Identifying the complexity of the role

Time-span is determined using the process described in Appendix C. The resulting measure is a discrete period of time, expresses in units of time (days, weeks, months, years). The measures are interval scale measures.

Role complexity: Converting time-span to stratum level

Role complexity is an indirect measure derived from time-span. The transformation is given on the left vertical axis of Figure 3. An extensive discussion of the rationale behind that transformation is the topic of Jaques' "Progression Handbook" (1968).

Appendix D

The stratum designations are I, II, III, IV, V, VI, VII, VIII.

Transforming the time-span measures will result in three levels within each stratum. For example: III_L, III_M, III_H.

Relative cognitive power: Calculating relative cognitive power

Relative cognitive power is defined for this study as the difference between the managers cognitive power and the complexity of his or her assigned role. Cognitive power is indicated by the managers mental processing and measured directly. Role complexity is indicated by the stratum level of the role which is derived from the time-span measure.

Assigning numeric values to cognitive power and stratum measures

Calculating relative cognitive power, a difference measure, requires that numerical values be assigned to both cognitive processing and stratum levels. In choosing the conversion, two aspects of the theory were incorporated: first, the idea that there is a qualitative difference between stages, and second, that there is a progression of the variable within a stage.

The first step in converting the stage is to assign a sequential integer beginning at one. For example, stratum I=1, stratum II=2 etc. Next the value of .25 is added for each successive internal level (Low=.25, Medium=.50, High=.75). For example: stratum III_M = 3 + .50; stratum III_H = 3 + .75; stratum IV_L = 4 + .25. This method of assigning values results in a difference of .25 between internal changes, and a difference of .50 between stages. A complete list of these conversions is given on the following page.

Appendix D

The relationship between complexity of mental processing, time-span, and role-complexity (stratum level)*

<u>time span</u>	<u>(stratum)</u>		<u>numerical values used in calculations</u>
	<u>complexity of mp</u>	<u>role-complexity</u>	
20 years	C2H	VIH	6.75
17 years	C2M	VIM	6.50
14 years	C2L	VIL	6.25
10 years	C1H	VH	5.75
8.5 years	C1M	VM	5.50
7 years	C1L	VL	5.25
5 years	B4H	IVH	4.75
4 years	B4M	IVM	4.50
3 years	B4L	IVL	4.25
2 years	B3H	IIIH	3.75
20 months	B3M	IIIM	3.50
16 months	B3L	IIIL	3.25
1 year	B2H	IIH	2.75
9 months	B2M	IIM	2.50
6 months	B2L	IIL	2.25
3 months	B1H	IH	1.75
1 months	B1M	IM	1.50
1 week	B1L	IL	1.25
1 day			

* This information was taken from Jaques & Clement, 1991, p. 87.
A graphical representation of this information is also included as Figure II-3

Appendix E

Raw Data

The data presented in the body of the dissertation has been organized as appropriate to the questions being addressed and the insights being sought. Appendix E includes tabulations of all the data as it was collected, and details of the various statistical tests that were applied.

