

A STUDY OF INTUITION IN DECISION-MAKING USING ORGANIZATIONAL
ENGINEERING METHODOLOGY

By
Ashley Floyd Fields

A DISSERTATION

Submitted to
Wayne Huizenga Graduate School of Business and
Entrepreneurship of Nova Southeastern University

in partial
fulfillment of the requirements for the degree of

DOCTOR
OF BUSINESS ADMINISTRATION

2001
Copyright 2001

A Dissertation

entitled

A STUDY OF INTUITION IN DECISION-MAKING USING ORGANIZATIONAL
ENGINEERING METHODOLOGY

By

Ashley Floyd Fields

We hereby certify that this Dissertation submitted by Ashley Floyd Fields conforms to acceptable standards, and as such is fully adequate in scope and quality. It is therefore approved as the fulfillment of the Dissertation requirements for the degree of Doctor of Business Administration.

Approved:

Ronald Fetzer, Ph.D.
Chairperson

Date

William Snow, Ph.D.
Committee Member

Date

William Harrington, Ed.D.
Committee Member

Date

Joseph Balloun, Ph.D.
Director of Research

Date

Preston Jones, DBA.
Associate Dean, The Wayne Huizenga School of Business and Entrepreneurship

Date

Nova Southeastern University
2001

CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions or writings of another.

Signed: _____

Ashley Floyd Fields

ABSTRACT

A STUDY OF INTUITION IN DECISION-MAKING USING ORGANIZATIONAL ENGINEERING METHODOLOGY

by

Ashley Floyd Fields

This dissertation examines the concept of intuition in decision-making by means of a Literature Review and a study of measures within organizations. In the Literature Review, the nature and experience of the use of intuitive skills and abilities will be examined and discussed. Research questions regarding the relationship between intuitive-type thought processes and methods of thinking and decision-making are considered. Finally, the Literature Review will explore rational and non-logical processing styles in decision-making and the organizational positioning which call for an intuitive approach.

Using a survey instrument, the study will examine group differences in measures for individuals having various positions and functions within a variety of organizations.

Dr. Gary Salton's Organizational Engineering concepts (Salton, 1996) which are consistent with the concept of intuition, provide the focus of this study. Organizational Engineering differs from other theories by looking at intuition as a phenomenon arising naturally from the information processing and decision-making methods and modes employed by individuals. The research question is:

Do various combinations of method and mode produce results that are consistent with the findings other researchers have attributed to intuition?

The research question was tested by five interrelated hypotheses. Three hypotheses were designed to examine both the Reactive Stimulator and Relational Innovator style component and their proposed relationship to hierarchy. In addition, two hypotheses were designed to test Research & Development, Information Technology, and Customer Service for the relative level of intuition required to discharge these functional responsibilities effectively.

All of the study hypotheses were found to perform as anticipated at a very high level of significance. However, in Hypothesis 2, the level of Reactive Stimulator did vary systematically within leadership ranks.

Ashley Floyd Fields

In fact, individuals using an unpatterned method (organization of data being input) and a thought and/or action mode (character of intended output) would arrive at decision options which would not appear to follow any of the standard, logical, and/or existing processes. Thus, an outside observer would tend to attribute the unexpected idea as arising from some sort of insight process founded on intuition.

ACKNOWLEDGEMENTS

While writing this dissertation, I continually thought of its beginning, when, in an intuitive moment, I decided to research the use of rational and non-rational thought processing within organizations. I believed then, and especially now, the topic would provide significant insight to the behavior within organizations at the individual, group and organizational levels. The process I have gone through is not unlike what happens today in organizations. At various stages of development, I received a spectrum of responses, both encouraging and challenging. What I thought was “cutting edge” research many times felt like “bleeding edge” because one of the characteristics associated with intuition is the inability to fully explain how you arrived at the answer being professed.

Fortunately, as happens in organizations, knowledgeable individuals stepped forward and supported going forward with the research. At this time, I would like to gratefully acknowledge my committee members: Dr. Ron Fetzner, Dr. William Snow, Dr. Bill Harrington, and Dr. Joe Balloun. For anyone who has been or is currently in a doctoral program, you know words are inadequate to express appreciation for people who have dedicated themselves so that others, like myself, could achieve such a significant milestone as the completion of the research process. Another critical and crucial supporter of this work is Dr. Gary Salton. Dr. Salton exemplifies the intuitive practitioner who, years ago, began developing the concept of Organizational Engineering and compiling the database which became the basis for this research. His unselfish contributions enable us all to benefit from organizational insights to this research which can facilitate new methods and better results at all levels for organizational workers.

Also during the course of researching and writing this dissertation, I have been blessed to have discussed this work personally with individuals well known in the fields of business, organizational development, and change management. I wish to thank the following people whose conversations were both encouraging and enlightening: Dr. Weston Agor, Dr. Bill Taggart, Patricia Aburdene, Dr. Charles Garfield, Dr. Elliott Jaques, Dr. Warren Bennis, and Sharon Franquemont.

In addition, I wish to thank the individuals who have assisted me in various ways over the years. Lest I should unintentionally leave one or two out, I say to them sincerely "Much Thanks". Without you I know I would not have made it. As you read this, you will know in your hearts and minds who you are.

Last but not least, I would like to express my love and appreciation for my family, who have sacrificed time and resources during both the course of study and the writing of this dissertation: To my loving and supportive wife, Sharon, who wanted me to finish as much as I did; to my children, Whitney and Geoffrey, who wondered if they would graduate high school before I completed my course of study; and to my parents who, "May They Rest in Peace", did not live to see this moment in time, at least not from here on earth.

TABLE OF CONTENTS

	Page
List of Tables	ix
List of Figures	xi
Chapter	
1. INTRODUCTION	1
Purpose of the Study	1
Significance of the Study	1
Theory/Aspect of Theory Being Tested	2
Research Question	7
Definition of Terms	7
Overview of Total Research Study	8
2. LITERATURE REVIEW	9
Definition of Intuition	9
Major Theorists	10
Researchers	18
Management Oriented Research	
28	
Instrumentation	40
Summary	42
3. METHODOLOGY	44
Variables	44
Relational Innovator Dimension: Hypothesis 1	44
Reactive Stimulator Dimension: Hypothesis 2	45
Organizational Level: Hypothesis 3	46
Relational Innovator/ Reactive Stimulator: Hypothesis 4	47
Hypothetical Analyzer/ Logical Processor: Hypothesis 5	48
I-OPT™ Instrument	49
Database	50
Subjects	54
Population	55
Instrument Design	55
Validity and Reliability of the Instrument	57
Data Analysis Environment	59
Summary	59
4. ANALYSIS AND PRESENTATION OF FINDINGS	60
Hypothesis One	60
Hypothesis Two	63
Hypothesis Three	67

Hypothesis Four	73
Hypothesis Five	78
Summary	82
5. SUMMARY AND CONCLUSIONS	83
Overview of Significant Findings	83
Limitations of this Study	85
Implications for Human Resource Management Professionals	85
Recommendations for Future Research	88
Conclusions	90
Appendix	
A. I-OPT™ SURVEY	91
B. THE VALIDITY AND RELIABILITY OF ORGANIZATIONAL ENGINEERING INSTRUMENTATION AND METHODOLOGY	93
C. PERMISSION LETTER	96
D. CLASSIFICATION OF HIERARCHICAL LEVELS	98
REFERENCES CITED	101
BIBLIOGRAPHY	108

LIST OF TABLES

Table	Page
1. Instruments Measuring Intuition	40
2. Examples of Work Groups in the Database	52
3. Types of Industries/Areas Included in Database	53
4. Organizational Distribution of Experts	58
5. Occupational Positions of Experts	58
6. Educational Achievements of Experts	59
7. Statistical Results of Hypothesis 1: Relation of Hierarchical and Relational Innovator Levels	61
8. Statistical Results of Hypothesis 2: Relation of Hierarchical and Reactive Stimulator Levels	63
9. Mann-Whitney Test Results of Hypothesis 2 _a : Leaders versus the Population in Reactive Stimulator Score	66
10A. Hypothesis 2: Leader Median and Mean Reactive Stimulator Results	66
10B. Hypothesis 2: Population Median and Mean Reactive Stimulator Results	67
11. Non-Parametric Statistical Results of Hypothesis 3: Relation of Hierarchical Position to Conservator Pattern Levels	68
12. Mann-Whitney Statistical Results of Hypothesis 3: Leaders versus Population in Conservator Pattern Levels	70
13. Median Test Statistical Results of Hypothesis 3: Leaders versus Population in Conservator Pattern Levels	71
14A. Hypothesis 3: Population Conservator Pattern Descriptive Statistics	72
14B. Hypothesis 3: Leader Conservator Pattern Descriptive Statistics	72
15. Mann-Whitney Statistical Results of Hypothesis 4: Changer Comparison of Research & Development and Information Technology	74
16. Median Test Statistical Results of Hypothesis 4: Changer Pattern Comparison of Information Technology and Research & Development Functions	75
17A. Hypothesis 4: Mean Research & Development Changer Pattern Results Descriptive Statistics	76
17B. Hypothesis 4: Mean Information Technology Changer Pattern Results Descriptive Statistics	76
18. Mann-Whitney Test Statistical Results of Hypothesis 5: Conservator Comparison of Population and Customer Service	79
19. Median Test Statistical Results of Hypothesis 5: Conservator Pattern Comparison of Customer Service And Population	80
20A. Hypothesis 5: Mean Customer Service Conservator Pattern Results Descriptive Statistics	80

20B.	Hypothesis 5: Mean Population Conservator Pattern Results Descriptive Statistics	80
21.	Hierarchical Distribution of LeaderAnalysis™ Database	100

LIST OF FIGURES

Figure	Page
1. Basic Information Processing Model	3
2. Large Scale Determinants of Information Processing: Method	3
3. Large Scale Determinants of Information Processing: Mode	4
4. Summary of Strategic Patterns	8
5. Maslow's Hierarchy of Needs	16
6A. Hypothesis 1: Median Scores by Hierarchical Rank	62
6B. Hypothesis 1: Mean Scores by Hierarchical Rank	62
7A. Hypothesis 2: Median Scores by Hierarchical Rank	64
7B. Hypothesis 2: Mean Scores by Hierarchical Rank	65
8A. Hypothesis 3: Median Scores by Hierarchical Rank	69
8B. Hypothesis 3: Mean Scores by Hierarchical Rank	69
9A. Hypothesis 3: Median Score by Population and Leader	72
9B. Hypothesis 3: Percent of Cases Above Median by Population and Leader	73
10A. Hypothesis 4: Changer Pattern Median Scores by Information Technology and Research & Development	76
10B. Hypothesis 4: Changer Pattern Percent of Cases above Median by Information Technology and Research & Development	77
10C. Hypothesis 4: Changer Pattern Mean Scores by Information Technology and Research & Development	77
11A. Hypothesis 5: Median Scores by Population and Customer Service	81
11B. Hypothesis 5: Percent of Cases Above Median by Population and Customer Service	81
11C. Hypothesis 5: Mean Scores by Population and Customer Service	82

CHAPTER 1

Introduction

This study examines the concept of intuition in decision-making by means of a literature review and study of measures currently being used within organizations. Human behaviorists have examined why the performance of some people get them to the top while others around them remain in lower levels of the organization. They have considered situations such as, given the same information, one person completes a problem-solving process much sooner than another with nearly the same responses and wondered how that happened. This research focuses on the relationship between intuitive thought, organization level; and function. It explores the use of intuition in decision-making and the organizational conditions which call for an intuitive approach.

Purpose of the Study

The purpose of this research is to determine the systematic use of intuitive skills and abilities in business organizations. Management research historically has been biased toward the analytical process in decision-making. This rational approach has been more popular as the preferred and acceptable method for studying management practices. Alternative unstructured methods have been ignored or labeled irrational in the negative sense. However, since this study's focus is centered on working adults, judgment can be reached using other non-logical thought processes such as intuition, which take into account years of expertise, considerable introspection, and/or informal rules learned over time.

This study identifies major theorists and their opinions and findings, as well as their sources of learning. However, no attempt is made to exhaustively identify all sources referencing the theories and studies related to intuition. Primary examination is given to twentieth century researchers, although earlier authors of prominence are noted in selected cases.

Significance of the Study

Eisenhardt (1989) linked rapid decision-making to such characteristics as decisive, operations-focused, hands on, and instinctive. Therefore, fast decision-making is linked to effective performance. As an example of behavior linked to fast decision-making, Eisenhardt found executives gathered real time information on firm operations and the competitive environment which resulted in a deep, intuitive grasp of the business. This intuitively-based understanding translates into improved business performance.

Many managers report using intuition in their decision-making, in spite of the deeply rooted bias against non-rational methods (Agor, 1984a; Agor, 1984b; Dean, Mihalasky, Ostrander, and Schroeder, 1974; Isaack, 1978; Mintzberg, 1976; and Rowan, 1986). Reports of managers use of intuition ranges from inferential processes, performed under their own pre-existing database (Agor, 1986a,b,c,d) to acceptance and use of predictive abilities (Dean, Mihalasky, Ostrander, and Schroeder, 1974). Successful decision-makers have been found to have great predictive abilities (Cosier and Alpin, 1982; and Dean, Mihalasky, Ostrander, and Schroeder, 1974).

However, many managers remain unwilling to acknowledge their use of intuition, fearing negative responses from their colleagues (Agor, 1986a, 1986b, 1986c, 1986d). Additional researchers who influence this study are Barnard (1968), Vaughan (1979), Hermann (1981), Isenberg (1984), Simon (1987), and Parikh (1994).

This study seeks to redefine intuition in a form which is acceptable to the rationalistic school and yet accommodates the scholarly but more inferential approaches. The study explores the use of intuition in an extensive cross section of people in organized environments.

Theory/Aspect of Theory Being Tested

Gary Salton (1996) developed the Organizational Engineering theory as a way of measuring and predicting the behavior of interactive groups of people. In Salton's theory, human beings are regarded as information processing organisms, by which, the human is bound to the Input-Process-Output model (Figure 1) common to all information processors, regardless of their format.



Figure 1
Basic Information Processing Model
(Salton, 1996, p.9)

Salton's (1996) theory proposes the type of information sought and the intended direction of the output predetermines processing behavior. For example, if the subject does not collect detail in the input phase of the process, his output will not likely be tightly structured, logical, precise, or optimal relative to the issue being addressed. Rather, minimal output will probably result. In effect, therefore an individual using an opportunistic strategy obtains speed of response at the price of precision.

Salton's (1996) theory maintains an input-process-output model is largely governed by two large-scale factors: method and mode, which are conceived as continuums. Method (Figure 2) governs the character of input. At one end of the continuum is what Salton calls an unpatterned method. Using the unpatterned strategy, an individual simply acquires whatever information is readily available and appears relevant to the issue at hand.

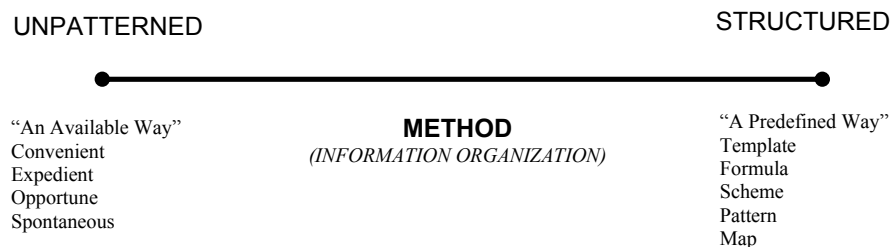


Figure 2
Large Scale Determinants of Information Processing: Method
(Salton and Fields, 1999, p. 49)

The other end of the method continuum (Salton, 1996) is defined as a structured methodology. Here the individual has some form of structure and attempts to apply it to acquire information, which appears relevant to the issue at hand. An individual can move to any point on the continuum trading speed, precision, understanding and certainty of outcome with every increment along the scale.

Salton (1996) defines the other large-scale characteristic as mode. This is visualized also as a continuum (Figure 3) ranging from thought on one polar extreme to action on the other. Salton defines thought not as a cognitive activity but rather as an intermediate result. Therefore, under Salton's definition, a plan requiring many hours of physical activity and which might fill reams of paper will still be considered a thought based response. It is intermediate. It has no effect on the outside world or the issue being addressed until it is acted upon.

Action (Salton, 1996) is the other end of the mode continuum. Here, the subject acts directly to affect the issue in question. This action may or may not have been preceded by thought as defined by Salton. From this perspective of intuition theory, action can be seen as a more decisive, aggressive, or positive response by an external observer. Thought, on the other hand, appears to the outside observer to be more rational, reflective, or coherent. Therefore, a subject tending to favor the action end of Salton's continuum will tend to be seen as decisive, operations-focused, and hands-on. These characteristics were associated with people employing intuitive strategies (Eisenhardt, 1989).

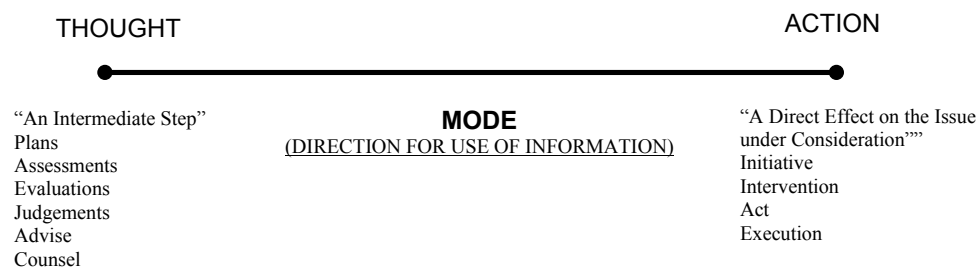


Figure 3
Large Scale Determinants of Information Processing: Mode
(Salton and Fields, 1999, p. 49)

These basic components of Salton's theory carry major implications for the study of intuition theory. Various combinations of method and mode produce behaviors paralleling the behaviors attributed to intuition. For example, a person using an unpatterned approach appears to an outside observer to be following a more intuitive strategy. There appears to be no logical structure to the information required. The logic exists, but it is in the mind of the subject and concerns the potential relevance of

information to the specific issue being addressed. If questioned, the subject may or may not be able to readily articulate why a particular element of information was selected. The outcome of this process is entirely consistent with rapid decision-making, displaying characteristics that are considered instinctive—a phenomenon often attributed to intuition (Eisenhardt, 1989). The use of the unpatterned end of Salton's continuum also produces results consistent with Clark's (1973) view, since the person will not know how he knows what he knows.

The mode element of Salton's theory also has implications for intuition theory. The thought side of Salton's continuum focuses primarily on intermediate steps (study, assessment, evaluation, etc.), many of which are not observable. Therefore, a person using an unpatterned method and thought mode may experience intuitive insights not visibly displayed.

A person using an unpatterned method with an action mode, however, will exhibit behaviors an observer can readily attribute to intuition. Inputs potentially useful to address the issue at hand are quickly acquired and promptly applied. A portion of these will successfully address the issue at hand and may be noticed by others who interact with the decision-maker. These outsiders may comment on the decision-maker's insight, further establishing or reinforcing the decision-maker's self-conception as being intuitive.

An example may help illustrate this situation. Consider a situation in which a person uses an unpatterned method to address a particular issue, such as when an executive interacts with the Board of Directors or with special interest groups. The person would begin indiscriminately seizing information, to help resolve the issue. If the person is also using an action mode, he will tend to apply the information without hesitation. If it works, the search is over. If it does not, he or she returns to the environment, picks up another piece of information, and cycles through the process again.

The indiscriminate acquisition of information increases the probability of discovering an improbable but valid way of addressing the issue. In other words, by not following an established structure, the person increases the odds of a serendipitous discovery or of a previously unrecognized approach to resolve a problem. This type of resolution is

easily attributable to insight or intuition since it is unexpected and not readily attributable to an obvious antecedent. Intangible concepts like intuition may be the real stimulus.

Because research in information acquisition is limited as well as in planning the application, the cycles can occur very rapidly. The use of the action mode increases the probability an individual will repeatedly demonstrate intuitive-type results in a manner visible to others. This often-observed style or behavior in turn suggests an innate quality. Hence, the person is considered to be intuitive.

Similarly, method and mode operate in a continuum; thus, people would exhibit degrees of intuition. However, the more committed a person is using an unpatterned method for information acquisition, the more likely they will display behavior attributable to intuition, and whom others will describe as using an intuitive strategy.

The focus on this combination of method and mode is similar to other thinkers in the field. For example, many issues addressed at the senior executive level do not have a readily identifiable structure of information acquisition. Some have parameters encouraging thought based (i.e., intermediate) responses, while others will require immediate action/reaction. Therefore Salton suggests executives will use both non-logical and logical methods in the conduct of their ordinary affairs—just as Barnard (1968) also proposed and Agor (1986a, 1986b, 1986c, 1986d) confirmed.

