INFORMATION TO USERS

The most advanced technology has been used to photograph and reproduce this manuscript from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.
Cognitive complexity and time perspective in hybrid organizations

Perlmutter, Sybil, Ph.D.

Case Western Reserve University, 1990

Copyright ©1990 by Perlmutter, Sybil. All rights reserved.
COGNITIVE COMPLEXITY AND TIME

PERSPECTIVE IN HYBRID ORGANIZATIONS

by

SYBIL PERLMUTTER

Submitted in partial fulfillment of the requirements
for the Degree of Doctor of Philosophy

Thesis Advisor: David A. Kolb

Department of Organizational Behavior

CASE WESTERN RESERVE UNIVERSITY

May, 1990
Copyright © 1990 by
Sybil Perlmutter
We hereby approve the thesis of

Sybil Perlmutter

candidate for the Ph.D degree.*

Signed:  

(Chairman)

Date    April 11, 1990

*We also certify that written approval has been obtained for any proprietary material contained therein.
I grant to Case Western Reserve University the right to use this work, irrespective of any copyright, for the University's own purposes without cost to the University or to its students, agents and employees. I further agree that the University may reproduce and provide single copies of the work, in any format other than in or from microforms, to the public for the cost of reproduction.

[Signature]

[Signature]

[Signature]
COGNITIVE COMPLEXITY AND TIME
PERSPECTIVE IN HYBRID ORGANIZATIONS

Abstract

by

SYBIL PERLMUTTER

Today organizations are under increasing pressure to manage the contradictions created by diminishing resources on the one hand versus the existence of multiple options for problem solving on the other. As resources stay static, or increase in scarcity, organizational problems become more urgent, while organizational responses become more delayed and inadequate. Efforts to respond to these problems have taken the form of increasingly hierarchical organizational structures based on the assumption that hierarchies, by definition, will more efficiently and prudently control resources. Thus, hierarchical forms of organization have appeared in work settings formerly managed primarily by mechanisms of collaboration and coordination. In addition, there has been the growing conviction that there exists in the current workforce significant untapped resources which if tapped would address issues of productivity and resource scarcity. An ongoing dilemma has been how to identify and develop untapped resources in the
workplace. This has been particularly true in the health-care industry.

This dissertation studies the ways in which organizational structure influences and shapes the thinking and behavior of its members with particular emphasis on the health care industry. Through the use of Elliott Jaques' Stratified-Systems-Theory, Henry Mintzberg's Theory of Organizational Structures and three psychometric instruments based on cognition (Stamp's Career Path Appreciation, Loevinger's Scale of Ego Development and Kolb's Adaptive Style Inventory), a paradoxical relationship between organizational structures and individual performance is demonstrated. At a time when maximal utilization of the existing workforce is desperately needed, existing organizations are structured in ways that constrain and obstruct the recognition, development and full use of their members' capacities.

Stratified-Systems-Theory offers a useful way of analyzing and designing organizational structures appropriate to the particular organization's purpose. Its very sensitivity to the distinction between associations and hierarchies enables it to identify the critical areas where mechanisms for mutually effective interfaces between professional and administrator must occur. In addition, it provides a framework for analyzing the task complexity of different specialty areas and organizational
levels as well as guidelines for recognizing and developing the
resources of individual members of the workforce.
DEDICATION:

To My Mother

with out whose support I would not have had this opportunity.
ACKNOWLEDGEMENTS

Deciding to pursue a Ph.D. during middle age evolved into a personal odyssey of epic proportions for me. Interest in a Ph.D. had been incubating on an internal back-burner for many years, always curbed from boiling over by an alarmed, but impeccably rational, inner voice that persisted in describing this desire as totally unattainable and grounded in fantasy.

Mid-life is well known as the life-stage that confronts one with the realization that time is no longer (and never really has been), an unlimited resource; that the realization of many cherished goals, dreams, and aspirations are not likely to happen within one's lifetime. It is this very "not likely" quality, that when more positively framed as, "well, maybe," or "might possibly," is not totally hopeless; but rather teases and tantalizes one with wisps of evanescent hope, causing many hours of ruminative and obsessional preoccupation. And, in my case, concluded with the realization that this particular aspiration would be achieved only through a willingness to radically change my lifestyle and to tolerate greater levels of risk and uncertainty than were heretofore typical of me.

As it turned out, the decision to enter this graduate program had to be made within a three-week period, which was probably fortuitous; as more time would have inhibited my impulsivity and
reinforced my common sense. In retrospect, the decision to pursue
my Ph.D. has been one of the best life decisions I have ever made,
as well as one of the most economically ill-founded. I left a
well paying position in the balmy and salubrious California
climate to become an older student with no obvious source of
income in the harsh and capricious Cleveland climate. My Tarot
card is The Fool, one not fully of this world, and clearly in need
of good Karma. And the universe has indeed been beneficent,
providing me with sources of support from all over the United
States, England, and Australia. I am particularly happy to
acknowledge the generous assistance I received during the course
of this work.

(In Cleveland, Ohio)

I am especially grateful to my committee, David Kolb, William
Pasmore, Donald Wolfe, Jim Block and Darlyne Bailey, for their
willingness and ability to support the self-directed older student
part of me, while also providing me with guidance and advice that
has culminated in a product with which we are all pleased.

Special thanks go to my friend and mentor of statistics,
Kerry Glaus, who took upon herself the thankless and never-ending
task of convincing me that "numbers are my friends." She somehow
survived my chaotic organization, my devious procrastination and
my amazingly sluggish and precarious comprehension of matters
statistical.
Elaine Kepner was invaluable as an "idea junky," always available to critically listen to one more concept, theory or model. She was also expert at strategically "noodging" me to "get on with it!" Together, Elaine and Kerry were a formidable force that alternately soothed and reassured me as well as challenged and agitated me ever onward.

Without Tom Evans' generous contribution of the MacPlus and Mike Sokoloff's unstinting willingness to be on-call during the days when the Mac was an Alien from an unfriendly planet, this dissertation would no doubt still be in progress.

And, of course, all of this originated with Rad Wilson's visit to me in California, the Spring of 1985. He had just finished his first year in this program and couldn't stop regaling me with all that he had read and learned and I was so incredibly jealous! Friends for over 20 years, it was intolerable that he might leave me behind. His presence in this program, particularly during personal periods of high stress, has been a steadying force for me.

(In New York)

A brief affiliation with George Harding and the Context VII group precipitated my introduction to Gillian Stamp and Elliott Jaques which subsequently eventuated in a trip to England, an
indepth immersion in their work and obviously, a significant change in the course of my professional life.

I have had the good fortune to meet with Gillian on several occasions both in the U.S. and the U.K., and am particularly appreciative of her ongoing interest in and support of my work, especially during those times when I felt I was moving in new and unfamiliar directions.

And then there are the Macdonald Brothers, Ian and Lt. Col. Rod, who seem to have an unlimited supply of energy and who epitomize British wit, charm, and love of intellectual debate; who generously opened their homes to me and critiqued this work with unexpected vigor and rigor. Colleagues of Elliott Jaques, they have years of experience in the application, modification and expansion of his theories. Access to them has been a unique privilege.

Along about this time I met Catie Burke, California based and a link between Gillian and the Macdonald Brothers. Her comprehensive understanding of the intricacies of Jaques theories and her ability to lucidly describe Jaques theories has made her a wonderful resource. Her generous availability, enthusiasm and encouragement has made her a lasting friend.

While these acknowledgements can never be complete, special thanks must go to Patricia Shea and Branch for providing me a home to commute to while I continued consulting in California and to
Richard Lockwood for providing me the consulting opportunities.

Also my appreciation and profound relief to Retta Holdorf for her willingness to type this manuscript and her patience in walking me through the seemingly unending administrative procedures required for graduation.

Last, but not least, are my children, Rachel and David, in Chicago, who are coming to see Mom graduate in May, 1990.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th></th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>PROLOGUE AND INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Prologue</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Introduction and Overview</td>
<td>5</td>
</tr>
<tr>
<td>II</td>
<td>CHANGE IN HEALTH CARE SYSTEMS</td>
<td>13</td>
</tr>
<tr>
<td>III</td>
<td>CONCEPTUAL BASE OF STUDY</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Stratified System Theory</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Theory of Organizational Structure</td>
<td>42</td>
</tr>
<tr>
<td>IV</td>
<td>HUMAN CAPABILITY</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Cognitive Development: A Conceptual Overview</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>The Career Path Appreciation</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>Loevinger's Model and Measure of Ego Development</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Adaptive Style Inventory</td>
<td>75</td>
</tr>
<tr>
<td>V</td>
<td>HYPOTHESIS, RESEARCH DESIGN AND PROCEDURE</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>History of a Specific Health Care Facility</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Health Care Site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>University Setting Research Site</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>Subjects and Methodology</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>Hypotheses</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>Research Design and Statistical Analysis</td>
<td>106</td>
</tr>
<tr>
<td>VI</td>
<td>RESULTS AND DISCUSSION</td>
<td>109</td>
</tr>
<tr>
<td>VII</td>
<td>SUMMARY AND CONCLUSIONS</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>Career Path and Appreciation</td>
<td>164</td>
</tr>
<tr>
<td></td>
<td>Loevinger's Scale of Ego Development</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>Adaptive Style Inventory</td>
<td>176</td>
</tr>
<tr>
<td></td>
<td>Relationships Among Instruments</td>
<td>182</td>
</tr>
<tr>
<td></td>
<td>Implications for the Future: Uses and Abuses</td>
<td>186</td>
</tr>
</tbody>
</table>

BIBLIOGRAPHY | 191 |
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Three Tier Model of Organization</td>
<td>54</td>
</tr>
<tr>
<td>2</td>
<td>The Experiential Learning Model</td>
<td>76</td>
</tr>
<tr>
<td>3</td>
<td>Current Capacity</td>
<td>110</td>
</tr>
<tr>
<td>4</td>
<td>Potential Mode</td>
<td>112</td>
</tr>
<tr>
<td>5</td>
<td>Discrepancy Between Mode and Current Capacity</td>
<td>114</td>
</tr>
<tr>
<td>6</td>
<td>Loevinger Scale</td>
<td>117</td>
</tr>
<tr>
<td>7</td>
<td>Adaptive Flexibility Total Scores</td>
<td>119</td>
</tr>
<tr>
<td>8</td>
<td>Total Variability</td>
<td>121</td>
</tr>
<tr>
<td>9</td>
<td>Adaptive Flexibility/Active Experimentation</td>
<td>124</td>
</tr>
<tr>
<td>10</td>
<td>Adaptive Flexibility/Concrete Experience</td>
<td>125</td>
</tr>
<tr>
<td>11</td>
<td>Adaptive Flexibility/Abstract Conceptualization</td>
<td>127</td>
</tr>
<tr>
<td>12</td>
<td>Adaptive Flexibility/Reflective Observation</td>
<td>129</td>
</tr>
<tr>
<td>13</td>
<td>Adaptive Flexibility Total Scores</td>
<td>130</td>
</tr>
<tr>
<td>14</td>
<td>Summary of Adaptive Flexibility Scores for Each Group</td>
<td>132</td>
</tr>
<tr>
<td>15</td>
<td>Physicians</td>
<td>133</td>
</tr>
<tr>
<td>16</td>
<td>Nurse-Managers</td>
<td>134</td>
</tr>
<tr>
<td>17</td>
<td>Faculty</td>
<td>135</td>
</tr>
<tr>
<td>18</td>
<td>Graduate Students</td>
<td>136</td>
</tr>
<tr>
<td>19</td>
<td>ASI Directionality Acting</td>
<td>138</td>
</tr>
<tr>
<td>20</td>
<td>ASI Directionality Deciding</td>
<td>140</td>
</tr>
<tr>
<td>21</td>
<td>ASI Directionality Thinking</td>
<td>142</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>22</td>
<td>ASI Directionality Valuing</td>
<td>144</td>
</tr>
<tr>
<td>23</td>
<td>ASI Total Directionality</td>
<td>145</td>
</tr>
<tr>
<td>24</td>
<td>Variability Acting</td>
<td>147</td>
</tr>
<tr>
<td>25</td>
<td>Variability Deciding</td>
<td>149</td>
</tr>
<tr>
<td>26</td>
<td>Variability Thinking</td>
<td>150</td>
</tr>
<tr>
<td>27</td>
<td>Variability Valuing</td>
<td>151</td>
</tr>
<tr>
<td>28</td>
<td>Total Variability</td>
<td>152</td>
</tr>
</tbody>
</table>
LIST OF TABLES

<table>
<thead>
<tr>
<th>Tables</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Strata Bound to Time Spans</td>
</tr>
<tr>
<td>2</td>
<td>Levels of Work</td>
</tr>
<tr>
<td>3</td>
<td>Differences Between Machine and Professional Structural Configuration</td>
</tr>
<tr>
<td>4</td>
<td>Chart of Working Modes</td>
</tr>
<tr>
<td>5</td>
<td>Demands Created by Types of Situation</td>
</tr>
<tr>
<td>6</td>
<td>Research Design</td>
</tr>
<tr>
<td>7</td>
<td>All Directionality Measures Correlated with Age, CPA, Loewinger and Total Adaptive Flexibility</td>
</tr>
<tr>
<td>8</td>
<td>Variability Scores for Deciding, Thinking, Valuing and Acting Correlated with Age, Current Capacity, Mode and Loewinger Scores</td>
</tr>
<tr>
<td>9</td>
<td>Correlations of Current Capacity, Potential Mode and Loewinger Scores with All Measures of Adaptive Flexibility</td>
</tr>
<tr>
<td>10</td>
<td>Generic Descriptors of Work</td>
</tr>
</tbody>
</table>
CHAPTER I

PROLOGUE AND INTRODUCTION

Prologue

We live in times of change. And the complexity of this change is as likely to increase as to decrease in years ahead. Numerous technological, social, and information revolutions are combining to create a degree of flux that often challenges the fundamental assumptions on which organizations and their managers have learned to operate.

Gareth Morgan
Riding the Waves of Change, 1988

Organizational demands to increase productivity in order to maintain competitive positions in the marketplace frequently result in initial improvements only to eventually plateau. Most industries today have exhausted resources to improve productivity. Many are now arguing that there exists in the current workforce significant untapped resources, which if tapped would dramatically enhance productivity. The dilemma has been how to identify and develop untapped resources in the workplace.

The impetus for this dissertation derives from the author's interest and experience with the way in which work is organized in education and health care systems. For the past 20 years the author has enjoyed consulting relationships with a variety of teaching hospitals and has been involved in such activities as: faculty and curriculum development for residency training programs, role clarification and conflict management within and
across specialty departments and health care disciplines, and strategic planning as well as implementation of large system changes in delivery of care.

Complex dilemmas confront both education and health care systems. The abundance of resources available following World War II has steadily diminished, while technology, particularly in health care, has proliferated. Today society is confronted with a wealth of information, knowledge and techniques responsive to problems formerly regarded as beyond human control. At the same time technological advances in health care have outstripped the development of criteria necessary for the appropriate use of sophisticated technology, not only further threatening existing resources, but bringing into question the very way health care is organized as well as what care should be provided.

Today health care is delivered through bureaucratic organizations that are under increasing pressure to manage the contradictions created by diminishing resources on the one hand versus the existence of multiple options for problem solving on the other. As resources stay static (or increase in scarcity), ensuing problems and dilemmas are experienced with greater urgency, while organizational responses are experienced as absent, delayed, or frequently inadequate. From the author's perspective as a consultant, the gap between identified problems and organizational responses is an ever widening one.
For example, the following scenario commonly encountered in health care settings, illustrates the mutual influence individual member and organizational structure exert on each other.

The setting is a busy trauma center in a combined county-teaching hospital. For several years the performance of the Emergency Medicine Nurse-Manager has been unsatisfactory according to the experiences of the medical staff with whom she works. A civil service employee, the Nurse-Manager reports to an Associate Administrator. Her relationship to the medical staff is under-defined and resembles a matrix with a dotted line to the Emergency Medicine Medical Director. She has no clearly articulated accountabilities and authorities vis a vis the medical staff. The Associate Administrator supervising the Nurse-Manager is too far removed from the Nurse-Manager to be aware of specific performance behaviors. Confused about the Nurse-Manager's accountabilities and authorities, and reluctant to complain beyond the boundaries of the trauma center, the Medical Director fails to document increasing incidents of unsatisfactory performance.

Eventually the Medical Director does complain to hospital administration, but complaints go unheeded because of lack of written documentation and seniority of the Nurse-Manager. In addition, the consequences of the Nurse-Manager's poor performance are not seen outside of the trauma center. Invested in maintaining the positive reputation of the trauma center, the Medical
Director creates a position of "liaison" between the medical staff and nursing which consists of one of the physician staff members assuming more and more Nurse-Manager functions. While the trauma center reputation remains unblemished, the "liaison" position results in increasing resentment of nursing by the medical staff. When the Nurse-Manager finally resigns, the medical staff withdraws from her successor, using this transition period as an opportunity to draw tight boundaries around themselves and create discrete sub-systems that function in parallel rather than collaboratively.

This scenario, based on actual events and occurring over a period of several years, richly illustrates a multitude of structural and managerial misadventures; the consequences of which continue to persist through the present time. In so doing, this scenario sets the stage for the following questions to be explored by this dissertation. Specifically:

1. Does organizational structure influence and shape the thinking, cognitive-complexity and adaptive behavior of its members?

2. Is the organization structured in a way that makes maximal use of the thinking, cognitive-complexity and adaptive behavior of its members?

3. Are there differences in the adaptive behaviors of individuals in different work settings, different organizational levels or occupational groups?
Introduction and Overview

Ours has become for better and for worse, a society of organizations. We are born in organizations and are educated in organizations so that we can later work in organizations . . . Organizations supply us and entertain us, they govern and harrass us . . . Finally, we are buried by organizations.

Henry Mintzberg

As early as the 1940's, Elton Mayo identified the pivotal role of industrial organizations in influencing the quality of individual lives and the quality of civilization. More recently, Charles Perrow (1988), Elliott Jaques (1969), and others have reported that at least 90 per cent of the workforce throughout the Western world is employed in some form of bureaucratic organization. Thus, organizations now have the capacity to, and do, shape both the thinking and the behavior of working adults in our societies.

Since Mayo wrote his book, and particularly during the decade of the '80's, all industrial organizations in the U.S. "... including the service and financial sectors, high technology as well as heavy industry [have developed] serious problems" (Lawrence, 1983, p. ix). The American industrial scene is plagued by "... declining productivity, unemployment, high interest rates, inflation, an aging workforce [and] a worsening trade balance" (Lawrence, 1983, p. x). While there is much debate,
there is no agreement on the causes of other difficulties. In addition, little attention is given to "... the internal capacities of business organizations that determine whether or not they can cope creatively with significant changes in their environment" (Lawrence, 1983, p. x). In summary, the very organizations which shape the thinking and ultimately the behavior of its members and thereby of society as a whole, are distressed organizations. And distressed organizations inevitably distress their members as well as the society in which they are embedded.

This dissertation examines higher education and health care as industries. In this dissertation, emphasis will be on the health care system with the data obtained regarding higher education used primarily for purposes of comparison and contrast. Studies of health care and higher education institutions frequently describe them as entities significantly different from product-oriented organizations (e.g., Jaques refers to them as "Associations," 1989), and/or emphasizes how the professionalism basic to both education and health care drives the organizations of which they are a part, thereby making them significantly different from organizations driven by pure hierarchical models of administration.

The forms of organizations common to institutions of higher education and health care will be examined through two very different theoretical frameworks: the "Stratified-Systems Theory"
of Elliott Jaques and Henry Mintzberg's "Theory of Organizational Structures."

The Stratified-Systems Theory of Elliott Jaques weds a general theory of organization with a theory of human capability. It encompasses broad areas of organizational design, management and the psychology of work. For purposes of this study the following four features of Stratified-Systems Theory are of particular relevance:

1. The distinction between an association and a bureaucratic organization;
2. The definition of work and work strata;
3. The patterns of development of human capability; and
4. The "depth" structure of bureaucratic organizations.

Central to Henry Mintzberg's theory of organizational structures, is a typology of organizational configurations that provides a broad spectrum of possible organizational arrangements. Mintzberg's typology provides a frame of reference from which it is possible to categorize organizational structures as well as to illustrate combinations of organizational structures existing within the same institution; and it is this last feature that is of particular value to this study. Combinations of two or more structural configurations within one institution are known as "hybrid" organizations and will be referred to as such throughout this study.
In this study the researcher attends to two different organizations and their environment as well as to the relationship between them and their individual members. A teaching hospital and a graduate program in a university were the research sites for this study. Two different kinds of population were studied in each organization: physicians and nurse-managers in the first, faculty and graduate students in the second.

There are four specific objectives of this research:

1. To examine the extent to which Jaques' stratified-system theory is useful in understanding health care systems as a form of hybrid organization.

2. To expand existing theory regarding characteristics of hybrid organizations and to further understanding of conflicts inherent in the particular hybrid organizations examined in this work, e.g., health care and a university graduate program.

Mintzberg's concept of hybrid organizations offers a way of better understanding the complexities of health care systems. According to Mintzberg, hybrid organizations are those organizations in which two or more kinds of structural configurations exist within one institution. Health care, particularly hospitals with their medical staff organization and their administrative operations organization, exemplify what is meant by a hybrid organization. The medical staff of a hospital functions as a professional bureaucracy, while hospital administrative officers
operate a hierarchical bureaucracy. While this classification has been widely recognized, it has not been examined through the approach proposed in this dissertation, i.e., the use of Elliott Jaques Stratified-Systems Theory. It should be noted that Jaques makes a distinction between hierarchical bureaucracies and associations, and explicitly discourages application of SST to associations. This is mentioned because Mintzberg's professional bureaucracy is very similar to and overlaps with Jaques' definition of associations. However (as will be discussed in greater depth in later portions of this dissertation), recent trends in health care have been directed towards the hierarchical bureaucratization of the practice of medicine. It is through the application of Stratified-Systems Theory to health care systems that historical and current cultural clashes and operational incompatibilities between the professional and hierarchical bureaucracies are explicated.

3. To describe the relationship between the individual and the workplace in hybrid organizations through data generated from three measures of cognitive functioning. In this study the relationship between the individual and the organization is of paramount interest, particularly as it occurs in health care organizations which are staffed by a variety of professionals of uneven status. The researcher assumes that one of the problematic features of organizations in general, and for the purposes of this
study, health care in particular, is that they neither recognize nor fully utilize their existing human resources:

... even though elaborate personnel and organizational development programs have emerged over the last decade in both the public and private sectors, the productive use of human [resource] skills ... particularly ... in the strategic planning and decision making process of organizations remains a relatively primitive art ... surprisingly, organizations often thwart, block, or drive out ... the very talent they require for their future survival! At the very least, most organizations lack well established human [resource] programs designed to search for and consciously use their employees’ ... talent in the strategic-planning process. As a result, this talent is either not used, suppressed, or lost altogether (Agar, 1989).

In his theory of stratified-systems, Jaques addresses patterns of cognitive development or, what he refers to as human capability. According to Jaques, individuals differ in their capacity to manage complexity. He refers to "work-capacity" (or "cognitive-complexity") as interchangeable with the levels of abstraction at which individuals function. In the context of this study, cognition describes reasoning, judgment and decision making functions. Organizations are fully utilizing the capacities of their members when they recognize the cognitive capacities of their individual members and place them in positions in which their capacities correspond to the complexities of the work to which they are assigned.

4. To examine construct validity for Career Path Appreciation (CPA) measures of cognitive complexity by computing correla-
tions between CPA measures, Loevinger's Scale of Ego Development and Kolb's Adaptive Style Inventory.