Serial number of data	Time-Span in years stratum		MP In Stratum	MP-TS	SCT TWS	SCT TPR	Num. of Nuclei (billions)	Transforming				not-Transforming				
								not high stage		High stage		not high stage		High stage		
								highMP	nhighMP	highMP	nhighMP	highMP	nhighMP	highMP	nhighMP	
A01	est GM	5.5	7	1.5	211	5.5	16	0	0	1	0	0	0	0	0	0
A02	3.5	4.5	5.5	1	155	4	15	1	0	0	0	0	0	0	0	0
A03	2	4	5	1	147	3.5	10	1	0	0	0	0	0	0	0	0
A04	2	4	4.62	0.62	141	3.5	6	0	0	0	0	0	1	0	0	0
A05	3	4.37	4.62	0.25	136	3.5	6	0	0	0	0	0	1	0	0	0
A06	4	4.62	4.25	-0.37	156	4	5	0	0	0	0	0	1	0	0	0
A07	5	5	4.5	-0.5	151	4	3	0	0	0	0	0	1	0	0	0
A08	2	4	3	-1	163	4.25	2	0	0	0	0	0	0	0	1	0
A09	1.2	3.25	no data	?	155	4	1	?	?	?	?	?	?	?	?	?
A10	3	4.25	3.75	-0.5	150	3.75	1	0	0	0	0	0	1	0	0	0
A11	4	4.65	4.5	-0.15	141	3.5	1	0	0	0	0	0	1	0	0	0
A12	0.5	2.37	3.25	0.88	140	3.5	1	0	0	0	0	0	1	0	0	0
A13	2	4	no data	?		?	1	?	?	?	?	?	?	?	?	?
A14	1.33	3.37	5	1.63	160	4		0	0	0	0	1	0	0	0	0
A15	2	4	3.88	-0.12	160	4		0	0	0	0	0	1	0	0	0
A16	0.33	2	no data	?	160	4		?	?	?	?	?	?	?	?	?
A17	2	4	3.62	-0.38	156	4		0	0	0	0	0	1	0	0	0
A18	1.5	3.5	5.38	1.88	151	4		0	0	0	0	1	0	0	0	0
A19	2	4	3.75	-0.25	147	3.5		0	0	0	0	0	1	0	0	0
A20	est GM	3.5	3.55	0.05	145	3.5		0	0	0	0	0	1	0	0	0
A21	2	4	4	0	127	3		0	0	0	0	0	1	0	0	0
A22	1	3	3.5	0.5		?		?	?	?	?	?	?	?	?	?
A23	1.67	3.62	3.5	-0.12		?		?	?	?	?	?	?	?	?	?
A24	no data	no data	3.5	?		?		?	?	?	?	?	?	?	?	?
								2	0	1	0	2	12	0	1	

Notes: "est GM," estimated by Glenn Mohltretter

Table E-1. Abalone site, summary of data

Serial Number	Interv. Sequ.	16 A01	15 A02	10 A03	6 A04	6 A05	5 A06	4 LS	4 RC	3 A07	2 A08	1 BK	1 A09	1 A11	1 A12	1 A10	1 AG
A01	6		1	1	1	1		1	1			1				1	
A02	22	1		1			1	1	1	1							
A03	10	1	1		1												
A04	7	1		1		1	1		1								
A05	11	1	1	1													
A06	13	1	1				1										
A07	14		1	1			1		1						1		
A08	12	1	1	1	1												
A09	9		1	1													
A10	1	1	1	1	1	1	1			1							
A11	18		1				1		1		1						
A12	3	1			1												
A13																	
A14	4	1															
A15	8	1	1														
A16																	
A17	2	1	1	1		1											
A18	15	1			1												1
A19	16	1	1														
A20	21	1	1	1				1		1	1		1	1			
A21	20																
A23	17		1			1											
A23	19	1	1														
A24	5	1															
Totals		16	15	10	6	6	5	4	4	3	2	1	1	1	1	1	1

Rows: Nominations made

First column headings: number of nominations received

Second column heading: Sequence number or initials of person receiving nominations

Columns: Nominations received

Table E-2. Abalone site nominations for successful transformation

Appendix E

Abalone site - Complexity of mental processing data

Serial number of data	Value used for Analysis In Stratum	Raw data converted to stratum			
		EJ Raw →	EJ Stratum	GM Stratum	GM ← Raw
A01	7	c2h/c3l	7	7.5	c3m
A02	5.5	c1m	5.5	5.25	c1l
A03	5	b4h/c1l	5	5	b4h/c1l
A04	4.62	b4m/h	4.62	Deferred to EJ (note1)	
A05	4.62			4.62	b4m/h
A06	4.25			4.25	b4l
A07	4.5			4.5	b4m
A08	3			3	b2h/b3m
A09	Tape damaged				
A10	3.75			3.75	b3h
A11	4.5	b4m	4.5	Deferred to EJ (note 2)	
A12	3.25			3.25	b3l
A13	Not interviewed				
A14	5	b4h/c1l	5	5	b4h/c1l
A15	3.88			3.88	b3hh
A16	Not interviewed				
A17	3.62			3.62	b3m/h
A18	5.38	c1l/m	5.38	5.5	c1m
A19	3.75			3.75	b3h
A20	3.55			3.55	b3m+
A21	4			4	b3h/b4l
A22	3.5			3.5	b3m
A23	3.5			3.5	b3m
A24	3.5			3.5	b3m