Salton does not directly address intuition in his research because his focus is on the interactive behavior people use in group activity. Other theorists and researchers have relied on psychologically based processes, which are not readily visible to external observers. However, as demonstrated above, Salton's theory can readily serve as a vehicle for integrating the works of multiple authors who have written extensively on intuition. In addition, Salton's theory has the merit of using ratio-scaled variables that allow people to express degrees of commitment to one or another strategy (i.e., method and mode) which can be measured and tested.

This study proposes the behavior a person exhibits using unpatterned information acquisition methods and action-based output modes will be consistent with the work found by numerous intuition theorists. This study also proposes the use of these strategies (unpatterned method, action mode) will be systematically exhibited in a manner consistent with the findings of others.

Research Question

This study will focus on the following research question with regards to management decision-making and the use of intuition:

Do various combinations of method and mode produce results that are consistent with the findings other researchers have attributed to intuition?

Definition of Terms

Organizational Engineering theory adopts a set of variables useful in describing the operation of the theory. This section defines these, as well as other terms applied in this study.

Intuition – A way of perceiving which relies on relationships, meanings, and possibilities beyond the reach of the conscious mind (Myers and McCaulley, 1985) and includes behavioral attributes (Brown, 1990). A way of knowing in which we often do not know how we know what we know (Vaughan, 1979).

Hypothetical Analyzer – One who processes information in a thought-oriented mode using structured methods (Salton, 1996).

Logical Processor – One who processes information with an inclination for the action mode using structured methods (Salton, 1996).

Reactive Stimulator – One who processes information with an inclination for the action mode using unpatterned methods (Salton, 1996).

Relational Innovator – One who processes information in a thought-oriented mode using unpatterned method (Salton, 1996).

Changer – This orientation pattern combines the styles of Relational Innovator and Reactive Stimulator (Salton, 1996).

Conservator – This orientation pattern combines the styles of Logical Processor and Hypothetical Analyzer (Salton, 1996).

Perfector – This orientation pattern combines the styles of Relational Innovator and Hypothetical Analyzer (Salton, 1996).

Performer – This orientation pattern combines the styles of Reactive Stimulator and Logical Processor (Salton, 1996).

Figure 4 (Salton, 1996) illustrates the various combinations and their resulting strategic patterns, given different primary and secondary strategic profiles.

PATTERN	Performer	Perfector
Changer	Reactive Stimulator (RS)	Relational Innovator (RI)
Conservator	Logical Processor (LP)	Hypothetical Analyzer (HA)

Figure 4
Summary of Strategic Patterns

Overview of Total Research Study

Chapter 2 reviews the findings of major authors in the field of intuition research and forms the foundation for the testable hypotheses to be used to examine the research question.

CHAPTER 2

Literature Review

Intuition is a relatively new subject of academic interest. Literature on the subject, particularly on its use in decision-making did not become prevalent until the early 1970s (Argyris, 1973a, 1973b; Clark, 1973; Dean, Mihalasky, Ostrander, & Schroeder, 1974; Jung, 1971; Leavitt, 1975a, 1975b; Livingston, 1971; Mintzberg, 1973, 1975, 1976; and Simon, 1977). These works, along with research in the 1980s, incorporated intuition related literature and research prior to the 1970s and as far back as the 1950s (Riggs, 1987).

This research study concentrates specifically on the research literature as it relates to the use of intuition in decision-making among organization managers and executives. Various organizational environments are examined in the literature review and thus, may be reasonably considered an overview of the subject. This research is classified into two categories: (1) theoretical developments concerning the concept of intuition, and (2) survey studies supporting the premise for using intuition in decision-making. The overview provides information on the use of intuition in business organizations as a function of leadership and decision-making; and explores various well- established methodologies as well as those still in development.

Definition of Intuition

The term intuition is defined as “knowing something instinctively; a state of being aware of or knowing something without having to discover or perceive it...”. (Encarta, 1999). Intuition is seen as an innate capacity not directly accessible by considering the process which gives rise to a judgment or action involving it. Thus, intuition seems to be a residual process accommodating whatever can't be explained by other means.

The literature reflects the inherent lack of obvious conceptual framework for the term intuition. Some of the alternative descriptors are ESP, psi, judgment, insight, and gut feelings (Dean, Mihalasky, Ostrander, and Schroeder, 1974); hunch (Barnard, 1968); extrasensory perception (Leavitt, 1975b); non-rational (Cohen and March, 1974); recognition (Goldberg, 1983; Ray and Myers, 1986), and edge (Tichy, 1997). Such

non-specific definitions suggest that different authors and researchers could be describing different processes or even measuring different phenomenon. Conversely, experts could be referring to the same phenomenon with different labels.

Major Theorists

This study attempts to capture the value of various theorists' approaches by focusing on the central contribution of each, and how these compare or contrast to Organizational Engineering theory.

Theorists are often classified as personality based such as Jung or transpersonal based such as Vaughan. The more classical theorists' approach view intuition as a distinct pattern of thought from the rational mode (Jung, 1971), while the transpersonal theorists' approach considers the integration of rational and intuitive approaches and considers them both valid and separate, as well as complementary (Goldberg, 1983; Vaughan, 1979)

One of the most important figures to focus on the concept of intuition is Carl Jung. His theory of psychological types is the basis for the development of the widely used Myers-Briggs Type Indicator (MBTI) (Kroeger and Thuesen, 1992). Jung's theory of intuition suggests intuition is a psychological function present in all people to varying degrees and is manifested in personality types.

Jung defines intuition as a perception and comprehension of the whole at the expense of details attributable to unconscious process. Intuition is thus viewed as a cognitive function outside the province of reason and given consideration whenever established rational or other cognitive concepts do not work. In short, it is the perception of reality in which the intuitive knows, but does not know how he knows (Clark, 1973). Later, Jung broadens his thoughts on personality types by introducing the concept of synchronicity, which further helps to explain intuitive-type feelings and visions not attributable to coincidence (Rowan, 1986). Jung uses such phrases for intuition as hunches, inspiration, and insight to problem-solving methods, all of which reflect little patience for detail or routine (Behling and Eckel, 1991).

Vaughan (1979) describes four levels of intuition: physical, emotional, mental and spiritual. The theorists, writers and researchers describe intuition in both psychological

and physiological terms. Intuition experienced through physical levels includes bodily sensations such as tension or discomfort. This is not to say however that every bodily sensation indicates an intuitive message, but these physical symptoms can be used for self-awareness, as well as a source of warnings and signs.

Emotional intuitive messages take several forms, such as liking or disliking something or someone for no apparent reason, feeling the need to perform an action or do something, and sensing energy levels in oneself or others. Emotional level intuition can be used to deepen one's self-awareness and to understand others (Vaughan, 1979).

The mental level of intuition is typically experienced as images or ideas. It may appear as the perception of patterns, insights, or images, especially in problem-solving situations. Intuition at the mental level can be used to trigger creativity, explore problem-solving areas not previously mined, and to enhance learning (Vaughan, 1979).

Spiritual intuition does not rely on sensations, feelings, or thoughts. In fact, these are considered being distracters at the spiritual level (Blackwell, 1987; Vaughan, 1979). Spiritual intuition is a means for improving self-awareness and transpersonal experiences.

Vaughan does not clarify whether a single intuition mode is responsible for all four types or whether unique factors exist for each type. This generality suggests Vaughan is defining taxonomy rather than a theoretical specification which can be tested and validated through scientific methods.

Salton's Organizational Engineering theory however does account for all facets of Vaughan's taxonomy. Salton's theory focuses on inputs and outputs, regardless of the source or the outcome. Vaughan's physical, emotional, mental or spiritual intuitive factors can be accounted for with equal facility. Salton's Organizational Engineering theory argues intuition is the result of a single process. Therefore, there is no operational need to specify the source or destination of the input-output chain (Salton, 2000). Vaughan's approach may be of value in describing intuition but it is not suitable to test the concept. Like Vaughan, Salton is indifferent to the source of the input providing the initial drive toward an external response. Further, Salton makes no judgment about the value, or lack of value, of these explanations.

The rational approach to intuition accepts the notion that the human mind has alternative methods of processing information and these methods influence behaviors. For example, Jung posits four independent but interacting categories of cognition—intuition, thinking, feeling, and sensing. Each of these categories can be operational at any particular time and any combination favored by a particular individual and gives rise to unique behaviors.

There are two views regarding the availability of intuition in individuals. One view suggests intuition is potentially available to everyone (Goldberg, 1983; Vaughan, 1979), while the other group professes individuals to be either intuitive or non-intuitive (Jung, 1971; Agor, 1984b). Researchers have even estimated what percentage of population they believe is in each category. Peavey (1963) as reported by Thornton (1971) agrees with Jung's notion that intuitives are rare, only 25% of his research sample were individuals whom he would define as intuitives.

Salton views intuition as a probabilistic outcome of a particular information processing strategy. The combination of an unpatterned method in acquiring input and a thought mode of output produce unexpected insights easily classified as intuition. This strategic posture, termed Changer within Organizational Engineering, serves a function within particular segments of a social group. The Changer is characterized by rapid idea generation, high failure rates, quick application, uneven optimality, high uniqueness, and potentially high disruptive potential (Salton and Fields, 1999). Therefore, while valuable, social system can only tolerate a certain proportion of its members subscribing to this strategic pattern. Beyond that level, the system will become unstable and the pattern will become dysfunctional (Salton and Fields, 1999). In periods of relative economic and social stability it is reasonable to expect the relative proportion of people subscribing to the Changer strategic pattern (Salton's equivalent of an intuitive) will be a minority within the population.

A study by MacKinnon in 1962 as reported by Thornton (1971), which used a select group of creative individuals, reflects a preference for intuition among 90% of that sample, in contrast to the general population figure of 25% most frequently cited. Peavey (1963) as reported by Thornton (1971) found approximately 25% of his sample were intuitives.

Salton's Changer orientation accommodates such cases as MacKinnon's. Organizational areas where the roles and responsibilities of individuals are to identify and create new products or initiatives, such as in Research and Development, must attract and retain more creative people in order to be strategically competitive (Salton, 2000).

Intuition as a concept and theory has been explained and defined in a variety of ways. Jung (1971) explains intuition as form of perception (one of four; the other three being; thinking, feeling, and sensing). Agor (1984b) and Goldberg (1983) view intuition as a process of knowing something without understanding how one knows it. Vaughan (1979) views intuition as a non-rational mode of knowing as opposed to a rational mode. She describes intuition as a distinct process characterized by directness, immediacy, perception, and unconscious processing of information.

The base theorist for the current concept of intuition is Carl Jung whose psychological types are explained in his general theory of personality (Jung, 1971). Jung elaborates on intuition as a core aspect of human experience within the field of psychology. Jung relates the concept of subconscious to intuition and in his early research relates unconscious to refer to what is currently known as subconscious. His theory connects intuition as a function of personality rather than knowledge experience. Jung does not believe intuition is related to inference. Jung believes intuition operates beneath the conscious realm and is made without the limitations and constraints of rationalism and logic. Jung also believes the intuitive process and how it accesses knowledge is indiscernible. In other words, the intuitive or intutor knows, but does not know how he/she knows. This theory is also the basis, either directly or indirectly, for many of the instruments, which have been designed to measure intuition preference levels.

In Jungian Theory (1971), human experience is composed of four basic functions: intuition, sensation, feeling, and thinking. Individuals possess and utilize all four functions to varying degrees. He further divides these functions into rational or concrete functions (thinking and feeling) in which people evaluate experiences and come to conclusions and non-rational or abstract functions (intuition and sensation) in which people capture experiences and gather information. Concrete intuition balances

perceptions concerned with the actuality of things; it is a reactive process, which responds to given facts. Abstract intuition is what mediates perceptions of ideals and connections, and is stimulated by an act of will or intent.

Jung's theory of personality is more complex than just intuition and included various other aspects. "Intuition fully described is 'introverted intuition with thinking,' or 'extraverted intuition with feeling,' and on through all combinations of the function" (Blackwell, 1987). Jungian psychology which identifies the four types has been viewed as useful in understanding and developing decision-making and problem-solving skills in business (Catford, 1987). Jung also believes that people have a tendency to favor or have one dominant type over the others. Jung suggests there are innate, unconscious modes of understanding which regulate our perception itself. These are referred to as archetypes, which is an inborn form of intuition (Hyde and McGuinness, 1994).

Jung's theory of intuition believes there is psychological functions present in all people in varying degrees and manifested in personality types. Intuition is a perception and comprehension of the whole at the expense of details based on unconscious processes. Furthermore, intuition is a cognitive function outside the province of reason and is used wherever established values and concepts do not work. In other words, it is the perception of reality not known to consciousness self in which the intuitive knows, but does not know how he/she knows (Clark, 1973).

Jung (1971) also further delineates intuitive types as extroverted or introverted. The extroverted intuitive personality perceives implications and possibilities in the external world, while the introverted intuitive focuses on the inner world and perceives the implications and possibilities of his/her own conscious processes, both personal and collective.

Later, Jung broadens his thoughts on personality types by discussing the subject of synchronicity which further helps to explain intuitive-type feelings and visions separate from coincidence (Rowan, 1986). Jung relates such phrases as hunches, inspiration, and insight to problem-solving with little patience for detail and routine (Behling and Eckel, 1991). Jung's general theory of personality is the basis for the Myers-Briggs Type Indicator self-reporting instrument (Myers and McCaulley, 1985; and Kroeger and Thuesen, 1992).

However, Salton's Organizational Engineering is indifferent to the Jungian approach. Jung's concepts of introvert may be applied to Salton's Relational Innovator and Hypothetical Analyzer strategic patterns which exhibit behaviors roughly consistent with those of the introvert, but, this does not mean they are the same, simply that they are correlated or share similar traits.

This study recognizes the continuing contribution of Jung to the field, especially as applied to individuals. However, in modern society, groups of individuals are the principal contributors to the common well being. Unfortunately, Jungian theory does not lend itself to the consolidation of individuals in groups. The principles of Salton's Organizational Engineering, on the other hand, have been shown to produce statistically significant and reliable results when applied to individuals in interactive groups (Soltysik, 2000). Therefore, Salton's Organizational Engineering methodology is the more appropriate choice for studying organizational development initiatives.

Having said this, both Organizational Engineering and Jungian theory offer alternative explanations to intuition. Jungian is psychologically based and assumed to be a fixed component of the individual. The hypothesized organizational prescription will be to identify individuals and/or groups endowed with intuition and place them in a position that makes use of their talent. In contrast, Organizational Engineering views intuition as a strategic response to an environment, individuals and groups can be taught to make use of the strategic styles or patterns (Salton, 1996).

For the purpose of this study, both Organizational Engineering and Jungian theory are relevant and identified in the literature review and useful in exploring intuition. The theories actually address two slightly different things, i.e., Organizational Engineering focuses on the individual as participant in group behavior, while Jungian theory focuses more narrowly on the individual. Subscribing to Organizational Engineering principles does not preclude simultaneously subscribing to those of Jung. These facts will suggest there is no need to prove one wrong and the other right. They both can coexist.

Maslow (1970) addresses intuition in his theories of human psychology. Maslow characterizes intuition as intrinsically and innately tied to the human psyche. Maslow suggests this inner capability is what contributes to the existence of the evolution of self

and self-actualization. Maslow also relates this inner nature with creativity. Maslow purports creativity in self-actualizing people is spontaneous and easy, as well as less concerned with the absolute truth or correct answer. Figure 5 illustrates Maslow's hierarchy.

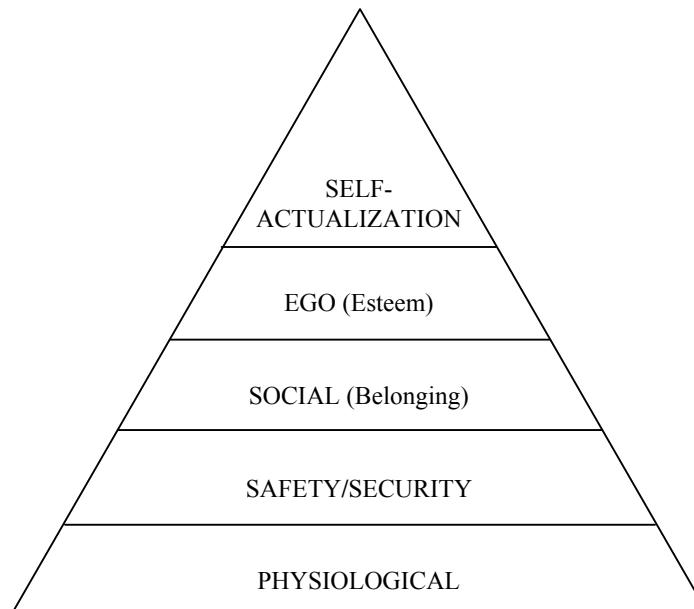


Figure 5
MASLOW'S HIERARCHY OF NEEDS
(Adapted from Maslow's Need Hierarchy, Abraham Maslow, 1954)

Maslow (1970) also discusses intuition and its suppression in his theory of denial. Here, he states, people tend to suppress their intuition or creativeness out of fear of knowing themselves or to avoid identifying personal areas in need of development. This is similar to rational versus non-rational thought processes and was discovered in the literature to contribute to less identification of intuition in decision-making.

Maslow indicates when one has knowledge, action follows and choices can be made without internal conflict. However, with such self-discovery comes responsibility for action and often means change accompanies such actions that typically go against some norm. Therefore, Maslow suggests, most people take the path of least resistance; they conform to rational norms, behaviors, and thought processes that are acceptable to the majority. This tendency is sometimes described in decision-making situations as siding with the status quo, a common and sometimes dominant response.

Salton's Organizational Engineering theory agrees with Maslow's underlying precepts. Intuition is available to all and is an innate part of the human structure. Salton makes no assertions as to why people are as they are beyond those dictated by the environment within which they exist. Concepts such as self-discovery and self-actualization lie in the realm of psychology and by Salton's Organizational Engineering standards may or may not be true. While the other factors and causal sequences Maslow notes may be meritorious and worthy of pursuit, Salton claims only to be able to explain observed behavior by reference to method and mode. For example, physics explains how nuclear energy can be produced, but does not tell society what to do with it. Similarly, Salton explains how intuition arises; he does not assign a generalized value to it. Intuition is viewed simply as one of many variables needed to run a successful social structure or business enterprise (Salton, 2000).

Therefore, Salton's views do not contradict those of Maslow. In fact, Salton agrees with Maslow's core thinking but is indifferent to the applications. As in the case of Jung, there is no need to design an experimental study to disprove one or the other; both schools of thought can coexist. While Maslow suggests an individual's motivation and subsequent actions are based on their needs, Salton suggests an individual's actions are based on their preferences.

Researchers

Researchers, academicians, and writers most noted for their contribution to the use or potential use of intuition in business, more specifically, management and decision-making include Agor (1983a, 1983b, 1984a, 1984b, 1985a, 1985b, 1986a, 1986b, 1986c, 1986d, 1987a, 1987b, 1988a, 1988b, 1989b, 1989c, 1992a, 1992b, 1992c, 1992d, 1993); Barnard (1938, 1968); Cappon (1993, 1994); Dean, Mihalasky, Ostrander, and Schroeder (1974); Frantz and Pattakos (1996); Isenberg (1984, 1985); Jackson (1989); Kroeger and Thuesen, (1992); Leavitt (1975a, 1975b); Mintzberg (1973, 1975, 1976, 1979); Peters and Waterman (1982); Raudsepp (1981); and Parikh (1994). Others contributors to the study the use of intuition include Vaughan (1979); Goldberg (1983) Rowan (1986); and Emery (1994, 1995). These numerous recent studies testify to the increasing importance assigned the subject of intuition as applied

to organized endeavors, such as work or project teams, leader selection and recruitment, organizational design, and research application. The subject matter would seem to be of substantive interest to the academic community. The findings of these researchers will be elaborated upon further throughout this study.

One of the first authors to discuss the use of non-logical processes in decision-making was Chester Barnard in The Functions of the Executive (1968). Barnard suggests that managers use non-logical decision-making, which balances rational and intuitive, and discussed his research insights in a public presentation:

I have found it convenient and significant for practical purposes to consider these mental processes consist of two groups, which I shall call 'non-logical' and 'logical'. These are not scientific classifications, but I shall ask you to keep them in your minds for the present, as I shall use them throughout this lecture. In ordinary experience the two classes of intellectual operations are not clearly separated but meld into each other. By 'logical processes' I mean conscious thinking which could be expressed in words or other symbols, that is, reasoning. By 'non-logical processes' I mean those not capable of being expressed in words or as reasoning, which is only known by judgment, decision or action. (p. 302)

It seems to me clear that, whatever else may be desirable, it is certainly well to develop the efficiency of the non-logical processes. It is the process by which an immense amount of material is unconsciously acquired for the mind to use, and intelligence can aid in selecting the field for action, the line of experience, that is promising. (p.321)

Barnard suggests both logical and non-logical thinking is necessary in the everyday affairs of a successful manager. In fact, Barnard's theory of cooperative behavior in formal organizations may be considered a forerunner to the shared values discussed in today's corporations.