Given Objectives 3 and 4 above, the following three psychometric instruments designed to tap different dimensions of cognitive-complexity were used: (1) The Career Path Appreciation (CPA) by Gillian Stamp which builds on Jaques' Stratified-Systems theory and demonstrates a connecting link between individual meaning-making and organizational structure (Stamp, 1986); (2) Jane Loevinger's Sentence Completion Test which is based on a stage theory of ego development (Loevinger, 1970); and (3) The Adaptive Style Inventory (ASI) which presents additional ways of describing individual adaptive behaviors (Kolb, 1984). All three instruments are rooted in the cognitive development theories of Jean Piaget.

The remainder of this dissertation consists of six chapters. Chapter II presents a brief history of significant changes in health care systems in the United States. Chapter III describes and contrasts Jaques' Stratified Systems Theory with Mintzberg's Theory of Organizational Structures. Chapter IV continues the study of human capability begun by Jaques through an overview of cognitive development and the three measures of cognitive complexity. Chapter V discusses hypotheses, research design and methodology, while Chapter VI presents the results and discussion.
Chapter VII summarizes the theoretical and methodological contributions made during the course of this research and identifies areas for further study.
CHAPTER II
CHANGE IN HEALTH CARE SYSTEMS

As we move toward the 21st Century, it is hard to believe that barely a century ago hospitals cared primarily for the indigent and that the practice of medicine was not regarded as a profession. Before the proliferation of medical technology, the common sense care available at home was as effective as treatment provided by physicians and usually less traumatic:

From their earliest origins in pre-industrial societies, hospitals had been primarily religious and charitable institutions for tending the sick rather than medical institutions for their cure. . . . From refuges mainly for the homeless poor and insane, they evolved into doctors' workshops for all types and classes of patients (Starr, 1982, p. 145-146).

It was in the hospital that physicians were able to study the course of disease processes as presented by their patients. Cure was not an expectation. Recovery was by chance rather than by skilled medical intervention.

The transformation of the hospital occurred gradually from philanthropically funded, modest resources in which to study disease, to large chaotically administered organizations equipped to rapidly identify and reverse disease processes. Many forces contributed to this transformation. Increasing urbanization and technological breakthroughs such as the discovery of antiseptic, anesthesia, antibiotics and vaccines were but a few of the
advances that precipitated dramatic changes in the medical profession and the health care industry. More recently, procedures once relegated to the province of science fiction fantasies (e.g., organ transplants, open-heart surgery, resuscitation techniques), and now done on a daily basis, has further accelerated radical changes in the delivery of health care. Because many of these discoveries occurred during a time of abundant resources, the development of the medical profession was not only encouraged, it was idealized. At the same time the espoused ideology of the U.S. supported a social commitment to good health for everyone at any cost. Health care in the U.S. was based on a tradition of philanthropy:

... although a hospital is similar to a business enterprise in its technical processes, at no time did economic values predominate in hospitals; rather [the hospital was operated] in a spirit of social or public service prompted by the importance and need of serving individuals and the community (Falk, et al., 1933, p. 306).

Hospitals continued to provide care to those unable to pay for it and placed the goal of providing the best possible care to patients above the quest for efficiency (Lawrence 1983, p. 95).

The rise of hospitals, as of universities, offers a study in the penetration of the market into the ideology and social relations of a precapitalist institution. As the university became more actively concerned with preparing students for practical careers, it moved from gentlemanly to utilitarian values and accorded more prominence and autonomy to its professors. As the hospital advanced in its functions from caretaking to active treatment, it shifted in its ideals from benevolence to professionalism and accorded its physicians greater power. In orienting their efforts to newly market-
able services, both institutions became less concerned with moral supervision and turned more squarely to professionals to carry out their new productive functions (Starr, 1982, p. 148).

A few of the developmental milestones contributing to the idiosyncratic organization of the health care industry as we know it today are discussed. As medical practices and procedures grew more sophisticated and complex, both hospitals and the medical profession developed simultaneously and in an unusual reciprocal relationship to each other. The status of physicians grew as their knowledge base and technical skills became more specialized. By referring patients to the hospital who could afford to pay for increasingly costly services, they generated income not only for themselves but for the hospital as well. "This economic leverage and technical knowledge put physicians in a better position to dictate the terms of their relationship to hospitals" (Lawrence, p. 90). And the preferred relationship for physicians has been one of independence and professional autonomy. Rather than be employees of a hospital, they were consultants to, or members of, an attending staff of the hospital. According to Eliot Freidson, medicine has remained a consulting profession in which members define their own goals:

... as opposed to a "scholarly profession" like scientific research or ... an "administrative profession" like management, in which goals are set by larger communities or institutions. Doctors are largely independent of hospitals, beyond administrative control. Indeed, it is sometimes
remarked that doctors "look like individual entrepreneurs who happen to conduct their business on the hospital's premises" (Freidson, 1979, p. 183-184).

By the mid '40's the sources of hospital revenue had changed in a way that undermined efforts to improve administrative efficiency. While the numbers of paying patients continued to increase, philanthropic support was replaced by government subsidies and private insurance programs. Initially government support was in the form of constructing and maintaining facilities for veterans and members of the armed services. This was soon followed by state and federal contributions to hospital budgets. The beginning of "third-party payers," these contributions inflated hospital costs almost immediately. Following World War II resources were lavished on the health care industry by the federal government and private insurance agencies. Intended to guarantee health care as a constitutional right, an unexpected consequence of third-party payments "has been to subsidize the extravagant growth of hospital technology and services" (Lawrence, 1983, p. 98) and to encourage hospitals "to produce a more expensive product than consumers actually wish them to produce" (Feldstein, 1971, p. 71). Excited by spectacular medical successes, the public has steadily demanded increasing medical care and ongoing support for technological advances. The prepaid insurance customer is:

... willing to purchase much more expensive care than [they] would if [they] were not insured ... This induced
demand for expensive care gives a false signal to hospitals about the type of care that the public wants. Unfortunately the production of high cost hospital care stimulated patients to prepay hospital bills through relatively comprehensive insurance, while the growth of such insurance makes hospital care more expensive (Feldstein, 1971, p. 71).

Until the advent of the Diagnostic Related Groups (DRG's) which signaled a profound change in the reimbursement structure at both a federal and state level, physicians continued to occupy "an anomalous position in hospitals." Only recently has there been a trend (albeit, not a popular one), for physicians to become hospital employees no longer shielded from financial pressures. Traditionally, physicians have instituted key policies:

Most elements of hospital and medical care costs [were] based on professional medical judgment. The judgment [included] the decision to order various diagnostic or therapeutic procedures for patients, and the larger decision as to the type of facilities and services needed by an institution for proper patient care. For the most part, these professional judgments [were] rendered outside of any organizational structure that [fixed] accountability for the economic consequences of these judgments (Fuchs, 1974, p. 81).

By the mid '70's it was becoming clear that the "extravagant technological growth" (Lawrence, 1983, p. 86) in health care that so flourished during the post-World War II years, had not only outstripped the economic resources required to support continued growth; it also stressed the ability to sustain the level of technology developed during the latter half of the 20th Century. For the past 15 years, at least, the health care industry has been in a state of crisis. Its history of social and public service for all has been increasingly eroded. Its tradition of no limits
to professional growth or technological development has been succumbing to less desirable practices entailing limited or no growth. There has been increasing lack of access to the health care delivery system, particularly for members of lower economic groups as a result of ever-escalating medical costs combined with the closure or downsizing of many health care facilities. There is a frantic effort to develop more cost-effective methods of operation with the caveat of not compromising quality of care. The need for new efficiencies in the delivery of health care continues to intensify.
CHAPTER III

CONCEPTUAL BASE OF STUDY

Introduction

In the hospital, people with extremely different skills and abilities . . . are in frequent interaction within a work structure whose requirements for functional interdependence and close cooperation are unmatched when compared to the great majority of complex human organizations of similar size . . . When compared with organizations of similar size, the hospital has a remarkable division of labor: specialization of roles and functions . . . reach extremely high levels both in intensity and intensiveness . . . The sources and possibilities of stress, friction and misunderstanding are numerous, while the impact of errors and difficulties can readily generalize throughout the entire system . . . The fact that the system can contain and resolve conflicts and contradictions to the extent that it does is an important result of member adjustment, voluntary cooperation, and involvement, more than it is an outcome of formal authority sanctions, high professional standards or monetary rewards to complying participants (Geogopoulos, p. 19, 1972; emphasis mine).

A review of sociological and organizational literature of the '60's and '70's (Heydebrand, 1965, 1973; Geogopoulos, 1972; Mintzberg, 1976; Perrow, 1965) presents strong arguments that hierarchical bureaucracies do not work well in health care organizations. While some form of hierarchical organization is acknowledged as necessary, it is clearly not regarded as sufficient for successful delivery of care. Rather, emphasis is placed on the organization's capacity for collaboration and coordination across disciplines and functions:
.. increasing complexity generates not hierarchical but lateral modes of coordination through horizontal communication and interaction between subunits ... the more complex organizations become, both internally and in their goal and task structure, the more likely will non-hierarchical modes of coordination predominate, and the less likely will bureaucratic-hierarchical modes of coordination be prevalent (Heydebrand, 1973, p. 160).

Considerable interest is expressed in the mechanisms that must be in place to support processes of collaboration and coordination in complex health care organizations. Based on the empirical evidence available in this literature, as well as the author's personal experience in health care organizations, it seemed logical to expect that forms of collaboration and coordination would be developed further during the '80's. And yet, the very opposite has been true. The past 17 years in health care has been marked by a profound shift towards increasing hierarchical structures. The reasons for this shift have been discussed in earlier portions of this study. As has been noted, while issues of economics and technology increased, clearly identified authorities and responsibilities became increasingly blurred. In fact, there seemed to be a growing abdication of authority. Like the game "hot-potato," authority was denied and rapidly passed on as "someone else's job." Poor or high risk decisions were replaced by poorer or no decisions, coordination slipped to disorganization and chaos replaced coherence. In the absence of a coherent sense of purpose and direction, hierarchically structured organizations
began to look increasingly attractive. And yet, their pitfalls and shortcomings (enumerated at such length in the writings of the '60's and '70's) remain. For the purposes of this study, the notion of "bureaucratic versus non-bureaucratic" (Heydebrand) or "hierarchical versus professional" (Georgopoulos) or "hybrid: mechanical/professional" (Mintzberg), or "hierarchy versus association" (Jaques) all describe organizational configurations that are polar opposites. No organizational configuration is absolutely pure (Mintzberg); nor does one organizational configuration have embodied in it all the solutions to the problems described as plaguing health care today. And yet, the momentum carrying health care towards more and more hierarchical forms of organization continues unabated.

This dissertation rather than continuing to elaborate the limitations of hierarchical structures in health care has instead assumed an "aikido" posture: that of deliberately going with the momentum and exploring health care systems through the lens of Jaques' "Stratified-Systems Theory." This has been done for two main reasons: (1) Given current trends, health care will be hierarchically organized for an indeterminate period of time; and (2) given that some form of hierarchical organization is acknowledged as necessary, if not sufficient, Jaques' Stratified-Systems Theory offers a precise and comprehensive description of components essential to a successful hierarchical organization. If Health
care must be hierarchical, the more that is known about successful hierarchies, the better. In addition, Jaques' concepts regarding "human capability" have applicability to all forms of organizational configurations, hierarchical, or otherwise.

Stratified-Systems Theory

Elliott Jaques has brought together psychoanalytic and sociological theories and has applied them to organizational contexts. Drawing heavily on the works of Melanie Klein, Piaget, Durkheim, and Weber, as well as others, Jaques presents a convincing picture of the nature of work, how it is organized and how it is experienced by the individual worker:

Working for a living is one of the basic activities in a man's life. By forcing him to come to grips with his environment, with his livelihood at stake, it confronts him with the actuality of his personal capacity to exercise judgment, to carry responsibility, to achieve concrete and specific results . . . it confronts him with the quality of enthusiasm or apathy which he brings to his work, he is faced with the state of the balance between the forces of life and the forces of death within him. In short, a man's work does not satisfy his material needs alone. In a very deep sense, it gives him a measure of his sanity (Jaques, 1961).

One of Jaques' major arguments is that work can be organized properly, e.g., with an appropriate stratified structure that supports the successful execution of the work of the organization.

... widespread activity these days to try to formulate the new type of organization for the information age that will be needed for management in the 1990's and beyond ... [underlying this activity] is a strong aspiration towards something better than what we have had so far in our employment systems; to remove the constriction of initiative, bureaucratic redtapeism, weak or autocratic leadership, unclear accountability and authority ... The world does not need some new type of organization to replace the [bureaucracy], but rather that the [bureaucracy] is the one and only type of organization ... that can employ people and that we have never properly understood it or used it (p. 3).

Jaques proposes that Stratified-Systems Theory provides the necessary "... concepts and principles to bring some order into the largely fragmented field of organization and human resourcing" (p. 3).

During the past two to three decades "bureaucracy-bashing" has become a familiar and righteous act so that the previous quote is almost a revolutionary thought. According to C. Burke:

There are many hypotheses as to why human beings create hierarchical organizations. Many of these assume hierarchy is somehow unnatural and reflects the domination of the few over the many. The origins of hierarchy are traced to the brute force of armies and the scheming of men who would be king (1989, p. 57).

However, the work of Elliott Jaques and Gillian Stamp offers an alternative explanation. Jaques and Stamp suggest that hierarchical systems are structured by humans as a means of adapting to the varying complexity of their environments. At the same time, hierarchical structures reflect the varying abilities of individuals to solve problems of greater or lesser complexity as required by their environment. Stewart (1986) argues that hierarchical
structures are essential during times of environmental turbulence. It is at such times that problems of increasing complexity arise requiring higher-order thinking to manage. "Humans can no longer turn to solutions created by their ancestors because under new conditions, the old solutions fail . . Where the environment is stable, however, hierarchy is not required" (Stewart, 1986).

This is contrary to popular notions in the United States where rapid rates of change in organization environments demand rapid responses from the organizations. It is often thought that hierarchical structures obstruct timely organizational responses and this has led to efforts to flatten organizational structures in many industries:

The belief that hierarchies are nonadaptive under changing conditions may be the result of observing badly structured hierarchies where the structure and associated roles have become ossified and static and have lost touch with their original purposes . . . Stewart [claims] that a hierarchy is the most effective organizational form to deal with a rapidly changing environment if it is structured to reflect the changing levels of complexity in work [as described by Jaques' Stratified-Systems Theory] (Burke, 1989, p. 57).

Health-care, characterized by a loose association of professional members whose functions are entangled with the functions of a hierarchical bureaucracy, together yield a system of blurred role boundaries, confused reporting relationships, and unclear authorities and accountabilities resulting in an organizational structure counter-productive to its mission. Health care organizations fit Burke's description of a badly structured hierarchy,
not because they are ossified and static; rather because they are both overly rigid as well as inadequately bounded, apparently designed without a clear understanding of the nature of the work to be performed. Because many of the concepts found in Jaques' Stratified-Systems Theory provide useful perspectives to better understand the work of health care and how it can best be organized, an indepth discussion of Jaques' theories will be presented.

An understanding of Stratified-Systems Theory is facilitated by first describing the distinction Jaques makes between associations and bureaucracies. "An association is a group of individuals who have come together and formed themselves into an institution with explicit rules and regulations governing membership" (Jaques, 1976, p. 48). While members are regarded as equal in associations, "... some members, through force of character, intellect, financial status, or organizing ability, may have more influence than other members. Associations operate through consensus, voting, debate, and persuasion" (Burke, 1989, p. 48). Associations may elect a few of their members to function as a governing body that is authorized to act on behalf of all members. It is this governing body that establishes association policies. Should the workload of the association become sufficiently large, it is the responsibility of the governing body to hire employees to implement association policy.
It is at this point, where the association has grown to a size which requires employees to sustain its operations, that marks the beginnings of a bureaucracy and shifts the way in which work is organized. The governing board starts by hiring an executive director who, in turn, may be authorized to hire additional employees:

The executive director is held accountable by the board for his/her own work and for the work performance of his/her subordinates . . . being held accountable for one's own work and the work performance of others may be used as a basic definition of management. With this definition and the minimal authorities required to make it workable in practice, one may recognize the beginning of . . . bureaucracy (Burke, 1989, p. 48).

This brief description of associations, the differences between them and bureaucratic forms of organization, as well as the relationship between them and bureaucratic forms of organization, is critical to this dissertation. As has been mentioned earlier, Jaques emphasizes that Stratified-Systems Theory is based on empirical data derived from indepth studies of (product oriented rather than service oriented) hierarchical bureaucracies over extended periods of time (Jaques, 1951, 1961, 1965, 1976) and is not intended to be used with forms of organizations that fit his definition of associations. However, in spite of this caveat, and because health care is moving so strongly towards hierarchical forms of organization, the researcher is convinced that Stratified-Systems Theory is particularly useful as a model for:

(1) designing well structured hierarchies; (2) high-lighting
important and frequently overlooked differences between associations and hierarchies; and (3) creating a hierarchical arrangement compatible with an association.

The following portion of this chapter presents the propositions and generalizations key to Stratified-Systems theory.

Proposition 1: There is a universality to the way bureaucracies are organized. The feeling, so commonplace, that all bureaucracies have similar characteristics, is supported by Jaques' studies that show that there does, indeed, "exist a universally distributed depth-structure of levels of bureaucratic organization" (1976, p. 100). Jaques' studies demonstrate natural lines of stratification, or levels of work stratum, around which bureaucracies are organized. "A work stratum is defined as a broad band of work within which the complexity of the tasks is all of a similar type" (Burke, 1989, p. 52) and the complexity of these tasks changes qualitatively from one stratum to another. These strata or levels of work occur at the following time intervals: three months span, 12 months, two years, five years, ten years and possibly at higher levels as well. As shall be seen, time plays a pivotal role in this theory. Time is regarded "... as the medium for the process of work and the criterion of its completion" (Stamp, 1981).

Proposition 2: Human capacity, e.g., the capacity to work, [although varied] is found to be patterned in such a way that it reflects the same discontinuities and stratification found in the organization of bureaucracies. Or vice-versa, the stratification found in bureaucratic organizations mirrors the capacity to work found in members of society. Jaques maintains that different individuals have different upper limits to their work capacity which are independent of intelligence as we are accustomed to measuring it, and which may be predicted early on in an individual's development, possibly as early as mid-teens. According to Jaques, how an individual uses time is an indicator of work capacity in two important ways. First, there are "target-completion times," agreed upon between individual and manager that identify the time required to complete a task. Second, all work involves a discretionary period during which the individual assigned the task, determines how she or he will execute the task: "The discretionary content of work is the exercise through
time of the capacity to pattern and order the experience on
the path towards the achievement of a goal" (Stamp, 1981)

These two ideas led to the development of the Time-Span-of-
Discretion, an instrument developed by Jaques and discussed at
greater length in a later portion of this study, which "... measures the maximum planned time from the point at which a person
can start work to the target completion time" (Stamp, 1981). Data
generated from time-span-of-discretion measurements consistently
revealed patterns of discontinuous levels of work differentiated
from one another by the previously described time intervals. As
time intervals lengthened from one level to the next, so did the
work of each level or stratum increase in scale and complexity.
Jaques assumed that these discrete levels of work:

... could be a reflection of individual differences in
capability expressed in the exercise of discretion over
varying periods of time ... that this capability would be
discontinuous in nature ... [so that] increasing capability
would not be a matter of amount but of change of state
(Stamp, 1981, p. 279).

These ideas were further explored and developed through a series
of experiments set up by Isaac and O'Connor (1978) to study dis-
continuities in modes of functioning from a quantitative perspec-
tive. Isaac and O'Connor used active problem solving tasks to
gain evidence of discontinuous modes of functioning:

There was no rehearsal; an important part of the task was to
define the nature of the problem and information emerged as
the problem progressed. In other words, their tasks were
concerned not with the solution of defined problems but with
active search, construction, definition and solution (Stamp,
These experiments were conducted over approximately a ten-year period yielding a sample of 800 subjects. Age of the subjects ranged from 6 to 60 years. Statistical analysis of individual scores not only supported Jaques original idea of five discrete levels of functioning but also demonstrated that the discontinuity between levels "resulted from the emergence of a new way of approaching a task" (Stamp, 1981, p. 280). A variation of this problem solving task is described more fully in the discussion of the Career Path Appreciation.

**Essential Characteristics of Work**

The previous two propositions describe a way of looking at the structure of bureaucracies and the varied patterns of capability evidenced by individuals working in bureaucracies. In addition to these propositions, Jaques has identified several characteristics of work that he regards as essential for both the individual worker and the organization as a whole.

1. Work consists of goal-directed activity that is time limited with a clearly articulated completion time. Goals are described as constructions produced by unconscious intuitive processes "... by touch-and-feel, by hunch, by guess, by flashes of insight" (1976, p. 102). They arise out of feelings of something lacking or incomplete, and it is these feelings that
direct attention to the development of an idea or the attainment of an object or the production of a product.

Once the goal has been articulated, the next step is the creation of a plan to achieve the goal. In order for the plan to be effective, it must guarantee an acceptable outcome within the targeted time frame. This challenge to produce an acceptable outcome within a designated period of time requires "... balancing [the] pace of work against [the] quality of output [and] is at the heart of work" (1976, p. 103).

2. In bureaucracies the employee's work is usually determined by his/her superior or manager rather than by the employee him/herself. Goals are broken down into specific tasks and are assigned by the manager to his/her subordinate. These tasks are set within prescribed limits which include a target completion time. The institution also prescribes limits which effects how a subordinate can carry out his or her task. Without prescribed limits, the employee would be essentially given carte-blanche to execute his/her task however s/he would choose, resulting in no control by the manager ar-i/or employing organization over cost and standardization of methods and procedures. Lack of prescribed limits would also preclude the possibility of specified time limits. Thus, the function of prescribed limits is to provide bureaucracies with a means of assigning and organizing work.
3. Jaques emphasizes the importance of distinguishing between the prescribed limits of a task and the actual work of a task. Prescribed limits are institutionally imposed and can be quickly learned and routinized. They are objectively defined and, therefore, eliminate any uncertainty as to whether the employee has been in compliance with the set limits. Non-compliance may appear as negligent or insubordinate behavior and may have a deleterious effect on the desired outcome. In a bureaucracy this is often the way non-compliant behavior is interpreted, even when the worker's intent has been constructive and innovative. The actual work, however, has less to do with attending to the prescribed limits and more to do with determining how a particular task is to be executed within the parameters of the prescribed limits:

. . . deciding what has to be done in the moving present in order to bring the future idea into being . . . work is what is left to the person to use his own discretion to do. If there is no discretion or judgment to be used in carrying out a task, then the task can be done by an automatic machine (1976, p. 105).

It should be noted that a task is always characterized as an instruction (occurring in the present) involving the realization of a future outcome.

4. An underlying theme in Jaques' theories is his attention to and development of the function of time in the execution of work. Referred to as the "time-span-of-discretion," it is one of the concepts Jaques is best known for, and as such, will be
discussed at length. Jaques was able to demonstrate a relationship between the employee's experience (as s/he executes his/her assigned tasks), and the length of the time-span within which the tasks must be executed:

The sense of size of effort in working, or the sense of size of the responsibility in role occupied, seems to vary directly with the length of time within which a person has to organize his problem solving activity. The longer forward in time is the overall goal of his work, the heavier his responsibility feels to him. It would appear that the further distant the future that has to be realized, and the longer the moving present that has to be organized and traversed, the weightier the feel of the task (1976, p. 108).

Time-Span-of-Discretion is also the name of an instrument designed by Jaques for the purpose of "... objectively measuring the maximum periods of time during which individual[s] ... were required by their managers to exercise discretion or judgment ..." in the process of carrying out their tasks. Jaques defines "time-span-of-discretion" as the longest period of time that a subordinate will be on his/her own before managerial review occurs to determine the degree to which the subordinate has been competently balancing the pace and quality of his/her work. "Time-span-of-discretion," then, is that period of time during which the manager must rely on the subordinate's discretion and the subordinate works on his/her own.