Raw data terminology:

MP = mental processes

"b" = Symbolic verbal

"c" = Abstract conceptual

"l,m,h" = low, medium, high

1 = declarative processing

2 = cumulative processing

3 = serial processing

4 = parallel processing

EJ = Coded by Elliott Jaques

GM = Coded by Glenn Mehlretter

For a description of the coding process used refer to:

Jaques & Cason (1994). Human Capability: A study of individual potential and its application. Falls Church, VA: Cason Hall.

The relationship between the raw data and the stratum numbers is given in Appendix C.

Note (1): Unusual structure of expression

Note (2): Non-native speaker

Table E-3. Abalone site complexity of mental processing

Serial number of data	Time span in stratum	MP In Stratum	MP-IS	SCT TWS	Transforming										
					SCT JPH	Success	Transforming		Not-Transforming		Transforming		Not-Transforming		
							highMP	nhighMP	highMP	nhighMP	highSCT	nhighSCT	highSCT	nhighSCT	
P01	4.75	6.75	2	note 1	4	1	1	0	0	0	0	0	1	0	0
P02	4	5.5	1.5	note 2	4.5	1	1	0	0	0	0	1	0	0	0
P03	2.75	5.5	2.75			0	0	0	1	0					
P04	2	2.75	0.75			0	0	0	0	1					
P05	3	3.5	0.5			0	0	0	0	1					
P06	2.38	2.75	0.37			0	0	0	0	1					
P07	2.5	2.75	0.25			0	0	0	0	1					
P08	3.25	3.5	0.25			0	0	0	0	1					
P09	5.5	5.62	0.12	note 1	4	0	0	0	0	1	0	0	0	0	1
P10	2.5	2.5	0	note 1	4	0	0	0	0	1	0	0	0	0	1
P11	4	3.75	-0.25			0	0	0	0	1					
P12	3	2.75	-0.25			0	0	0	0	1					
P13	2.62	2.5	-0.12			0	0	0	0	1					
P14	retired	6.5				0									
P15	no data	4.5				0									
							2	0	1	10	1	1	0	2	

Note 1: The SCT used in the preliminary testing was a 36 question version.

The TWS's were not listed here since they are not comparable with the 24 question version used at Abalone.

Note 2: Developmental stage was measured using the Hall-Tanna values inventory.

The 4.5 value is based on overlaying Hall's developmental model over Kegan's model.

Table E-4. Preliminary data summary

Appendix E

Abalone site data
Complexity of mental processing

EJ	GM
7.00	7.50
5.50	5.25
5.38	5.50
5.00	5.00
5.00	5.00
r = 0.9868	

EJ & GM = assessors initials

Preliminary data
Complexity of mental processing

EJ	GM
5.5	5.25
5.5	3.5
3.5	3.25
2.75	2.5
2.75	2.75
2.5	2.5
2.75	2.25
2.75	2.5
3.5	3.5
3.75	3.75
4.5	4.5
6.5	5.5
5.62	5.5
6.75	6.5
2.5	2.5
r = 0.9370	

Table E-5. Inter-rater correlations for complexity of mental process observations.