Barnard (1968), along with Herbert Simon (1977), argue organizational decision-making is a distributed activity, extending over time, and involving a number of people. Because decision-making is a process rather than a discrete event, one critical management task is to shape the environment of decision-making in a way that produces desired ends. This perspective contrasts sharply with the psychological theories which view decision-making as a personal responsibility, rather than as a

shared, dispersed activity an individual must orchestrate and lead (Barnard, 1968 and Simon, 1977).

Given Barnard's perspective on distributed decision-making and the value of intuition within the executive's skill repertoire, it is reasonable to suggest that Barnard believes intuition is a phenomenon which should be reorganized and managed like any other element in the decision-making environment. If this inference is true and if managers follow Barnard's prescription, even without knowing it. This study hypothesizes Salton's intuitive strategic profiles of Relational Innovator and Reactive Stimulator will be distributed within working groups and those groups making the most important decisions will tend to have greater representation of the intuitive patterns (Salton, 2000).

Salton seems to support Barnard's position regarding the importance of intuition as a component of organizational decision-making, and emphasizes Organizational Engineering's value as a tool to describe group as well as individual decision-making behaviors (Soltysik, 2000). Therefore, Organizational Engineering incorporates both Barnard's organizational theory, as well as Jung's psychological approach to the use of intuition.

Westcott (1968) was one of the first to do experimentation examining psychological research on intuition. In fact, he is one of only a few researchers, to date, involving only about a dozen studies for a period of about fifty years which had described, observed, or attempted to measure to some degree the function of intuition. Westcott believes intuition or intuitive knowledge is learning process-related, rather than detail- or content-related. He further suggests intuitive knowledge is generally not acceptable to the general public, which on the whole, requires a more rational approach.

Westcott (1968) defines intuition as occurring when an individual reaches a conclusion on the basis of less explicit information than is ordinarily required to reach that decision. Westcott (1968) conducted studies of intuition with college students. He classified them on the basis of their ability to solve problems using as few clues as possible and labeling those using the fewest number of clues as intuitive thinkers. These studies examined intuition as inference and subliminal perception, and found that

individuals varied in the amount of explicit information they needed before attempting to solve problems.

Westcott's findings are generally compatible with Salton's Organizational Engineering theory. Like Westcott, Salton theorizes individuals will differ in the amount of explicit information they need to resolve problems and issues. Unlike Westcott, however Salton sees this as an outcome of the strategy used, rather than as an innate quality of the individual using it. Again, Salton is indifferent to the judgmental attributes assigned to intuition, such as Westcott's self-confidence attribution, seeing this as immaterial to his study of intuition.

Salton's Organizational Engineering theory agrees with Westcott as it relates to intuition and the need for information by the subject in order to make a decision. However, Salton's sees intuition as a strategic preference, which deliberately trades speed of response for certainty of outcome. Put another way, an individual processing information at higher speeds is presented with more opportunities to get it right, given the outcome levels of risk and importance. Westcott, on the other hand, sees intuition as an innate human quality influenced by the structure of the mind, and perhaps requiring the individual to process information in a more structured manner regardless of the situation. The basic definition of intuition remains the same, but the amount of information needed by an individual prior to making a decision may differ sharply between Westcott and Salton's methodology.

The systematic data available from the research study database and the relatively thin data and loose rigor of Westcott's study precludes a definitive resolution of differences between Westcott and Salton's Organizational Engineering theory. For this study, it is sufficient to note the behavioral outcomes of both theories are consistent. Thus, any choice between them would rest on their value in organizational application, as well as in future research and the expansion of knowledge. In this regard, Salton's work with its greater scope, and higher scientific rigor with verifiable results and predictive capabilities, would seem to be the more attractive alternative for business applications.

Clark (1973) questions the notion of developing intuition. He notes intuitive knowledge tends to be general rather than specific, subjective rather than objective.

Thus, it is characteristically experienced as subjectively meaningful. It is important to note that having intuitive capacity and/or capability does not necessarily mean one uses it or can develop its use. Therefore, the capacity for intuitive problem-solving was found to be significantly related to mathematical aptitude, self-confidence and individual spontaneity (Clark, 1973).

Breakthrough research was conducted in the 1960s and later documented in the book Executive ESP (Dean, Mihalasky, Ostrander, and Schroeder, 1974). This major study brought together the two elements of intuition and decision-making in management (Agor, 1984b). This study measured how CEOs of various corporations performed on tests for ESP and how this skill was linked to higher corporate earnings performance for respective organizations. Dean, Mihalasky, Ostrander, and Schroeder sought to identify intuition as a factor, which would help distinguish the extraordinary manager from the merely competent. The study spanned more than three years during which over 5000 tests were recorded and measured. The hypothesis was to validate management level personnel, in determining the importance of future information, relying upon the use of intuition. This study found the executives with the highest scores also corresponded respectively to companies with the best records of increased profits. Their findings suggest these results do not prove profit making and precognitive ability are related. However the results do indicate the probability of achieving superior profit making is enhanced by choosing a person who scores well in precognition ability (Dean, Mihalasky, Ostrander, and Schroeder, 1974).

Again, Salton's Organizational Engineering theory is consistent with the work of Dean, Mihalasky, Ostrander, and Schroeder. Unlike Dean, Mihalasky, Ostrander, and Schroeder, it does not view intuition as the outcome of some undefined process such as ESP. Yet, it also does not deny there may be process available to humans yet to be recognized. Stripped of the ESP references, Salton suggests that intuitive strategic patterns are favored at higher organizational (i.e. leadership) levels. The reason is the nature of the issues being confronted at that level tend to be vague, uncertain and ill defined. The use of structured strategies based on details and explicit relations are a poor fit.

By contrast, Dean, Mihalasky, Ostrander, and Schroeder (1974) assume the CEO is the decision-maker. Their theory does not recognize the existence of other, lower-level decision-makers who also simultaneously influence successful outcomes. Barnard (1968) on the other hand, sees the CEO as one variable among many within a network of decision-makers. It is notable that Salton equally supports both theories. The individual intuitive abilities stressed by Dean, Mihalasky, Ostrander, and Schroeder are characterized by choice of method and mode. The network aspects stressed by Barnard are comparable to the group-based methodologies suggested within Salton's Organizational Engineering theory. The reconciliation of the two theories can best be seen in Organizational Engineering's Leader Analysis™ which describes the ease or difficulty with which a leader will experience when attempting to persuade a group of individuals toward his or her preferences. The analysis measures the leader's preferences along a continuum and compares them to the composite preferences of the subordinate group. The greater the discrepancy, the more difficulty the leader will have with others in the organization — whether their preferences are founded on ESP or some rational basis (Salton, 2000).

Dean, Mihalasky, Ostrander, and Schroeder, (1974) reinforce their argument through anecdotal evidence. For example, they cite business notables who had acknowledged they used intuition in the process of making decisions such as Leon Hess, Amerada-Hess Oil Co.; Conrad Hilton, Hilton Hotels; William C. Durant and Alfred P. Sloan, General Motors; Charles Kemmons Wilson, founder of Holiday Inns; Dwight Joyce, President, Glidden Co.; and Benjamin Fairless, former Chairman of the Board of U.S.Steel just to name a few.

Anecdotes are also used by Kanter (1977) who suggests Cornelius Vanderbilt, instrumental in building the railroad, acted on impulse and intuition, and could not explain his process for making the decisions he enacted. Ray and Myers (1986) discuss notable business leaders in their Master's classes at Stanford University's Business School who acknowledge using intuition in making decisions. Some of those identified are: Alexander Poniatoff, Founder and Chairman of the Board, Emeritus, Ampex Corporation; Paul Cook, Raychem; Robert Marcus, Alumax; Steve Jobs, Apple

Computer; Charles Schwab, Charles Schwab Discount Brokers; James Treybig, Tandem Computers; Nolan Bushnell, Atari; and Bob Swanson, Genentech.

Rowan (1986) presents anecdotal evidence, citing a multitude of business leaders who reported they used intuition in significant decision-making situations. The most prominently identified were H. Ross Perot, founder, Electronic Data Systems; Ray Kroc, former Chairman of McDonald's; Mary Kay Ash, founder, Mary Kay Cosmetics; Edgar Bronfman, Chairman, Seagram; Debbi Fields, founder of Mrs. Fields' Cookies; Fred Smith, founder of Federal Express; and John Fetzer, former Owner of the Detroit Tigers, and founder, Fetzer Broadcasting Company.

This support of anecdotal traits has continued in current research. Spitzer and Evans (1997) make reference to such well-known leaders in business and academia as Scott Davidson, CEO of ICI Acrylics; Ray Marshall, former Secretary, U. S. Department of Labor; Ralph Larsen, Chairman and CEO, Johnson & Johnson; Richard Teerlink, President and CEO, Harley-Davidson; and C. K. Prahalad, Professor, University of Michigan.

While the list of people identified as using intuition is impressive, it is nonetheless, anecdotal, whether self-reported or observer-noted. An anecdote is a personal account of some incident or event (Encarta, 1999). As such, anecdotal evidence is a form of proof, based on hearsay or self-report. Thus, it has minimal value as a foundation upon which to base empirical research.

During the mid-1970s Harold Leavitt (1975a, 1975b), a managerial psychologist, discussed the consequences of over-emphasizing analytical problem-solving in management education. Leavitt coined the term "Analysis Paralysis", suggesting the intuitive and emotional elements of information processing deserve the same attention as the logical and analytical. He (1975b) notes his discomfort with the concept of intuition and his rationale for not wanting to research it further. Leavitt's articles were published following the first major research study on intuition (ESP) done by Dean, Mihalasky, Ostrander, and Schroeder, (1974) as previously discussed.

Later, Leavitt as reported by Ray and Myers (1986) while lecturing at Stanford University, discussed a concept he labeled pathfinding, which refers to how people define their personal mission. He identified three approaches: proactive, reactive, and

enactive. He defines enactive as working on a problem until the individual finds the right path or solution, trusting the problem and solution constitute a personal dialogue, an exercise in communication between one's inner and outer selves. This form of intuition places high trust in an undefined process that guides an individual's choice to select a right choice or solution. While Leavitt omitted the term intuition in his writings, it appears he subscribes to the belief in some existing variable that guides the decision-making process.

Henry Mintzberg (1976) reported the results of his brain dominance research of management in his classical piece published in the Harvard Business Review. He suggests management researchers have not been successful in finding the perfect technique for managing because critical elements have been overlooked, i.e., the right hemisphere of the brain controls emotional, intuitive, creative, non-linear, visual, spatial, and relational thinking processes (Agor, 1984b; Isaack, 1978; and Mintzberg, 1976). Mintzberg (1973, 1975) had earlier noted observations of five chief executives whose decisions were made primarily through impressions, feelings, hearsay, gossip, and other sources, rather than relying on empirical data. The terms most often referenced by Mintzberg are hunch and judgment, which he describes as incorporation of the thought processes, which the intellect does not articulate (1976).

Isaack (1978) also uses terms like hunch, guess, and feel, to describe intuition as used in decision-making. Mintzberg (1976) emphasizes that managers need more than analytical skills to do their jobs well; they also needed the intuitive (right brain in Mintzberg's terms) skills. However, he does not suggest managers discard the use of analytical thinking. Rather, he argues for a balance between analytical thinking and intuition. He notes how very little is mentioned in management textbooks on the topic of intuition during the mid-seventies. When reference was made in management textbooks, three of twenty-four stated intuition should not be considered in the study of management

Vaughan (1979) sees intuition as a non-rational or non-linear mode of knowing. However, she states intuition has the capability of being developed and therefore has the aspects of being both a capacity and an experiential inference. This view has had very little empirical research to test whether people can actually develop intuition.

Vaughan agrees with Maslow regarding the significance of experiencing intuition because it affords personal freedom, which is then expressed in personal choices and decisive action. In addition, both Vaughan (1979) and Maslow (1970) contend there is a connection between intuition and creativity. Vaughan believes there is a close relationship between using intuition and one's willingness to risk discovery of one's deeper self-regarding life experiences.

This view is entirely consistent with Salton. Salton's Organizational Engineering theory argues intuition and creativity are simply points along the same continuum running from weakly defined suspicions to highly articulated, actionable proposals. The use of an unpatterned method and a thought mode increases the probability of finding the unexpected. If the discovery is of a new ill-defined relationship, which has not been recognized but can be acted upon, it can be termed intuition. If the same process yields an explicit discovery that can be articulated and defined, it can be termed creative.

While there are similarities between Salton's view of intuition and that of these other theorists, there are also differences. For example, Vaughan defines intuition in terms of experiences being dealt with in four distinct and separate levels of awareness. These include the physical (i.e., heart rate or sense of uneasiness), emotional (paying attention to one's feelings or expression in the artistic world), mental (inner awareness/vision or creativity), and spiritual (holistic perception of reality transcending rational) as cited in Brown (1990). Vaughan states:

Experiences, which are commonly called intuitive, include mystical apprehension of absolute truth, insight into the nature of reality, unitive consciousness, artistic aspiration, scientific discovery and invention, creative problem-solving, perception of patterns of possibilities, extrasensory perception, clairvoyance, telepathy, precognition, retrocognition, feelings of attraction and aversion, picking up 'vibes', knowing or perceiving through body rather than through rational mind, hunches and premonitions. (Clark, 1973, p.156)

Vaughan's book entitled Awakening Intuition (1979), could best be characterized as a prescription for understanding and developing tools in the area of intuition capability. The three steps involved in awakening an individual's intuition are: (1) quieting the mind; (2) focusing attention on the issue at hand or desired and (3) accepting or developing a non-judgmental frame of mind which allows intuitive thoughts to flow freely. Vaughan reported that many of her adult patients feel they were more intuitive as children and

had since curtailed the use of intuition due to ridicule and skepticism from others (Agor, 1984b).

Salton's methods for developing one's intuition is radically different from Vaughan's. In a series of publications, Salton (2000) outlines methods of developing different strategic styles. The exact strategy for emulating the Relational Innovator/Reactive Stimulator depends on the strategic style a person currently prefers to use. Therefore, there is no universal one size fits all prescription. However, all of Salton's prescriptions distill down to use whatever information is available (rather than searching for it), quickly testing its viability relative to the issue needing attention (rather than planning), and rapidly discarding things which do not work. This strategy allows a high volume of tests and, every once in a while, something unexpected will surface. As this strategy is practiced, ever-greater volumes can be processed, therefore significantly increasing the likelihood of involving intuition and creativity.

Vaughan's (1979) research concerning imaging, as it relates to intuition, asserts meditation is an extremely productive method to increase intuitive awareness. Dean, Mihalasky, Ostrander, and Schroeder (1974), and Goldberg (1983) also support this thinking. However, Vaughan cautions that information gathered during an exercise of imaging is not judged on face value, as the event may not present itself until a later time versus closer to the present.

Salton's views imaging as a good vehicle for discovering unexpected relationships. Unlike analysis, imaging involves visualizing a situation in all of its complexity as a single episode. This increases the likelihood something unexpected will be discovered. Analytical structures preclude this phenomenon due to the focus on using predetermined formulas, methodologies and proven techniques.

Raudsepp (1982) believes the steps used in intuition are the same as those used in analytical methods, merely faster processing. This view supports the notion that intuition occurs without one knowing how they know or upon what one's thoughts, experiences, and knowledge are based. Raudsepp (1982) defines intuition as an experiential, holistic way of knowing or reasoning where the weighing and balancing of evidence are carried on unconsciously. Although a certain amount of fact finding and data gathering are necessary when using intuition not every decision or problem to be

solved uses intuition. Similarly, he suggests the use of intuition in complex problem-solving results in the identification of other opportunities not necessarily noticed or developed by those who are using greater levels of details and seeking more facts. In summary, Raudsepp (1981) suggests:

Usually, intuitive thinking rests on familiarity with the domain of knowledge involved and with its structure, which makes it possible for the thinker to leap about, skipping steps, and employing short cuts in a manner that requires a later rechecking of conclusions by more analytic means, whether they are deductive or inductive. (p.36).

While they may disagree on the cause of intuitive behavior, Raudsepp and Salton agree on the practical outcomes of its use. Quickly apprehending things readily at hand, rapidly applying them to an issue of interest, and discarding those which do not work.

Cosier and Aplin (1982) imply intuition is closely allied with ESP. Current research challenges this stance, and therefore Cosier and Aplin's views are not widely accepted or cited in the literature.

Peters and Waterman (1982) assert the use of a rational model in decision-making is contributing to the decline of productivity and quality in America. Peters and Waterman, as reported by Catford (1987), while researching excellent organizations found that successful decision-making and problem-solving are more inspirational than rational involving attention to several factors simultaneously. They suggest business schools have trained inexperienced managers to think the correct answer can be obtained through analysis based on numerical data. Rowan (1987b) agrees our society and business schools in particular put heavy emphasis on left brain thinking which encourages analysis paralysis. Unlike the work of Cosier and Aplin (1982), Rowan's position is based on a logical foundation and should be seriously considered.

Management Oriented Research

Weston Agor has done the most recent and extensive research in the field of intuition in management decision-making. Agor is retired from the faculty of the University of Texas—El Paso and was founder of The Global Intuition Network, now known as the Intuition Network. Agor (1983c) suggests “managers in the future will

need to make decisions in a more rapid manner and with less complete data". Therefore, managers who develop their intuitive skills will be more adept at making decisions. This timeliness in making those decisions can be the difference between success and failure. Agor (1984a) concludes most decisions are made either on the basis of incomplete information or because information is not available within the time restrictions. Agor (1986a, 1986c) studied, over a period of two years, 2,000 managers using a portion of the Myers-Briggs Type Indicator which later developed into what is now known as The AIM Survey. This study indicates top executives rated significantly higher in intuition than middle or low level managers.

Agor (1986) completed a follow-up study of 200 of those executives who scored in the top 10 percent on the intuition scale from others surveyed using a more specific set of questions. Of these 200 surveyed, seventy responded and all but one of the executives stated they used their intuitive ability to guide their most important decisions. They further went on to clarify intuition was not their only tool but it was an important management resource.

Agor (1984a, 1984b) found the ability to use intuition and the frequency of its use varies by management level, type of organization, sex, occupational specialty, and ethnic background. Top management scores higher than middle management in both use and frequency, and middle managers in turn score higher than lower level managers. His research also shows top managers display greater potential intuitive ability than middle or lower level managers.

These results are consistent with Salton's Organization Engineering theory. In addition, the progression is geometric making it mathematically impossible for purely analytical methods to be applied in all facets of a senior executive's area of responsibility. Therefore, the ability to effectively use partial information and to generate resolutions without full specification of the process will become increasingly valuable and the strategies of Reactive Stimulator and Relational Innovator work best within these environments.

Agor (1984a, 1984b) concluded from his research that subjects in his study were more likely to use intuition where the following conditions existed: a high level of uncertainty; little precedence exist; variables are not scientifically predictable; facts are limited or do not indicate a path to travel; use of analytical data is not appropriate at the

time; multiple realistic alternative solutions exist; and/or time is of the essence. These are exactly the conditions which favor the combined styles of the Relational Innovator and Reactive Stimulator strategy, in Salton's Organizational Engineering

Agor also reiterates the importance of knowing the different personality types and brain dominance patterns with regards to staff positions with individuals whose strengths are aligned with the desired work results. He also states where this is not done properly less than optimal, if not dismal outcomes may result. Hermann (1981) states this same basic principle from a different perspective, suggesting people tend to become employees where they can do work which best fits their preferences.

Both Agor's and Hermann's position on these issues are fully compatible with those parts of Salton's theory, people will tend to seek environments favorable to their elected strategy and will therefore be aligned with the demands of the position. However, unlike Agor and Hermann, Salton allows for shifts in the preferred strategic profile, permitting alignment to be realized over time. Both Agor and Hermann suggest the alignment is more static and individuals can only be aligned if their position is changed in character.

Goldberg (1983) describes the use of intuition in a range of human functions, from how the mind works to developing one's intuitive abilities, to using it in decision-making and problem-solving. He suggests intuition is often defined in terms of what it is not, rather than what it is. For example, Goldberg distinguishes the difference between intuition and ESP as precognition (intuition) and an extension of our five senses already present (ESP). Goldberg like some of the other experts links closer the relationship between rationality and intuition as being complementary rather than separate and distinct. In fact, he even goes so far as to say intuition is a part of rational thinking (1983). Agor (1984b) points out a limitation of Goldberg's book in that it was not based on actual field testing nor did it contain detailed descriptions on specific management situations in which to use intuition. And uniquely. Sprecher (1983) prefers to think of intuition as merely a subset of logical thinking.