Time-span-of-discretion was also found to correlate with an employee's sense of fair pay for his/her work. That is, those employees working at the same time-span level, or same point in
the future, report expecting the same range of pay when asked to identify the worth of their work. This was empirically supported by a study of industries based on production processes. Thus, time-span measurement is thought to give an objective indication of the employee's subjective experience regarding the level of work demanded by the tasks for which s/he is responsible.

Additional findings of interest that support the relationship between time-span and level of work are in those situations where the usual time-span is shortened. When the future is more immediate, the employee will feel that his/her level of work is dropping. The reverse is also true; when the future becomes more distant, the level of work will be experienced as increasing, the weight of responsibility will be greater, and the worth of the work (felt-fair-pay) will be more costly.

Time-span-of-discretion also may reflect the way in which managers delegate tasks. For those subordinates who are initially unable to complete tasks within the designated time frame, the task may be broken into smaller subparts with each subpart having an appropriate contracted target completion time. As competency increases, the manager may recombine subpart tasks into larger tasks having greater size, weight, responsibility, and a correspondingly expanded time-span-of-discretion.

In summary, in a bureaucracy, while the manager sets the goals and boundaries for the subordinate, it is the subordinate
who actually does the work, using his/her own idiosyncratic judgment and planning processes. This period of discretion is highly personal. Judgments must be made about priorities, pace of work, and particular courses of action. Uncertainty may be intense, as decisions are made without full knowledge of their accuracy. This uncertainty inevitably precipitates anxiety, both of which must be tolerated until the outcome is known. It is this uncertain and anxious aspect of work which "... gives it weight in a psychological sense, weight which matches the amount of uncertainty and anxiety and period of time during which it must be carried out and tolerated" (1976, p. 279). When the subordinate is well matched to the tasks to which s/he is assigned, s/he will have previous knowledge and experience relevant to the task at hand. S/he will feel challenged by the scope and complexity of the task and s/he will be comfortable with the designated time frame.

Let us return briefly to the Emergency Medicine scenario describing the interface between the ER Nurse-Manager and the Medical Staff and consider it from the theory thus far presented.

1. The first assumption is likely to be that there is a poor match between the Nurse-Manager and the tasks to which she is assigned. However, it is difficult to know just how poor the "fit" is between job and incumbent because of the way in which the hierarchy is structured and operates. While she has the title of
Nurse-Manager, her role and reporting relationships are not clearly developed. Her manager, one of the Associate Administrators and part of the hierarchical bureaucracy, is unfamiliar with and removed from day-to-day operations in the ER. Thus he is unable to work with her effectively in assigning appropriate goals and tasks. The Medical Director, who is part of the professional bureaucracy and who is in close contact with daily operations in the ER has no organizational authority to assign the Nurse-Manager goals and/or tasks. Instead he must rely on the Nurse-Manager's cooperation, capacity to recognize what needs to be done and good will. This results in too much discretion and too little useful feedback for the Nurse-Manager.

2. As has been described earlier, the medical staff did not perceive hospital administration (that is, the hierarchical bureaucracy), as a useful resource in the management of the poorly performing Nurse-Manager. Rather than being able to utilize the hierarchical structure, the Medical Director attempted to solve the problem within the framework of the professional bureaucracy. The Physician-Liaison's position created to absorb unmet Nurse-Manager functions was a position that had no place in either bureaucracy. Consequently, roles and responsibilities of both the Physician-Liaison and Nurse-Manager were further blurred and accountabilities, especially those of the Nurse-Manager, became even more obscure.
3. The Physician-Liaison's solution was a stop-gap measure designed to manage problems encountered on a day-to-day basis reflecting a Stratum I and or II approach to the situation, while the problem was at Stratum III and required the intervention of an administrator at Stratum III or Stratum IV. The unanticipated consequences of this solution was the degree of alienation that resulted between nursing and the medical staff and the long-term effect this alienation had on their working relationship.

Alternatively, in a well-structured hierarchy, the reporting relationship between the Nurse-Manager and her superior would have been closer. The Nurse-Manager would have clearly articulated goals and tasks and would receive feedback on a regular basis. In addition, her reporting relationship to the Medical Director would be more developed, and the medical staff would have an appreciation for as well as the ability to appropriately utilize the hierarchical bureaucracy as needed.

The previous two propositions and four characteristics of work have been provided as an orientation to the reader as well as to lay the foundation for exploring in greater depth the levels or strata of work common to bureaucracies. For purposes of review, Jaques has postulated the existence of a universal depth-structure or hierarchy in bureaucracies, composed of levels of work or strata which are bounded by the time-spans-of-discretion as shown in Table 1.
In Stratum I, work is highly prescriptive. Goals are concrete, tasks are sequential and are performed one at a time in a particular order, much like following a recipe. Continual feedback is provided monitoring readiness to move from one task to the next. When problems are encountered, the Stratum I individual will either use previously learned methods or seek help. Work never exceeds the three months time-span and often may be considerably shorter than three months.

It should be noted that work at this level is frequently regarded as not requiring real judgment or decision making. Jaques emphasizes that that is not so: "The essence of work is the same at all levels; namely, the exercise of discretion within limits. It is the latitude of these limits and the complexity which change with level (1989, p. 24).

Individuals working at Stratum II are likely to be first-line managers or specialists in areas such as engineering, social work, et al. While work continues to be prescriptive, that is, there are clear guidelines and procedures to follow, it is much less specific than that described in Stratum I. Stratum II work requires the capacity "... to reflect on what is occurring so as to note things that might indicate potential problems..." (Jaques, 1989, p. 25). The first-line manager, engineer, and social worker all have to be able to collect and interpret data
Table 1
Strata Bound by Time-Spans

<table>
<thead>
<tr>
<th>TIME-SPAN</th>
<th>STRATUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>(? 20 years</td>
<td>STR-7</td>
</tr>
<tr>
<td>10 years</td>
<td>STR-6</td>
</tr>
<tr>
<td>5 years</td>
<td>STR-5</td>
</tr>
<tr>
<td>2 years</td>
<td>STR-4</td>
</tr>
<tr>
<td>1 year</td>
<td>STR-3</td>
</tr>
<tr>
<td>3 months</td>
<td>STR-1</td>
</tr>
</tbody>
</table>
in order to recognize emerging problems and to initiate actions to manage or otherwise minimize any disruptive impact of emerging problems.

Work at Stratum III demands the following capacities: (1) to use direct judgment similar to that seen in Stratum I; (2) to reflect on and interpret data collected, similar to that seen in Stratum II; and (3) to incorporate (1) and (2) above by clustering data in situational constructs, analyzing situations and designing plans and procedures responsive to the situations analyzed. Key to Stratum III work is the capacity to develop plans and implementation processes that respond to short-run requirements of weeks or months, and at the same time begin the planning process for goals requiring a time span of one to two years. In addition, pre-planned alternatives have to be developed and held in reserve should changes need to be made in the original plans.

"Senior" or "chief" engineers, scientists and/or physicians or lawyers capable of working as independent practitioners are the type of incumbents found in Stratum III positions.

Stratum IV work shifts from the direct management seen in Stratum III to general management: "It is the world of the product development General Manager, the production General Manager, and the sales General Manager, or of senior project managers or researchers or analysts" (1989, p. 27). The Stratum IV manager recognizes linkages between multiple projects (or multiple
departments), and is able to coordinate their operations, overseeing their pacing and resourcing. Of particular importance in this Stratum is the capacity to make skillful trade-offs that ensures the collective progress of all the linked projects.

While the General Manager at Stratum IV recognizes "unified whole systems" and manages their parts in such a way as to sustain the whole system, the Stratum V individual constructs "unified whole systems." Jaques defines "unified whole systems" as "... a system intact and complete in itself and operating in an unbounded environment" (1989, p. 28).

The Stratum V world is characterized by constantly shifting events both within the system as well as within the environment in which the system is embedded. Thus, work at Stratum V demands the capacity to attend to both internal organizational and external environmental events, continually adjusting them in relation to each other.

The shifts from Stratum V to Stratum VI and Stratum VII complexity are very large. Work no longer takes place within the boundaries of a given system. Work at Stratum VI involves a "... continual bombardment of political, economic, social, technological, and intellectual events from the whole wide-world environment . . ." (1989, p. 29). The Executive Vice-President of
operations who oversees groups of business units, or the corporate
treasurer, or the Executive Vice-President of human resources are
types of Stratum VI positions. Stratum VI work focuses on
world-wide networking, accumulating data at a world-wide level
judged to be significant to the corporation. Stratum VII complex-
ity mirrors Stratum III complexity but at a much more global
level. It is at Stratum VII that alternative world-wide strategic
plans and international resourcing are developed. VII is the
stratum of executive leadership: "... the CEO's, COO's, and
presidents of large corporations ... work is concerned with
judging the needs of society, nationally and internationally, and
deciding what types [of organizations] to provide ..." (1989, p.
30).

Jaques further suggests that this universal bureaucratic
depth-structure provides the basis for a formula for the design of
bureaucratic organizations:

Measure the level of work in time-span of any role, manage-
rial or not, and that time-span will give the stratum in which
that role should be placed. For example, if the time-span is
18 months that makes it a Stratum-3 role; or 9 months, a
Stratum-2 role (1976, p. 135).

In addition to placing a given role in its appropriate
stratum, this formula can also ascertain how many strata of orga-
nization there should be in a particular system. For instance, if
the top position is measured according to time-span, that time-
span will identify the stratum in which the top position falls, as
well as the number of strata necessary below the role of the top position.

This universality of hierarchical organization of work led to a hypothesis regarding a similar pattern of work-capacity distributed throughout the populations. That is, the patterns of work-capacity (or levels of abstraction at which individuals function) will be seen to replicate the same time-span intervals identified in bureaucratic organizations (see Table 2). In fact, the particular bureaucratic structures (or levels) are thought to be a direct result of the discontinuous nature of work capacity:

... Any human population is stratified with respect to the work-capacity of its individual members as measured in time-span, and the depth-structure of bureaucratic systems is stratified in accord with these changes in state in work-capacity (1976, p. 142).

Work-capacity is another way of describing cognition. As can be seen, levels of work or strata are differentiated according to the type of cognitive complexity required to solve the problems set by the work at each level.

**Theory of Organizational Structure**

American hospitals have long intrigued and sometimes bewildered students of organizations. Certainly hospitals are strange institutions... Doctors are not employees of the institutions in which they work. Doctors, not hospitals, admit patients. Doctors, not administrators decide what technologies are necessary for hospitals to adopt (Lawrence, 1983, p. 87).
Table 2  
Levels of Work

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>General system of strategic design</td>
</tr>
<tr>
<td></td>
<td>Drawing together the connections between the development and deployment of groups of complex systems</td>
</tr>
<tr>
<td>7</td>
<td>Strategic design for Development of deployment of complex systems</td>
</tr>
<tr>
<td></td>
<td>Creating a strategic context</td>
</tr>
<tr>
<td>6</td>
<td>Direct deployment of complex systems</td>
</tr>
<tr>
<td></td>
<td>Interpreting overall strategy into operational plans for total business units</td>
</tr>
<tr>
<td>5</td>
<td>Complex systems</td>
</tr>
<tr>
<td></td>
<td>Comprehensive management: encompassing the operating systems and where necessary modifying the context of the total unit</td>
</tr>
<tr>
<td>4</td>
<td>Alternative operating systems</td>
</tr>
<tr>
<td></td>
<td>General management: contrasting and comparing alternative operating systems; ensuring that operating systems have the resources they need</td>
</tr>
<tr>
<td>3</td>
<td>Direct operating systems</td>
</tr>
<tr>
<td></td>
<td>Management of a unit; moulding operating tasks and operating methods into a system of direct work; adjusting the system as necessary in the light of changing trends</td>
</tr>
<tr>
<td>2</td>
<td>Direct operating systems</td>
</tr>
<tr>
<td></td>
<td>Supervising, putting together a number of tasks, choosing methods for those tasks according to each given situation</td>
</tr>
<tr>
<td>1</td>
<td>Direct operating tasks</td>
</tr>
<tr>
<td></td>
<td>Working directly on physical objects or serving people, one at a time</td>
</tr>
</tbody>
</table>
"Strange institutions" require comprehensive theories that embrace their "strangeness," if they are to be adequately understood. An example of just such a comprehensive theory is the work of Henry Mintzberg on organizational structure. Mintzberg describes organizations as composed of various attributes; attributes that are arranged in particular kinds of configurations designed to accomplish the work of a given organization. Mintzberg has developed seven different configurations which when taken singly or in various combinations provides a frame of reference from which to study any organization. The following is a brief description of each configuration:

1. **Entrepreneurial Organization**: Highly centralized, coordinates work through direct supervision, minimally differentiated, commonly a part of start-up functions.

2. **Machine Organization**: Standardizes work processes, specific rules, regulations, policies, et al., prescribing what work should be done, how it should be done and who should do it. Very similar to Jaques' description of an Accountability Hierarchy.

3. **Professional Organization**: Standardizes work skills. Professionals seek to minimize influence of administrator, and to promote horizontal and vertical decentralization. Professionals prefer to work autonomously, coordinating work through standardization of skills. Professionals rely on training outside of the organization that enhances their skills.

4. **Diversified Organization**: Seek autonomy by drawing power down from top management and up from line operations to concentrate it in their own units. Favor limited decentralization, pull to Balkanize their structure into units that can control their own decisions. Coordination is achieved by standardization of work outputs only.
5. **Innovative Organization:** An organization which is structured "... into work constellations to which power is decentralized selectively ... [work constellations] are free to coordinate within and between themselves by mutual adjustment" (Mintzberg, 1983, p. 302-303).

The remaining two structural configurations were not developed until 1983, when they appeared in Mintzberg’s book: *Power In and Around Organizations.* They differ from the previous configurations in that they are described as both "forces" as well as "forms." As "forces" these newer configurations tend to "... 'overlay' on more conventional structures ..." (Mintzberg, 1983, p. 222), although they may also be actual structural configurations.

6. **Ideology and the Missionary Organization:** Refers to those organizations managed through the use of norms and beliefs instead of standards and procedures. These values and beliefs are sufficiently unique to distinguish one organization from all others.

7. **Politics and the Political Organization:** Describes the configuration that is dominated by politics and conflict. Mintzberg defines the political system in organizations as "[reflecting] power that is technically ... legitimate ... in the means it uses, and sometimes also in the ends it promotes. ... Political power in the organization ... is not formally authorized, widely accepted, or officially certified ... political activity is usually divisive and conflictive, pitting individuals or groups against the more legitimate systems of influence ..." (Mintzberg, 1983, p. 238).

Mintzberg recognizes that no organization fits any one structural configuration perfectly, and refers to those organizations in which more than one configuration is apparent as
"hybrid organizations." Hybrid organizations are those organizations that:

... [either] exhibit characteristics of more than one configuration ... [or] ... uses different configurations in different parts of the organization ... Each part of the organization strives for the structure that is most appropriate to its own particular needs, in the face of pressures to conform to the most appropriate structure for the overall organization, and it ends up with some sort of compromise (Mintzberg, 1983, pp. 474-475).

It is this concept of hybrid organizations that makes Mintzberg's theory particularly applicable to the study of health care organizations. The health care industry are hybrid organizations composed of three configurations: (1) the machine organization, (2) the professional organization, and (3) the diversified organization. They are also overlaid with ideological and political forces. This study emphasizes the differences between the professional and machine configurations. The diversified configuration is subsumed and incorporated into the discussion of the professional configuration. The remaining two configurations (professional and machine) approach work very differently and are inherently conflictual. While both may be service oriented, the former functions with considerable discretion and autonomy, while the latter emphasizes discipline and compliance. In the machine configuration, work is standardized and prescriptive; discretion is carefully delimited.
It is important to note that four out of the five original structural configurations are not capable of sophisticated innovation. In the Entrepreneurial Organization, innovation may occur but only in simple and undifferentiated forms:

Both the Machine and Professional bureaucracies are performance, not problem-solving structures. They are designed to perfect standard programs, not to invent new ones (Mintzberg, 1979, p. 432).

The notion that such hybrid organizations are not capable of innovation has profound implications both for how such organizations respond to demands for radical change as well as how they utilize the skills of their members, particularly during periods of unrest. It would appear that organizational structures designed to provide stable and standardized programs may well be limited in their capacity to effectively respond to pressures for large changes. In addition the inherent differences between the Machine and Professional organizations are such that conflict and dysfunction are often inevitable. Specifically, some of these differences are seen in Table 3.

Most studies of hybrid organizations emphasize one type of configuration as major, making it figural; while the impact of the other type of configurations receive inadequate consideration receding into a background supportive position. For example, hospitals have been traditionally described as inverted and squat pyramids (Mintzberg, 1979; Jaques, 1978; Heydebrand & Noell, 1973). The relatively flat top usually consists of professional
### Table 3

**Differences Between Machine and Professional Structural Configurations**

<table>
<thead>
<tr>
<th><strong>MACHINE ORGANIZATION</strong></th>
<th><strong>PROFESSIONAL ORGANIZATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Generates own standards within organization and enforces them</td>
<td>Standards generated from outside self-governing associations and are brought into the organization</td>
</tr>
<tr>
<td>Relies on authority of a hierarchical nature: the power of office position</td>
<td>Emphasizes authority of a professional nature: the power of special expertise. Work processes too complex to be standardized</td>
</tr>
<tr>
<td>A single-purpose structure: has one standard sequence of programs. No diagnosis involved</td>
<td>Diagnosis a fundamental (but circumscribed) task. Seeks to match a predetermined contingency to a standard program</td>
</tr>
<tr>
<td>Highly centralized</td>
<td>Highly decentralized. Great demand for services. Identifies with and (traditionally) answers to profession more than to organization</td>
</tr>
<tr>
<td>Extensive supervision</td>
<td>Controls own work and seeks collective control of administrative decisions affecting them</td>
</tr>
</tbody>
</table>
members who are supported by managerial members. The professional members organize their work in such a way as to deliver direct services to their consumer/patients. In order to be able to execute a wide range of complex and rapid procedures, they require elaborate support services. It is the responsibility of the managerial members (who are accountable to the professionals), to operate the support services required by the professional members. This model is no longer an accurate description of hospital organizations. Emphasis on the professional configuration blurs and underestates the impact of the machine configuration on the organization as a whole.

This study presents both the professional/divisionalized and machine configurations as simultaneously figural; thereby illustrating the nature of the dialectical tension between these two types that sustains the organizational stress and dysfunction experienced in health care institutions today. One of the purposes of this dissertation is to sharpen awareness of the contradictions between the machine and professional configurations in order to more clearly understand the consequences of demanding that they, at least to some extent, integrate their operations.
CHAPTER IV
HUMAN CAPABILITY

Introduction

The theories presented in Chapter III emphasized ways of analyzing organizational structure. In Chapter IV the focus shifts to the resources represented by individual members of the workforce, e.g., Jaques' notion of human capability. Theories of cognitive development are used to describe human capability. This chapter begins with some introductory remarks regarding cognitive development and then proceeds to describe the three psychometric instruments used in this study to capture profiles of human capability at a particular point in time.

Cognitive Development: A Conceptual Overview

Before continuing with descriptions of the psychometric instruments used in this study, some introductory remarks regarding cognitive development are in order.

Cognition is a psychological construct that refers to all of mental life. It includes perception, memory, intelligence, reasoning, judgment and decision making. It permits humans to represent and to think about the world, to conceptualize experiences, to fantasize beyond experience, to maintain a sense of self, and to communicate with others. It expands individual competence and allows us to solve and to circumvent problems . . . this ability gives us the power to anticipate and plan for the future, to develop strategies, to hypothesize alternatives, and to evaluate consequences . . . Cognition, then, . . . underlies all personal adaptation and all societal progress (Perlmutter, M., 1988, p. 192).

-50-
There are four major approaches to the study of cognitive development: (1) organismic, (2) mechanistic, (3) contextualism, and (4) psychometrics.

Organismic: While the organismic approach views man as an active constructor of knowledge, it does so within biological constraints which it considers as "... central in determining both the nature of cognition and the nature of cognitive development" (Perlmutter, 1988, p. 200). Chomsky, Kohlberg and Piaget are examples of scientists with an organismic orientation. They describe cognitive development evolving from simple, undifferentiated processes to increasingly complex processes "... in the same invariant manner as all other biological activity" (Perlmutter, M., 1988, p. 200).

Mechanistic: The mechanistic perspective states that cognition is reducible to specific elements and processes. Humans are viewed as basically reactive and knowledge is assumed to directly reflect the external environment. Cognition is studied through experiments that isolate and then examine individual cognitive processes. Both the organismic and mechanistic approach agree the study of cognition should focus "... on generalizations about cognition that occur across individuals and across domains ..." Skinner is an example of a cognitive scientist with a mechanistic orientation. One of the more interesting findings from this point
of view is that the cognitive system retains and profits from past life experience:

There is a continuous age–related increase in world knowledge. In addition, with age, the cognitive system gains the capacity to regulate and strategically control itself in potentially adaptive ways . . . Thus, cognitive development is conceived of as an environmentally determined quantitative change in the cognitive system (p. 202).

**Contextual:** The contextual approach focuses more on development than it does on the nature of cognition. In contrast to the previous two approaches the contextual approach recognizes and emphasizes cultural and historical time differences. Barker, Bronfenbrenner, Lewin, et al., who focus mainly on the ecology of the organism, are examples of cognitive scientists with a contextual orientation:

The emphasis on both cultural and historical specificity is tied to the view that development is a reciprocal or bidirectional process in which individuals are molded by the social groups that they themselves help to construct . . . social context is given more emphasis than it is afforded in other approaches (p. 204).

**Psychometric:** The psychometric approach is primarily atheoretical, pragmatic and empirical. In contrast to the previous three approaches, individual differences are of central interest to the psychometrician. Intelligence testing (e.g., Binet & Simon) is probably the best example of the psychometric approach. Although psychometrically derived constructs are interesting they lack a model of cognitive processing which limits their usefulness.

However, " . . . [psychometric] studies have provided considerable
empirical information about cognitive performance across the life span. In particular, they indicate that different cognitive abilities follow different developmental trajectories."

This three tier model of cognition integrates the previously discussed four major cognitive approaches (see Figure 1). Tier 1, present at birth, is thought to be the most primitive and to be biologically constructed. This tier does not change very much during an individual's life time. Found in this first tier are the basic mechanisms as identified by the mechanistic orientation; the primary mental functions coined by the contextualists, and the fluid abilities of the psychometricians.

Tier II is more of an open system than is Tier I (which is relatively fixed and closed). It develops postnatally, and driven by external experience and activity, continues to grow throughout the individual's lifetime. It is in this tier that world knowledge as defined by the mechanistic orientation and the crystallized abilities of the psychometricians are found:

This tier gives the system the power to operate in an ever more environmentally responsive and adaptive manner . . . [slowing] in its rate of growth as newness of experience diminishes (p. 211).

While there is less evidence to support the existence of a third tier, it is thought to be the locus of mechanistic strategies and contextualists higher mental functions:
Figure 1
Three-Tier Model of Cognition

TIER III
(Synthesized Abilities)
(Logico-Mathematic Structures; Strategies; Higher Mental Functions)

TIER II
(Crystallized Abilities)
(World Knowledge; Crystallized Abilities)

TIER I
(Mechanized Abilities)
(Basic Mechanisms; Primary Mental Functions Fluid Abilities)
It gives humans extensive potential for adaptive modification and this potential could presumably increase throughout life. The unique aspect of this tier may be that it ... emerges from its own activity ... [e.g.] out of the organism's cognition about its own cognitive activity.

Flavell (1977) described a process similar to this as metacognition and Piaget (1983) calls this process reflective abstraction and claimed that it developed as a result of internal mechanisms. Vygotsky (1978), on the other hand, thought that social interaction stimulated the development of higher mental functions. Further research is needed.