Appendix E

	MP	TWS	SCT TPR	Nomin- ations
A01	7	211	4.5	16
A02	5.5	155	4	15
A03	5	147	3.5	10
A04	4.62	141	3.5	6
A05	4.62	136	3.5	6
A06	4.25	156	4	5
A07	4.5	151	4	3
A08	3	163	4.25	2
A09	no data	155	4	1
A10	3.75	150	3.75	1
A11	4.5	141	3.5	1
A12	3.25	140	3.5	1
A14	5	160	4	0
A15	3.88	160	4	0
A16	no data	160	4	0
A17	3.62	156	4	0
A18	5.38	151	4	0
A19	3.75	147	3.5	0
A20	3.55	145	3.5	0
A21	4	127	3	0

Table E-6. Abalone correlations

Appendix E

Sequence number	(stratum) time span	(stratum) MP	TWS	TPR	ExM	MP-TS	Transf	(mp, tpr) $r_{mp,tpr}$	(mp,ts) $r_{mp,ts}$	(ts,tpr) $r_{ts,tpr}$	mp-ts,tpr $r_{mp-ts,tpr}$	(mp,tws) $r_{mp,tws}$
A01	5.50	7.00	211	5.50	16	1.50	1	1	1	1	1	1
A02	4.50	5.50	155	4.00	15	1.00	1	0	1	0	1	0
A03	4.00	5.00	147	3.50	10	1.00	1	1	1	1	1	1
A04	4.00	4.62	141	3.50	6	0.62	0	1	1	1	1	1
A05	4.37	4.62	136	3.50	6	0.25	0	1	1	1	1	1
A06	4.62	4.25	156	4.00	5	-0.37	0	1	1	1	1	1
A07	5.00	4.50	151	4.00	3	-0.50	0	1	1	1	1	1
A08	4.00	3.00	163	4.25	2	-1.00	0	1	1	1	1	1
A09	3.25	5.50	155	4.00	1			1	1	1	0	1
A10	4.25	3.75	150	3.75	1	-0.50	0	1	1	1	1	1
A11	4.65	4.50	141	3.50	1	-0.15	0	1	1	1	1	1
A12	2.37	3.25	140	3.50	1	0.88	0	1	1	1	1	1
A13	4.00				1			0	0	0	0	0
A14	3.37	5.00	160	4.00	0	1.63	0	1	1	1	1	1
A15	4.00	3.88	160	4.00	0	-0.12	0	1	1	1	1	1
A16	2.00		160	4.00	0			0	0	0	0	0
A17	4.00	3.62	156	4.00	0	-0.38	0	1	1	1	1	1
A18	3.50	5.38	151	4.00	0	1.88	0	1	1	1	1	1
A19	4.00	3.75	147	3.50	0	-0.25	0	1	1	1	1	1
A20	3.50	3.55	145	3.50	0	0.05	0	1	1	1	1	1
A21	4.00	4.00	127	3.00	0	0.00	0	1	1	1	1	1
A23	3.62	3.50			0	-0.12	0	0	1	0	1	0
A23	3.00	3.50			0	0.50	0	0	1	0	1	0
A24		3.50			0			0	0	0	0	0
P01	4.75	6.75		4.00		2.00	1	1	1	1	1	0
P02	4.00	5.50		4.50		1.50	1	0	1	0	1	0
P03	2.75	5.50				2.75	0	0	1	0	1	0
P04	2.00	2.75				0.75	0	0	1	0	1	0
P05	3.00	3.50				0.50	0	0	1	0	1	0
P06	2.38	2.75				0.37	0	0	1	0	1	0
P07	2.50	2.75				0.25	0	0	1	0	1	0
P08	3.25	3.50				0.25	0	0	1	0	1	0
P09	5.50	5.62		4.00		0.12	0	1	1	1	1	0
P10	2.50	2.50		4.00		0.00	0	1	1	1	1	0
P11	4.00	3.75				-0.25	0	0	1	0	1	0
P12	3.00	2.75				-0.25	0	0	1	0	1	0
P13	2.62	2.50				-0.12	0	0	1	0	1	0
P14		6.50						0	0	0	0	0
P15		4.50						0	0	0	0	0
	(stratum) time span	(stratum) MP	TWS	TPR	ExM	MP-TS	Transf	21	34	21	33	18
	$r_{mp,tpr}$	0.4674	$n_{mp,tpr}$	21								
	$r_{mp,ts}$	0.6633	$n_{mp,ts}$	34								
	$r_{ts,tpr}$	0.2644	$n_{ts,tpr}$	21								
	$r_{mp-ts,tpr}$	0.4962	$n_{mp-ts,tpr}$	33								
	$r_{mp,tws}$	0.2637	$r_{mp,tws}$	18								