Salton's theory incorporates all of the above observations; i.e., intuition is just a position on the method and mode continuums. Although sometimes distinct other times complementary, all types can be accommodated within Salton's Organizational Engineering theory.

Isenberg (1984) studied a dozen executives by conducting interviews, work observations, talking to colleagues/subordinates, reading logs/diaries, and engaging them in various exercises over a two-year period. The managers ranged from entrepreneurs to division-level managers within Fortune 100 companies. While Isenberg was not able to clearly identify a linear rational process, there was a tendency to combine rational with intuitive processes. This integrative approach is also identified in later studies and articles on the subject. What he (1984) did find is two-thirds of those studied are preoccupied with a very limited number of quite general issues:

In making their day-to-day and minute-to-minute tactical maneuvers, senior executives tend to rely on several general thought processes such as using intuition; managing a network of interrelated problems dealing with ambiguity, inconsistency, novelty, and surprise; and integrating action into the process of thinking. (p. 84)

He suggests there are five circumstances in which intuition is used:

First, they intuitively sense when a problem exists.
Second...to perform well-learned behavior patterns rapidly.
A third function of intuition is to synthesize isolated bits of data and experience into an integrated picture...
Fourth...as a check...on the results of more rational analysis. And,
Fifth...to bypass in-depth analysis and move rapidly to come up with a plausible solution. (p. 85)

The most important of these five circumstances he identifies is of the inner knowing sense versus the rational or data analysis. Isenberg (1984) states intuition comes from extensive experience with analysis, problem-solving, implementation, and to the extent the lessons of experience are well founded, then so is intuition. The importance of intuition occurs at the problem-solving/decision-making time as well as at the time a problem is sensed to be happening, prior to identification. Isenberg describes the phenomenon as everything finally coming together in either an experience or seeing a big picture, which he termed the "AHA!".

Herbert Simon (1987) discusses the role of intuition and emotion in management decision-making. He refers to Barnard's logical and non-logical processes, and to split-brain research to explain his view of analytic (rational) and judgmental (intuitive) decisions. He best sums up his research position by saying:

It is fallacy to contrast analytic and intuitive styles of management...the effective manager does not have the luxury of

choosing between...approaches to problems. Behaving like a manager means having command of the whole range of management skills and applying them as they become appropriate. (p. 63)

Again, the thinking of both Isenberg and Simon are reflected in Salton's theory.

The selection of the method and mode continuums does not address the degree of expertise which those positions can be manifested. Salton's (2000) general rule of practice makes perfect especially supports Isenberg's concepts.

Naisbitt and Aburdene (1985) take a futurist approach to the subject of intuition in management and relate it to western civilization, which they contend is more analytical than intuitive its decision-making and problem-solving processes. These researchers contend chief executives use intuition or more holistic thought processes regularly in circumstances where planning, decision-making, and complex problem-solving are too complex for rational models, or when information is limited. Again, this thinking is entirely consistent with Salton's theory.

Eisenhardt (1989), tracking the decision-making processes in twelve microcomputer firms, conducted extensive interviews with members of top management teams, used questionnaires, observed group meetings, and examined various secondary data. The study showed rapid decision-making is linked to such characteristics as being decisive, operations-focused, hands-on in work style, and being instinctive by nature. This rapid decision-making is then measured against effective performance. As an example of behavior linked to rapid decision-making, Eisenhardt finds executives gather real time information on firm operations and on the competition's environment. This suggests the presence of a deep, intuitive grasp of the business operations.

Salton's Organizational Engineering research is consistent with Eisenhardt's finding of rapid decision-making, which, she reports, is effective. However, Salton's theory qualifies this by noting it is effective in the particular industry she studied.

Microcomputers were rapidly evolving during the period of her research and there was minimal reliable structure available for extensive lengths of time, a condition favoring unpatterned strategies. For example, it is unlikely Eisenhardt would recommend her theory be applied to a brain surgery situation in a hospital. Salton's Organizational

Engineering theory does accommodate Eisenhardt's theory given when it is applied to real limitations.

Cappon (1993, 1994), a medical doctor and psychotherapist, is convinced based on his practice that everyone has some capacity for intuition, even though not everyone uses it: those who do use it, do not always apply its use equally. He suggests intuition can be trained and this is based on his use of "IQ2" (instrument designed to measure for actual capacity). This is a predecessor to his Cappon Intuition Profile, used to test for the likelihood of intuitiveness that was developed in 1989. Cappon believes the reason people either do not use it or do not admit to using it is because intuition is not necessarily processed consciously, and is therefore suspect.

Cappon (1993) began his studies of intuition with the hypothesis it is the secret to success in most endeavors, even in business environment. He tested more than 3,000 clients and found women do not have more intuition than men do. He attributes this false belief that women use more intuition to Western societies being dominated by males, and scientific thinking, of which both distrust intuition. Cappon also suggests intuition has been viewed negatively because the process itself is almost unconscious. These negative views because scientific research bias that further forced it underground. The intuitive process thus becomes masked and its relative importance greatly obscured.

Cappon (1993) extended his research to measure 20 specific skills:

- Perceptual closure on insufficient time;
- Perceptual closure on insufficient definition;
- Perceptual recognition;
- Positive perceptual discrimination;
- Negative perceptual discrimination;
- Synthesis or Gestalt insight;
- Time flow estimation;
- Retrieving memory or quick memory;
- Passive imagination;
- Psycho-osmosis or knowing the unknown;
- Stimulated imagination;

- Active imagination;
- Anticipation or foresight;
- Optimal timing of intervention;
- The hunch or seeing the solution before you have it;
- The choice or best method;
- The choice of best application;
- The hindsight (uses empathy and identification in order to divine the cause of things);
- Associative and disassociative matching; and
- Seeing the meaning of things.

Cappon's request to administer his research instrument was not well received among some intuition-sensitive companies which feared the public would lose faith in them if they were thought to be operating on gut feeling. Interestingly however, companies in the manufacturing industries willingly agreed to use Cappon's instrument.

Cappon's research contribution points out how informal judgments on the use or study of intuition can generate some heavy skepticism. The same is not true of Salton's Organizational Engineering theory, because its instrument does not require summary judgments based on classification of observed behavior. Rather, these observations confirm the validity of the instrument's findings.

Parikh (1994) conducted intuition research on 1312 managers from large non-governmental industrial and service organizations located in nine countries: Austria, France, Japan, the Netherlands, Sweden, the United Kingdom, the United States, Brazil, and India. Parikh's findings suggest many managers use intuition; intuition contributes to business success; and intuition contributes to harmonious interpersonal relationships. Specifically, respondents perceived the following areas as important for the use of intuition: corporate strategy and planning; marketing; public relations; human resource development; and research and development.

Parikh's research is entirely in line with Salton's Organizational Engineering theory. The applications Parikh cites are inherently unstructured in nature and would favor the unpatterned strategies of the Relational Innovator and Reactive Stimulator.

Spitzer and Evans (1997) discuss a meta-study done by Kepner and Tregoe using content experts to: (1) examine the state of problem-solving and decision-making in

business today; (2) conduct a detailed examination of their client base to determine whether their problem-solving and decision-making are effectiveness as that of the best in the world; and (3) interview management experts and researchers, such as Ken Blanchard, Henry Mintzberg, Tom Peters, Peter Senge, Noel Tichy, and Stuart Varney. Kepner and Tregoe had three hypotheses when they began their inquiry:

1. Consistently good decision-makers use a consistent process that differs from mediocre or poor decision-makers.
2. Good decision-makers can describe the process they use.
3. The decision-making process can be codified and taught to others.

Results found the first and third hypotheses were significantly supported, while the second hypothesis was not supported.

As a theorist, Salton is concerned with how human decisions are made both by individuals and groups. Judgmental terms, such as good decision-makers can be seen as inappropriate because the term good depends upon a pre-defined measure.

Joel Kurtzman, former editor of The New York Times business section and The Harvard Business Review, (Ray and Myers, 1986) suggests:

The rational process is linear. It's when you are putting your facts in order and looking at them, weighing them, and making a decision based on the importance you assign each fact. Intuition is looking at the same facts and trying to see a pattern. The patterns aren't always evident because they are not linear. That's where intuition is very valuable. You look at a set of variables, and suddenly it snaps into your mind that there's a pattern. The ability to recognize patterns is intuitive. Rational and intuitive thinking is not mutually exclusive. (p. 177)

The existence of two different types of information processing, one analytical and rational, the other more intuitive and non-rational, have been verified by scientific studies investigating the two hemispheres of the human brain (Ornstein, 1972). Over the past twenty years, this research has made a distinction between the hemispheres of the brain. People are described as either left-brain thinkers, who rely on logic and rationality, or right-brain thinkers, who tend to use intuition and creativity in making decisions--the premise being that each person prefers one style of thinking more than the other, but is not limited to a single style. A position suggests that a balance between the two opposites is the more desirable, either from an individual applications perspective or one using two or more people in a group decision-making process.

Salton's Organizational Engineering theory does not take a position on the biological determinants of human behavior including brain dominance research. However, Salton objects to the position a balance between the two is some kind of ideal or optimal. Salton's Organizational Engineering theory looks at the desirability of a particular kind of decision-making as being determined by the context being addressed. For example, if a decision is required during an operation involving extraction of a brain tumor, it can be argued linear thinking based on tested science is the best strategy. A decision involving the purchase of a forward contract on the commodity exchange may be better served with an intuitive strategy. The idea that there is some kind of common decision-making process integrating both preferences is summarily rejected by the engineering orientation of Salton's Organizational Engineering theory.

Other researchers do agree intuition is not only a personality trait, but also agree the right cerebral hemisphere functions for intuitive choice, while the left hemisphere is analytical (Agor, 1984a, 1984b; Lynch, 1980; Hermann, 1981; and Zdenek, 1983). Ned Hermann's research on creativity in the mid-1970s at General Electric confirmed that different areas of the brain are used for various types of cognitive processing (Talbot, 1989/90). This research was further verified with Hermann Brain Dominance Instrument research (Hermann, 1989).

Thornton (1971) suggests intuition can be differentiated from other forms of cognitive abilities and, in particular, from reasoning. Intuition is also an active mental process found as front-end principles in mathematics and science. Thornton also concludes intuition can be used to learn more about oneself, about others, and about the world. Therefore, Thornton sees intuition as a means of self-awareness, rather than as an approach to explaining organizational functions.

Riggs (1987) studied the use of intuition in management and compares intuitive abilities, management styles, and management types (executive, middle, and lower level managers), the were managers of major corporations in Washington state. Riggs used an early version of Agor's Test Your Management Style questionnaire as well as follow-up telephone interviews with those who scored in the top ten percent on the intuitive scale. Contrary to Agor's previous research, Riggs' results indicate, there are no significant differences for intuitive ability, management style, or management type

between various levels of management. However, consistent with Agor's research, additional information obtained as a result of her telephone interviews reveals (1) managers who scored the highest on the intuitive scale used intuition when making major business decisions, (2) knew they were using intuition, (3) often disguised their intuitive decisions, but (4) considered themselves intuitive decisions-makers.

Riggs offers a weak design protocol, but does serve to reinforce the previously cited view of Cappon's studies attempting to directly address intuition through questionnaires, which are challenged to overcome a reporting bias. Such a data collection challenge may suggest the relative importance of intuition is probably understated as a managerial tool. The other important finding of Riggs concerning the variance of intuition by hierarchical level, is an important aspect of this study's design.

Blackwell (1987) studied a small sample of a higher education population with a questionnaire using measures from Agor's Intuitive Management survey and Goldberg's Are You Intuitive? test, along with questions asking about the frequency of intuitive experiences. Blackwell concludes managers scored higher than non-managers and women score higher than men do. Blackwell also indicates brain organization tentatively suggests a linking to intuition. Furthermore; a balanced style of intuition and reasoning may suggest some relationship to a visionary leadership style.

Catford (1987) tested fifty-seven business professionals using problem-solving models on a survey with a demographic assessment instrument and the Myers-Briggs Type Indicator (MBTI). Catford concludes the MBTI would not be a good indicator for determining what actual problem-solving strategy business professionals will use. Catford's research finds middle and senior management experience intuition in their decision-making processes. Catford finds those comparison scores between senior and middle managers do not appear to factor in the participant's experience with the use of intuition in decision-making situations. Furthermore, she concludes the comparisons of senior and middle managers' high and low degrees of intuitive experiences are proportionate to the sample size studied.

Blackwell's findings reinforce Agor, while challenging Rigg's position on the variance of intuition by hierarchical level position. However, Rigg's position is supported

by the findings of Catford who concluded the senior and middle manager results were in proportion to the sample size versus correlated to their hierarchical position.

Taylor (1988) researched the intuitive decision-making experiences of ten managers using a case analyses and questionnaire. Taylor's research supports the view that middle and senior managers experience intuition in their decision-making processes. Other factors which influence their decision-making are: the quality of their managerial experiences; relationships within their organizations; their rational tendencies and the rational forces in the environment; their intuitive predisposition; and their individual degree of intuitive development. Furthermore, Taylor finds intuition occurs around certain kinds of management decisions involving people judgments, decision-making in a situation where no problem-solving precedent has been established, or around incomplete problem scenarios.

Taylor's findings are consistent with Salton's theory; the strategy being used will tend to be aligned with the issue in question. However, this contradicts Ornstein's (1972) expectation that some kind of overall optimal is to be sought between intuitive and rational methods.

Brown (1990) studied fifty-two school superintendents using the MBTI, as well as on-site observations of four of the superintendents. Of those responding (17 of 52); five were very clearly intuitive, five were clearly intuitive; five were moderately intuitive, and two measured minimally intuitive.

Brown (1993) also researched intuition among advertising agency employees. This study measures intuitive responses to advertisements, both in terms of their private judgment and as a predictor of consumer response. Brown's research reveals 43 percent of the subjects would have made more accurate predictions of consumer response had they merely reported their own intuitive judgments only, rather than attempting to rely on their intuitive judgments and the available research data combined. In fact, another factor which was discussed and brings up another dimension is even being able to tell good from bad [research] data. Brown's (1993) findings are in line with Salton's Organizational Engineering theory expectations. The weakly defined variables and structure of advertising make it an ideal venue for the exercise of the unpatterned strategies of Relational Innovator and Reactive Stimulator. This suggests

the desirability of an implied balance between intuitive and rational methods is not supported.

These findings reinforce the position intuition can be expected to vary by hierarchical level, which argues against some kind of ideal balance as proposed by Ornstein. It also tends to reinforce the findings of Agor, Blackwell, and Salton; while contradicting Riggs and Catford.

Instrumentation

Different instruments are found for measuring intuition as indicated in Table 1.

Table 1
Instruments Measuring Intuition

INSTRUMENT	SOURCE
"Test Your Management Style" also known as "The AIM Survey"	Agor, 1989a
"The Cappon Intuition Profile" also known as "IQ2"	Cappon, 1994
"PSI Game"	Dean, Mihalasky, Ostrander & Schroeder, 1974
"Intuitive Quotient Checklist"	Emery, 1994
"Are You Intuitive"	Goldberg, 1983
"Hermann Brain Dominance Instrument"	Hermann, 1989
"The Keirsey Temperament Sorter"	Keirsey-Bates, 1984
"Myers-Briggs Type Indicator"	Myers-Briggs, 1983
"Questionnaire"	Parikh, 1994
"Personal Style Inventory: Gateway to Personal Flexibility"	Taggart & Taggart-Hausladen, 1993
Problem Solving	Westcott, 1961
"I-Opt™ Survey"	Salton, 1994

The commonality among most of the instruments cited is they are based on psychological theory. The contribution of the Salton's instrument is it is based on information processing theory, an added dimension to the research previously reviewed, none of which is considered in any of the reported research.

The training aspects of Intuition in business have appeared in several forms. Agor (1983b) supports the value of management training programs, which included intuition as well as analytical skills for decision-making that have become an integral part of management education in the 1990s. Universities such as Stanford (Ray and Myers, 1986) and Florida International (Taggart and Taggart-Hausladen, 1993) have incorporated intuition and creativity based courses into their curricula for business students. In fact, Creativity in Business (Ray and Myers, 1986) was based on the Stanford University course of the same name by Ray and Myers (Agor, 1989c). MIT, through a training company called Innovation Associates, founded by Peter Senge, has been training managers on the use of intuition in management (Agor, 1989c). Senge (1990a) also introduced the use of intuition by managers as part of his mental models in his book The Fifth Discipline. Senge's personal mastery mental model relates to the work of Agor (1984a), Mintzberg (1976), and Isenberg (1984) with regard to integrating reason and intuition. Senge (1990a) states:

People with high levels of personal mastery do not set out to integrate reason and intuition. Rather, they achieve it naturally as a by-product of their commitment to use all resources at their disposal. They cannot afford to choose between reason and intuition, or head and heart, any more than they do would choose to walk on one leg or see with one eye. (p. 168)

Senge (1990a) goes on to state that integrating reason and intuition is not a linear process, cause and effect are not close in time and space...obvious solutions will produce more harm than good...and short-term fixes produce long-term problems. He believes rationality and intuition are not diametrically opposed, but they can be used in conjunction with each other, such as being able to convert intuitive thought into rationally testable ideas.

Summary

The literature presented in this chapter focuses on intuition and being used in managerial decision-making processes. Two approaches to the viability of intuition are discussed: one is based on the concept that intuition is potentially available to everyone and can be developed (Vaughan, 1979), and the other that an individual's type is either intuitive or non-intuitive (Jung, 1971).

The literature shows many managers report using intuition, in spite of the deeply rooted practice against non-rational methods (Agor, 1984a, 1984b; Dean, Mihalasky, Ostrander, and Schroeder, 1974; Isaack, 1978; Mintzberg, 1976; and Rowan, 1986). It also suggests the influence of intuition or non-rational thought processes is one which has been neglected as a form of legitimate management understanding. The rational or logical thinking mode characteristic of the scientific management era has been the dominant accepted style in practice.

Research which has been done to indicate and illustrate managers' use of intuition ranges from inferential processes performed with a pre-existing database (Agor, 1986) to acceptance and use of predictive abilities (ESP) (Dean, Mihalasky, Ostrander, and Schroeder, 1974). Even though there has been documentation which indicates the value of the use of intuition (Agor, 1984b, 1986; Dean, Mihalasky, Ostrander, and Schroeder, 1974; Isaack, 1978; Mintzberg, 1976; and Rowan, 1986) in business, there is still a reluctance to readily acknowledge or report its use due to perceived negative reaction (Agor, 1986a, 1986c, and 1986d). Some researchers report, and I believe, successful decision-makers are found to have greater ESP abilities (Cosier and Aplin, 1982; Dean, 1974).

This study, through a comparative analysis of the review of the literature to demonstrates Salton's Organizational Engineering theory can accommodate many divergent positions (e.g., Vaughan, 1979 and Jung, 1971). Salton's research also confirms the position that only a certain portion of the population is expected to be endowed with high levels of intuitive skills (e.g., MacKinnon, 1962; Parikh, 1994; Peavy, 1963; and Thornton, 1971). Salton's Organizational Engineering theory also supports differences in gender and intuition research which can help to resolve issues on whether there is a difference. Finally, the role of intuition in the area of organizational

development is addressed by Salton to resolve the issue of whether intuitive abilities vary by hierarchical levels (e.g., Barnard, 1968; Dean, Mihalasky, Ostrander, and Schroeder 1974; and Riggs, 1987). The purpose of this research is to resolve these opposing positions reported in the literature.

In addition, the survey instrument adds a dimension not heretofore available because of previous reliance on psychological theory and measures. Salton's Organizational Engineering theory relies on information processing and can be seen as adding a dimensionality to the field. In today's ever-changing business environment, application of organizational theorists' views on rational versus non-rational aspects of decision-making becomes even more relevant. Current organizations are characterized by ambiguity, diversity, emerging technologies, and cultural mixes, and are ideal environments for testing the use of intuition. Intuition is important in understanding complex organizations which allow individuals to deal with the inherent uncertainty and complexity (Senge, 1990a). Future decision-making using intuition will have a greater role for individuals in leadership positions (Agor, 1984a). Furthermore, inclusion of intuition in leadership models and development activities is repeatedly recommended by several individuals mentioned in this chapter (Agor, 1984a, 1984b; Dean et al, 1984; Senge, 1990a).

Chapter 3, describes the research design, data collection instrument, and data analysis to be used in this study. The population and related sample for measuring the use of intuition in decision-making are described.

CHAPTER 3

Methodology

The focus of this study is the use of unsystematic strategies by human beings in organized environments. Dr. Salton's Organizational Engineering concepts of unpatterned method and action mode, which produce observable behaviors consistent with the concept of intuition are also used by other researchers in intuition research.