This three-tier model of cognition incorporates developmental phenomenon: The first tier, biologically based and present at birth is a relatively closed system. Tier II, based on the external environment develops after birth, and by definition is a relatively open system. Tier III is described as an infinitely open system and is driven by internal experience:

Biological factors impact Tier I, environmental factors, from both the physical and social world, impact Tier II, and the cognitive system is itself the main impetus for development of Tier III, although the social world may also be important. The main advantage of framing the cognitive system in such a multidisciplinary perspective is that it highlights the diversity of factors that impinge upon cognitive development ... (p. 212).

The three psychometric instruments used in this study tap into cognitive dimensions characteristic of Tier II.
The Career Path Appreciation

Appreciation manifests itself in the exercise through time of mutually related judgments of reality and value. These appreciative judgments reflect the view currently held by those who make them of their interests and responsibilities, views largely implicit and unconscious which nonetheless conditions what events and relations they will regard as relevant. . . . Such judgments disclose what can best be described as a set of readinesses to distinguish some aspects of the situation rather than others and to classify and value these in this way rather than that. I will describe these readinesses as an appreciative system. I call them a system because they seem to be organized as a whole . . . being so interrelated that a change in one part of the system is likely to affect and be dependent on changes elsewhere (Vickers, 1983, p. 67).

The notion conveyed by the term "Appreciation" within the context of the CPA is the taking in and attending to the setting or milieu in which the respondent exists and conducts his/her day-to-day life. There are no preconceived standards of the right or wrong, or good or bad way for the respondent to behave. This "taking in" requires a particular process of listening/observing in which the listener/observer suspends his/her customary way of viewing the world and, in family systems language, attempts to "join" the respondent and see and understand what the respondent sees and understands.

An Appreciation is a projective procedure, that is to say, it offers triggers to the respondent which help him or her to reveal their working self. It is not a matter of asking a series of set questions or of scoring strategies, but of creating a setting in which the respondent is at ease and is put in touch with the way s/he works in the present, past and future of their working life . . . The point is to be aware of the amazing variety of individual behavior and response, to avoid preoccupation with "data," to set aside one's own need to interpret and to allow responses to float and be mulled
over. I am aware that each new administrator will bring his or her own gifts, but I believe that this is central to the ethos of an Appreciation (Stamp, 1983).

The Career Path Appreciation consists of three free-standing parts:

1. Nine sets of phrase cards
2. A symbol-card problem solving task
3. A work history interview

While there is no prescribed order in which these items are presented, it is customary to begin with the phrase cards, followed by the symbol-card sort, and end with the work history interview.

Regardless of which task an administrator chooses to begin with, by the end of the first task one or more working hypotheses will have been formed regarding the respondent’s mode and current level of work. Mode refers to the level of abstraction the respondent has the potential to achieve at full maturity. Current level of work refers to the level of work the respondent is performing at, at the time of the CPA. The remaining two tasks are used to confirm or disconfirm the hypotheses.

Phrase Cards

There are nine sets of phrase cards, six cards to a set. The cards are constructed to correspond to each of the six levels of abstraction. Thus each set of cards has a card which represents each of the six different levels of abstraction or complexity.
While generally administered as the first item on the CPA, the phrase cards are actually an outgrowth of the problem solving card sort previously alluded to in the discussion under Isaac and O'Connor. The phrase cards were culled from the comments made by respondents discussing their experience and strategies following their work with the card sort:

Out of more than a hundred phrases taken from protocols of the card sort, also known as the symbol card task, 54 were chosen for the final pack of phrase cards. They were chosen because . . . they emerged as the phrases which consistently elicited the fullest discussions about the way the respondent approached his or her work (Stamp, 1983).

The respondent's task is to select the card or cards which s/he feels most accurately captures his/her relationship to his/her work. Respondents are then encouraged to discuss their selection or, as the case may be, selections, and to give examples to illustrate them. Responses are judged by looking for patterns, e.g., responses that cluster at the same or adjacent levels; at the quality (level of complexity) or language used when discussing their selection(s); and the appropriateness or fit between the example(s) given and the card(s) selected.

The phrase cards lend themselves to being grouped according to the level at which most of the responses cluster once congruence between phrase card selected and example provided have been ascertained. Because multiple cards were so frequently selected from each set, the following method of interpreting these responses was
designed to capture the richness of the data afforded by these multiple choices. When multiple cards were selected from a given set, the respondent was asked to rate the cards selected in an order reflecting the one most like him/her, or to indicate if they were equally weighted. It was assumed that those choices identified as first (when examples given were drawn from current work experience), reflected what the respondent was doing currently. When the respondent was well-matched to his/her work, or when the respondent was working close to or at his/her potential mode, first choice responses would tend to be at a level higher than second or third choices. The second and/or third choices, when lower than the first, tended to reflect the respondent's backup style, and demonstrated his/her awareness of ways of behaving that are situationally appropriate, while not necessarily drawing on his/her maximal capacity.

The Symbol Card Task

While the phrase cards afford the respondents an opportunity to reflect on and describe their approach to their work, the Symbol Card Task presents the respondents with an actual piece of work to execute.

The symbol card task is designed to emphasize how the respondent enacts the discretionary portion of his/her work. Prescribed limits are minimal and intentionally vague in order to "... observe [the respondent's] process of defining the task, generat-
ing alternative courses of action, acting on them, handling uncer-
tainty and reaching a resolution (Stamp, 1987, p. 16).

The symbol card task (utilizing Bruner cards), was built on an
earlier card-sort experiment developed by Isaac and O'Connor.
Because Stamp, MacDonald and other associates were interested in
developing a means of researching individual differences in func-
tioning, as well as making as visible as possible how individuals
go about the discretionary portion of their work, a task was
needed that would simulate a real-life working situation which
could be closely observed. The original number of variables was
enlarged and made more complex. The number of variables was in-
creased and additional uncertainty and ambiguity were introduced.

In the CPA, the symbol card task consists of a set of 170
cards composed of simple geometric symbols varying in color,
number, size and shape. The respondent is presented with four
display cards, three of which have a symbol configuration, and one
which is blank. The respondent is requested to sort the remaining
symbol cards according to criteria unknown to the respondent, but
known to the administrator. The respondent is told that s/he will
receive feedback regarding the correctness of placement, except
when s/he uses the blank card. The respondent is then asked to
place ten cards correctly consecutively. There is no opportunity
for rehearsal or for review of cards already placed. Requests for
additional information beyond that which has already been
described is usually responded to with: "That's for you to discover."

According to Stamp's report of her experience with this procedure: ". . . it appeared to be possible to elicit enough information about the respondents' characteristic patterns of realizing discretion in action to make a judgment about the level of work at which they would currently be effective" (Stamp, 1987, p. 29).

Interest is focused less on the successful completion of the task and more on the way in which the respondent goes about organizing and acting upon the information presented to him/her. Upon completion of the symbol card task, the respondent is asked to describe strategies s/he used to deal with the task, and to comment on any similarities between this experience and the ways in which s/he customarily approaches work. The following are guidelines for interpreting performance on the symbol card task:

**Mode 1**: Respondents focus on the color of the symbols. Size of the symbols is not actively used as a discriminator.

**Mode 2**: Respondents recognize symbol size as a discriminator, and that something goes with something.

**Mode 3**: Respondents recognize and indicate awareness of the blank card. However, it is experienced as an irritant rather than an assist to solution of the problem. It is important to note that the blank card does not exist in Mode 1 and 2.

**Mode 4**: Respondents actively integrate the blank card into the task and describe the task as a stretching experience.
Mode 5: Respondents understand the use of the blank card as the key to the solution of the task, do not feel particularly challenged by the task and expect the administrator to change the rules during the course of the task.

Mode 6: Respondents experience the task as boring and may refuse to complete it, or to not even engage in it.

This task appears to be a particularly vivid and potent experience for respondents. In addition to the previously described complexity, uncertainty and ambiguity, it also replicates a mini-hierarchy (if you will) in the form of a superior/subordinate relationship in which the superior-administrator has predetermined accurate and inaccurate responses, serving to intensifying performance anxiety on the part of the respondent. And, as MacDonald has mentioned, the higher the respondent's level of anxiety and stress, the simpler will be the strategies used to solve the problem.

Work History

The last portion of the CPA is a fairly structured interview in which respondents are asked to describe their previous work experience with particular emphasis on those work experiences in which they felt especially well-matched, in contrast to those experiences in which they perceived themselves to be underutilized or overstretched. Respondents are encouraged to give examples of the time spans of their longest tasks in each of their previously
occupied positions and of how they approached each work situation. The interview concludes by focusing on the respondent's future plans and aspiration.

From the work history it is possible to ascertain the level of work the respondent has functioned at in previous positions. By plotting the work history on the Chart of Working Modes (see Table 4), it is possible to note consistencies and/or discrepancies between positions previously and/or currently held and performance on the CPA that reflects current work level and mode.
Loevinger's Model and Measure of Ego Development

The ego is above all a process not a thing. The ego is in a way like a gyroscope whose upright position is maintained by its rotation. To use another metaphor, the ego resembles an arch; there is an architectural saying that the 'arch never sleeps.' That means that the thrusts and counterthrusts of the arch maintain its shape as well as support the building. Piaget uses the term 'mobile equilibrium'—the more mobile the more stable. The striving to master, to integrate, to make sense of experience is not one ego function among many but the essence of the ego (Loevinger, 1969, p. 85).

Loevinger's definition of ego development is in sharp contrast to the psychoanalytic conception of ego development. In psychoanalytic theory, the concept of ego has been thought of as a number of related processes whose overall function is problem solving, coping, adjusting; in contrast to instinctual expression. "In this framework, ego development refers either to the development of multiple processes, cognitive functions, defenses and/or interpersonal skills" (Hauser, 1976, p. 928).

Loevinger's ideas about ego development grow out of, and are supported by, the works of Adler, Sullivan and Pingenette. Adler equated his concept "style of life" with ego, the unity of personality, individuality, the method of facing problems, opinion about oneself, et al. Adler used all of these terms to describe a single thing or function; that is, what Loevinger calls "ego." Sullivan further elaborated Adler's work and used the term "self-esteem." He formulated a theory of ego stability, a managing anxiety theory:
By selective inattention, a person tends to recognize only what is in accord with his already existing self-system; thus his ego is his frame of reference. . . . discordant observations are anxiety producing, and a major purpose of the self-system is to avoid or minimize anxiety" (1956, p. 8).

Fingarette (1963) carries this work still further, stating that: 
". . . the search for meaning is not something the ego does but is what the ego is" (Loevinger, 1970, p. 7) and that " . . . the failure to integrate an observation into one's current frame of reference is what anxiety is, rather than the cause of an emotion called 'anxiety'" (p. 8).

Loevinger's approach is one which takes account of the individual's integrative processes and overall frame of reference. Her conception of ego development assumes that each person has a customary orientation to him/herself and to the world; and that there is a developmental continuum along which these frames of reference can be arrayed: "In general, ego development is marked by a more differentiated perception of one's self, of the social world, and of the relations of one's feelings and thoughts to those of others" (Candee, 1974, p. 621). Loevinger's stages of ego development describe the sequence of steps comprising this continuum of complexity and differentiation. In addition, through the construction of her sentence completion instrument, her model of ego development is amenable to empirical research. Responses to the sentence stems reflect the subject's own frame of reference, thereby making it possible to determine the frame of
reference through which an individual relates to him/herself and to the external world.

Loevinger's model of ego development refers to the framework of meaning an individual gives to his/her experience and describes a series of sequentially ordered stages (seven stages and three transitional phases). While these stages are defined independent of age, they do correlate with chronological age. Occurring in a fixed hierarchical order, each subsequent stage is more complex than the previous stage. According to this model, it is not possible to skip any of the stages during the course of development; however, not everyone progresses through all of the stages. Through the use of the sentence completion test, Loevinger claims to be able to determine the stage at which a given individual has developed and to study issues such as individual differences, age relationships, and correlations with other lines of development:

In fact, Loevinger repeatedly states that the definition of ego development is best given by pointing to the successive stages. Although one cannot clearly define the sequence itself in a single definitional statement, it is nonetheless possible to offer specific, operational definitions of each stage in the sequence. In other words, the continuum is a high level abstraction referring to sequential changes in structures of meaning and structures of character. The stages and associated character types are patterns which can be operationally defined (Hauser, 1976, p. 930).

Stage One (I-1) consists of a presocial and a "symbiotic" phase. The presocial phase describes the very young infant who is oblivious to all but gratification of immediate needs. Animate and inanimate parts of the environment are not yet distinguished.
During the symbiotic phase the infant develops a strong attachment to the mother. While the child can now distinguish mother from the rest of the world s/he is unable to differentiate self from mother. Stage One is preverbal and comes to an end as the use of language is acquired. Because this is a preverbal stage of development it is not accessible to study through the use of the sentence completion test which depends on verbal skills.

Stage Two (I-2) is known as the "impulsive" and/or "self-protective" stage. At this time impulses are the driving force in the individual's life. Internal control of impulses is erratic, undeveloped and undependable. The individual depends on and is shaped by external controls of reward and punishment as s/he seeks to satisfy immediate physical needs. The view of the world is egocentric and concrete. This is the earliest stage that can be tapped through the sentence completion test.

Stage Three (I-3) is known as Delta/3 and is a transitional stage occurring between the self-protective and conformist stages. The theoretical basis for this stage is unclear. It appears to exist as the result of empirical work with the test itself, where enough responses were shown to have been given that are not complex enough to warrant a higher rating, and at the same time are not low enough to fit into Stage Two.

Stage Four (I-3) is known as the "conformist" stage. According to Loevinger, most people, either during childhood or
adolescence move to this stage. It is at this stage that adherence to rules becomes most important. Rules provide a clear structure and affirm the rightness or wrongness of an act. There is little, if any, awareness of feelings and motives, rather, interpersonal relationships are described by actions and concrete events. Conscious thoughts focus on appearance, materialistic objects, and superficial reputation. Inner states tend to be expressed as moralistic judgments, as stereotypes, or as banal cliches.

(I-3/4) is the transitional phase between conformist and Stage Five, "conscientious." It is during this phase that an emerging awareness begins that what is the "right behavior" may be contingent upon the situation or context in which the individual finds him/herself. The capacity for introspection begins at this time, accompanied by increasing self-awareness and self-criticism. As this inner self develops, the external influence of social groups and their rules as described in the conformist stage lessens. It should be noted that in four studies occurring between 1971 and 1975 more respondents were found to be at the I-3/4 phase than at any other stage.

Stage 5 (I-4) is known as the "conscientious" stage. It is at this stage that morality has become internalized. Inner rules now override those external rules generated by peers or authority figures. Rather than through action and concrete events, inter-
personal relationships are now perceived in terms of feelings and motives. Broad stereotypes give way to an awareness of and appreciation for individual differences. Ideals, traits, obligations and achievements make up the conscious thoughts occurring at this stage. The emerging capacity for self-criticism, first identified at I-3/4, is considerably elaborated at this stage.

I-4/5 is the third transitional phase characterized by responses that are at a higher level than that of conscientious, but not as high as Stage Six, autonomous. There is greater complexity in conceptualizing interpersonal relationships which have come to be increasingly valued.

Stage Six (I-5) is known as the "autonomous" stage and emphasizes coping with inner conflicts, conflicting needs and conflicting perceptions. Along with greater awareness of inner conflicts, there is increased tolerance for the solutions and choices of others. Mutual interdependence is recognized as critical to interpersonal relationships as well as the need for individual autonomy. Role differentiation and self-fulfillment are additional concerns of this stage.

Stage Seven (I-6) is the "Integrated" stage and is the highest stage in this model of ego development. In this stage coping with conflicting demands becomes elaborated to reconciling conflicting demands along with recognizing and letting go of unattainable aspirations. Individual differences are now cherished rather than
tolerated. In studies utilizing the sentence completion test it is rare to find more than 1 per cent of the population at this stage.

Summary. Loevinger's model of ego development originally described seven sequentially ordered stages. As additional data were gathered, three additional transitional phases were added (specifically Delta/3, I-3/4, and I-4/5) to indicate those times when respondents had completed one stage, but had not yet successfully entered the next stage, instead, were somewhere in between.

There is a tendency to idealize Stage Seven (I-6), the integrated stage, as it is perceived to be the highest stage of development. However, because so few subjects have been found there, there is a paucity of empirical description regarding this stage; and Loevinger herself suggests that those that are found there may be inaccurately placed. She goes on to say that for research purposes, Stages Six and Seven may be combined without in any way compromising the model.

The Sentence Completion Test

Ego development is assessed through the use of a 36-item sentence completion test constructed by Loevinger and her associates. One of the ego stages or transitional phases is assigned to each of the 36 responses. A scoring manual has been developed that provides examples of responses characteristic of each of the
stages and transitional phases. These examples are based on specific characteristics of each of the successive stages as they were described in the theoretical section. Assuming that each person has a core level of ego functioning, the scoring process determines this level and assigns an ego level to him/her. This assigned level is determined by the cumulative distribution of individual responses presented on the sentence completion test. To minimize scorer bias, protocols are scored in groups. For example, 10 to 20 protocols may be looked at one time, attending to one item across all protocols before moving on to the next item. In this way identity of the respondent tends to be unknown and patterns of responses idiosyncratic to a particular protocol are not obvious. Once all 36 items have been assigned an ego level, individual protocols are looked at separately and a total score is generated for each respondent by matching the cumulative frequency distribution of the respondent's scores with the "automatic ogive rules" provided by Loevinger and Wessler (1970). It is from this table of values that the ego development level for each respondent is calculated.

Initially, scoring procedures were learned through personal experiences provided by Loevinger and her associates. In addition to constructing the previously mentioned manual, Loevinger, et al. also created a series of self-training exercises. This was done in order to avoid dependency on personal training, as well as some
of the consequences of personal training (e.g., fewer numbers of people would know how to score, there would be less likelihood of critical thinking, etc.). These self-training exercises consists of a number of practice protocols together with an answer key and explanatory notes. Additional studies were conducted to determine what level of agreement would exist between self-trained scorers, and how would self-trained scorers compare with personally trained scorers?

Median interrater agreement on (543) total protocol ratings by five personally trained raters was 61 per cent, median interrater correlation for these five raters was .86. A comparison between the five personally trained raters and two self-trained raters on (100) total protocol ratings showed median interrater correlations ranging between .89 and .92. "Median interrater correlations for various pairs of trained and self-trained raters on item ratings was .76. Finally, the median percentage agreement on item ratings for personally trained and self-trained raters was 78 per cent" (Loevinger & Wessler, 1970). The results of these studies suggest the following: Both the manual and self-training exercises are sufficiently clear, making it possible to attain high agreement between different scorers who have been trained by the manual only. In addition it is possible to attain close agreement between personally trained raters and self-trained raters. Thus, these results suggest: "... that when ego development level
scores are reported by different self-trained investigators who have used these rating procedures . . . one can assume that all have used a comparable assessment procedure which is also congruent with the procedure developed by Loe inger" (Bauer, 1976, p. 935).

The author of this dissertation was trained through the previously described self-training exercises combined with a training workshop conducted by Loevinger Associates. A colleague of the author rated 20 per cent of the total sample for this study for the purpose of demonstrating interrater reliability. Median percentage agreement between the author and colleague was .86 per cent.
Adaptive Style Inventory

... A lifelong process of evolution or adaptation is the master motion in personality ... the word "adaptation" [is used] not in the sense of "coping" or "adjusting to things as they are," but in the sense of an active process of increasingly organizing the relationship of the self to the environment (Kegan, 1982, p. 113).

The Adaptive Style Inventory is designed to capture the transactions employed by individuals as they respond to shifting environmental demands. It is an effort to operationalize the construct of "adaptive flexibility," "... which is defined as the tendency of a person to modify his behavior on the basis of transactions between his personal orientation, values and purposes, and changing environmental demands" (Gish, 1980, p. iv).

Developed by David Kolb, the Adaptive Style Inventory is based to a large extent on the developmental psychology of Piaget, the theories of mid-life development of Jung and the social psychology of Lewin. The Adaptive Style Inventory builds on the four stage learning cycle developed by Kolb in his earlier work, "The Learning Style Inventory" (1972) (see Figure 2).

Immediate concrete experience provides the basis for observation and reflection. Through the process of reflection, observations are generalized into ideas which drive subsequent actions:

[An effective] learner. . . needs four different kinds of abilities: Concrete Experience abilities (CE), Reflective Observation abilities (RO), Abstract Conceptualization abilities (AC), and Active Experimentation abilities (AE). That is, [the learner] must be able to involve himself fully, openly and without bias in new experiences from many perspec-
Figure 2
The Experiential Learning Model

CONCRETE EXPERIENCE

TESTING IMPLICATIONS OF CONCEPTS IN NEW SITUATIONS

FORMATION OF ABSTRACT CONCEPTS AND GENERALIZATIONS

OBSERVATIONS AND REFLECTIONS
tives (RO); he must be able to create concepts that integrate his observations into logically sound theories (AC), and he must be able to use these theories to make decisions and solve problems (AE) (Kolb, 1979, p. 4).

In addition, this learning model suggests that the learning process involves abilities that are polar opposites of each other. Every learning situation confronts the learner with the need to choose from one of the four stages described above in order to successfully respond to the demands of the situation. According to Kolb:

... There are two primary dimensions to the learning process. The first dimension represents the concrete experiencing of events at one end and abstract conceptualization at the other. The other dimension has active experimentation at one extreme and reflective observation at the other. Thus in the process of learning, one moves in varying degrees from actor to observer, from specific involvement to general analytic detachment.

In this model, descriptions of individual approaches to learning are not restricted to classroom settings, but rather are meant to have holistic application to the individual's way of organizing his/her physical and social environment.

The Adaptive Style Inventory (hereafter referred to as the ASI), is a 104-item self-report instrument. The respondent is presented with eight different sentence stems that are partial descriptions of incomplete learning situations (e.g., When I start something new ____________________). The respondent is asked to complete the sentence stem thereby describing a situation known to him/her. Each sentence stem is followed by six pairs of
possible responses. Next the respondent must select from each of the six pairs one of the choices which most frequently characterizes his/her behavior. These six pairs of possible responses reflect all possible permutations of learning modes and afford the respondent the opportunity to select the learning mode deemed most relevant to the situation:

The learning situations correspond to the learning presses Affective, Perceptual, Symbolic and Behavioral. The learning responses correspond to the learning modes of Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation. The Affective learning press demands a Concrete Experience response, Perceptual demands Reflective Observation, Symbolic demands Abstract Conceptualization and Behavioral demands Active Experimentation (Kolb, 1984).

Responses from the ASI were converted to a number of dependent variables measuring different aspects of Adaptive behaviors. For clarity in presentation and ease in understanding, the dependent measures derived from the ASI were classified as Adaptive Flexibility measures, Directionality measures and a single measure of total response variability. Formulae for calculating these measures are presented below.