Table E-7. Full data set correlation matrix

Appendix E

Correlation matrix: Ego development, mental processing, & time span
(for Table 4-9)

	r=		n=
r(mp, tpr)=	0.48744	n(mp, tpr)=	21
r(mp,ts)=	0.66334	n(mp,ts)=	34
r(ts,tpr)=	0.28436	n(ts,tpr)=	21
r(mp-ts,tr)=	0.49617	n(mp-ts,tr)=	33
r(mp,tws)=	0.26365	r(mp,tws)=	18

Test of significance of correlation using Fisher's r-to-z transformation (McGee, p. 256)

	z=	se(z)=	s n deviate	p(nd 0,1, one tail, look up)
z(mp, tpr)=	0.5327	0.2357	2.2601	0.0119
z(mp,ts)=	0.7987	0.1796	4.4472	0.0000
z(ts,tpr)=	0.2924	0.2357	1.2406	0.1074
z(mp-ts,tr)=	0.5442	0.1826	2.9808	0.0014
z(mp,tws)=	0.2700	0.2582	1.0458	0.1478

Significance of Hirsh results shown in Table 2-12.

	r=		n=
r(interview, SCT)	-0.1	n=	13
r(interview, ment proc)	0.85	n=	10
r(interviews, gross inc)	0.98	n=	13
r(SCT, mental proc)	-0.29	n=	10
r(SCT, gross inc)	-0.05	n=	13
r(mental proc, gross inc)	0.82	n=	10

Test of significance of correlation using Fisher's r-to-z transformation (McGee, p. 256)

	z=	se(z)=	s n deviate	p(1 tail, look up)
r(interview, SCT)	-0.1003	0.3162	-0.3173	0.6245
r(interview, ment proc)	1.2562	0.3780	3.3235	0.0004
r(interviews, gross inc)	2.2976	0.3162	7.2655	0.0000
r(SCT, mental proc)	-0.2986	0.3780	-0.7899	0.7852
r(SCT, gross inc)	-0.0500	0.3162	-0.1582	0.5629
r(mental proc, gross inc)	1.1568	0.3780	3.0607	0.0011

Significance of Lewis & Jacobs

	r=		n=
r(Kegan, mental proc)	0.59	n=	28

Test of significance of correlation using Fisher's r-to-z transformation (McGee, p. 256)

	z=	se(z)=	s n deviate	p(1 tail, look up)
r(Interview, SCT)	0.6777	0.2000	3.3883	0.0004

Table E-8. Significance of correlation values

Appendix E

	n=	Cumulative distribution		Fraction obs/n	Prediction pop/n	delta	
		sample	population				
below stage 3.5	0	0	10.00	0.000	0.1	0.100	
at stage 3.5	1	1	56.00	0.167	0.56	0.393	
at stage 4	2	3	90.00	0.500	0.9	0.400	<-largest
above stage 4	2	5	100.00	0.833	1	0.167	
	<u>5</u>						

p > 0.20 Look up in table F, p. 330

Kolmogorov-Smirnov

Siegel & Castellan. (1988, p. 51-55). Nonparametric statistics for the behavioral sciences. McGraw-Hill

	n=	Cumulative distribution		Fraction obs/n	Prediction pop/n	delta	
		sample	population				
below stage 3.5	0	0	10.00	0.000	0.1	0.100	
at stage 3.5	0	0	56.00	0.000	0.56	0.560	
at stage 4	2	2	90.00	0.333	0.9	0.567	<-largest
above stage 4	2	4	100.00	0.667	1	0.333	
	<u>4</u>						

p > 0.15 Look up in table F, p. 330

Kolmogorov-Smirnov

Siegel & Castellan. (1988, p. 51-55). Nonparametric statistics for the behavioral sciences. McGraw-Hill