The research question driving this study is:

Do various combinations of method and mode produce results that are consistent with the findings other researchers have attributed to intuition?

This chapter describes the methodology used to examine the research question by constructing hypotheses that can be refuted by data collected in the environments within which intuitive behavior is proposed to operate.

Variables

In Chapter 1, the general theory of Organizational Engineering is outlined. The relevance of Organizational Engineering to intuition research is focused as the use of unpatterned method and the level of action mode.

In Chapter 2, the theorists and researchers who have identified and codified variables associated with intuition are described. This review identified multiple findings which can also be tested using Salton's Organizational Engineering theory. The findings of these earlier theorists can be recast in terms of the large-scale method and mode factors which underlie Salton's theory. Positive findings on these hypotheses will answer the research question and support the use of Salton's Organizational Engineering theory as a foundation for future research and theoretical development.

Relational Innovator Dimension

Hypothesis H_{1o}

Relational Innovator style is not positively correlated with hierarchical position.

Hypothesis H_{1a}

Relational Innovator style is positively correlated with hierarchical position.

The Relational Innovator style is based on the thought mode and will not necessarily display external behavior typically associated with intuition. However, when the unpatterned method is used, this style is given access to the insights, which may arise from the discovery of unexpected relationships. Researchers (Agor, 1986a, 1986b, 1986c, 1986d; Brown, 1990; and Cappon, 1994) find a relationship of intuition to hierarchical position, thus it is hypothesized a positive correlation shall be found between the strength of the Relational Innovator component and organizational level.

The independent variable in Hypothesis 1 is scores on the Relational Innovator scale of the I-Opt™ instrument. The dependent variable is the hierarchical ranking of the respondent. The data are drawn from the hierarchical database of the Organizational Engineering Institute.

Kendall's tau-b test is used to test data about hierarchical position, since it uses an ordinal scale not testable using parametric statistics, which requires normalcy conditions apply to the data. Kendall's tau is a rank-based, non-parametric method, and hence, does not require the use of the normal curve.

Reactive Stimulator Dimension

Hypothesis H_{2o}

The Reactive Stimulator style is not correlated to hierarchical position.

Hypothesis H_{2a}

The Reactive Stimulator style positively correlates to hierarchical position.

The independent variable in Hypothesis 2 is the Reactive Stimulator scale of the I-Opt™ instrument. The dependent variable is the hierarchical ranking of the respondent. The data are drawn from the hierarchical database of the Organizational Engineering Institute.

This hypothesis states the unpatterned method is combined with the action mode. This contrasts with the thought mode of the Relational Innovator in Hypothesis H_{1o} and H_{1a}. A positive finding on this hypothesis confirms the importance of the unpatterned method and its associated intuitive behaviors as a component of executive decision-making. In addition, if positive results are obtained for both Hypothesis 1 and Hypothesis 2, then documented results support the correlation-based argument that the unpatterned method, rather than the mode, is driving the phenomenon.

The same statistical treatment employed for Hypothesis 1 is used to test Hypothesis 2. The finding of a significant difference between organizational levels supports the position the unpatterned method is a component of effective decision-making at higher organizational levels.

Organizational Level

- Hypothesis H_{3o}
The Conservator pattern is not negatively correlated with hierarchical position.
- Hypothesis H_{3a}
The Conservator pattern is negatively correlated with higher hierarchical positions.

If intuitive behaviors are favored at higher organizational levels because the issues confronted are more general and vague, then it should also be true that the lower organizational levels will confront issues of more specificity. In these circumstances, structured methods will be supported as applied to action-based processes at lower organizational levels.

The independent variable for Hypothesis 3 is the Conservator pattern measured by the I-Opt™ instrument and illustrated in Figure 4. This pattern employs a structured method and action mode. The dependent variable is the hierarchical ranking of the respondent. The data are drawn from the hierarchical database of the Organizational Engineering Institute.

This hypothesis examines whether there is a systematic difference within leadership ranks. In other words, first-level management is expected to have greater levels of the Conservator pattern than higher hierarchical levels. This association will be explored using Kendall's tau.

The association is also expected to be visible between managers and non-managers along all of the dimensions of the Conservator pattern as measured by the I-Opt™ instrument. Comparing one group tests this, leaders to another group, non-leaders. Therefore, this test does not involve the rank ordering of position mandated for the use of Kendall's tau. Here, the non-parametric Mann-Whitney test is used to test whether the overall strategic profiles of managers and non-managers differ significantly.

A positive finding both within leadership ranks and between leadership and non-leadership ranks on the Conservator pattern will test whether or not structured methods are conducive to the generation of insight and whether this varied systematically by hierarchical level. In short, the information processing requirements of hierarchical level are likely to permit or preclude the exhibition of insightful behavior.

Relational Innovator/Reactive Stimulator

- Hypothesis H_{4o}
Research & Development professionals will not have higher Changer pattern scores than will Information Technology professionals.
- Hypothesis H_{4a}
Research & Development professionals will have higher Changer pattern scores than will Information Technology professionals.

The basis of these hypotheses is information technology demands rigorous adherence to the structures mandated by the computer. Research and development on the other hand benefits from spontaneously connecting unrelated variables. Therefore, research and development is systematically more intuitive.

The independent variable for Hypothesis 4 is the results of the Changer pattern, illustrated in Figure 4, which is a combination of the Relational Innovator and Reactive Stimulator, as measured by the I-Opt™ instrument for people occupying positions in Research and Development groups. The dependent variable is the patterned strategies (Logical Processor and Hypothetical Analyzer), as measured by the I-Opt™ instrument for people occupying positions in other than Research and Development groups. The data are drawn from the general database of the Organizational Engineering Institute.

The literature review suggested there is an observable difference in intuition based on the functions being performed. By its nature, the Research and Development function favors intuition, because developing new products, processes, and methods involves abandoning, at least to a degree, established structures. If intuitive behavior is being captured by Organizational Engineering's unpatterned method, it is expected the

styles using this unpatterned method are more in evidence in the Research and Development function than in the general population.

A positive finding on this hypothesis supports the thesis that the information-processing model, which underlies Organizational Engineering, is an adequate or at least viable explanation of intuitive behaviors.

Hypothetical Analyzer/Logical Processor

- Hypothesis H_{5o}
Customer Service professionals will not have higher Conservator pattern scores than will the general employee population of organizations.
- Hypothesis H_{5a}
Customer Service professionals will have higher Conservator pattern scores than will the general employee population of organizations.

Hypothesis 5 tests whether the Customer Service function is more prone to use structured methods than are members of the general population. The Customer Service function is typically confined to following strict guidelines in satisfying customer claims and demands. This hypothesis tests whether people who systematically rely less on unpatterned methods are attracted more to Customer Service functions than are those in the general employee population.

The independent variable for Hypothesis 5 is the structured methods of the Conservator pattern, Hypothetical Analyzer and Logical Processor, (Figure 4) as measured by the I-Opt™ instrument for people occupying positions in Customer Service groups. The dependent variables are the scores on structured styles for people occupying positions in occupational areas other than Customer Service. The data are drawn from the general database of the Organizational Engineering Institute.

Hypotheses H_{5o}/H_{5a} use the non-parametric Mann-Whitney test to establish whether there is a statistically significant difference between Customer Service groups and the general population.

A positive finding for Hypothesis H_{5a} supports the proposition that information-processing styles are a determinant of success within a function. If Hypothesis H_{4a} on

Research and Development is also positive, the issue will be triangulated on both sides of the spectrum and, therefore, the inference will be greatly strengthened.

I-OPT™ Instrument

The data collection instrument is the I-Opt™ Survey and is presented in Appendix A. The I-Opt Survey™, also marketed under the name DecideX™, are trademarks of Professional Communications Incorporated. The instrument has been in use since 1991.

Soltysik (2000) tested the validity of the instrumentation, as it is applied to Organizational Engineering along all major dimensions of formal validity theory. The instrument has met all tests of significance in face validity, construct validity, content validity, convergent validity, discriminant validity, concurrent validity, predictive validity, conclusion validity, and reliability. The instrument is found to meet or exceed the generally accepted criteria for significance of $p < .05$. See Appendix B for Summary of Reliability and Validity Findings (Soltysik, 2000).

Of particular interest in this research is content validity. Content validity concerns the degree to which “judgments made on the basis of the instrument are truly appropriate to the underlying theory or concept” (Soltysik, 2000). In other words, high content validity provides assurance the proposed relationship between unpatterned method and action mode and intuitive behavioral displays are captured by this instrumentation.

Using a Nomological Net methodology (Trochim, 1999) Soltysik finds between 84 percent and 92 percent of the statements used in the I-Opt™ Survey can be directly traced back to the underlying theoretical concepts of method and mode. This finding, along with Soltysik’s finding that respondent misunderstanding is improbable, supports this study’s research design and the tests conducted in this study correctly test the relationship between the method and mode as well as the dimensions of intuitive behavior being tested.

Database

This researcher has obtained unrestricted access to primary and archival, unfiltered data, using the I-Opt™ Survey instrument from the Organizational Engineering Institute of Ann Arbor, Michigan. These data exist in a formatted database maintained by the Organizational Engineering Institute in Ann Arbor, Michigan for research purposes by qualified scholars and practitioners in the field. This researcher is permitted (Appendix C) to use this database and is certified as a Level III Certified Organizational Engineer by the Organizational Engineering Institute.

The data used in this research are primary, unfiltered, unprocessed, and have not been screened or summarized for any other purpose. The data consists of raw scores on each of the four dimensions captured by Salton's Organizational Engineering effort, through instrument administration sessions by trained personnel using human subjects completing the I-Opt™ Survey. In addition, the data on group leaders are referenced to specific organizational positions and, as groups, by organization function. While not initially collected for the purposes of this study, the data provide an unbiased look at an extensive body of human subjects with whom to test the hypotheses derived from the research question and literature review.

The Organizational Engineering Institute provided the source data for this dissertation as well as the analysis of groups and teams in actual field situations. The typical procedure involved:

1. An internal Organizational Development/Human Resource professional or an external consultant acted as an agent for the group and contacted the Institute to request an analysis of an individual or a group.
2. The agent distributed and collected the Survey instruments and forwarded them to the Institute either electronically or by physical courier (i.e., mail, FedEx, UPS, etc.).
3. If the agent had access to the software-scoring program, the agent scored the instruments locally and forwarded the results to the Institute.
4. The information provided would normally include the requesting organization's name so it could be incorporated into the final report.
5. The Institute then conducted the analysis and returned the results to

the agent for distribution to the individual participants.

6. In the development of TeamAnalysis™ and LeaderAnalysis™ software, the Institute called back the agent representative to determine the accuracy and effectiveness of the group reports. In this conversation PCI would often (but not always) discover the name of the client company and mission of the group analyzed.
7. The Institute then entered the information from the Survey and the group reports into a Microsoft Excel database for future reference.

The resultant information was divided into two distinct databases: The TeamAnalysis™ database includes the calculated survey results for all individuals included in the various TeamAnalysis™ surveys the Institute has conducted. The individual survey results are identified by the group within which they participated. The LeaderAnalysis™ database includes the calculated survey results for all individuals included in the various TeamAnalysis™ surveys PCI conducted. Because a TeamAnalysis™ is a precondition for a LeaderAnalysis™, all of the individuals identified in the LeaderAnalysis™ database are also included in the TeamAnalysis™ database. Team Analysis™ and Leader Analysis™ are both trademarks of Professional Communication Incorporated.

TeamAnalysis™ does not require the identification of the leader, but rather treats all participants as equally influential. The LeaderAnalysis™ requires the identification of a group leader, and the LeaderAnalysis™ database includes the hierarchical positioning of the participants. PCI attempts to collect the title of the group leader for inclusion in the database. This effort was successful in most, but not all cases. The title collected for each leader is the usual title used in the firm or organization.

The unedited information in the database has been systematically collected from November 1994 to January 2001 and contains information on 9034 individuals who used the I-Opt™ instrument and whose scores are contained in the TeamAnalysis™ database. This researcher obtained access to the database on January 30, 2001. The data are collected in conjunction with performing various group-based analyses and are organized by the individual groups for which studies and analyses were performed. The groups represent a broad range of activities illustrated by the sampling of group names in Table 2 (Soltysik, 2000).

Table 2
Examples of Work Groups in the Database

Executive Committee	QS 9000 Team
Surgical Team	Institute Leadership Team
University Housing	Telemarketing Developpt Group
Supermarket Operations	Telephone Customer Service
"Business Optimization" Project Team	Board of Directors
Production & Surveillance Team	Warehousing and Distribution
Lease & Contract Administration	Payroll Dept
Central Seismic Processing	Proj. Mgt Consultants Team
Field Safety Team	Plant Management
Accounting & Scheduling	Chemical Research Team
Business Analysis	New Product Committee
Midwest Management Team	Megastore Team
Human Resources	Creative Services
Body Interior Management	Board of Commissioners
Materials Technology Team	Geosciences Admin. Team
Risk Management	Architectural. Engineering
Executive Team	Custom Mfg Team
Solar Team	EEOC Operating Office
Product Marketing Managers Team	Museum Sr. Staff
Electric Regulatory Affairs	Adult Education Faculty
Dept. 470 Packers	Vice President Ops Team
Federal Tax Team	Org.Effectiveness Group
Strategy and Plans	Marine Construction Team
Solvents Team	Publications Staff
Legal Staff	Retail Clothing Store
Union Management	Radio Station Selling Team
Ice Cream Sales and Marketing	Plant Managers
Diversity Center	Secretarial Team
Systems Integration Team	Claims Processing Team
Client/Vendor Team	"As-Is" Team
Sensor Engineering Team	Rate Investigations Unit

In addition to the group-based data, the Organizational Engineering Institute began collecting hierarchically based data in 1996. The LeaderAnalysis™ database consists of the raw I-Opt™ Survey scores for groups organized with defined hierarchical structures. The LeaderAnalysis™ (hierarchical) database is drawn from the same population as the TeamAnalysis™ database, and therefore has the same industries as represented above within it. This database also contains information on groups with the leader and subordinates identified, where applicable. In many cases, the rank of the leader is identified because of requested analysis. A sampling of the titles in the database include President, Managing Partner, Senior Vice President, Chief Operating Officer, Vice President, Owner, General Manager, Director, Manager, and Supervisor. Appendix D contains the classifications along with coding, definitions, and number of individuals included in the hierarchical levels used by this study.

Leadership of a group does not necessarily imply high position within a firm's hierarchy. For example, some groups are led by secretaries and administrative

assistants and others by the CEO of the firms. There are also situations in which people on a team have higher rank within the firm than does the leader. For example, one New Product Committee is headed by the VP of R&D and the President of the firm is a committee member. However, in most cases, the leader of a group has higher or at least equal rank within the firm as the participants.

The primary data, made available to this researcher, are collected across a wide variety of industries primarily located in the United States. A sampling of the industries included is given in Table 3 (Soltysik, 2000).

Table 3
Types of Industries/Areas Included in Database

Insurance	Hospitals
Manufacturing	Banking
Electrical Utilities	Gas Utilities
Telecommunications	Nursing Homes
Marketing	Warehousing and Distribution
Sales	Tool & Die
Laboratories	Federal Agencies
State Government	City Government
Fast Food Chains	Chemicals
Consultants	Non-Profit Organizations
Universities	Middle Schools
Construction	Charitable Organizations
Religious Organizations	Temporary Services
Waste Management	Aerospace
Radio	Newspapers
Retail Stores	Engineering Firms
Fabrics	Publishing
Advertising	Design
Information Technology	Housing Authorities
Joint Ventures	Accounting Firms
Pharmaceuticals	Automobile OEM
Grocery Chains	Printers
Oil Exploration/Distribution	Logistics (e.g., Trucking)
Training	Greeting Cards
Remanufacturing	Appliances

Technically, the data in the database are considered a purposive rather than a truly random sample. However, the size of the sample, the wide range of functions represented, and the variety of industries involved indicate the findings of this study are reasonably considered representative of the use of intuition, as defined herein within organized environments in the United States (Soltysik, 2000). In summary, the databases used in this analysis are unique to scholarly research in that they are:

- Large in absolute size
- Sourced from a wide variety of different organizations
- Drawn from groups which are actually functioning in the “real world”
- Collected independently by a wide variety of agents
- Catalogued and collected from an independent source
- Freed of much unintentional bias due to independent researcher and data source.

These factors suggest more confidence may be placed in the results of this dissertation than might be appropriately attributed to typical scholarly research in this area.

Subjects

The subject companies in this study include firms of all sizes. Participants include the most senior levels of Fortune 100 firms as well as those from entrepreneurial startups. The names of the firms were disclosed to this researcher; however, strict confidentiality provisions in the data access agreement require the protection of privacy to the contributing participant organizations. Similarly, the names of the individuals participating were made available to this researcher, but are covered under the same confidentiality agreement as their organizations. The individuals represent a sampling of various nationalities and ethnic groups, as well as both genders, which information is coded to protect all participants.

On the basis of a personal examination of the data, this researcher, along with Organizational Engineering Institute staff, is able to assert the data are of high integrity. The unedited, primary nature of the data provides assurance the data are not biased by unstated assumptions or unintended obfuscation.

Population

As indicated in the database section of this chapter, the population being tested is reasonably inferred to be a representative sample of the people participating in organized environments within the United State of America.

A majority of the sample is drawn from profit-making firms. However, the sample also includes representatives of non-profit associations, institutions such as universities, and governmental entities at local, state and federal levels. Therefore, the findings of

this study may be reasonably considered representative of the use of intuition as used by those in a wide variety of venues.

It is also worth noting the groups represented in this research are real entities functioning in the real world, and directed at the satisfaction of real needs as perceived by the organizations for which they are employed. They are not simulated entities and, therefore, the findings can be considered representative of the actual functioning of intuition as it occurs in the day-to-day operation of the organizational entities which are representative of the population of the United States.

Instrument Design

The study includes quantitative information gathered by the I-Opt™ Survey instrument. An identical instrument is also available under the tradename DecideX™ and is distributed by HRD Press of Amherst, MA. A copy of the instrument is included in Appendix A. I-Opt™ and DecideX™ are both trademarks of Professional Communications Incorporated.

The instrument uses a proprietary algorithm to produce measurements of the dimensions identified in Chapter 1. The structure of the Survey questionnaire is transparent. There are 24 sets of responses, organized as forced choice selections. Each set of responses contains four options from which the respondent must select a single response otherwise known as a forced choice. Each of the four options represents a different position on the underlying method and mode scale. By making this choice, the respondent is expressing his or her preferred position on these underlying scales. The methodology is fully described by Salton (1996, 2000).

The I-Opt™ instrument, which underlies the database used in this study is of a forced choice nature. Many psychometricians have argued ipsative questionnaires cannot be used for interpersonal comparison. This, of course, does not mean they are right, it only means they hold a different opinion. A basis for the ipsative argument is a forced choice does not tell how much a person favors one response over another; just that one is favored. For example, people might be offered a choice between ice cream

and candy. One person may choose candy, but really favors it only a little more than ice cream. Another person might choose ice cream and favors it massively over candy. Consolidating many such responses, the psychometricians argue, can (but not necessarily will) lead to distorted results.

Recent research (Saville and Willson, 1991) has called into question the practical value of the psychometricians' arguments. There now seems to be good evidence people do show behavioral consistency across situations. These consistencies are not just illusory by-products of the language system. There are very good reasons for using ipsative scaling. Saville and Willson assert ipsative scaling is used for two main reasons: better control of response sets and to reflect the position life, is about choices.

Using theoretical arguments based on the laws of large numbers, as well as empirical tests and simulations based on various forms of the Master Personal Profile test, Karpatschof and Elkjaer (2000) have shown:

The present analysis does not just state that there is correspondence but that the choices made in the magnitude and ipsative version of the test are as close to one another as can be expected according to the psychometric model.

And they continue:

We have thus demonstrated two things in our study:

1. Choice behavior in normative and ipsative tasks is the same (defined by identical preference).
2. Assessments made in the normative and ipsative versions are the same. (p.36).

The Karpatschof and Elkjaer study lends some confidence the results of this research will not be jeopardized by ipsative considerations. Another, perhaps more compelling reason, lies in the validity study of the I-Opt™ instrumentation by Soltysik (2000). This study tested the instrumentation against all eight recognized tests of validity including predictive validity (Soltysik, 2000). If ipsative considerations were a contaminant it is unlikely the strengths reported in all of the remaining validity tests could have been achieved at the high values reported. Furthermore, Soltysik's validity study addressed group effects with similar positive results. Difficulties arising from ipsative consolidation effects, if they existed, would have been revealed there, but in fact, were not.