Calculation of Adaptive Flexibility

A detailed discussion of the derivation of adaptive flexibility measures can be found in Gish (1980, pp. 54-55). Briefly, adaptive flexibility measures were calculated for concrete experience, reflective observation, abstract conceptualization and active experimentation. These measures yielded the subject's
preferred style of response. The formulae for calculation of adaptive flexibility in concrete experience, for example, is as follows:

\[
\begin{align*}
\text{cn} & \quad \text{AF} = \text{ABS} \left( \frac{T}{\text{cn}} \right) \quad (\text{ce/4} - t \cdot \text{ce}) \\
\text{ce} & \quad \text{AF} = \text{ABS} \left( \frac{T}{\text{ae/4}} \right) \quad (\text{ce} - t \cdot \text{ce})
\end{align*}
\]

—where AF is Adaptive Flexibility —where cn is converger situations —where ce is concrete experience responses —where ABS is the absolute value —where T is the total modal score —where t is the total modal score in a situation

\[
\begin{align*}
\text{as} & \quad \text{AF} = \text{ABS} \left( \frac{T}{\text{ae/4}} \right) \quad (\text{ce} - t \cdot \text{ce}) \\
\text{ce} & \quad \text{AF} = \text{ABS} \left( \frac{T}{\text{ae/4}} \right) \quad (\text{ce} - t \cdot \text{ce})
\end{align*}
\]

—where as is assimilator situations

\[
\begin{align*}
\text{dv} & \quad \text{AF} = \text{ABS} \left( \frac{T}{\text{dv}} \right) \quad (\text{ce/4} - t \cdot \text{ce}) \\
\text{ce} & \quad \text{AF} = \text{ABS} \left( \frac{T}{\text{dv}} \right) \quad (\text{ce/4} - t \cdot \text{ce})
\end{align*}
\]

—where dv is diverger situations

\[
\begin{align*}
\text{ac} & \quad \text{AF} = \text{ABS} \left( \frac{T}{\text{ac}} \right) \quad (\text{ce/4} - t \cdot \text{ce}) \\
\text{ce} & \quad \text{AF} = \text{ABS} \left( \frac{T}{\text{ac}} \right) \quad (\text{ce/4} - t \cdot \text{ce})
\end{align*}
\]

—where ac is accommodator situations

This set of formulae expresses the differences between the total score in terms of concrete experience style and the subscores for the same style within each separate kind of situation. A total score for each adaptive style, herein termed the Adaptive Flexibility Score, was created by summing, as follows, for Adaptive Flexibility in concrete experience:
\[ cn \text{ as } dv \text{ ac} \]

\[ \text{AFCE} = \text{AF} + \text{AF} + \text{AF} + \text{AF} \]

\[ \text{ce ce ce ce} \]

—where AFCE = Adaptive Flexibility in Concrete Experiences

Identical formulae were applied to generate Adaptive Flexibility in reflective observation (AFRO), Adaptive Flexibility in abstract conceptualization (AFAC), and Adaptive Flexibility in active experimentation (AFAE).

In a final calculation Total Adaptive Flexibility was computed as the following sum:

\[ \text{AFTOT} = \text{AFCE} + \text{AFRO} + \text{AFAC} + \text{AFAE} \]

—where AFTOT = Total Adaptive Flexibility

**Interpretation of Adaptive Flexibility Measures**

High scores in Adaptive Flexibility Concrete Experience suggests that the respondent behaves in an open and uncensored fashion. Individuals high in Concrete Experience favor their intuition and emotions and enjoy interacting with others. Preferring to avoid theoretical and scientific approaches to problem-solving, they are comfortable making judgments and responding to events as they happen.

In contrast, individuals scoring high in Adaptive Flexibility Reflective Observation are deliberate and contemplative, postponing judgments until additional information is collected. Such individuals are more interested in acquiring knowledge than in
acting on their knowledge, and are able to bring to bear several points of view on a given situation.

Concepts, theories and logic are the preferences of individuals high in Adaptive Flexibility Abstract Conceptualization. Systematic and symbolic, precise and disciplined and favoring the scientific approach to problem solving describe individuals strong in Abstract Conceptualization.

Pragmatic and action oriented are descriptors of individuals scoring high in Adaptive Flexibility Active Experimentation. The capacity to exert influence and take risks to make things happen are valued by these individuals.

In summary, one's Adaptive Style is represented by the favoring of a particular adaptation mode or the combining of adaptation modes as one responds to varying life situations. While most people will use all four adaptation modes, they will not be able to use them equally, being stronger in one or two and less skillful in the others. According to Kolb (1984), the broader the range of adaptive mode responses the individual has available to a given situation, the more flexible and resourceful the individual's behavioral repertoire.

Calculation of Directionality Measures

Central to the idea of directionality in the ASI is the concept of situational "demand" or "press" (Kolb, 1989). Briefly,
each of the situations described in the ASI are divided into four
types: Valuing, Acting, Deciding and Thinking. Each of these
situational types creates a demand on the respondent to respond
with two of the adaptive modes. Each of the situational types is
shown in Table 5, along with the response "demand" created for the
respondent.

Directionality measures for each of the situations above were
calculated by examining responses to the appropriate items. In
each case the number of responses that were consistent with the
response demand were given a positive weight and those not con-
sistent with the demand were given a negative weight. The
weighted totals were then summed to obtain a value reflecting
strength of response toward (a positive value) or against (a nega-
tive value) the response demand. For example, in calculating
directionality in Valuing, items 4 and 8 of the ASI were examined.
A respondent's choice of concrete experience or reflective obser-
vation responses were totalled and this total was assigned a
positive valence designating responses complying with the demand
or press of the situation. On the other hand, responses in active
experimentation and abstract conceptualization were considered
responses against the demand or press of the situation. These
were also summed, but were given a negative valence to designate
their going against the situational demand.
Table 5
Demands Created by Types of Situation

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SITUATION</th>
<th>RESPONSE/DEMAND OR PRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 &amp; 8</td>
<td>Valuing</td>
<td>Concrete Experience</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reflective Observation</td>
</tr>
<tr>
<td>1 &amp; 5</td>
<td>Acting</td>
<td>Concrete Experience</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active Experimentation</td>
</tr>
<tr>
<td>2 &amp; 6</td>
<td>Deciding</td>
<td>Abstract Conceptualization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active Experimentation</td>
</tr>
<tr>
<td>3 &amp; 7</td>
<td>Thinking</td>
<td>Reflective Observation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abstract Conceptualization</td>
</tr>
</tbody>
</table>
In this same manner, items appropriate to Acting, Deciding and Thinking situations were summed and given positive and/or negative valence according to whether or not they were consistent with the situational demand. The results of these calculations yielded directionality scores for Valuing, Acting, Deciding and Thinking. In the case of each of these situations, positive values indicated responses that complied with the demand of the situation. Negative values, on the other hand, indicated responses that were not in compliance with (or went against) the demand of the situation.

Finally, a total Directionality measure was calculated by an algebraic summing of directionality measures for each of the four situations as follows:

\[ \text{TOTDIR} = \text{DIRVAL} + \text{DIRACT} + \text{DIRDEC} + \text{DIRTHK} \]

where TOTDIR = Total Directionality
where DIRVAL = Directionality in Valuing situations
where DIRACT = Directionality in Acting situations
where DIRDEC = Directionality in Deciding situations
where DIRTHK = Directionality in Thinking situations

The Total Directionality measure, when high and in the positive range indicated a substantial response style compliant with the demands of the situations. Conversely, a Total Directionality measure that was high and in the negative range indicated a substantial response style against or not in compliance with the demands of the situation.
**Total Variability Measure**

The Total Variability measure (Gish, 1980; Kolb, 1990) describes the variability of subjects' responses independent of the situational demands. As such, this measure represents an additional index of a subject's overall flexibility regardless of demands of the situation. Accordingly, positive and negative weights employed in the directionality measures were eliminated and Total Variability was computed as the sum of the following absolute values:

\[
\text{TOTVAR} = |\text{ABS(DIRVAL)}| + |\text{ABS(DIRACT)}| + |\text{ABS(DIRDEC)}| + |\text{ABS(DIRTHK)}|
\]

—where TOTVAR = Total Variability
—where ABS(DIRVAL) = Absolute Value of Directionality in valuing
—where ABS(DIRACT) = Absolute Value of Directionality in acting
—where ABS(DIRDEC) = Absolute Value of Directionality in deciding
—where ABS(DIRTHK) = Absolute Value of Directionality in thinking

Total variability scores at, or close to, zero indicate little variation in responses from one situation to another. Higher Total Variability scores indicate a greater tendency to vary responses from one situation to another. However, the Total Variability measure does not indicate whether variations in responses are toward or against a situational demand. Instead, it describes stylistic preferences and overall variability as expressed by the respondent.
CHAPTER V

HYPOTHESIS, RESEARCH DESIGN AND PROCEDURE

**History of a Specific Health Care Facility Health Care Site**

The health care system in this study is a county hospital. Affiliated with the state university as a teaching hospital, it has a housestaff of approximately 150 physicians completing their training in a variety of residency training programs. Total employees of the hospital are estimated at 1,750.

The primary patient population serviced by this county hospital is indigent, consisting of a large Hispanic and Southeast Asian population (seasonally migrant workers and illegal aliens). Special services unique to the hospital are its burn center and its recent designation as a regional trauma center.

While the hospital is licensed for 417 beds, since 1983 it has been staffed for 232 beds. The hospital is governed by a lay Board of Supervisors, the County Administrative Officer and administrative staff. The hospital is only one of several public services under county administration (e.g., law enforcement, the park system, mental health, etc.). It is regarded as one more general public service, not requiring any special expertise at the Board or County administrative level relevant to the delivery of health care. This posture assumes that the needs of the county hospital (at the Board of Supervisor level) do not significantly
differ from the needs of any other public service. Job descriptions, wages, benefits for all county employees, and budgets for operating public county services are determined and regulated by the County Administration and the Board of Supervisors using a generic boiler-plate model that does not differentiate between the work entailed in the services they oversee. As a result, the hospital is structurally arranged and operated for the convenience of county administration, rather than being designed to efficiently facilitate and enhance the services it must provide. Consequently, already scarce resources are misused even further: Job descriptions are not updated as technology becomes more complex, staffing and equipment decisions must be approved at the administrative level where in-depth knowledge regarding standards for provision of care is inadequate.

According to Heydebrand (1973), the type of ownership and control of a hospital may be used as an indicator of organizational autonomy. Using Max Weber's definition of autonomy: "... means that the order governing the organization has been established by its own members on their own authority, regardless of how it has taken place in other respects. In the case of heteronomy, it has been imposed by an outside agency" (Weber, 1968, p. 49-50), Heydebrand describes voluntary "private," non-profit hospitals as relatively autonomous in contrast to "public" state and local governmental hospitals (1973). As can be seen,
the health care site in which this study took place not only fits
Heydebrand's description of an institution whose policies and
procedures are externally imposed as a result of its governance
structure; it also illustrates many of the consequences of an
externally imposed governance structure.

The locus of expertise in the delivery of health care first
appears at the level of Chief Executive Officer of this hospital.
This is potentially problematic since the Chief Executive Officer
must answer to the County Administrative Officer and to the Board.
In this structure, pressure is often brought to bear on the Chief
Executive Officer to function as an advocate for the county system
rather than promoting the viability and development of the
hospital.

The Board of Supervisors represents various constituencies
within the county ranging from areas of poverty to areas of
considerable wealth, including private hospitals competing for
resources historically allocated to the county hospital.

While the mission of the Board of Supervisors is primarily
political, "... developing a sense of what are desirable and
undesirable aims and methods ..." for the various services under
its jurisdiction, the organization of the county administration
includes increasing indepth executive functions that directly
impinge and confound the operations of the services it oversees.
According to Stephen Cang (1986):
... political and executive aspects of work are distinct from each other, each with different purposes, needing different organization and procedures, and different people having different interests; ... a political process [becomes] confused by executive responsibilities unclearly carried, and executive programs suffer from political interference which diminishes executive effectiveness.

In 1984 a new Chief Executive Officer was hired with the mandate to cut hospital costs, reduce staff, and create new services that would attract paying patients to offset the current predominant indigent patient population. The previous Chief Executive Officer had been with the hospital for five years, had been a strong advocate promoting the hospital's interests and thereby generating an adversarial relationship between himself and the Board of Supervisors. His efforts to consistently educate this lay Board to the inner workings of the hospital resulted in increasing animosity towards him and he was abruptly asked to leave in June, 1984. His successor made immediate efforts to comply with Board demands, paying little attention to the internal working conditions of the hospital and making a series of decisions that were to have a profoundly deleterious effect on the hospital's ability to provide care, and ultimately to threaten the hospital's very survival. The full impact of his decisions was not apparent at once, but rather they converged over the past three year period, resulting in a series of crises occurring during the period this study was being conducted.
The Chief Executive Officer's efforts to be responsive to Board demands were made during the time when changes in the national health care reimbursement structure were affecting not just health care delivery systems, but consumer behavior as well. Due to the ever rising costs of health care, patients were no longer seeking care during early stages of their disease. Instead they were waiting until they were so acutely ill that they had no other recourse than to seek aid. This change in consumer behavior significantly increased not only the numbers of critically ill patients requiring immediate care, but also increased the need for more skilled providers at the same time as services and staff were being down-sized. The inevitable outcome was a delivery system unable to respond to the increasing volume of work and unable to provide safe care.

Nursing staffing for the hospital had been based on an average daily census of 232 patients since 1984. However, the average daily census had been steadily increasing over the past three years. By 1986-'87 the average daily census was at 252, and during the summer of 1987, frequently peaked at 300. Also it should be noted that the statement "staffing for 232" is an inflated number since it does not include the vacancy factor. On the average, 80 to 100 positions are kept vacant at any one time. When this figure is adjusted for the vacancy factor, it will be seen that the staffing level was appropriate to a patient load of
approximately 218. (A small number of these vacant positions may be temporarily filled on a day-to-day basis by "per diems" who usually lack needed specialty skills.)

Specifically, a recurring problem was the particularly busy periods during which the number of critically ill patients requiring admission into Critical Care Units (CCU's) from the Emergency Room (ER) increased dramatically. The CCU's were unable to receive admissions at the rate the ER needed to send them, if the ER was to manage its own high volume of emergency patients. The CCU's inability to respond resulted in a severe backup in the ER of patients requiring intensive care for prolonged periods of time (frequently in excess of 24 hours). The ER is not staffed to provide sustained intensive care and to also respond to varying levels of life threatening conditions. The medical staff were aware that there were empty beds in the CCU's and pressed nursing to admit more patients more rapidly. Nursing replied that, while there were indeed a number of empty beds, there was not a corresponding number of nurses to provide adequate bedside care and increasing admissions to the unit would be unsafe. CCU admissions are costly and labor intensive. They represent a significant source of revenue to both the institution and the physician. Thus, the medical staff and hospital administration continued to press nursing to increase admissions—to do so by working harder, by creative scheduling of staff, by working overtime, by adding
extra temporary help (usually not trained in critical care). But they did not support creating additional permanent positions, as this situation was perceived to be temporary. Initially, nursing complied with these pressures; but as this “temporary situation” persisted, the Nurse-Managers of the CCU’s collectively decided to close the empty beds so that the numbers of patients admitted could receive safe and competent care. This decision resulted in turning away patients to competing institutions, a significant loss of revenue and growing ill-will between nursing, medical staff and administration. This situation continued to worsen and spread to other areas of the hospital.

County institutions tend to be characterized by little turnover. Employees tend to have high affiliative needs and a high degree of loyalty to their institution. In addition they have a strong need for as much autonomy as their level of work can support. Initially, staff shortages and increasingly unsafe conditions were absorbed and regarded as a temporary challenge that could be managed. As unsafe conditions persisted and worsened, turnover increased dramatically, with the most competent employees leaving first.

County facilities are historically racked by periods of excessive stress and work overload. More often than not, their members are willing to manage with remarkably little complaint, upheld by their ideology and by the usual time-limited nature of
these stressful periods. In this case the sustained nature of the stress escalated unsafe conditions and became intolerable, particularly to the more competent employees. Using Jaques' concept of cognitive-complexity, the more competent employees are the ones with a time-frame of one to two years, at least. These are the employees that have the capacity to perceive both the complexities of the problems confronting the hospital, as well as the growing evidence of lack of administrative competencies to manage crises that were engendered by the very administrators now depended on for their solution. From Loevinger's perspective of ego development, these employees will be at the conformist/conscientious transitional stage. The internal conflict precipitated by not being able to provide care according to professionally espoused, as well as internalized standards of practice, became intolerable. Alternative sources of employment congruent with valued standards of practice were sought.

The census continued to rise; newly vacated positions were not refilled and administration denied any serious problems. In fact, hospital administration went to some lengths to minimize and conceal the extent of the previously described problems from the Board of Supervisors. With no constructive dialogue possible between administration and the care-givers, a series of walkouts and strikes ensued, initially by some of the smaller unions composed of maintenance, dietary and clerical support services.
As dissatisfaction and concern increased, the nursing union (significantly larger than the other unions and controlling direct bedside care throughout the institution) began mobilizing and planning a strike which subsequently resulted in a restraining order and a court injunction prohibiting nursing from striking. Ironically, because there was a period of uncertainty as to whether a restraining order would be served, administration, shaken out of their complacent denial, decided to prepare for a strike and gradually closed down major hospital functions. The time and momentum involved in closing down a large county facility and then reopening it extended over a two-week period resulting in a loss of occupancy that persisted far beyond the acute two-week period. An actual strike could not have had any greater impact.

This, then, was the milieu in which this study was carried out and has been mentioned at some length for two reasons. (1) To call attention to the extraordinary stress the participants were undergoing during the course of this study. While one would be hard-pressed to "scientifically" demonstrate a direct one-to-one correlation between subjects' responses on the three psychometric instruments and the stress they were undergoing, there can be no question that the out-of-control nature of their immediate environment profoundly influenced their attitudes toward and experience of their work. The subjects' awareness of the fluctuating quality of their work will be described in greater
detail in a later section of this dissertation. 2. To emphasize that this is not an uncommon story unique to this particular hospital. Unfortunately, variations of this situation are occurring all over the country. While other health care institutions may not be experiencing the extremes of mismanagement described in this study, it is not an exaggeration to say that most are struggling to maintain a standard of care that exceeds their resources as they are currently organized.

If, in fact, untapped resources do exist within the current workforce in health care facilities, it is incumbent that they be identified.

**University Setting Research Site**

Do other hybrid organizations with similar structural configurations operate in a fashion similar to that observed in health care? Are they confronted with similar problems? In what ways do they differ?

As was mentioned earlier, a second hybrid organization, university education, is included in this study for purposes of contrast and comparison. Institutions of higher education, not unlike health care, have also undergone marked transformations in the development of their patterns of organization and their purpose. Originally small and undifferentiated, universities were operated by a few individuals who functioned as both administrators and educators. As enrollment and curricula expanded disci-
pline specialization and differentiation began to occur resulting in faculty members grouping themselves into separate departments of instruction:

The rise of departments grew out of a need to improve the organization and management of the academic process as knowledge expanded at an ever accelerating pace (Tucker, 1984, p. 28).

As the university became more actively concerned with preparing students for practical careers, it moved from gentlemanly to utilitarian values and accorded more prominence and autonomy to its professors . . . [and] became less concerned with moral supervision (Starr, 1982, p. 148).

While educational institutions share similar structural configurations and similar problems with health care institutions, their operating procedures are significantly different from those of health care. The following quote exemplifies the similarity of problems experienced by both organizations:

The present economic crisis in higher education raises a fundamental question concerning the ability of colleges and universities to fulfill their traditional functions. Specifically, can institutions of higher learning maintain flexibility and variability, preserve quality, remain accountable, and respond effectively to the changing needs of society within the context of continuing inflation and steady-state or even declining resources? . . . The increasing complexities of operating institutions of higher education, along with shrunken budgets, have led deans and other university administrators to delegate more and more tasks to department chairpersons (Tucker, 1984).

The educational system in this study is a small private midwestern university which offers undergraduate, graduate and professional education in more than 60 fields. It is particularly known for its programs in engineering, mathematics, medicine and
management. Enrollment figures for 1988-'89 were 8,333 students, with 2,787 students in undergraduate programs. There is a full-time faculty of 1,534 members. Faculty members and students from a graduate program in the business school participated in this study. This particular program has a core faculty of 12 and a student population of 52.

**Subjects and Methodology**

The participants for the health care portion of this study were drawn from two client populations (the Department of Emergency Medicine and the Nursing Division) with whom the author had worked for extended periods of time dating back to 1980 and 1985 respectively. Thirteen physicians, consisting of the Chief of the Emergency Medicine Department and his faculty comprised the first group. They ranged in age from 29 to 47 years with an average age of 36.4 years. Of the 13 physicians, one was female and two were oriental. The second group consisted of the Director of Nursing and the 12 Nurse-Managers who were responsible for the medical, surgical, obstetric-gynecologic, extended care and intensive care units in the hospital. This group ranged in age from 32 years to 55 years with an average age of 44.5 years. Of the 13 Nurse-Managers, one was male; of the remaining women, one was black, one hispanic, two were oriental. Both the Chief of the Emergency Medicine Department and the Director of Nursing supported partici-
pation in this study on a voluntary basis. This research study was presented to each client group separately as a requirement the author needed in order to complete her Ph.D. The intent and purpose of the Career Path Appreciation (CPA) was described, individual feedback was promised to each respondent and confidentiality was guaranteed to all respondents. The Chief of Emergency Medicine and the Nursing Director were promised a group profile without individual identification if desired. It was emphasized that agreeing to be a respondent in this study was in response to the author's needs, and would not be used in any way to evaluate or make decisions about the respondents' current or future positions. Benefits to the respondents would be in the form of any personal insights gained through undergoing the CPA process. Each participant was scheduled for a 90-minute session during which the CPA was conducted. In addition, each participant was given a copy of Loevinger's Scale of Ego Development and Kolb's Adaptive Style Inventory to fill out on their own and return within a seven-day period. A feedback session ranging from 30 to 60 minutes was scheduled at a later date during which only the results of the CPA were shared. The total population of 27 participants were interviewed over a three-month period beginning January, 1987 and ending March, 1987. Feedback began in April, 1987 and was completed by July, 1987.
The participants for the university portion of this study were drawn from two groups (faculty and students) in a business school graduate program of a small university. Twelve faculty, consisting of the Chairman of the department, senior and junior faculty comprised the first group. They ranged in age from 36 to 59 years with an average age of 42 years. Of the 12 faculty, three were women, nine were men and all Caucasian. The second group consisted of 12 students from this same graduate program who had been in the program for two or more years. This group ranged in age from 29 years to 55 years with an average of 38.5 years. Of the 12 students, eight were women; of the eight women two were black. Of the remaining four men, one was Indian and one was black. A similar procedure to that used with the health care participants was followed with these groups, with the exception that faculty and students were approached individually. Again, participating in this study was voluntary and in response to the author's needs. Benefits would be in the form of any personal insights gained or interests generated in this area of study. These 24 participants were interviewed over a six-month period beginning in April, 1988 and ending in November, 1988.

**Hypotheses**

While health care facilities such as hospitals fall within hierarchical bureaucracies as defined by Jaques, the growing trend
to bureaucratize the practice of medicine has resulted in the development of inappropriate management systems that either have physicians' "accountable" to non-physician managers whose modes and/or levels of work are likely to be at a level lower than that of the physicians, or assume that all physicians need to know how to be managers. These solutions appear oversimplified and often seem to create more problems than they solve.

Having exhausted their usual resources to improve productivity, the health care industry (with its emphasis on improving management practices), is searching for significant untapped resources in their current workforce. The tapping and utilization of these resources would dramatically enhance productivity and off-set excessive costs of providing care. The dilemma has been how to identify and develop these untapped resources and it is toward this end that the current study, utilizing measures of cognitive function, focuses on the relationship between the individual's cognitive functioning and the needs and demands of the workplace.

Specifically, the following hypotheses were generated for measures of cognitive functioning derived from the Career Path Appreciation (CPA), the Scale of Ego Development Sentence Completion Test, and the Adaptive Style Inventory (ASI).

I. Physicians and faculty would demonstrate a higher level of work capacity than Nurse-Managers and graduate students in the
two areas judged by the CPA: current work level and potential mode.

This hypothesis is based on the following information. Generally speaking, physicians expect to and do realize a significantly higher earning curve during the course of their career than do Nurse-Managers. Likewise, faculty are realizing a significantly higher earning curve than are graduate students during their student years. According to Jaques' theoretical formulation, higher earning curves should be associated with significantly higher levels of work capacity.