Table E-9. Distribution of ego development among transforming leaders
Four & five with transforming results

Appendix E

Developmental stage vs transforming				
	Transforming		Not-Trans	
Variable	I	II	Combined	
High Stage	1	1	2	
Not high stage	1	15	16	
Total	2	16	18	0.2092
Fisher exact probability =				0.20915033
More extreme				+
	Transforming		Not-Trans	
Variable	I	II	Combined	
High Stage	0	2	2	
Not high stage	2	14	16	
Total	2	16	18	0.7843
Fisher exact probability =				0.78431373
				Probability this could occur at random
				p= 0.9935

Developmental stage vs transforming				
	Transforming		Not-Trans	
Variable	I	II	Combined	
High Stage	1	1	2	
Not high stage	2	14	16	
Total	3	15	18	0.2941
Fisher exact probability =				0.29411765
More extreme				+
	Transforming		Not-Trans	
Variable	I	II	Combined	
High Stage	0	2	2	
Not high stage	3	13	16	
Total	3	15	18	0.6863
Fisher exact probability =				0.68627451
				Probability this could occur at random
				p= 0.9804

Table E-10. Fisher exact probability for ego stage vs. transforming for Table 4-3

Appendix E

Developmental stage vs transforming				
Variable	Transforming		Not-Trans	Combined
	I	II		
High Stage	2	1		3
Not high stage	2	17		19
Total	4	18		22
Fisher exact probability = 0.0701 This table only				0.0701
More extreme				+
Variable	Transforming		Not-Trans	Combined
	I	II		
High Stage	3	0		3
Not high stage	1	18		19
Total	4	18		22
Fisher exact probability = 0.0026				0.0026 Probability this could occur at random p= 0.0727

Developmental stage vs transforming				
Variable	Transforming		Not-Trans	Combined
	I	II		
High Stage	2	1		3
Not high stage	3	16		19
Total	5	17		22
Fisher exact probability = 0.1104				0.1104
More extreme				+
Variable	Transforming		Not-Trans	Combined
	I	II		
High Stage	3	0		3
Not high stage	2	17		19
Total	5	17		22
Fisher exact probability = 0.0065				0.0065 Probability this could occur at random p= 0.1169

Table E-11. Fisher exact probability for ego stage vs. transforming
For Table 4-6

Appendix E

Complexity of mental processing vs transforming (for Table 4-4)

Variable	Transforming		Combined
	I	II	
high mp	2	3	5
not-high mp	0	13	13
Total	2	16	18

Fisher exact probability = 0.0654 Probability this could occur at random

Variable	Transforming		Combined
	I	II	
high mp	3	2	5
not-high mp	0	13	13
Total	3	15	18

Fisher exact probability = 0.0123 Probability this could occur at random

Complexity of mental processing vs transforming (for Table 4-7)

Variable	Transforming		Combined
	I	II	
high mp	2	1	3
not-high mp	0	10	10
Total	2	11	13

Fisher exact probability = 0.0385 Probability this could occur at random

Complexity of mental processing vs transforming (for Table 4-8)

Variable	Transforming		Combined
	I	II	
high mp	4	4	8
not-high mp	0	23	23
Total	4	27	31

Fisher exact probability = 0.0022 Probability this could occur at random

Variable	Transforming		Combined
	I	II	
high mp	5	3	8
not-high mp	0	23	23
Total	5	26	31

Fisher exact probability = 0.0003 Probability this could occur at random

Table E-12. Fisher exact probability for complexity of mental processing vs. transforming for Table 4-4, 7 & 8



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