The conduct of an ipsative analysis relies on the availability of the individual responses to each of the questions in the instrument used; in this case, I-Opt™. The Institute of Organizational Engineering has files of the individual questionnaires in paper form. However, access to these data do not fall within the scope of the agreements between the author of this dissertation and the Institute. Rather, access is only provided to scores generated by these instruments. Therefore, an explicit test of the exact ipsative characteristics of the I-Opt™ instrumentation will not be conducted as part of this research. However, the above citations provide confidence the results of this research can be relied upon and the ipsative threat is not present.

In summary, the instrument is reasonably straightforward and has been widely tested in actual operating situations. It has been consistently applied over long periods of time and can be considered a stable, well-recognized instrument.

Validity and Reliability of the Instrument

As noted in the database section of this chapter, the I-Opt™ instrument has been validated along all recognized dimensions of validity. An extensive study using the Organizational Engineering Institute database was conducted in 1999 and published by Soltysik (2000). Soltysik's study considers validation of both the I-Opt™ instrument and the methodology used to consolidate individuals to obtain representation of entire groups. For purposes of this work, only the validation of the instrument itself at the individual level is of concern. Soltysik covered all academically recognized forms of validation in his study. Because the scope of the effort is extensive, Soltysik drew on various data elements. For tests of validity involving direct comparisons of scorings along various dimensions, Soltysik draws on the unedited database of the Organizational Engineering Institute. For all tests of this character, the results meet or exceed the academically accepted standards of $p < .05$ significance or better.

This study, using established, well-recognized statistical procedures examines each of the hypothesis statements. However, in his validation research, Soltysik (2000) finds certain data elements do not meet the normality assumptions required by parametric tests, such as the t-test and analysis of variance (ANOVA). Where this occurs, non-parametric statistics are employed to test the hypothesis.

Certain tests, such as face validity, do not lend themselves to inferences which could be drawn from the numerical database. For these, Soltysik relies upon an expert panel of 50 people who had experience using the instrument. This very large panel had members with high educational qualifications, many of whom had operational responsibilities in the area of organizational development. A summary of the qualifications of panel members is presented in Tables 4 through 6 (Soltysik, 2000).

Table 4
Organizational Distribution of Experts

Universities	2	4%
Corporations	30	61%
State/Federal Agencies	4	8%
Consulting Firms	13	27%
TOTAL	49	100%

Table 5
Occupational Positions of Experts

Corporate Officers (VP and above)	2	4%
Directors/ Managers	24	48%
Professionals	10	20%
Consultants	14	28%
Total	50	100%

Table 6
Educational Achievements of Experts

Ph.D.	5	10%
Masters Degree	32	64%
Bachelors Degree	9	18%
Some College	4	8%
Total	50	100%

In cases involving the individual instrument (the matter of interest in this research), the members of the expert panel validated the element being tested with 99% agreement among themselves (Soltysik, 2000).

Soltysik (2000) also tested the reliability of the I-Opt™ instrument by applying a variation of the parallel form methodology to data from the years 1994 through 1999. The test offered 15 independent opportunities to reject the null hypothesis and thereby call into question the validity of the instrument. The instrument passed all 15 tests as well as the overall test. Soltysik (2000) states this provides strong evidence of the reliability of the survey instrument.

Data Analysis Environment

The data currently exist in electronically retrievable form. This researcher will input these data to a Hewlett Packard Kayak workstation computer for processing. Statistical procedures will be processed using SPSS – version 8.0 for Windows.

Summary

Chapter 3 describes the methodology used in this study. It outlines the survey process, the database, the subjects, the instrument, the hypotheses tested, and the analysis procedures. Reliability and validity studies concerning the selected instrument are also presented both in this chapter and in Chapter 2. Chapter 4 discusses the results of this study and examines procedure.

Chapter 4

Analysis and Presentation of Findings

The research question is tested by five interrelated hypotheses. Three hypotheses are designed to examine both the Reactive Stimulator and Relational Innovator style components of the proposed relationship to hierarchy, separately and then together. In addition, two separate hypotheses are designed as crosschecks of the proposed underlying relationship. These two hypotheses test functional areas-- Research & Development, Information Technology and Customer Service--for the relative level of intuition required to discharge the functional responsibilities effectively. The specific hypotheses and the results are:

Hypothesis One

This study proposes the strategic style of Relational Innovator (unpatterned method, thought mode) is associated with hierarchical position, otherwise known as organizational rank. Specifically, the hypothesis is stated as:

- H_{10} : Relational Innovator style is not positively correlated with hierarchical position.
- H_{1a} : Relational Innovator style is positively correlated with hierarchical position.

Kendall's tau-b is applied to an extract LeaderAnalysis™ database consisting of leaders identified by their organizational position. Tau-b (rather than "a") is used as the relevant statistic because it accommodates tied scores which may be present in the data. The 1-tail option is chosen because the hypothesis proposes a specific direction for the relationship. The results of the application of the test statistic are presented in Table 7. The null hypothesis is rejected at a significance level of $p < .001$, clearly superior to the $p < .05$ level typically accepted as a standard in the field. The ".000" level is an artifact of the SPSS system, only reporting to three decimal places.

Table 7
 Statistical Results of Hypothesis 1
 Relation of Hierarchical and Relational Innovator Levels

Correlations					
Kendall's tau_b	Code	Correlation Coefficient	Code	RI	
		Sig. (1 tailed)			-.157**
		N	438	438	
	RI	Correlation Coefficient	-.157**	1.000	
		Sig. (1 tailed)	.000		
		N	438	438	

** Correlation is significant at the .01 level (1-tailed)

Table 7 reports a negative correlation, rather than the positive one proposed in the hypothesis. This is a result of the method used to code the organizational rank. A “0” is assigned to the CEO and Presidents, “1” to Vice-Presidents, “2” to managers and a “3” to the Supervisors. Therefore the direction of correlation is reversed in the report. In other words, the correlation coefficient is saying the lower the code (i.e., the higher the rank), the higher the Relational Innovator score. This is as hypothesized. Examining the graphics, produced by the statistical analysis presented in Figures 6A and 6B, illustrates the phenomenon. The “stair step” nature of the graphics lends visual evidence to the correspondence of the Relational Innovator strategic style to hierarchical position.

In summary, Hypothesis H_{1o} is rejected, and the alternative H_{1a} is accepted. The evidence strongly suggests a positive and significant correlation between organizational rank and the presence of a Relational Innovator strategic style.

Figure 6A
Hypothesis 1: Median Scores by Hierarchical Rank

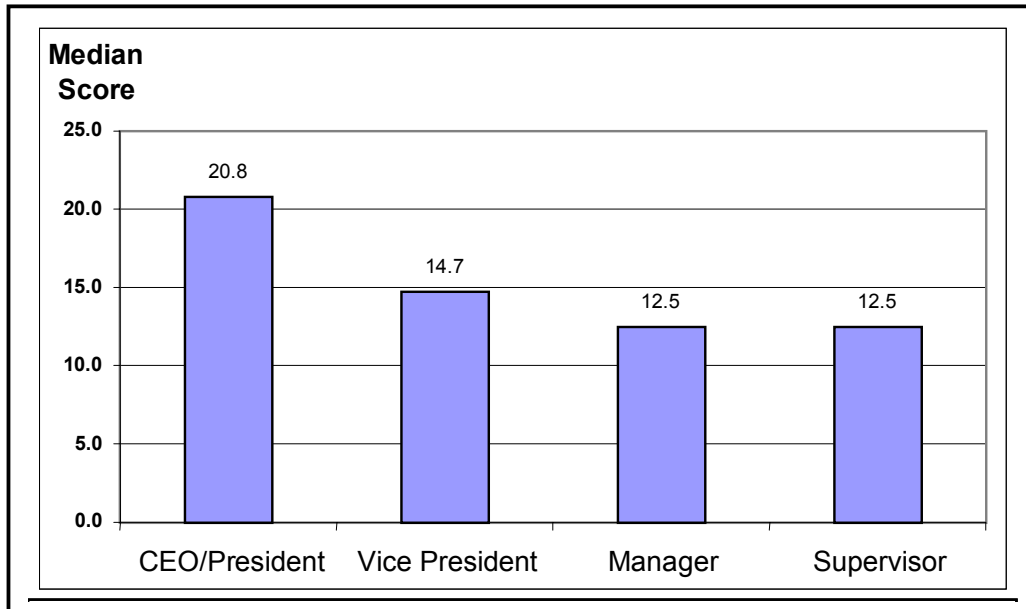
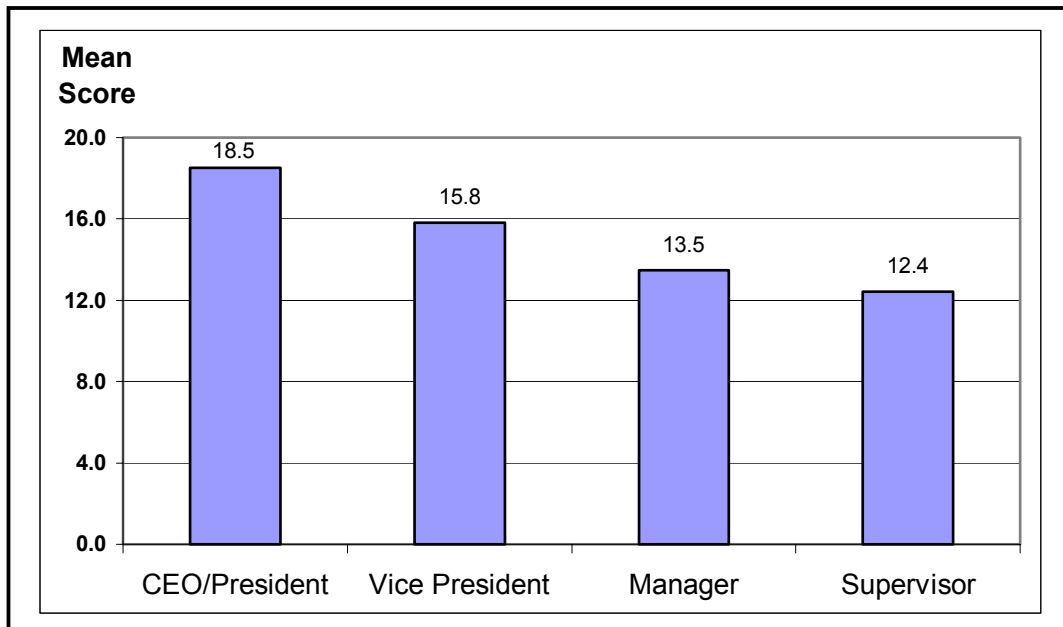


Figure 6B
Hypothesis 1: Mean Scores by Hierarchical Rank



Hypothesis Two

This hypothesis proposes the strategic style of Reactive Stimulator (unpatterned method, action mode) is associated with hierarchical position, otherwise known as organizational rank. Specifically, the hypothesis is stated as:

- Hypothesis H₂₀: The Reactive Stimulator style is not correlated to hierarchical position.
- Hypothesis H_{2a}: The Reactive Stimulator style positively correlates to hierarchical position.

Kendall's tau-b is again applied to the LeaderAnalysis™ database, which has leaders identified by their organizational position. The results of the application of the test statistic are presented in Table 8. The null hypothesis is not rejected, because the significance level of $p = .305$ exceeds the traditional standard of $p < .05$.

Table 8
Statistical Results of Hypothesis 2
Relation of Hierarchical and Reactive Stimulator Levels

Correlations				
			Code	RS
Kendall's tau_b	Code	Correlation Coefficient	1.000	-.019
		Sig. (1 tailed)		.305
		N	438	438
	RS	Correlation Coefficient	-.019	1.000
		Sig. (1 tailed)	.305	
		N	438	438

This finding is unexpected and is clearly demonstrated by the graphics generated by SPSS as presented in Figures 7A and 7B. Figures 7A and 7B indicate the possibility of the expected association, but not clearly enough to validate a significant statistical judgment.

This analysis explores the relationship between Reactive Stimulator and organizational rank through a supplemental evaluation. Within leadership positions, Reactive Stimulator scores are not significantly correlated with rank. However, participation in leadership is itself a rank relative to the remainder of the organizational population. In other words, being designated a leader is of a higher rank than not carrying such a designation.

To test this form of organizational ranking, the various levels of leadership are consolidated, and this aggregate is compared to the overall population in the TeamAnalysis™ database. The null hypothesis in this comparison is the exact equivalent of H_{20} , except the nature of “hierarchical position” is redefined as all hierarchical ranks combined versus the remainder of the population in the database.

Figure 7A
Hypothesis 2: Median Scores by Hierarchical Rank

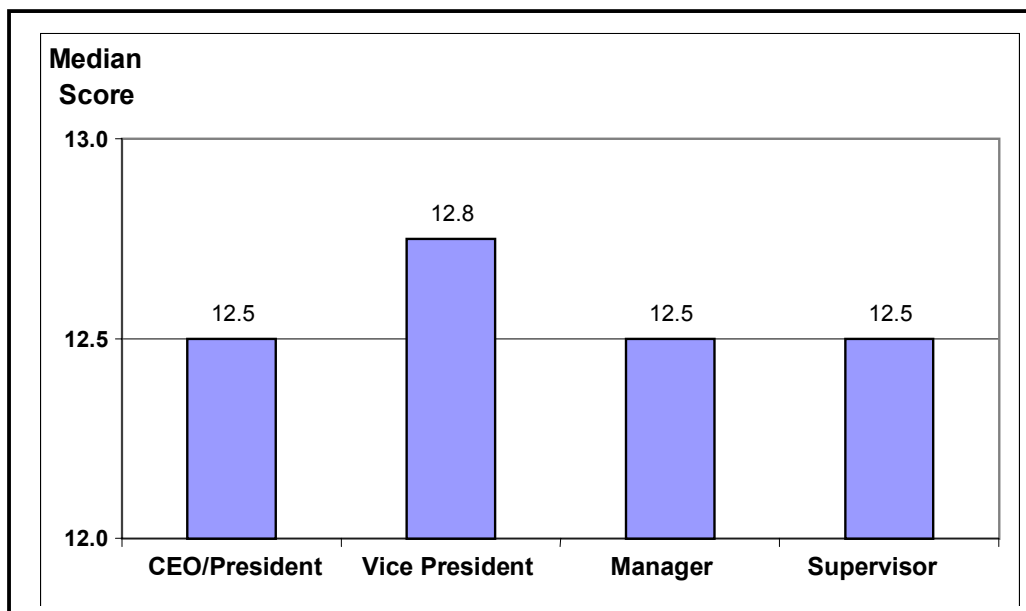
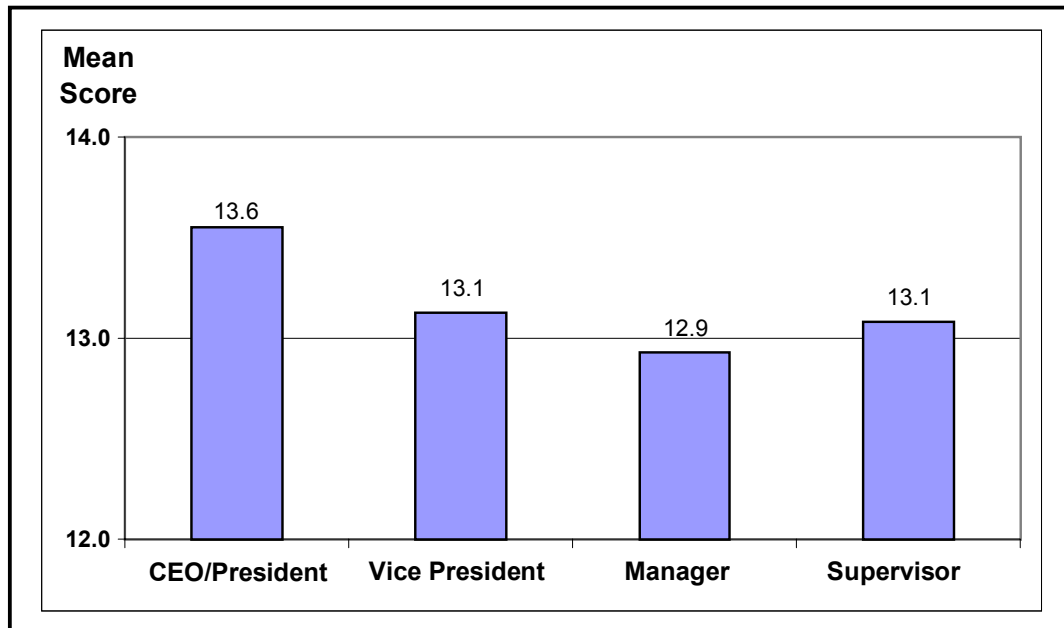


Figure 7B
Hypothesis 2: Mean Scores by Hierarchical Rank



The non-parametric Mann-Whitney test is applied to the two populations. “The Mann-Whitney test is the most popular of the two-independent sample tests. It is equivalent to the Wilcoxon rank sum test and the Kruskal Wallis test for two groups. Mann-Whitney tests that two sampled populations are equivalent in location.” (SPSS, Help Index). Table 9 displays the results of this analysis.

The 2-tail test is automatically provided by SPSS as a part of the Mann-Whitney test. The results indicate the null hypothesis is rejected at a significance level of $p < .001$, clearly superior to the $p < .05$ level typically accepted as a standard in the field. Because the hypothesis indicates direction, the 1-tail test would be more appropriate; however, the 1-tailed significance level for a test is always less than or equal to the 2-tailed level. In other words, the 2-tailed test is at best equal to and most likely more stringent than the 1-tail.

Table 9
Mann-Whitney Test Results of Hypothesis 2a
Leaders versus the Population in Reactive Stimulator Score

Ranks				
	Leadership	N	Mean Rank	Sum of Ranks
RS	Population	8596	4457.46	38316352.00
	Leaders	438	5695.77	2494745.50
	Total	9034		

Test Statistics	
	RS
Mann-Whitney U	1366443.500
Wilcoxon W	38316348.000
Z	-9.700
Asymp. Sig. (2-tailed)	.000

Kirk (1982) states “an experimenter is less likely to reject a false null hypothesis with a two-tailed test than with a one-tailed test”. The direction and magnitude of the association between rank and leader/non-leader organizational status can be inferred from an examination of the descriptive statistics, as presented in Tables 10A and 10B. The Reactive Stimulator scores of people in leadership positions far exceed those of people in non-leadership roles in both median and mean.

Table 10A
Hypothesis 2: Leader Median and Mean Reactive Stimulator Results

	N	Median	Mean	Std. Deviation
RS	438	12.5000	13.0241	6.5010

Table 10B
Hypothesis 2: Population Median and Mean Reactive Stimulator Results

	N	Median	Mean	Std. Deviation
RS	8596	8.3333	9.9286	6.4857

These results suggest there is a threshold condition prevailing. In other words, leaders demonstrate more Reactive Stimulator style than the non-leader population. However, once the threshold is reached, there is not a need to forever increase levels of Reactive Stimulator, as one rises in the leadership hierarchy. This condition is probably due to the fact that, in order to be selected for leadership, an individual must somehow stand out within the general employee population. The Reactive Stimulator strategy is ideal for this purpose, because fast responses are characteristically displayed by this style in confronting unusual situations (Salton, 2000; Salton and Fields, 1999).

This style calls attention to an individual and increases the probability they will demonstrate leader behaviors, and therefore of their being considered and/or selected for possible leadership roles/positions.

In summary, hypothesis H₂₀ is rejected, and the alternative H_{2a} is accepted with the proviso that organizational rank is defined only as leadership versus non-leadership position. The evidence suggests there is a positive and significant correlation between organizational rank and the presence of a Reactive Stimulator strategic style.

Hypothesis Three

This hypothesis proposes the Conservator strategic pattern is negatively associated with organizational rank. Specifically, the hypothesis is stated as:

- Hypothesis H₃₀: The Conservator pattern is not negatively correlated with hierarchical position.
- Hypothesis H_{3a}: The Conservator pattern is negatively correlated with higher hierarchical position.

Kendall's tau-b is applied to an extract of the LeaderAnalysis™ database, which displays leaders identified by their organizational position. The results of the application

using this test statistic are presented in Table 11. The null hypothesis is rejected at a significance level of $p < .001$, again clearly superior to the $p < .05$ level typically accepted as a standard in the field.