In addition, in order for the would-be physician to be successful in medical school and residency training, s/he has to be able to manage a more extended time-span-of-discretion than does the Nurse-Manager. This is very simply illustrated by the significant difference in time required for training, usually seven years including a residency for physicians, in contrast to the four years required for a baccalaureate in nursing. In the graduate program, faculty subjects have already completed a training period of comparable length to that of physicians, and also have previous work experience, both of which required the capacity for managing extended time-spans-of-discretion. The coursework of graduate students, on the other hand, reinforces relatively short-term pieces of work which do not demand extended time-spans-of-discretion. Again, according to Jaques' theory,
individuals who manage a significantly longer time-span-of-
discretion should demonstrate significantly higher levels of work
capacity.

1.1: It was predicted that in each organization physicians and faculty would exhibit higher current work levels than graduate students and Nurse-Managers.

1.2: It was predicted that in each organization, physicians and faculty would exhibit higher modes than graduate students and Nurse-Managers.

1.3: It was predicted that a greater discrepancy would exist between the mode and the current work level of physicians and faculty than of graduate students and Nurse-Managers.

II. Physicians and faculty would demonstrate higher scores on Loevinger's scale of Ego Development than Nurse-Managers and graduate students. This hypothesis is based on the following assumptions: Higher levels of ego development will be found in subjects demonstrating higher levels of current work capacity and potential/mode. Greater capacity for cognitive-complexity is associated with greater self-awareness and self-management skill.

2.1: Higher scores on Loevinger's Scale of Ego Development were predicted for physicians and faculty than for graduate students and Nurse Managers.

III. Physicians and faculty would demonstrate higher Total Adaptive Flexibility scores as well as higher Total Variability scores on the Adaptive Style Inventory than Nurse-Managers and graduate students. This hypothesis is based on the following assumptions. Because of their status and positions within their respective organizations, physicians and faculty have greater
opportunities for a broader range of flexible behavior than do Nurse-Managers and graduate students whose practices tend to be more prescribed and directed.

3.1: It was predicted that Total Adaptive Flexibility scores for the Adaptive Style Inventory would be higher for physicians and faculty than for graduate students and Nurse-Managers.

3.2: It was predicted that Total Variability scores would be higher for physicians and faculty than for graduate students and Nurse-Managers.

According to Jaques' theoretical formulation, greater age is associated with realization of potential/mode. While Loevinger's stages of ego development are defined independent of age they do correlate with chronological age. Therefore, older subjects are more likely to demonstrate higher mode, higher current work capacity and higher stages of ego development.

4.1: For physicians and faculty there will be a significantly positive correlation between age and the Loevinger scores, between age and mode, and between Loevinger scores and mode.

4.2: Graduate students and Nurse-Managers will show a positive relationship between Loevinger scores and current work capacity on the CPA.

V. The following hypotheses relate to characteristics of the members of health care and university hybrid organizations as these individuals exhibit adaptive flexibility and directionality in response to the demands of their respective situations. Because health care facilities fall within hierarchical bureaucracies as defined by Jaques, it is predicted that work in health
care organizations will be characterized by a predominance of prescribed "hands-on" activities. Higher education, while falling within Mintzberg's definition of a hybrid organization, appears less hierarchical when contrasted to health care. Thus for subjects in higher education, work will be less prescriptive and will offer more opportunities for discretionary behavior.

5.1: Subjects in the health care system, regardless of whether they are physicians or Nurse-Managers, will show more Active Experimentation and Concrete Experience than will faculty or graduate students on the Adaptive Style Inventory. In contrast to the above, faculty and graduate students will show more Abstract Conceptualization and Reflective Observation in their Adaptive Style Inventory scores.

5.2: Because of the greater prominence of hierarchical organization in health care settings, physicians and Nurse-Managers overall will show less total adaptive flexibility than faculty or graduate students.

5.3: Different demands present in each site will influence directionality measures for ACTING, DECIDING, THINKING, and VALUING situations. Specifically, because of the immediate demands for action and rapid decision making in hospital settings, it is predicted that the health care groups, physicians and Nurse-Managers will show a greater tendency to go with the press in terms of ASI directionality in ACTING and DECIDING situations. In contrast, demands within the university setting for creative thought, critical thinking, and examination of personal and/or professional values lead to a prediction that university groups, faculty and graduate students will show a greater tendency to go against the press in THINKING situations and with the press in VALUING situations when compared with the hospital groups.

5.4: Different demands present in each site will also influence variability measures for ACTING, DECIDING, THINKING, VALUING. Because of the immediate demands for action and rapid decision making in hospital settings, it is predicted that the health care groups will show
less variability in ACTING, DECIDING, THINKING and VALUING than the university groups.

5.5: When total directionality is examined, physicians and faculty will tend to move against the situation demand or press more than Nurse-Managers or graduate students because of their positions within each of the respective organizations.

5.6: Regardless of setting or position in the organization, with greater age there will be more of a tendency to move against the press when total directionality is considered.

5.7: Generally, across all groups, ASI directionality measures will be correlated with CPA measures, Loevinger scale scores, Total Adaptive-Flexibility, and Total Variability in such a way that high scores for the latter four variables will generally be associated with movement against the press in the ASI directionality measures, most particularly, total directionality.

5.8: Generally, across all groups, Variability scores will be correlated with age, CPA measures, and Loevinger scale scores in such a way that high scores for the latter three variables will be associated with high levels of Total Variability.

VI. According to Mintzberg, four out of five of the original structural configurations identified in his theory are not capable of innovation:

"Both the [hierarchical] and professional bureaucracies are performance, not problem solving structures. They are designed to perfect standard programs, not to invent new ones (Mintzberg, 1979, p. 432).

Rather, they are designed to provide stable and standardized programs. Jaques describes the level of cognitive-complexity required to maintain organizational stability as characteristic of Level III. The incumbent of a Level III position must design and
oversee the tasks required to achieve existing organizational goals.

6.1: Because both systems attempt to maximize stability, the average current work level on the CPA will not exceed Level-IV in either system.

6.2: Because both systems require and support conformity, Loevinger's scores for both systems will on the average not exceed I-4.

VII. The three psychometric instruments used in this study share common assumptions. All three are based on a developmental orientation of the individual, that the individual will continue to grow throughout his/her lifetime, and that his/her growth will be an outcome of the interaction between environmental experiences and innate characteristics. Because of this common theoretical foundation, the scores of all three instruments will correlate positively. Specifically:

7.1: It is hypothesized that the two CPA scale scores, current capacity and mode, will show significant positive correlations with both Loevinger's scores and ASI Flexibility scores.

Research Design and Statistical Analyses

As noted earlier, the main focus of this research was on the health care hybrid organization with physicians and Nurse-Managers representing, respectively, members of the professional association and hierarchical organizational components. The university organization with its parallel faculty and graduate student
organizational components was employed as a contrasting hybrid organization. This research plan generated a design wherein two groups representing professional associations and hierarchical components were nested in two hybrid organizations, the health care organization and the university organization as shown in Table 6. Statistical analysis performed for examining differences between the two hybrid organizations and analyses performed for examining differences among the four experimental groups were based on corresponding analyses of variance (ANOVA) designs (Winer, 1968). In situations wherein ANOVA results indicated statistically significant group differences, post-hoc analyses employing Duncan's Multiple-Range t-tests (Bruning and Kintz, 1968) were employed to allow pairwise comparisons among all groups and to assist in determining between which groups, specifically, significant differences lie. Finally, since some hypotheses referred to relationships among particular dependent variables, data for subjects in all groups were combined and Pearson Product-Moment correlations (Runyon and Haber, 1978) were performed on the entire data set. For all analyses, the convention of establishing the probability of a Type I error at or less than 5 per cent was retained.
Table 6
Research Design

<table>
<thead>
<tr>
<th></th>
<th>ASSOCIATION</th>
<th>HIERARCHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTH CARE</td>
<td>PHYSICIANS 13</td>
<td>NURSE-MANAGERS 14</td>
</tr>
<tr>
<td>UNIVERSITY</td>
<td>FACULTY 12</td>
<td>GRADUATE STUDENTS 12</td>
</tr>
</tbody>
</table>
CHAPTER VI

RESULTS AND DISCUSSION

Hypothesis 1.1: In education and health care organizations, physicians and faculty would exhibit higher current work levels than graduate students and Nurse-Managers.

Measures of current work capacity were analyzed in an Analysis of Variance (ANOVA) that tested for any differences among the four groups. Physicians and faculty did not show higher current work levels than graduate students and Nurse-Managers as was hypothesized. Instead the results of this ANOVA indicated that the four groups did not differ in levels of current capacity, F(3,47) = .90, ns. Levels of current work capacity shown by each group are presented in Figure 3.

Examining Figure 3, it is clear there are no differences across groups. However, it is also noteworthy that all groups were functioning at Level 3.5. Work at Level III demands the capacity to develop plans and implementation processes that respond to short-run requirements of weeks or months and at the same time begin the planning process for goals requiring a time-span of one to two years. This level of work consists of direct management, e.g., incumbents of positions at Level III design the tasks to be performed; they do not perform the task itself (Stewart, 1990). It is this level of work that is critical to maintaining organizational stability and suggests support for
Figure 3

Current Capacity

Current Capacity \( (F(3, 47) = .90, \text{ ns}) \)
Mintzberg's position that these types of organizations are structured to maintain and replicate themselves.

Hypothesis 1.2: In education and health care organizations, physicians and faculty would exhibit higher modes than graduate students and Nurse-Managers.

This hypothesis was substantiated; however, the differences among the four groups were complex and interesting. The potential/mode scores for all groups were analyzed by an ANOVA, identical to that employed above, and the results of this ANOVA indicated highly significant differences among the groups, $F(3,47) = 6.35$, $p < .001$. As shown in Figure 4 the highest mean potential/mode scores were shown by the faculty group with graduate students, physicians and Nurse-Managers showing lower levels.

To allow closer examination of these group differences, pairwise mean comparisons were made with Duncan's Multiple-Range $t$-tests. Results of these tests indicated that the faculty exhibited significantly higher potential/mode scores than did physicians ($p < .05$). In fact, the faculty group was significantly higher in potential/mode than all other groups including physicians, graduate students ($p < .05$) and Nurse-Managers ($p < .05$). Comparisons by $t$-tests of potential/mode scores for physicians and graduate students indicated no differences between these two groups. Physicians and graduate students were, however,
significantly higher in potential/mode than Nurse-Managers who
showed significantly lower scores than any of the other three
groups.

While this hypothesis was substantiated, the finding that the
mode scores of physicians were comparable to those of the graduate
students was not expected. The original expectation was that mode
scores of faculty and physicians would be comparable.

Hypothesis 1.3: A greater discrepancy would exist between the
mode and current work level of physicians and
faculty than of graduate students and Nurse-Managers.

This hypothesis was partially substantiated by the faculty
group who showed significantly greater discrepancies between mode
and current work level than did physicians or Nurse-Managers. An
unexpected finding was that graduate students showed the same
level of discrepancy between mode and current work level as was
shown by the faculty group. Physicians and Nurse-Managers showed
the least discrepancy between potential/mode and current work
level. These findings were substantiated by an ANOVA which indi-
cated significant differences among groups, F(3,47) = 5.94, p <
.002. Comparisons among the three groups were made on the basis
of t-tests as in the analysis above. Discrepancy levels exhibited
by each of the groups are shown in Figure 5.

The issue addressed by this measure of discrepancy is, para-
doalically, the individual's "fit" to the level of work for which
s/he is being paid to perform. The present findings would suggest
Figure 5
Discrepancy Between Mode and Current Capacity

DEV(3-47) = 5.94, p < .002

DISCREPANCY BETWEEN MODE AND CURRENT CAPACITY
faculty and graduate students show the poorest "fit" in that their current work level is two levels below their potential/mode. On the other hand, the physician and Nurse-Manager groups show the closest "fit" of all four groups. This finding can be partially accounted for by the age of certain of the groups. Specifically, the Nurse-Manager group is significantly older than the other three groups. According to Jaques' theory of human capability, potential/mode is realized with increasing age; thus it is predictable that the Nurse-Manager group being the oldest, would show the closest "fit" (or the least discrepancy between mode and current work level). Two factors contribute to a possible explanation for physician performance. The physician group tended to be composed of the youngest members of all four groups and as such would be least likely to have realized their potential mode according to Jaques' theory of human capability. In addition, the organizational structure of the hospital setting is far more prescribed and hierarchical than is the university setting, thereby suggesting that it may be more difficult to demonstrate potential/mode in highly prescriptive work environments.

Hypothesis 2.1: Physicians and faculty would exhibit higher scores on Loevinger's scale of ego development than graduate students and Nurse-Managers.

This hypothesis was only partially supported by the data. An ANOVA performed on the Loevinger Ego Development scores indicated
differences between groups, \( F(3,47) = 5.06, p < .01 \). As shown in Figure 6 the faculty group appeared to have higher ego development scores than the other three groups.

This observation was confirmed when Duncan's Multiple-Range t-tests were performed on mean values for the four groups. The t-test comparisons indicated that the faculty showed significantly higher ego development scores than did the physicians (\( p < .05 \)), Nurse-Managers (\( p < .05 \)) or graduate students (\( p < .05 \)), whereas physicians, Nurse-Managers and graduate students did not significantly differ from each other in terms of ego development.

According to Loevinger, higher levels of ego development are characterized by higher levels of self-differentiation and reflection. It is thought that faculty exhibit higher levels of ego development because in the process of achieving faculty status they have had to demonstrate the capacity to develop and utilize a broad and encompassing overall frame of reference (Loevinger, 1970).

On the other hand, individuals in the health care setting, e.g., physicians and Nurse-Managers, are selected and reinforced for their capacity for immediate action rather than self-reflection; and immediate problem-specific focus rather than a more all encompassing frame of reference. In addition, particularly in an emergency setting, the demands of acute care reinforce
Figure 6

Loewinger Scale

Loewinger Scale ($F[3,47] = 5.06, p < .01$)
attending to others over attending to self which, in turn, supports lower differentiation of self from others and the environment.

The graduate students are comparable to the physicians in that at this time in their lives and their position in the organization they are other-directed and demonstrate less self-differentiation.

Hypothesis 3.1: Total adaptive flexibility scores for the Adaptive Style Inventory will be higher for physicians and faculty than for graduate students and Nurse-Managers.

This hypothesis was strongly confirmed. The results of an ANOVA performed on total adaptive flexibility scores for all groups indicated highly significant group differences, $F(3,47) = 6.39$, $p < .005$. As shown in Figure 7, average total adaptive flexibility scores for physicians and faculty appeared to be significantly higher than adaptive flexibility scores for Nurse-Managers and graduate students. Positions occupied by physicians and faculty, in their respective organizations, are at an organizational level higher than that of the graduate students and Nurse-Managers; and as such, their work is less prescribed affording them opportunities for greater flexibility.

Pair-wise mean comparisons with Duncan's Multiple-Range t-tests confirmed these observations. Specifically, no differences existed between physicians and faculty in total adaptive flexibility; however, these two professional groups were significantly
Figure 7

Adaptive Flexibility Total Scores

Adaptive Flexibility Total Scores (F(3, 47) = 6.39, p < .005)
higher than Nurse–Manager or graduate student groups who also did not differ from each other in total adaptive flexibility.

**Hypothesis 3.2:** It was predicted that Total Variability scores would be higher for physicians and faculty than for graduate students and Nurse-Managers.

This hypothesis was confirmed in the sense that physicians and faculty showed very high levels of Total Variability. Unexpectedly the Nurse–Manager group also showed high levels of Total Variability that were equivalent to physician and faculty levels. The graduate student group, as predicted, showed significantly lower levels of Total Variability. In this case, however, the graduate students showed significantly lower levels than any of the other three groups. An ANOVA, F(3,47) = 3.18, p < .05) confirmed these conclusions as did the results of post-hoc t-tests comparing individual pairs of means. Mean Total Variability scores for all groups are shown in Figure 8.

Of the four groups the graduate student group is the only group not salaried. While the degree to which work is prescribed may vary for the other three groups this finding suggests that the underdefined and ambiguous role of the graduate student has an inhibitory effect on the total range of adaptive flexibility responses possibly available to the graduate student.

**Hypothesis 4.1:** Physicians and faculty will exhibit significantly positive correlations between age and Loevinger scores, between age and mode, and between Loevinger scores and mode.
This hypothesis was tested by examining correlations among age, Loevinger scores and potential/mode separately for the physician and faculty groups. Overall the hypothesis received only weak support. When correlations between age and Loevinger scores were examined, no significant correlation was observed for either the physician \( (r = .17, \text{ ns}) \) or for the faculty group \( (r = .02, \text{ ns}) \). Correlations between age and mode yielded some support for the hypothesis in that the faculty group exhibited a significantly positive correlation between these variables \( (r = .53, p < .05) \). However, the physician group failed to show any significant relationship between age and potential mode \( (r = -.26, \text{ ns}) \).

Correlations between Loevinger scale scores and potential mode were not significant for either physicians \( (r = .07, \text{ ns}) \) or faculty groups \( (r = .13, \text{ ns}) \).

**Hypothesis 4.2:** Graduate students and Nurse-Managers will show a positive relationship between Loevinger scores and current work capacity on the CPA.

This hypothesis was supported for the Nurse-Manager group but not for the graduate student group. Specifically, the Nurse-Managers exhibited a significant positive correlation between Loevinger scores and current capacity \( (r = .55, p < .05) \) whereas the graduate student group showed no such relationship between these variables \( (r = .23, \text{ ns}) \).
Hypothesis 5.1: Physicians and Nurse-Managers will show more Active Experimentation and Concrete Experience than will faculty and graduate students on the Adaptive Style Inventory.

In contrast to the above, faculty and graduate students will show more Abstract Conceptualization and Reflective Observation in their Adaptive Style Inventory scores.

Since the Adaptive Style Inventory was a rich source of multiple measures of adaptive flexibility, separate analyses were performed for each adaptive mode: Adaptive-Flexibility-Abstract Conceptualization (APAC), Adaptive-Flexibility-Active Experimentation (AFAE), Adaptive-Flexibility-Concrete Experience (AFCE), and Adaptive-Flexibility-Reflective Observation (AFRO). Analysis of Adaptive-Flexibility scores for Active Experimentation (AFAE) and Concrete Experience (AFCE) did not substantiate higher scores for physicians and Nurse-Managers. In fact, no differences among any of the four groups were apparent in terms of Active Experimentation (AFAE) or Concrete Experience (AFCE). This conclusion was confirmed by separate ANOVAS performed on Adaptive-Flexibility in Active Experimentation and Concrete Experience.

The results of these analyses failed to yield significant Group effects for either AFAE ($F[3,47] = 5.8$) or AFCE ($F[3,47] = 1.38$). Mean values for all groups for AFAE and AFCE are shown in Figures 9 and 10 respectively.
Figure 9

Adaptive Flexibility/
Active Experimentation

Adaptive Flexibility/Active Experimentation ($F(3, 47) = 5.80, \text{ ns}$)
Figure 10
Adaptive Flexibility/
Concrete Experience

Adaptive Flexibility/Concrete Experience (F[3,47] = 1.38, NS)
Analysis of Adaptive Flexibility in the Abstract Conceptualization (AFAC) mode provided support for this being a prominent mode in faculty and graduate students. However, Abstract Conceptualization also was found to be a prominent mode for physicians in the health care setting. This conclusion was confirmed by an ANOVA performed on the AFAC measures for all groups which yielded a significant Groups effect ($F[3,47] = 3.89$, $p < .01$). The mean AFAC values for the four groups are shown in Figure 11.

Inspection of Figure 11 suggests that Nurse-Managers showed lower levels of Adaptive-Flexibility in Abstract Conceptualization and that the University groups, faculty and graduate students, showed equivalent AFAC scores that were virtually identical to those shown by the physicians. These conclusions were confirmed by the results of Duncan's Multiple-Range $t$-test performed on the group mean values. Specifically, Nurse-Managers exhibited significantly lower AFAC scores when compared with physicians ($p < .05$), faculty ($p < .05$) and graduate students. No differences were significant, however, when physicians, faculty and graduate students were compared with each other in terms of AFAC.

Of the four groups studied, the Nurse-Manager group is most pragmatic and action oriented. Preference for this style is tempered by standards of practice designed to ensure safe and
competent care. While physicians are also action-oriented, the complexities of their work requires a well developed capacity for analytic and abstract behaviors.

Analysis of Adaptive-Flexibility in Reflective Observation did not confirm the hypothesis that faculty and graduate students would show higher AFRO levels than physicians and Nurse-Managers. In fact, an ANOVA performed on the AFRO data failed to yield any significant Groups effects ($F[3,47] = 1.49$). The mean AFRO values for all groups are presented in Figure 12. Although differences can be noted when visually inspecting Figure 12, statistical analyses indicated that these differences were not significant.

Hypothesis 5.2: Because of the greater prominence of a hierarchical organizational structure in health care settings, physicians and Nurse-Managers will show less total adaptive flexibility than faculty and graduate students.

Analysis of Total Adaptive Flexibility (AFTOT) scores did not confirm less total flexibility for physicians and Nurse-Managers, even though marked group differences were apparent. An ANOVA performed on AFTOT data indicated significant differences between groups ($F[3,47] = 4.28$, $p < .01$). As can be seen in Figure 13, physicians and faculty appear to show significantly higher total Adaptive Flexibility than Nurse-Managers or graduate students.

Comparison of mean values with Duncan's Multiple-Range t-test confirmed this observation. Specifically, no significant differences appeared when physician and faculty groups were compared
Figure 12

Adaptive Flexibility/
Reflective Observation

Adaptive Flexibility/Reflective Observation ($F(3, 47) = 1.49$, ns)
with each other. Similarly, comparison of Nurse-Manager and graduate student groups indicated that these group means also were not different. However, both the physician and faculty groups were significantly higher in total Adaptive-Flexibility than either Nurse-Managers or graduate students, suggesting that membership in the association component of either hybrid organization is linked with high total adaptive flexibility.

To facilitate comparisons among groups, Figure 14 is included as a summary of all Adaptive Flexibility scores for each group. In addition, graphic representations of Adaptive Flexibility in all of the four modes are depicted separately for each of the four groups in Figure 15 (physicians), Figure 16 (Nurse-Managers), Figure 17 (faculty), and Figure 18 (graduate students).

Hypothesis 5.3: Different demands present in each site will influence directionality measures for ACTING, DECIDING, THINKING and VALUING situations. Specifically, because of the immediate demands for action and rapid decision making in a hospital setting, it is predicted that physicians and Nurse-Managers will show a greater tendency to go with the press (in terms of ASI directionality) in ACTING and DECIDING situations. In contrast, demands within the university setting for creative thought, critical thinking and examination of personal and/or professional values lead to a prediction that faculty and graduate students will show a greater tendency to go against the press in THINKING situations and with the press in VALUING situations (when compared with the physicians and Nurse-Managers).
Figure 14

Summary of Adaptive Flexibility Scores for Each Group
To address this hypothesis, separate ANOVAS were performed on the four ASI directionality measures in order to test for differences among groups.

The results of ANOVAS performed on the ACTING and DECIDING directionality measures confirmed differences among the groups. However, these group differences tended not to be in the hypothesized direction. The ANOVA performed on directionality measures for ACTING situations, for example, indicated highly significant groups differences ($F[3,47] = 8.21, p < .001$). As can be seen in Figure 19, there were marked differences in directional responding in ACTING situations between the two sites, with the physicians and Nurse-Managers showing marked tendencies to go against the press in ACTING situations. Also, as Figure 19 suggests, faculty and graduate students showed only minimal responses in ACTING situations with the faculty group showing a slight tendency to go with the press and the graduate student group showing even less of a tendency to go against the press. The attenuated responding in the University groups may suggest that situations pulling for action responses are much less salient in evoking responses in consistent directions for these groups than for the Health Care groups; while in the Health Care groups, the prolonged environmental press for rapid action ultimately results in fatigue and resistance.
These observations were verified with Duncan's Multiple-Range t-test which indicated no differences between the two Health Care groups and no differences between the two University groups. However the t-test confirmed that each of the Health Care groups (physicians and Nurse-Managers) was significantly different (p < .05) from each of the University groups (faculty and graduate students) in the extent to which they responded against the press.