Table 11
 Non-Parametric Statistical Results of Hypothesis 3
 Relation of Hierarchical Position to Conservator Pattern Levels

Correlations				
			Code	RS
Kendall's tau_b	Hierarchical Position	Correlation Coefficient	1.000	.127**
		Sig. (1 tailed)		.000
		N	438	438
	Conservator Pattern	Correlation Coefficient	.127**	1.000
		Sig. (1 tailed)	.000	
		N	438	438
**Correlation is significant at the .01 level (1-tailed)				

Table 11 reports a positive correlation, rather than the negative one proposed in H_{30} . This is an artifact of the method used to code the organizational rank. A "0" is assigned to the CEO and Presidents, "1" to Vice-Presidents, "2" to managers and "3" to Supervisors. Therefore the direction of correlation is reversed in the report. In other words, the correlation coefficient is saying the higher the code (i.e., the lower the rank), the higher the Conservator pattern score. This is as hypothesized. Examining the graphics produced by the SPSS system, as displayed in Figure 8A and 8B, one readily recognizes this phenomenon. The "stair step" nature of the graphics clearly demonstrates the correlation of the Conservator pattern to lower organizational position.

Figure 8A
Hypothesis 3: Median Scores by Hierarchical Rank

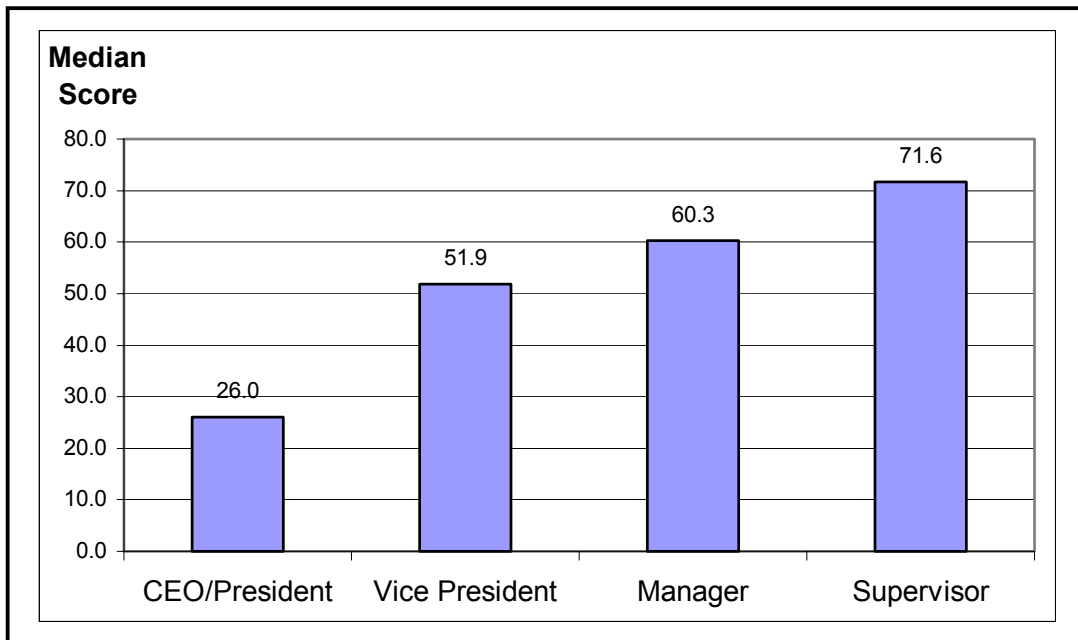
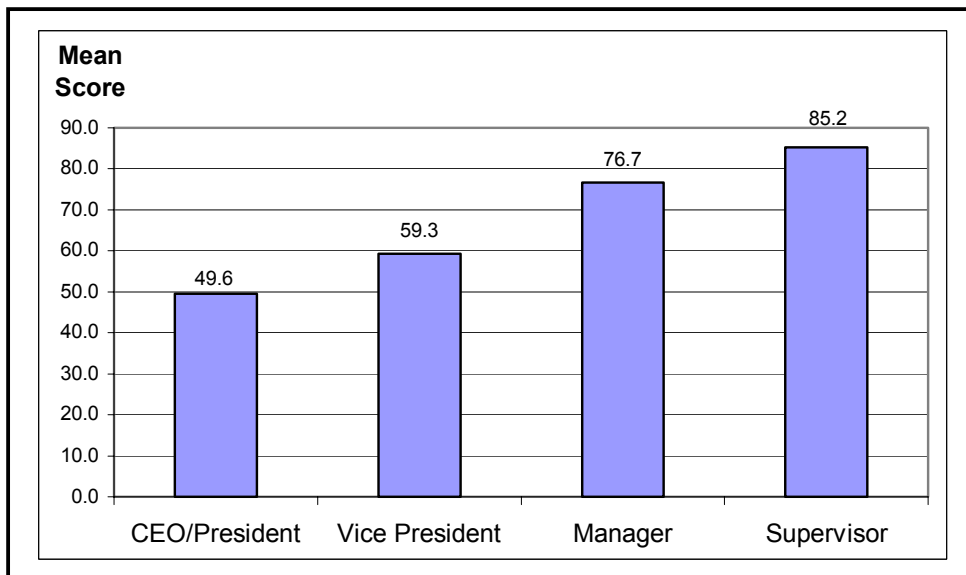


Figure 8B
Hypothesis 3: Mean Scores by Hierarchical Rank



Hypothesis 3 also suggests the Conservator pattern scores of leaders should be significantly lower than the Conservator pattern scores of non-leaders. To test this form of organizational ranking, the various levels of leadership are consolidated and compared to the overall population in the TeamAnalysis™ database using the Mann-Whitney test, the results are presented in Table 12.

Table 12
Mann-Whitney Statistical Results of Hypothesis 3
Leaders versus Population in Conservator Pattern Levels

Ranks				
	Leadership	N	Mean Rank	Sum of Ranks
Conservator	Population	8596	4587.46	39433788.00
	Leaders	438	3144.53	1377304.50
	Total	9034		

Test Statistics	
	Conservator
Mann-Whitney U	1281163.500
Wilcoxon W	1377304.500
Z	-11.295
Asymp. Sig. (2-tailed)	.000

The Mann-Whitney test requires identified dispersions of the two populations being compared. In the validity study associated with the I-Opt™ instrumentation (Soltysik, 2000), the Ansari-Bradley test is used to confirm this condition. SPSS, however, does not contain the Ansari-Bradley test and, therefore, this condition could not be explicitly tested. However the Median test, while weaker than the Mann-Whitney test, does not require an equal dispersion of the two groups. Therefore, the Median test was applied to the data to indirectly eliminate this consideration. The results are presented in Table 13.

Table 13
 Median Test Statistical Results of Hypothesis 3
 Leaders versus Population in Conservator Pattern Levels

Frequencies			
		Population	Leaders
Conservator	> Median	4385	129
	<= Median	4211	309

Test Statistics		
		Conservator
N		9034
Median		97.5000
Chi-Square		77.491
df		1
Asymp. Sig.		.000
Yates' Continuity Correction	Chi-Square	76.631
	df	1
	Asymp. Sig.	.000

Again, the results of the application of the test statistic suggest the null hypothesis is rejected at a significance level of $p < .001$. Given this confirmation, it is reasonable to assume the condition of equal dispersion within population groups does not threaten the findings.

The direction and magnitude of the association between leadership and non-leadership ranks is inferred from an examination of the descriptive statistics presented in Tables 14A and 14B. The scores of people in a non-leadership position far exceed those of people in leadership roles in median values.

Table 14A
Hypothesis 3: Population Conservator Pattern
Descriptive Statistics

	N	Median	Mean	Std. Deviation
Conservator	8596	97.7600	109.5514	71.2989

Table 14B
Hypothesis 3: Leader Conservator Pattern
Descriptive Statistic

	N	Median	Mean	Std. Deviation
Conservator	438	52.0833	72.0605	61.0831

This correlation is perhaps more vividly demonstrated in the graphics provided within the SPSS program, presented in Figures 9A and 9B.

Figure 9A
Hypothesis 3: Median Scores by Population and Leader

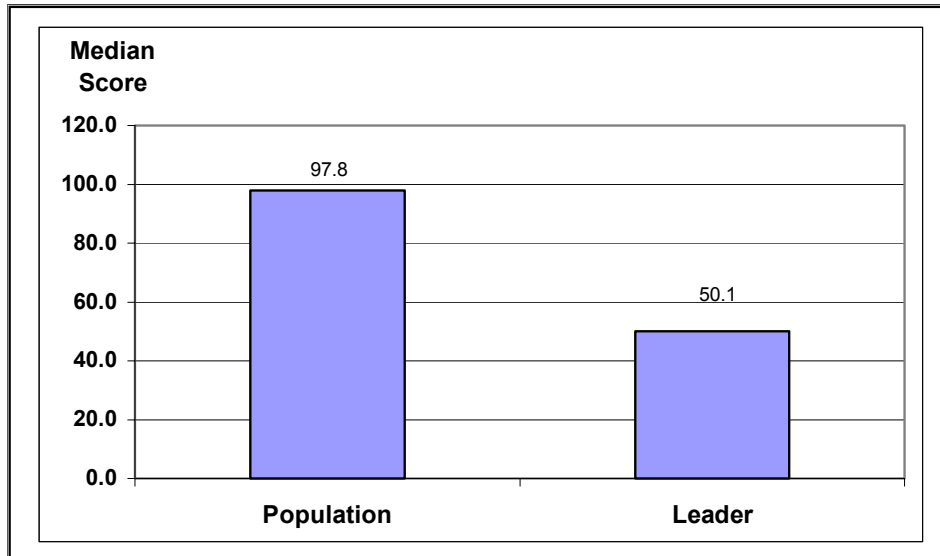
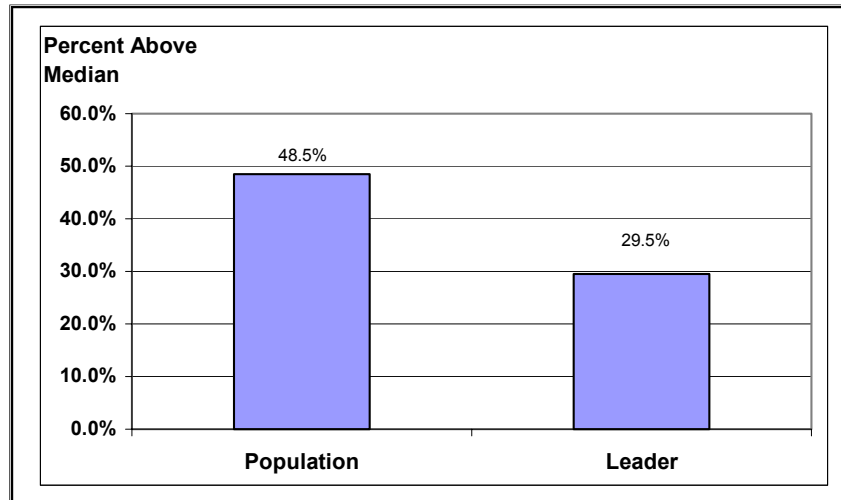


Figure 9B
Hypothesis 3: Percent of Cases above Median by Population and Leader



In summary, Hypothesis H_{3o} is rejected, while H_{3a} is accepted. The evidence suggests Conservator patterns are negatively correlated with hierarchical position within leadership ranks. Also, the evidence indicates there is a negative correlation between leaders and non-leaders along the Conservator pattern. All of these results are obtained at very high levels of statistical significance, namely $p < .001$.

Hypothesis Four

This hypothesis proposes the Changer strategic pattern is positively associated with organizational roles, which demand insightful processes. Specifically, the hypothesis is stated as:

- Hypothesis H_{4o}: Research & Development professionals will not have higher Changer pattern scores than will Information Technology professionals.
- Hypothesis H_{4a}: Research & Development professionals will have higher Changer pattern scores than will Information Technology professionals.

To test this hypothesis, organizational units clearly identifiable as Research and Development (R & D) related are extracted from the TeamAnalysis™ database. A similar process is performed for groups with an Information Technology (IT) orientation. The two groups are then compared using a Mann-Whitney test. The results are presented in Table 15.

Table 15
Mann-Whitney Statistical Results of Hypothesis 4
Changer Comparison of Research & Development and Information Technology

Ranks				
	Function	N	Mean Rank	Sum of Ranks
Changer	IT	320	192.66	61650.50
	R&D	93	256.35	23840.500
	Total	413		

Test Statistics	
	Changer
Mann-Whitney U	10290.500
Wilcoxon W	61650.500
Z	-4.530
Asymp. Sig. (2-tailed)	.000

The results of the application of the test statistic suggest the null hypothesis is rejected at a significance level of $p < .001$, again superior to the $p < .05$ level typically accepted as a standard in the field. It should be noted the Mann-Whitney test (as well as the Median test) automatically reports out as a 2-tail test in SPSS. The hypothesis indicates a direction, therefore making a 1-tail test more appropriate even though, the 2-tail is more rigorous than the 1-tail. Therefore, application of the 2-tail test represents no threat to the conclusions.

The Mann-Whitney test requires the dispersions of the two populations being compared be identical. In the validity study associated with the I-Opt™ instrumentation, the Ansari-Bradley test was used to confirm this condition (Soltysik, 2000). SPSS, however, does not contain the Ansari-Bradley statistic, and therefore, this condition could not be explicitly tested. However the Median test, while weaker than the Mann-Whitney test, does not require equal dispersion. Therefore, the Median test was applied

to the data to indirectly eliminate this consideration. The results are presented in Table 16.

Table 16
Median Test Statistical Results of Hypothesis 4
Changer Pattern Comparison of Information Technology and Research & Development
Functions

Frequencies			
		IT	R&D
Changer	> Median	144	62
	<= Median	176	31

Test Statistics		Changer
N		413
Median		52.6050
Chi-Square		13.531
df		1
Asymp. Sig.		.000

Again, the results of the application of the test statistic suggest the null hypothesis is rejected at a significance level of $p < .001$. Given this confirmation, it is reasonable to presume the assumption of equal dispersion within population groups does not threaten the findings.

The direction and magnitude of the association between Changer pattern scores concerning Research & Development (R&D) and Information Technology (IT) status can be inferred from an examination of the descriptive statistics as presented in Tables 17A and 17B. The scores of subjects holding an R&D position far exceed people in IT roles in mean values.

Table 17A
Hypothesis 4: Mean Research & Development Changer Pattern Results
Descriptive Statistics

	N	Mean	Std. Deviation
Changer	93	88.6144	59.7600

Table 17B
Hypothesis 4: Mean Information Technology Changer Pattern Results
Descriptive Statistics

	N	Mean	Std. Deviation
Changer	320	60.4469	56.2968

This correlation is perhaps more vividly demonstrated in the graphics provided within the SPSS program, as presented in Figures 10A through 10C.

Figure 10A
Hypothesis 4: Changer Pattern Median Scores by Information Technology and Research & Development

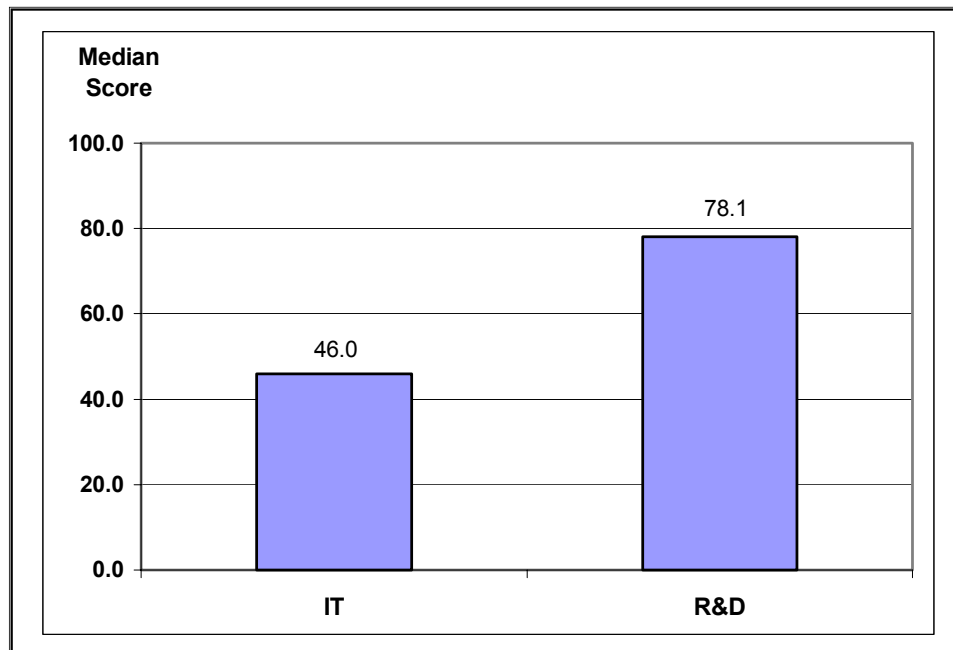


Figure 10B
Hypothesis 4: Changer Pattern Percent of Cases above Median by Information Technology and Research & Development

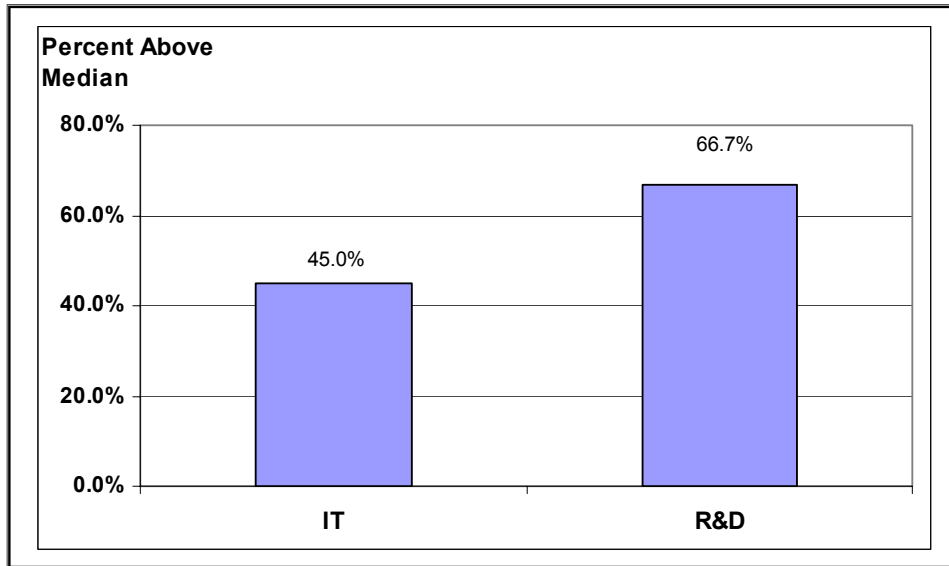
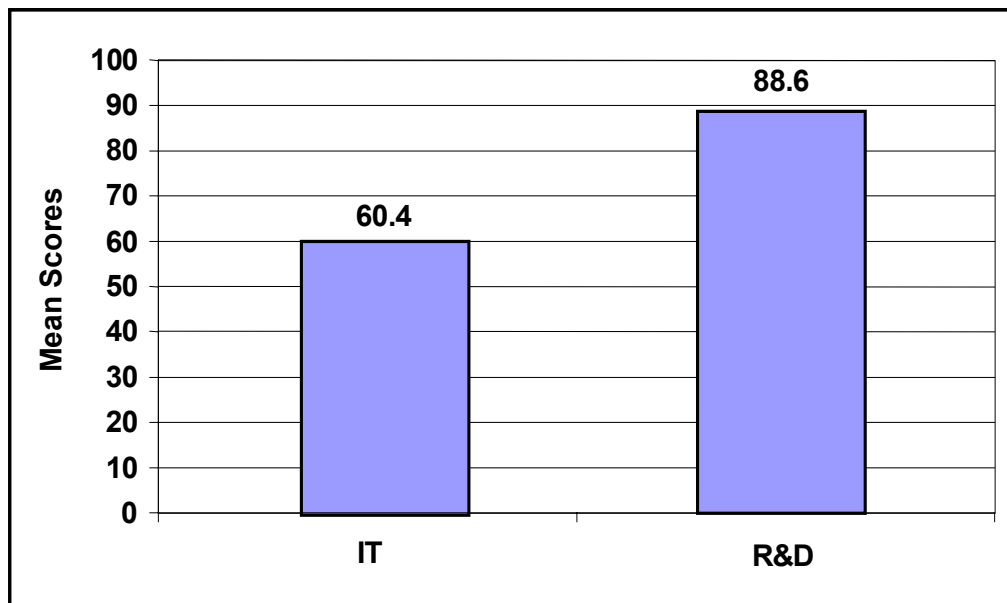


Figure 10C
Hypothesis 4: Changer Pattern Mean Scores by Information Technology and Research & Development



In summary, Hypothesis H_{4o} is rejected, and H_{4a} is accepted. The evidence suggests people in the Research & Development group have significantly higher levels of the Changer Pattern than do people in the inherently more structured Information Technology group.

Hypothesis Five

This hypothesis proposes the Conservator strategic pattern is positively associated with organizational roles which demand disciplined processes. Specifically, the hypothesis is stated as:

- Hypothesis H_{5o}: Customer Service professionals will not have higher Conservator pattern scores, than will the general employee population of organizations.
- Hypothesis H_{5a}: Customer Service professionals will have higher Conservator pattern scores than will the general employee population of organizations.