When directionality measures for DECIDING situations were examined, the hypothesis that physicians and Nurse-Managers would move toward the press was not confirmed. An ANOVA performed on directionality measures for all groups yielded a marginally significant difference among the groups (F[3,47] = 2.61, p = .06). The mean directionality measures for DECIDING are shown in Figure 20.

As can be seen in Figure 20, both Health Care groups, physicians and Nurse-Managers, as well as the faculty group showed marked tendencies to move against the press in DECIDING situations. Only the graduate student group was different in that it showed only a minimal tendency to move against the press in DECIDING situations. Examination of these mean differences with Duncan's Multiple-Range t-test indicated no differences among physicians, Nurse-Managers or faculty members; all three groups went against the press in these situations to an equal degree. The graduate student group, however, did differ significantly from
each of the above three groups in showing only a minimal tendency to go against the press. This finding also suggests that the position occupied, in terms of organizational level as well as role clarity, contributes significantly to whether individuals comply with situational demands or push against them. The graduate students are temporary members, passing through the organization without clearly articulated roles.

The hypothesis regarding directionality measures in THINKING situations predicted that both faculty and graduate students would show a greater tendency to go against the press when responding to THINKING situations. An ANOVA performed on this directionality measure indicated highly significant differences among the groups ($F[3,47] = 8.49, p < .001$). These group means are displayed in Figure 21.

Inspection of Figure 21 indicates that it was not both faculty and graduate students, but faculty and physicians who showed marked tendencies to move against the press in THINKING situations. In fact, for the faculty group, the tendency to move against the press in these situations is extreme. The graduate student group showed some tendency to move with the press and the Nurse-Manager group showed no observable tendency either way. Again, differences among the groups were examined with Duncan's Multiple-Range t-tests which indicated that the faculty group was different from all other groups ($p < .05$). The physician group
Figure 21

ASI Directionality Thinking

$t(13.47) = 6.48, p < 0.001$
differed not only from the faculty but also from the Nurse-Managers and graduate students. Only the Nurse-Manager group and graduate student group did not differ in their directionality responses.

The hypothesis concerning directionality in VALUING situations predicted that faculty and graduates students would go with the press more so than physicians and Nurse-Managers. This hypothesis was not confirmed. In fact, the one-way ANOVA performed on these data indicated no significant differences among the four groups ($F[3,47] = .89$). The mean values for each of the groups are shown in Figure 22. Although variability in the group means can be seen in Figure 22, statistical analysis indicate that these differences are random and not statistically reliable.

Hypothesis 5.4: When total directionality is examined, physicians and faculty will tend to move against the press more than Nurse-Managers or graduate students because of their positions within each of the organizations.

Analysis of the total directionality scores confirmed this hypothesis for the faculty and graduate students but not for the physicians and Nurse-Managers. Analysis of variance performed on the total directionality measures yielded highly significant differences among the four groups ($F[3,47] = 5.96, p < .005$). The mean values for all groups are shown graphically in Figure 23.

As can be seen in Figure 23, both Health Care groups, Nurse-Managers and physicians as well as faculty showed a marked
tendency to move as predicted, against the press to a much greater extent than graduate students who showed only a minimal tendency to respond against the press. Duncan's Multiple-Range t-test comparing means for all groups indicated no differences between physicians, Nurse-Managers and faculty in terms of their moving against the press. However, graduate students were significantly different from each of these three groups in their negligible total directionality response.

Hypothesis 5.5: Different demands present in each site will also influence variability measures for Acting, Deciding, Thinking, and Valuing. Because of the immediate demands for action and rapid decision making in hospital settings, in this case it is predicted that the health care groups will show less variability in acting deciding, thinking and valuing than the university groups.

All variability measures were analyzed in separate and identical ANOVAS that tested for differences among groups. The results of the ANOVA performed on variability in acting yielded a marginally significant Groups effect (F[3,47] = 2.57, p < .06). Mean values for variability in acting are shown in Figure 24. As can be seen in Figure 24, Nurse-Managers showed the greatest variability in Acting, whereas graduate students showed the least. This observation was confirmed by Duncan's Multiple-Range t-Tests which indicated that Nurse-Managers exhibited higher variability in acting than did either graduate students or the faculty group. There was no significant difference between Nurse-Managers and
Figure 24

Variability Acting

Variability Acting \( F[3, 47] = 2.57, p < .06 \)
physicians, nor between physicians and faculty members. However, physicians did show greater variability in Acting than did the graduate students. Thus, contrary to the hypothesis, members from the hospital setting actually showed greater or equal variability in Acting than did members from the University setting.

In the case of variability in Deciding, the analysis revealed no significant differences among groups \( (F[3, 47]) = 1.19, \) ns. The mean values for each group in variability in Deciding are shown in Figure 25.

When variability in Thinking was analyzed, highly significant group differences were apparent \( (F[3, 47] = 4.57, p < .005) \). The mean values for variability in Thinking for each of the four groups are shown in Figure 26. As is obvious from Figure 26, the faculty group exhibited greater variability in Thinking than any of the other three groups. This observation was confirmed by Duncan's Multiple-Range \( t \)-tests which indicated that the faculty group was significantly higher than any of the other three groups which did not differ from each other.

Analysis of variability in Valuing again indicated no differences among the four groups \( (F[3, 47] = 1.92, \) ns). The mean values for each of the four groups are shown in Figure 27.

Finally, group differences in Total Variability were significant \( (F[3, 47] = 3.18, p < .05) \). The group values are shown in Figure 28 from which it is apparent that the graduate student
Figure 25
Variability Deciding

Variability Deciding ($F(3.47) = 1.19$, ns)
Figure 27

Variability Valuing

Variability Valuing ($F(3, 47) = 1.92, ns$)
group deviated in exhibiting less total variability than did any of the other three groups. This conclusion was confirmed by Duncan’s Multiple-Range t-tests which indicated that the graduate student group showed less total variability than the remaining three groups and that the remaining three groups did not differ from each other.

Hypothesis 5.6: Regardless of setting or position in the organization, with greater age there will be more of a tendency to move against the press when total directionality is considered.

Pearson Product-Moment Correlations were performed correlating Age with all ASI directionality measures, CPA measures, Loewinger scores, and total adaptive-flexibility on the ASI. The results of these correlational analyses are presented in Table 7. As hypothesized, total directionality was correlated with age such that greater age was associated significantly with a tendency to go against the press in total directionality. As shown in Table 3, the correlation coefficient yielded was \(-.35, p < .05\). Although it was not predicted, it can also be seen in Table 7 that a significant relationship \((r = -.27, p < .005)\) obtained between age and directionality in Deciding, indicating that greater age is associated with movement against the press in Deciding situations.

Hypothesis 5.7: Generally, across all groups, ASI directionality measures will be correlated with CPA measures, Loewinger scale scores and Total
Table 7
All Directionality Measures Correlated with Age, CPA, Loewinger and Total Adaptive Flexibility (all subjects N = 52)

<table>
<thead>
<tr>
<th></th>
<th>CE-AE ACTING</th>
<th>AC-AE DECIDING</th>
<th>RO-AC THINKING</th>
<th>CE-RO VALUING</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>-.20</td>
<td>-.27</td>
<td>-.05</td>
<td>-.03</td>
<td>-.35</td>
</tr>
<tr>
<td></td>
<td>(ns)</td>
<td>(p &lt; .05)</td>
<td>(ns)</td>
<td>(ns)</td>
<td>(p &lt; .05)</td>
</tr>
<tr>
<td><strong>Current Capacity</strong></td>
<td>-.01</td>
<td>-.08</td>
<td>-.12</td>
<td>.15</td>
<td>-.04</td>
</tr>
<tr>
<td></td>
<td>(ns)</td>
<td>(ns)</td>
<td>(ns)</td>
<td>(ns)</td>
<td>(ns)</td>
</tr>
<tr>
<td><strong>Mode</strong></td>
<td>.27</td>
<td>.08</td>
<td>-.29</td>
<td>.03</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>(p &lt; .01)</td>
<td>(ns)</td>
<td>(p &lt; .05)</td>
<td>(ns)</td>
<td>(ns)</td>
</tr>
<tr>
<td><strong>Loewinger</strong></td>
<td>.21</td>
<td>-.01</td>
<td>-.42</td>
<td>.04</td>
<td>-.05</td>
</tr>
<tr>
<td></td>
<td>(p = .07)</td>
<td>(ns)</td>
<td>(p &lt; .001)</td>
<td>(ns)</td>
<td>(ns)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>-.14</td>
<td>-.20</td>
<td>-.39</td>
<td>-.34</td>
<td>-.45</td>
</tr>
<tr>
<td>Adaptive Flexibility</td>
<td>(ns)</td>
<td>(p = .07)</td>
<td>(p &lt; .01)</td>
<td>(p &lt; .01)</td>
<td>(p &gt; .01)</td>
</tr>
</tbody>
</table>
Adaptive-Flexibility in such a way that high scores for the latter three variables will generally be associated with movement against the press in the ASI directionality measures, most particularly, total directionality.

Support for this set of hypotheses would appear in the form of statistically significant Pearson-Product correlations for directionality measures and the remaining variables shown in Table 7. As can be seen from inspection of Table 7, the hypothesized relations were confirmed in at least some instances. It is notable that the CP measure, current capacity, showed no significant correlation with any of the ASI directionality measures. The CPA measure, Mode, showed a mixed pattern of correlations. Mode levels were significantly related to directionality measures for ACTING \( (r = .27, p < .01) \) indicating that higher levels of mode were associated with movements with the press in ACTING situations. Interestingly, mode levels were related to directionality measures in THINKING \( (r = -.29, p < .05) \) in an opposite fashion. That is, Mode was associated with directionality in THINKING such that higher levels of Mode were related to movement against the press in THINKING situations.

A consistent and somewhat similar pattern emerged in the correlations between Loevinger scale scores and directionality measures. Loevinger scale scores also correlated significantly with directionality measures in ACTING \( (r = -.21, p < .07) \) such that higher Loevinger scale scores were associated with movement toward
the press in Acting situations. Again, the reverse pattern appeared in significant correlation between Loevinger scale scores and directionality measures in Thinking ($r = -.42, p < .001$) such that higher Loevinger scale scores were associated with movement against the press in Thinking situations.

Total Adaptive Flexibility scores from the ASI correlated significantly with several of the directionality measures including total directionality. It was only when total Adaptive Flexibility scores were correlated with directionality measures in Acting that no significant relationship emerged. A marginally significant relationship emerged ($r = -.20, p < .07$) indicating that higher Total Adaptive Flexibility is associated with movement against the press in Deciding situations. A highly significant relationship emerged when Total Adaptive Flexibility was correlated with directionality measures in Thinking ($r = .39, p .01$) demonstrating that high levels of Total Adaptive Flexibility are associated with strong movement against the press in Thinking situations. A similar and strong relationship maintained between Total Adaptive Flexibility and directionality measures for Valuing ($r = .34, p .01$). Again, high levels of Total Adaptive Flexibility were strongly associated with movement against the press in Valuing situations. Finally, Total Adaptive-Flexibility was very strongly correlated with measures of Total Directionality ($r = -.45, p .001$) indicating a strong tendency for high levels of
Total Adaptive Flexibility to be associated with high levels of Total Directionality.

This is one of the most interesting findings of this study. It suggests that those individuals with high potential/mode and high ego development scores are able to make discrete behavioral choices in response to situational demands. Directional responses suggest that choices to actively comply with situational demands may be made even though the individuals may be in strong disagreement with the demands. Such choices may be made, for instance, in order to achieve a promotion or maintain one's position in the workplace. As such, these choices would then reflect mature judgment (e.g., knowing which rules must be followed and which rules can be bent), rather than be choices driven by a need for conformity.

Hypothesis 5.7: Across all groups variability scores in deciding, thinking, acting, and valuing will be correlated with age, CPA measures and Loevinger scores in such a way that high values for the latter three variables will be associated with high variability scores and high total variability.

Correlations for variability scores in deciding, thinking, acting and valuing are shown in Table 7. As can be seen, age and current capacity failed to show significant correlations with any of the variability measures. On the other hand, Mode showed a significant positive correlation with variability in deciding, indicating that individuals exhibiting high levels of mode also
exhibit greater variability in deciding. Similarly, mode showed a significant correlation with thinking, indicating that individuals exhibiting high mode also exhibit greater variability in thinking. In contrast, however, mode showed a negative correlation with acting, suggesting that individuals who are high in mode exhibit less variability in acting.

Also of interest were Loevinger scale scores which showed a significant correlation with variability in thinking, indicating that individuals obtaining high Loevinger scores exhibit more variability in thinking. The Loevinger scores showed a negative correlation with variability in valuing, indicating that individuals obtaining high Loevinger scale scores show less variability in valuing.

Correlations involving Total Variability scores are shown in Table 8. In contrast to the other variability measures, Total Variability showed no significant correlations with age, CPA measures or Loevinger scores.

Hypothesis 6.1: Because the hybrid organizations studied attempt to maximize organizational stability, the average current work level of all subjects on the CPA will not exceed Level IV in either organization.

This hypothesis was clearly confirmed. The mean current work level scores for both Health Care and University subjects were respectively 3.54 and 3.61 (both are obviously below 4). Mean
Table 8
Variability Scores for Deciding, Thinking, Valuing and Acting Correlated with Age, Current Capacity, Mode and Loevinger Scores

<table>
<thead>
<tr>
<th></th>
<th>Deciding</th>
<th>Thinking</th>
<th>Valuing</th>
<th>Acting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>-.04</td>
<td>.08</td>
<td>.03</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>(ns)</td>
<td>(ns)</td>
<td>(ns)</td>
<td>(ns)</td>
</tr>
<tr>
<td><strong>Current Capacity</strong></td>
<td>-.07</td>
<td>-.01</td>
<td>-.01</td>
<td>-.21</td>
</tr>
<tr>
<td></td>
<td>(ns)</td>
<td>(ns)</td>
<td>(ns)</td>
<td>(ns)</td>
</tr>
<tr>
<td><strong>Mode</strong></td>
<td>.23</td>
<td>.25</td>
<td>.81</td>
<td>-.21</td>
</tr>
<tr>
<td></td>
<td>(p &lt; .05)</td>
<td>(p &lt; .05)</td>
<td>(ns)</td>
<td>(p &lt; .05)</td>
</tr>
<tr>
<td><strong>Loevinger</strong></td>
<td>-.12</td>
<td>.34</td>
<td>-.19</td>
<td>.07</td>
</tr>
<tr>
<td></td>
<td>(ns)</td>
<td>(p &lt; .01)</td>
<td>(p &lt; .05)</td>
<td>(ns)</td>
</tr>
</tbody>
</table>
values for all of the four groups were presented previously in Figure 3.

Hypothesis 6.2: Because both hybrid organizations require and support conformity Loevinger's scores for subjects in both organizations will, on the average, not exceed Stage IV.

This hypothesis received only partial support. The average Loevinger score for Health Care subjects did not exceed Stage IV, but remained at 3.86. The University subjects on the other hand, had a mean Loevinger score of 4.20 which clearly exceeds Stage IV. As discussed earlier, and as shown in Figure 6, the mean value for the University subjects was pulled above a Stage IV level by the high scores obtained by the faculty.

Hypothesis 7.1: It is hypothesized that CPA scores are valid indices of cognitive functioning and specifically that CPA scale scores, current capacity and mode will show significant positive correlations with both Loevinger's scores and ASI Flexibility scores.

Table 9 summarizes correlations of current capacity, potential mode and Loevinger scores with all measures of adaptive flexibility. In examining correlations with current capacity, it is obvious that there exists a high correlation with potential mode scores. This finding is not surprising in that both current capacity and potential mode are scales from the same instrument. However, current capacity also correlates with Loevinger scores such that individuals exhibiting high current capacity also exhibit high Loevinger scores. Also, current capacity shows a
<table>
<thead>
<tr>
<th></th>
<th>CUR/CAP</th>
<th>MODE</th>
<th>LOEV</th>
<th>AFCE</th>
<th>APAC</th>
<th>AFAE</th>
<th>AFRO</th>
<th>TOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Capacity</td>
<td>—</td>
<td>.53</td>
<td>.32</td>
<td>.07</td>
<td>-.25</td>
<td>-.05</td>
<td>.05</td>
<td>-.01</td>
</tr>
<tr>
<td>(p &lt; .001) (p &lt; .01) (na) (na) (na) (na) (na) (na)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mode</td>
<td>—</td>
<td>—</td>
<td>.34</td>
<td>-.09</td>
<td>.11</td>
<td>-.06</td>
<td>.05</td>
<td>.02</td>
</tr>
<tr>
<td>(p &lt; .01) (na) (na) (na) (na) (na) (na) (na)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOEV</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>.82</td>
<td>.01</td>
<td>.06</td>
<td>.23</td>
<td>.12</td>
</tr>
<tr>
<td>(na) (na) (na) (na) (p &lt; .05) (na) (na) (na)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
negative correlation with adaptive flexibility in abstract conceptualization, indicating that individuals exhibiting higher current capacity tend to show relatively less use of the abstract conceptualization mode.

For potential mode, there is only a correlation with Loevinger scores. Again, this correlation indicates that individuals exhibiting high potential mode also exhibit high Loevinger scores.

Loevinger scores showed a significant correlation with adaptive flexibility in Reflective Observation. It should be noted that this finding is a partial replication of results presented by Kolb (1984) on a study based on a different population.
CHAPTER VII

SUMMARY AND CONCLUSIONS

Introduction

Far too much attention has been paid to the personal characteristics and attitudes of individual members of occupations and far too little to the work-settings. This is particularly the case for the professions. On the whole, students of the professions in general and medicine in particular have adopted the same individualistic value positions of the men they study. They have been inclined to postulate and search for personal qualities manifested in views of work, of self, and of clients which are supposed to be inculcated or, at least intensified and stabilized in the course of professional education . . . Education is a less important variable than work environment. There is some very persuasive evidence that "socialization" does not explain some important elements of professional performance as well as does the organization of the immediate work environment.

Friedman, 1970, p. 145

This dissertation has attempted to describe the impact of the organizational environment on individual members as inferred from their responses to Stamp's Career Path Appreciation, Loevinger's Scale of Ego Development and Kolb's Adaptive Style Inventory. In this study the researcher attends to two different organizations and their environments, as well as to the relationship between them and their members. A teaching hospital and a graduate program in a university were the research sites for this study. Two different kinds of populations were studied in each organization:
physicians and Nurse-Managers in the first; faculty and graduate students in the second. Emphasis is on the health care faculty with the university graduate program used as a backdrop for purposes of contrast.

Career Path Appreciation

There were several interesting and unexpected findings in this dissertation. Given the author's interest in the impact of the work environment on the work performance of individual members, the findings on the CPA warrant considerable discussion.

Although four different occupational groups from two different organizations were studied, there were no significant differences in current level of work across all four groups regardless of site or occupation. Since the groups clearly differed from each other not just occupationally, but also in the positions they occupied within their respective organizations, the fact that all four groups were performing at the same level suggests that this finding was not by chance, and that work environments may be even more potent than was originally hypothesized.

It is also noteworthy that all four groups were performing at Level 3.5. Work at Level III demands the capacity to develop plans and implementation processes that ensure the immediate and short term stability of the organization. Incumbents of Level III positions design the tasks to be performed within clearly articu-
lated parameters or boundaries. While they do not perform the task itself, they do oversee those who do perform the task and are held accountable for the performance of those they oversee. Nor do they in any way alter the given parameters or boundaries within which they design tasks. This finding also supports Mintzberg's position that the types of hybrid organizations in this study are structured to maintain and replicate themselves rather than to create new ways of organizing their work. This finding assumes even greater significance when it is seen that in the next finding, three out of four of the groups demonstrate modes significantly higher than their current level of work, suggesting that the work environment either does not recognize, or does not know how to, or is not necessarily interested in, utilizing the full capabilities of its members. As has been described earlier, the faculty group showed the greatest discrepancy between current work level and mode, with graduate students and physicians showing comparable discrepancies between their modes and current work level. This latter finding was unexpected; faculty and physicians were the two groups expected to demonstrate the most similarities. Little if any discrepancy between mode and current work level was demonstrated by the Nurse-Manager group. There are several possible explanations for the differences in modes for the four groups.
1. Faculty enjoy the least prescriptive work environment. In fact, they are encouraged to develop interests and skills in scholarly efforts beyond their immediate teaching responsibilities. Their daily obligations are to a specific teaching load, committee meetings, and (over a longer timeframe), the odd publication. In fact, teaching loads may be adjusted to support research activities. Of all four groups, they are the most unfettered.

2. At first blush it would appear that graduate students are temporary members of the same environment as the faculty. However, the position they occupy, because of its temporary nature as well as the pre-professional status they enjoy, significantly alters their environment from that of the faculty. Their work, i.e., required courses with their attendant papers and exams, the qualifying process for candidacy, etc. creates a more prescriptive, and thus constraining, environment than that of the faculty, particularly during the first two years of scheduled classes. Nevertheless, next to the faculty, the graduate students enjoy the greatest amount of discretion in the execution of their work. At the same time, they are likely to experience more uncertainty than any of the other groups, particularly because from the third year on there are no more scheduled classes. In fact, there is no clearly demarcated path to the end-point of a completed dissertation. The unlimited discretion and ambiguity surrounding graduate
student work is fraught with anxiety; anxiety which is often experienced as a constraint and which may be managed by constructing boundaries which reduce uncertainty and within which it is possible to function. In addition, according to Jaques' theory of human capability, individuals with modes higher than III do not fully realize their potential until well into middle age. Thus, discrepancies between mode and current work level would be expected during graduate years.

3. The work environment of physicians, particularly in emergency medicine, is far more prescriptive than that of the previous two groups. While the work of the ER physician is characterized by formidable complexity, this complexity is reduced through the use of detailed policies, procedures, and protocols which provide exact instruction, standardization and routinization of otherwise frightfully complex activities.

The emergency medicine work environment is designed with speed in mind. The faster patients flow through the emergency room, the more efficient is the emergency room regarded. Patients are seen on a case-by-case basis, and often in a piecemeal fashion where one patient may be seen by a variety of caregivers during the course of his/her stay in the emergency room. The symptoms presented by the patient, particularly if they are life-threatening, are the focus of work, rather than the patient as a complete person. Work is fractionated into those procedures
specifically responsive to the presenting symptoms. Because of the urgency characteristic of work in emergency rooms, protocols exist describing when and how different procedures should be administered. Thus, thinking time and reflection is reduced to reflexive response as much as possible. The knowledge-base and judgments involved in determining appropriate procedures and designing the protocols is at a level significantly higher (probably Level IV), than the work environment (with its prescribed limits: Levels I and II) in which care is provided. The many life and death crises inherent in emergency medicine requires elaborate organizational structures to ensure safe care and minimize the attendant anxiety associated with uncertain and potentially fatal outcomes. At the same time these same organizational structures may have a stultifying effect, significantly limiting opportunities to fully demonstrate one's potential mode. This was partially demonstrated in the content of physician responses to the CPA. In many instances, physician responses reflected an approach towards their clinical work that was at a significantly lower level (II) than their approach towards their administrative, faculty and/or research work (III and IV); and this also varied from their approach towards other aspects of their lives. For physicians with modes of high III and particularly IV, as they grow older, direct delivery of care in the case-by-case pattern (II) previously described will be experienced as
increasingly unsatisfactory. They will desire a form of work that impacts larger numbers over a longer period of time. Unless their work is redesigned they will leave clinical work at a time when they may be most clinically skilled.

4. The Nurse-Manager group was the oldest of the four groups (by 10 years), and, therefore, for reasons of age alone would be expected to show the least discrepancy between their mode and their current work level. Furthermore, literature developed in the United Kingdom describes the level of work of the Nurse-Manager at Level III (and that of the Nursing Director at Level IV), suggesting that in this study the Nurse-Managers as a group were well matched to the requirements of their position and that the requirements of the position were appropriate to the needs of the institution. Therefore, it would be reasonable to assume that in the case of the Nurse-Manager group, the hospital had been able to identify and access needed resources and was using them appropriately. However, this story has an O'Henry twist to it that further demonstrates the impact of the work environment on its members. While the Nurse-Manager group was well matched to its work, according to CPA results, the Nursing Director was not.

During the course of this study, the Nurse-Manager group had been immersed in an ongoing and escalating conflictual relationship with their new Nursing Director (who had been in the position approximately five to six months when this study first started).
The author was consulting to the Nurse-Manager group, supporting their experimenting with a variety of approaches designed to, if not resolve, at least to minimize and manage the conflict constructively. All efforts had been, at best, experienced as temporarily placating and at worst, generally unsuccessful. When the individual Nurse-Managers were, prior to receiving their feedback, requested to describe what their job asked them to do (using generic descriptors of unidentified levels of work; see Table 10), eight out of the 13 Nurse-Managers spontaneously stated that before the arrival of their current Nursing Director, their job had asked them to perform Level III functions. However, since the arrival of the new Nursing Director, they experienced their job as requiring them to perform Level I activities. The Nursing Director's current work level and mode on the CPA was judged to be at a mid-Level II. When the range of current work level and mode within the Nurse-Manager group is examined, the data suggest a clear explanation for both the conflict situation as well as the impossibility of resolving it. Three out of the 13 Nurse-Managers were currently performing at mid-Level II, and not surprisingly, experienced the least conflict with the Nursing Director. Eight of the Nurse-Managers' current performance ranged from mid to high Level III, and two were performing at low Level IV. Conflict was greatest between the Nursing Director and those Nurse-Managers who were performing at Levels III and IV, and whose modes ranged
<table>
<thead>
<tr>
<th>Table 10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generic Descriptors of Levels of Work</strong></td>
</tr>
</tbody>
</table>

| Transforming: the international and/or national context and create alternative social institutions | General system of strategic design | Drawing together the connections between the development and deployment of groups of complex systems |
| Extrapolating: from contexts at stratum VI and create connections which can sustain the formation and development of stratum V institutions initiated at stratum VIII. | Strategic design for development of deployment of complex systems | Creating a strategic context. |
| Defining: generate a range of perceptions of complex stratum V systems and shape the social, political and economic contexts in which they operate. Construct it: future rather than forecast it. | Direct deployment of complex systems | Interpreting overall strategy into operational plans for total business units. |
| Shaping: make relationships between previously unrelated material; create general rules and redefine fields of knowledge and experience. Engage with an open context and decide when it should be closed; operate a complex five stratum system, modify its boundaries and cope with second and third order consequences which arise. Elements explicitly seen as interdependent; to change one part is to change the whole. | Complex systems | Comprehensive management: encompassing the operating systems and where necessary, modifying the context of the total unit. |
| Transforming: retain contact with what currently exists and detach to conceptualise something completely different—not a modification but a point of departure. Contrast and compare alternative operating systems and alternative modes of deploying or modifying them. Maintain a patterned structure within which hypotheses are tested. | Alternative operating systems | General management: contrasting and comparing alternative operating systems: ensuring that operating systems have the resources they need. |
| Extrapolating: extrapolate from given rules and handle ambiguity by creating new connections within a defined system. Mold operating tasks and operating methods into a system of direct work and fine tune that system to cope with changing trends. | Direct operating systems | Management of a unit: moulding operating methods into a system of direct work; adjusting the system as necessary in the light of changing trends. |
| Defining: generate different perceptions of a given situation; organise perceptions in alternative ways; handle ambiguity by polarising. Put together a program of direct operating tasks in order to accumulate knowledge about their aggregation and to change programs in the light of the given situation. | Direct operating methods | Supervision: putting together a number of tasks, choosing methods for those tasks according to each given situation. |
| Shaping: see the world through a few focussed dimensions and engage directly with physical objects or serve people one task at a time. | Direct operating tasks | Working directly on physical objects or serving people, one at a time. |
between low and high Level IV. By June, 1987, two of the six Nurse-Managers performing at high Level III and IV had resigned and the remaining four were considering resigning—testifying to the impossibility of reporting to a manager whose mode and particularly, whose current work level is lower than his/her subordinates. In fact, Jaques goes so far as to say that it is not possible to be supervised by individuals performing at the same level as that of the supervisee.

The Nurse-Manager group, by definition of their function, has to have their collective hand on the pulse of the institution. Metaphorically they are the glue of the institution as well as the barometer maintaining an environmental equilibrium that enables their staff to provide safe patient care:

Physicians typically initiate and direct the process of medical care, but do not as a rule, implement it. The implementation of medical care and of the wider process of comprehensive patient care is the responsibility of the professional nurse (Heydebrand, 1973, p. 159).

Traditionally nursing has been organized as a matriarchal system with a strong Director of Nursing in a leadership position that supports the managers in maintaining a stable work environment. In the case of this study the vacuum of leadership at the Nursing Director level was absorbed by those Nurse-Managers with the capacity to function at Level IV. However, since the Nurse-Manager position is a Level III rather than Level IV position, this resulted in confusion and conflict between them and their
peers, as well as between their director, as previously described, even though it filled in the breach (so to speak) in that the necessary work was attended to. However, this capacity to at least partially expand the roles of the Level III Nurse-Manager could be sustained only temporarily, and ultimately resulted in decimating the Nurse-Manager group. The confusion precipitated by lack of and/or poor direction from the accustomed hierarchical structure, combined with the prolonged period of conflict between the Nursing Director and her managers, resulted in exhausting both the director and those managers functioning at Level IV. Even though the Nursing Director left the institution prior to the resignation of the Nurse-Managers, the exhaustion and distress of the Nurse-Managers was so great that remaining at the institution was not a viable option for them. This illustrates the importance of an administrative function at a top level of the organization that supports and maintains a requisite hierarchical structure essential to executing the work of the institution. Administration's failure (at the COO and CEO levels) to monitor and intervene in the nursing division as problems became apparent, resulted in squandering available and competent resources, disorganizing the work force, and dangerously compromising the quality of care.
Loevinger's Scale of Ego Development

While the Career Path Appreciation attends to interactive phenomena occurring between the individual and his/her work environment, Loevinger's Scale of Ego Development addresses the individual's capacity to manage his/her internal affective states, i.e., impulse control, etc. Obviously the way in which one manages him/herself internally influences, and is influenced by one's subsequent way of apprehending and interacting with one's environment, work or otherwise.

An interesting way to look at Loevinger's stages of ego development is to postulate a relationship between occupational choice and its requisite ideal stage of ego development. For instance, the unfettered, minimally prescriptive work environment of the faculty both demands and provides opportunities for autonomous behaviors. Individuals demonstrating I-5 autonomy are likely to be more comfortable in faculty positions than those demonstrating stages of ego development lower than I-5. Given this assumption, it is not surprising then that faculty showed significantly higher ego development scores than the remaining there groups. In fact, the earlier description of uncertainty and anxiety characteristic of the graduate student environment suggests that an environment experienced as comfortable by I-5 faculty is a source of anxiety for the graduate student group who demonstrated the ego transitional stage I-3/4. I-3/4 describes the transition from
conformity to conscientiousness. Scores at I-3/4 indicate that while the conscientious stage has begun, the orientations of the conformity stage continue to significantly drive behavior. Thus it is to be expected that graduate students would feel stretched both by the lack of boundaries as well as the abundance of discretion available to them.

The physician and Nurse-Manager groups also demonstrated the ego transitional stage I-3/4. (In fact, it should be noted that Loevinger reports that most of the population she has tested score at stage I-3/4, suggesting that stage I-3/4 perhaps is normative to society at large.) In any event, the nature of the work and the work environment of both physicians and Nurse-Managers demands a high level of conscientiousness and close adherence to rules, regulations, policies and procedures. These findings raise the possibility then that individuals whose modes exceed III, but whose stage of ego development does not exceed I-3/4 may be more comfortable in work environments that support their needs for conformity/conscientiousness, rather than in work environments that, while making fuller use of their capacities may press for a higher stage of ego development than is available to them. It is also possible that conformist and conscientious behavior is choiceful rather than ego driven, and this will be explored more fully in the Adaptive Style Inventory discussion.
Adaptive Style Inventory

Thus far, this dissertation has presented findings from two psychometric instruments: (1) Stamps Career Path Appreciation which focuses on interactive phenomena between individual and work environment, and (2) Loevinger's scale of Ego Development which assesses individual capacity to manage internal affective states. Together the results from these two instruments present interesting information regarding the influence a given stage of ego development may exert on the level of cognitive complexity employed to identify and manage problems.

Kolb's Adaptive Style Inventory is a third psychometric instrument, that while also focusing on interactive phenomena, is designed to assess the scope or repertoire of interactions available to an individual as s/he responds to changing environmental situations. The ASI emphasizes that each interaction between individual and environment is a learning process in which the particular environmental situation presents both a demand and an opportunity for a particular type of response. Thus, it affords another way of exploring the individual/environment relationship. The ASI yields the following information:

1. **Total Adaptive Flexibility scores** describing adaptive style, preference or propensity for one or more modes, possibly to the relative exclusion of other modes, e.g., an individual showing
a propensity for one or two modes over the remaining two modes as compared with one who uses all four modes fairly equally.

2. **Total Directionality scores** describing adaptive responses that are congruent with situational requirements versus those responses that appear to be different from situational requirements.

3. **Total Variability scores** refers to the range of adaptive responses demonstrated independent of situational requirements.

**Total Adaptive Flexibility scores** reflect the extent to which each adaptation or learning mode is used across four situations (for a detailed description of the ASI, refer to Chapter IV).

According to Kolb, most people use all four modes at one time or another. However, some modes will be considerably more developed and thus used more than others, either because of personal propensity, and/or because some situations may require that some modes be emphasized more than others. Nevertheless, Kolb maintains that to be most effective one must be able to "... use all four adaptation modes as much as possible" ... and that the capacity to use all four modes is not usually developed until or after mid-life. The finding that **Total Adaptive Flexibility scores** were significantly higher for the physician and faculty groups was expected for the following reasons:

1. The positions these two groups occupy in their respective organizations. In each organization they are positioned at a
higher organizational level than are the other two groups: Nurse-Manager and graduate student. Both the work at their level of organizations as well as their role is less prescriptive than that of the Nurse-Manager and graduate student, and thus affords more opportunities for the use of many modes.

2. The extended length of professional training these two groups have had, combined with their professional experience has provided (as well as demanded) opportunities to develop both the dominant and non-dominant adaptation modes. In contrast, while the Nurse-Manager group may have as much or more work experience than the physician and faculty groups, the length of their professional training is much shorter and circumscribed in focus than is that of the physician and faculty groups. In addition, the immediacy of their work environment reinforces or demands responses primarily from two of the adaptive modes.

While the physician and faculty groups did demonstrate greater total adaptive flexibility than the Nurse-Managers and graduate students as expected, the specific modes favored by each group was not as expected. The physician and Nurse-Manager groups were expected to demonstrate greater use of the Active Experimentation and Concrete Experience modes while the faculty and graduate student groups would show a preference for the Abstract Conceptualization and Reflective Observation modes. Instead there was no significant difference in the use of the Active Experimen-
tation and Concrete Experience modes by any of the groups. While Abstract Conceptualization was a favored mode of faculty and graduate students, it was equally favored by physicians. However, it was least favored by the Nurse-Managers, again suggesting that the immediacy of their work environment coupled with the length and focus of their training provides fewer opportunities or demands of this particular mode.

**Total Directionality Scores** also yielded unexpected results. Directionality measures for ACTING, DECIDING, THINKING and VALUING situations describe adaptation responses that are situationally influenced. Although any of the modes may be selected in response to a given situation, each situation is constructed to "pull" or "press" for a particular mode more than the others. The extent to which respondents select the mode of the "press" or select a mode not of the "press" is what is meant by directionality. Conceptually, directionality is interested in determining whether responses to situations are primarily driven by personal preferences and propensities; or, are individuals able to vary their responses according to characteristics idiosyncratic to the situation; or, are individuals able to recognize the situational "press" and choose an alternative mode with the intent of reframing the situation? At this time, ASI Directionality measures are able to distinguish whether responses are consistent with, that is, moving towards, the mode of the "press," or whether they are
different from, and therefore are moving against the mode of the "press." This instrument is not yet sufficiently developed to discriminate whether responses that move away from the "press" represent efforts made to reframe the situation, or whether this movement reflects a preferred mode. However, some inferences can be made when Total Directionality scores are contrasted with Adaptive Style, Total Adaptive Flexibility scores and Total Variability scores.

Of particular interest were the Directionality scores obtained for Acting situations. Responses to Acting situations appear to be especially influenced by organizational site, e.g., both the Physician and Nurse-Manager group moved significantly against the "press" in acting situations, while both the faculty and graduate student group demonstrated little movement either towards or against the "press." Given the action-orientation of health care institutions, it is assumed that physicians and Nurse-Managers have had extensive experience in situations pressing for action. Similarly they have also developed the capacity to identify those situations in which regardless of the "press," action would be ill-advised. Concrete Experience and Active Experimentation, the modes pulled for in Acting situations, are well developed in health care professions. In addition, it should be noted that during the time in which this study was conducted, the health care environment was particularly stressful and turbulent.
Although not measurable within the scope of this study, the impact of staff burnout and low morale as a deterrent to responding with the "press" in acting situations, should be explored.

Directionality responses to Thinking situations were also of interest. In this case, physicians and faculty demonstrated significant movement against the "press," while the Nurse-Managers showed no movement and the graduate students moved toward the "press." These responses provide further support for the previously presented idea that length and scope of professional training required for physicians and faculty will have demanded as well as facilitated development of the Reflective Observation and Abstract Conceptualization modes pulled for in Thinking situations. As has been mentioned earlier, the prescriptive nature of the professional training of the Nurse-Manager is consistent with the work environment of the Nurse-Manager; both of which present far fewer opportunities for, or demands of, the Thinking mode, when contrasted to physicians and faculty. The graduate students, in moving towards the "press" were the only group that exhibited "conformity" in this respect. In fact it was notable that the graduate student group when compared to the other three groups showed remarkably little movement either towards or against the "press" in all directionality situations. Compared to the other three groups, the graduate student group knows the least about their work and may be described as novices when contrasted with
the professional experiences of the other three groups. Thus, it is not surprising that the adaptive responses of the graduate students exhibit more constraint than that of the other three groups.

Relationships Among Instruments

Among the three measures, Current Capacity on the CPA shows some correlation with Loevinger's scale and some correlation with sub-scales of the ASI.

Potential mode from the CPA correlates significantly with Loevinger's scale and with several sub-scales from the ASI, including several Directionality measures and several measures of variability, suggesting that potential mode, the Loevinger scale, and ASI sub-scales indexing directionality and variability, tap similar and dynamic interactive cognitive processes. It is possible that the relationships among these three instruments observed in the current study may be limited to the groups studied. However, several of the relationships were highly significant and appeared to be robust. It would be for future work to test the generalizability of the current findings.

The Loevinger scale also showed significant correlations with ASI sub-scales including both directionality and variability measures. Some of the findings of the current study in this regard, replicated previous correlations reported by Kolb (1984).
The fact that correlations between Loevinger's scale and ASI subscores was replicated suggests, again, that the relationship between the Loevinger scale and the ASI is an important and robust one. It remains for future research to document the extent to which these two measures tap the same or related aspects of cognitive functioning.

The Total Variability Scores describing the range of adaptive responses independent of situational requirements has been placed at the end of this discussion on the ASI because the results, when combined with the correlations between the three instruments, suggest several questions for further study.

Individuals with higher CPA modes are assumed to have the potential to manage increasingly complex activities—which, in turn, appears to be associated with a higher stage of ego development and greater variability in adaptive flexibility for Thinking and Deciding modes in contrast to less variability in Acting modes. Do these findings suggest that:

1. Individuals with higher CPA modes have had more opportunities and demands to utilize and develop Deciding and Thinking modes than they have had to utilize and develop Acting modes?

2. Thinking and Deciding modes are more greatly valued by the groups in this study than would be found with other populations?

3. Thinking and Deciding modes tend to have greater individual impact on the individuals, while the Acting mode is more obviously an exchange between individual and environment. Use of the Acting mode may have consequences of a broader magnitude than either the Thinking or Deciding
modes, and thus may be used with more constraint. Therefore, findings of less variability in Acting modes may represent intentional choices to not act rather than an under-developed ability to take action.

This last point further refines the question of the relationship between the individual and the workplace. This dissertation opened with questions regarding the impact of the organizational environment on the individual member within organizational configurations known as hybrid. In addition to exploring the nature of the relationship it was also assumed that there were untapped resources within the work force, and that these untapped resources were connected to the way work is organized. This assumption was reinforced and made more explicit first, by the discrepancies found between Thinking and Deciding versus Acting, in the ASI, and between Current Work Level and Potential Mode in the CPA, and second, when these discrepancies are added to the positive correlation between CPA Potential Mode and ASI Thinking and Deciding, and the negative correlation between CPA Potential Mode and ASI Acting.

History does seem to be on the side of the administrators. The increasing rationalization of technology serves as a foundation for increased division of labor, formalization, and bureaucratization within medical organizations. But to the extent that medical technology is not completely rationalized so that individual judgment continues to play a significant role in the performance of medical tasks, and to the extent that the customized ministration to the needs of individual patients continues to be a primary goal of health systems, there remains justification for the physician's demand for some autonomy in his practice. The issue would seem to be how much autonomy in what areas of functioning can be accorded individual physicians consistent with the
requirements of coordination and efficiency in the provision of medical care? (Scott, 1972, p. 156)

The above statement was made in 1972. As of this writing, in 1990, the issues continue to be the same. History has indeed been on the side of the administrators in that today health care is delivered through hierarchical structures that were tentative and less formed in 1972. Unfortunately, the types of hierarchies introduced into health care systems have been more generic, transplanted from hierarchical structures successful in product oriented and/or hospitality industries, then thoughtfully designed to facilitate efficient provision of health care; and thus, have been more troublesome than useful.

Stratified-Systems Theory offers a useful way of analyzing and designing organizational structures appropriate to the particular organization's resources and purpose. It is a theory not well known to the health care industry in the United States. Because it is not crisis oriented (e.g., its application requires an extended time frame), and because it seems at cross-purposes with the professional component of the health care organization, it would probably be regarded with considerable skepticism. However, its very sensitivity to the distinction between associations and hierarchies enables it to identify the critical areas where mechanisms for mutually effective interfaces between professional and administrator must occur. In addition it provides a framework for analyzing task complexity as it varies
from one specialty and/or organizational level to another, and offers guidelines for recognizing and developing the resources of individual members of the work force, both professional and non-professional.

The orientations provided by Kolb's ASI and Loevinger's Scale of Ego Development complemented and greatly enriched understanding of subjects in their workplace. Although the sample size in this study was quite small, the results suggest further research in the interaction between the following variables: level of cognitive complexity, level of ego-development, level of position occupied in the organization and extent of experience (novice versus expert) to further explicate the forces determining behavior in the workplace.

**Implications for the Future: Uses and Abuses**

While the results of this dissertation have been interesting and provocative, some cautionary remarks are warranted regarding the future use of the theories and instruments advanced in this work. Of the three instruments, it is the Career Path Appreciation that most obviously suggests itself for use in the selection and promotion of personnel. In contrast, both Loevinger's Scale of Ego Development and Kolb's Adaptive Style Inventory are more relevant for use in research, individual counseling and career development situations.
However, Western society, particularly the pragmatic orientation of the United States, is drawn to those tools that promise rapid, and assume meaningful, results. Thus, the appeal of psychological testing is that it claims to collect wide-ranging samples of "significant" behavior in a short period of time. The Career Path Appreciation, then, becomes tempting to rely on for purposes of selection, promotion and out-placement. And it is this very temptation which needs to be monitored for the following reasons.

According to Busch-Jensen, the Career Path Appreciation [may have a unique] advantage when "... compared to the largely atheoretical traditional psychological test systems—in its foundation on a genuine theory of organization and the development of human work capability" (1990). However, it is still very much "work in progress":

[CPA] ... procedures are rather complex and require so much interpretive skill from the administrator that the value of the procedure is contingent on the capability of the psychologist more than on the procedure as such ... [In addition, the concept of mode needs further development] ... available descriptions of the patterns of characteristics associated with each mode have always been rather meager, and have changed from time to time ... (Busch-Jensen, 1990).

Dilemmas confronted in the appropriate development and use of the Career Path Appreciation reflect a larger conundrum troubling to the field of psychological testing as a whole.

The history of psychological testing is a peculiar mixture of sincere scientific research and slick business. Many types of psychological tests originate in the research psycholo-
gist's laboratory and [are] developed as instruments for the investigation of specific scientific questions or applied research problems. They have subsequently been eagerly promulgated as a cure-all in a large number of fields far from those for which they were developed (Busch-Jensen, 1990).

As a variety of psychological tests have gained in popularity, decision-making regarding selection and promotion appropriate to the manager, all too often, isidiously comes to depend on psychological test interpretations made by the psychologist. This results in a dangerous loss of boundaries between the psychologist as "information gatherer" and the manager as "decision maker." Dangerous because, compared to the manager, the psychologist knows little or nothing about the nature of the work awaiting the prospective employee. When this happens, the "scientific objectivity" of the psychological test over-rides the perceptions of the manager (inappropriately empowering the psychologist and disempowering the manager), "... whose knowledge may be less theoretically articulated and even of an intuitive and idiosyncratic nature" (Busch-Jensen, 1990), but who commands a comprehensive understanding of the work to be done in his/her organization. As psychological testing, assessment centers for career development and other such processes have proliferated more and more effort has been directed towards increasing the quality of work of psychologists and other similarly inclined experts. The better these specialists become, the more commonplace it will be to turn to them for personnel decisions.
Inadequate attention has been given to providing managers with the conceptual framework embodied in Stratified-Systems-Theory. Intuition without a conceptual framework is experienced as subjective, unreliable, ephemeral, certainly not replicable; and when depended on as the primary means for weighty decisions, generates anxiety and self-doubt. Without a conceptual framework outcomes of intuitive efforts (whether successful or not) are difficult if not impossible to explain to others in understandable terms. When psychological tests promise efficient, objective and replicable information regarding current and future employee performance, it is no wonder that managers turn to them with considerable relief and enthusiasm.

On the other hand, intuition buttressed with conceptual frameworks increases self-assurance and provides a language through which experience may be shared and replicated. It is currently thought that good managers are intuitively able to assess both applicants and subordinates (Jaques, 1988; Cang, 1987; Macdonald, 1989; Stewart, 1990), but tend to be unable to describe their process of doing so.

A more productive and far reaching endeavor would be to study those very intuitive and idiosyncratic processes that prior to the advent of psychological testing, occurred naturally and with a fair degree of success. Research addressing such issues as:
How do good managers make good potential assessments, and what are the requisite organizational arrangements that facilitate the use of their ability to do so . . .?

would ultimately result in organizations becoming more effective in handling their managerial development themselves.

Thus far concern has been expressed regarding the means with which the concepts underlying Stratified-Systems-Theory and human capability are best disseminated throughout organizations. At an individual level the CPA can be a very affirming and insightful experience, one that brings about considerable reflection, often leading to an enriched self-image. Subjects in this study frequently commented on the different and enhanced perspective the CPA experience provided them regarding their work. In many instances, the dialogue precipitated by the CPA procedure supported subjects in confronting difficult decisions. When timed well, administration of the CPA can be particularly useful in framing issues and establishing attainable goals. Further development of the CPA is expected.
BIBLIOGRAPHY