To test this hypothesis, organizational units clearly identifiable as having a Customer Service function were extracted from the TeamAnalysis™ database. The balance of the database with all Customer Service personnel data removed represents the comparison group. The two groups are then compared using a Mann-Whitney test. Twenty-three people scored a zero in the Conservator pattern and, therefore, were excluded from the calculations. The results are presented in Table 18.

The results of the application of the test statistic suggest the null hypothesis is rejected at a significance level of $p < .001$. Again, the Median test was used to offset any risk from the potential violation of any assumption of equal dispersion required by the Mann-Whitney test. The results are presented in Table 19.

Again, the results of the application of the test statistic suggest the null hypothesis is rejected at a significance level of $p < .001$. Given this confirmation, it is reasonable to presume the assumption of equal dispersion within population groups does not threaten the findings.

Table 18
Mann-Whitney Test Statistical Results of Hypothesis 5
Conservator Comparison of Population and Customer Service

Ranks				
	Group	N	Mean Rank	Sum of Ranks
Conservator	Population	8536	4416.40	37698396.00
	CS	475	6116.14	2905167.00
	Total	9011		

Test Statistics	
	Conservator
Mann-Whitney U	1262483.000
Wilcoxon W	37698400.000
Z	-13.860
Asymp. Sig. (2-tailed)	.000

The direction and magnitude of the association between Conservator scores for Customer Service and the remainder of the population of the database can be inferred from an examination of the descriptive statistics, as presented in Tables 20A and 20B. The scores of people in a Customer Service function far exceed those in the remainder of the population of the database in mean values.

This correlation is perhaps more vividly demonstrated in the graphics provided within the SPSS program, as presented in Figures 11A through 11C.

In summary, Hypothesis H_{50} is rejected, and H_{5a} is accepted. The findings suggest people in the Customer Service function have significantly higher levels of the Conservator pattern as represented by their scores than do people in the remainder of the population database.

Table 19
 Median Test Statistical Results of Hypothesis 5
 Conservator Pattern Comparison of Customer Service and Population

Frequencies			
		Population	CS
Conservator	> Median	4098	358
	<= Median	4438	117

Test Statistics		Conservator
N		9011
Median		97.6562
Chi-Square		134.747
df		1
Asymp. Sig.		.000
Yates' Continuity Correction	Chi-Square	133.655
	df	1
	Asymp. Sig.	.000

Table 20A
 Hypothesis 5: Mean Customer Service Conservator Pattern Results
 Descriptive Statistics

	N	Mean	Std. Deviation
Conservator	475	153.3553	69.8635

Table 20B
 Hypothesis 5: Mean Population Conservator Pattern Results
 Descriptive Statistics

	N	Mean	Std. Deviation
Conservator	8536	105.4791	70.5441

Figure 11A
Hypothesis 5: Median Scores by Population and Customer Service

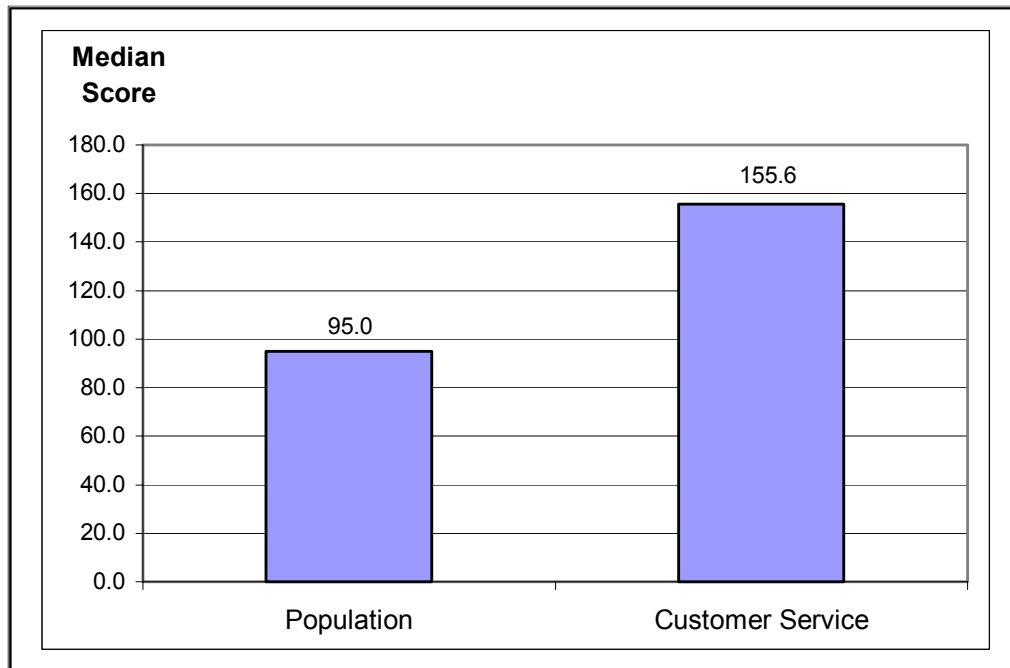


Figure 11B
Hypothesis 5: Percent of Cases Above Median by Population and Customer Service

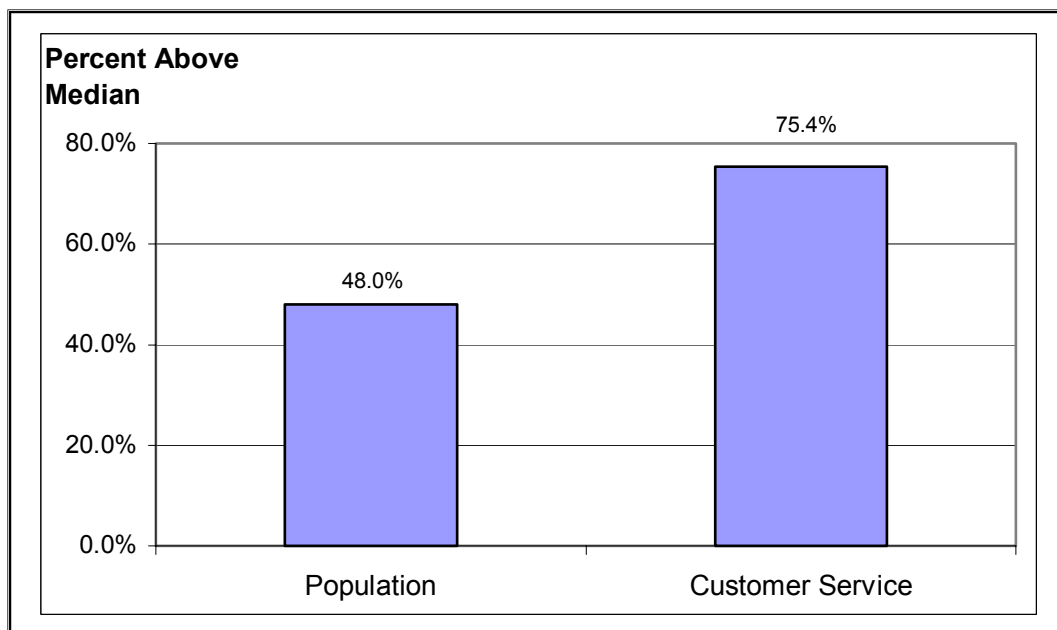
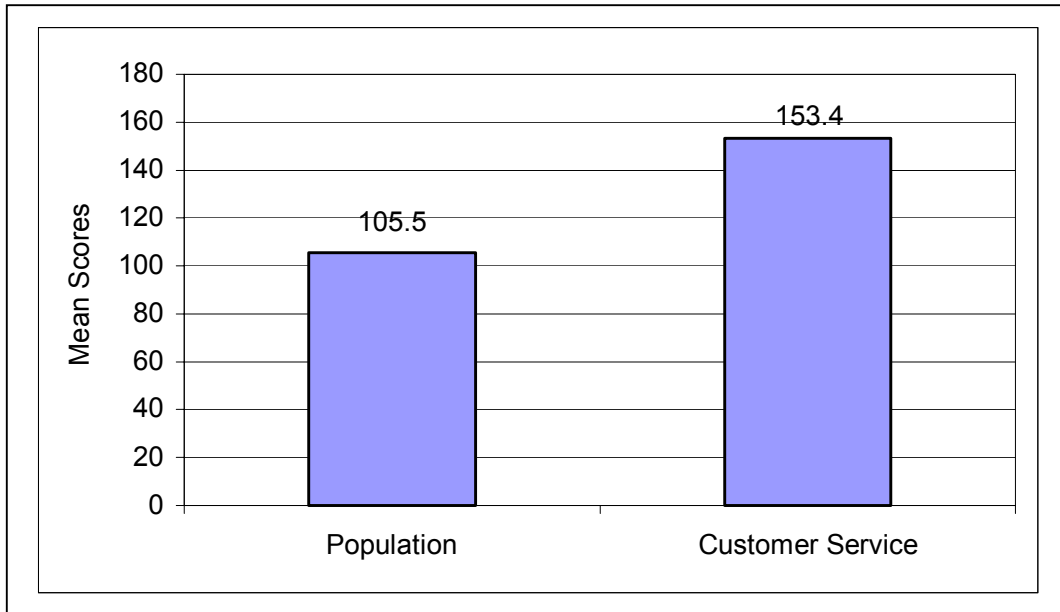


Figure 11C
Hypothesis 5: Mean Scores by Population and Customer Service



Summary

All of the hypotheses postulated in this study have performed as anticipated at a very high level of significance. The single exception is encountered with Hypothesis 2, where the level of Reactive Stimulator was not found to systematically vary within leadership ranks. However, supplemental analyses show the levels did systematically and significantly vary between the categories of leaders and non-leaders. This is a hierarchical relation and would seem to satisfy the intent of the originally proposed hypothesis.

In general, the theory of intuition as discussed in the earlier chapters of this dissertation is supported by the results of the statistical analyses. In other words, actual results in the field support Organizational Engineering theory as an explanation of the phenomenon of intuition. However, the implications of these findings go far beyond the restricted area of intuition. Chapter 5 presents the Summary and Conclusions, along with implications of this research and possible areas for future research.

CHAPTER 5

Summary and Conclusions

The definition of the concept of intuition varies within the literature. However, it can generally be considered to be a non-rational decision-making process within which the decision-maker cannot easily or readily explain to another person how decisions are derived. Because the basis of the decision cannot be easily explained, it is attributed to mental capacity defined as intuition.

Overview of Significant Findings

The literature review examined the various psychologically based approaches which address the issue of intuition. In this research, it is shown Organizational Engineering can be used to explain the common process addressed by numerous other theorists and researchers. These theorists offer different specific definitions of intuition in their research, and Organizational Engineering is sufficiently robust to integrate all of them.

This study contends the phenomenon of intuition could best be observed in individuals who favor and apply the unpatterned thought and action modes. This analysis is based on the fact the action mode can be observed by others. In combination with an unpatterned method, the action mode is likely to reflect images and/or behaviors for the user of the Changer strategy (unpatterned method, thought and action modes) whom coworkers and colleagues perceive as an insightful person.

The review of literature disclosed people who tend to be promoted in organizations typically displayed more intuitive abilities than do others in this same organizational population. Therefore, if the Organizational Engineering theory of intuition is correct, observers should be able to witness an increase in the use of unpatterned methods, as well as thought and action modes, by individuals at ever higher organizational levels.

The same phenomenological relationship is also analyzed according to functional groups within organizations. If the theory of Organizational Engineering is correct as applied to intuition, others can witness a higher level of unpatterned method and action

mode in Research and Development personnel than in Information Technology areas of a firm. Research & Development works in advance of current technology and, hence, has a strong need for less obvious relationships to create new products and processes, i.e. intuitive behaviors. Information Technology, on the other hand, works within the boundaries of a well-defined, logical system. Almost by its nature, processes are more readily explained within the Information Technology field. Readily explained processes are typically not attributed to intuition. Therefore, Research & Development functions are perceived to be more intuitive than Information Technology operations.

Another measure of Organizational Engineering theory is examined by comparing results collected from a Customer Service population those of the general organizational population. Customer Service is a very confined area, tightly bound by rules, well-defined processes, and explicit procedures. There is less allowance for intuitive processing of any kind; those scores when compared with the general population of the database in this area should reflect this in their low levels of Organizational Engineering correlates to intuitive behavior.

Chapter Four of this research displays charted results of the findings in the statistical analyses of the five research hypotheses tested by this study. In all cases, the findings were significant at the .001 level, beyond the defined level established by the SPSS statistical program. Therefore, the findings are, at minimum, 50 times more powerful than the standard acceptable level of .05.

The single unexpected finding encountered in Hypothesis 2 suggests the degree of unpatterned method and action mode identified as Reactive Stimulator style does not increase as individuals are promoted into leadership roles. A supplemental test, however, demonstrates the absolute level of this strategic style preference systematically differs between leaders and non-leaders at the .001 level. This suggests a threshold-level of this capacity requires some degree of recognition for promotion into leadership rank. However, leadership levels beyond this point provide less advantage for continued promotions within the various leadership hierarchies.

Overall, the findings of this research create a compelling case for using Organizational Engineering theory over the older psychological theories as an explanation of intuitive behavior. The Organizational Engineering theory appears to be

more succinct and has greater theoretical rigor, while producing quantifiable results which far exceed the standards typically employed in organizational development research.

Limitations of the Study

This study uses a system of testable hypotheses which, when examined individually and as a group, create a compelling argument for the value of Organizational Engineering as an explanatory paradigm in the area of intuition. These hypotheses were predicated and correlationally analyzed using the I-Opt™ instrumentation and Organizational Engineering Institute database, which share common variables used by other theorists in their research and studies. To the degree the conceptual design of these instruments differ, and an underlying presumption that only one can be most effective, some intuition researchers will question the results.

The extensive database used in this research study clearly addresses challenges concerning the overall generalizability of these findings. True, specific industries may be under-represented in the database used, which is a common criticism in most research of this type. Researchers whose interest focuses on investigating a single organizational sample may find the results less than compelling.

Implications for Human Resource Management Professionals

The findings concerning threshold levels of Reactive Stimulator strategies to be a factor for admission into the managerial ranks may offer the most immediate value for the field of organizational development. An argument can be made that the sudden and unusual action typical of the Reactive Stimulator strategy calls attention to the individual. Because the individuals at higher organizational levels can notice and observe such employees, the probability for promotion into the managerial ranks improves. If future research also finds this to be true, there are substantial implications for career development, as well as for leadership training. This suggests people with lower levels of Reactive Stimulator skills can be taught to emulate Reactive Stimulator behavior patterns and; therefore, increase their probability of advancement. In addition,

other considerations would relate to the value of intuition to increase the effectiveness of decision-making, productivity, and competitive advantage.

Organization Development consultants can use the results of this research to design or re-design systems, processes, and structures to either encourage or restrict non-rational thinking for the promotion of learning, problem-solving and decision-making. More specifically, items like idea generation; problem-solving, decision-making and strategy development might be considered; in light of the information processing patterns which support the desired outcomes. Training and learning strategies can be implemented to develop these abilities in individuals. In other words, in what specific processes and at what stages can each of the styles preferences be integrated into the application repertoire of all employees to add strength to decisions or processes which could then result in enhanced productivity and competitive advantage? Project management, for example, might be considered as a staged process. The Relational Innovator may have more value at the early stages where ideas and options can be admitted without penalty. The next stage of narrowing the field is more suited to the Hypothetical Analyzer's skills of assessment and criteria analysis. The implementation phase favors the disciplined strategies of the Logical Processor, supported by the quick reaction strength of the Reactive Stimulator. The proof of these different well-defined patterns, existing in different measurable strengths in different people, might allow the overall optimization of project management in all types of organizational settings.

Another implication concerns the amount of structure, which can be optimally designed to support an employee using an intuitive strategy. This support might include items such as infrastructure to detail level work of correspondence, record keeping, calendaring and work scheduling. Identifying and quantifying such an optimal support strategy might allow an improvement in productivity at individual and organizational levels. In other words, the gain in productivity from the individual using an intuitive strategy might be sufficient to offset the cost of the structured support systems and resources, while generating a profitable return on investment. The one-size-fits-all, leaner-and-meaner strategy might be replaced with an intelligent allocation of information processing assets, guided by a defined theory and accurate measurement.

In the area of training, this research can be leveraged and extended to support the selection process of who goes to what type of training, as well as designing the types of training used at various hierarchical levels of an organization. In addition, this information can be further used as part of the training needs assessment for virtual and self-directed work teams to include telecommuter employees. Further training programs, which train people on how to better utilize their intuitive behaviors to gain greater degrees of speed, efficiency, effectiveness, and capacity environment, might be identified and specified. In essence, what this creates is the ultimate version of customized training for each individual's information processing and learning styles. Organizational Engineering provides both the theoretical base and measurement tools to address these and other training issues.

Other implications for Human Resource and Organizational Development professionals include how they select, design, and utilize teams in our team-based workplace environments. This can support staffing decisions and subsequent performance for designing workflow structures. Teams, departments, workgroups, committees, and other forms of organized entities can benefit from varying mixes of information processing styles. This research demonstrates systematic differences in strategic processing styles by hierarchical level and function. The mix of styles within a group will enhance overall goal achievement, support designing ideal solutions for complex problems, as well as making the best decisions in a minimal amount of time.

Implications for Senior Executives include methods for improving policymaking, staffing, strategy, consensus building, and organizational culture. Different mixes of strategic styles among the organizational populations could produce outcomes more easily predicted and controlled. In general, the findings of this research suggest there are multiple opportunities available to recruit, select, train, develop, and promote future leaders. The systematic differences in strategic styles identified by this study do point the way to many possibilities for mixing and matching these styles in order to consciously structure more efficient and effective organizations.

Other areas rich with implications such as designing new work environments, global and virtual teaming, telecommuting, knowledge management, competency modeling and building, and fast cycle decision-making, just to name a few. Essentially, the

demonstrated existence of defined information processing strategies and styles can be applied to any area in which human beings must work in concert with each other to achieve a common purpose.

Recommendations for Future Research

Research questions and supported results of this research carry significant implications across a wide range of subjects, from the philosophical to the practical.

On the philosophical side, the same processes which give rise to intuitive behavior in human beings are available to any information-processing organism. Theoretically, since animals are information processors, they might display degrees of intuition. If this proves true in future research, it means humans have lost yet another claim to being unique in the universe. This would be a finding of significant dimension in philosophical circles.

Some other future considerations for research may include:

- Determine career patterns for individuals with high Relational Innovator scores and Changer patterns. For example, perhaps the population for this research represents a residual of a much larger group. Many people with these strategic preferences may have gotten lost in the climb to the top. The relative risk of the strategy probably merits research.
- Research the information processing preferences among people in large Fortune 500-type organizations versus the less structured entrepreneurial organizations, which are growing more numerous. The possibility of different environments favoring different strategic styles suggests a separate stream of hypothesis worthy of investigation.
- Determine correlation between Goleman's work on Emotional Intelligence and Relational Innovator scores and Changer patterns. Like intuition, emotional intelligence is a learned ability.
- Investigate economic performance relative to the varying styles and patterns at the CEO level merit serious investigation. In other words, could certain styles correlate with better performance on a consistent basis at the highest leadership role?

- Examine or investigate the longevity of individuals at varying organizational levels. Do certain styles lend themselves to staying in positions for shorter or longer periods of time? How could functions such as succession planning, recruitment strategies, and retention processes benefit from knowledge gained in this type of research?
- Conduct longitudinal studies to determine whether scores for the styles and patterns systematically change in relation to movement in the organization. Organizational Engineering theory specifically allows for change in strategic styles and patterns, but does not focus on specific direction relative to hierarchical level. Knowledge of systematic tendencies could support designs for more effective training and development programs for all employees within organizations.
- Implement uniquely designed benchmarking studies centered on the amount of time people with varying levels of various styles spend working in office versus out in the field, on the shop floor versus out with customers, and so on. The existence of systematic differences in these behaviors could help guide strategic planning and more productive management practice and expectations.
- Determine if certain style and pattern strengths are correlated within professions such as medicine, law, accounting, and engineering could determine whether certain styles and pattern strengths are correlated with roles or jobs within each profession. Findings in this area may provide insights about generalizations and stereotypes which individual professions are forced to address. These distinctions and verified discriminations could help facilitate social harmony, and public policy, as well as improving quality of work life issues for professionals.

In the final analysis, Organizational Engineering theory holds promise for all aspects of organizational design and development. Any collective of individuals must be able to communicate in order to be a successful organization. The existence of defined patterns of decision-making and communication postulated by Organizational

Engineering and demonstrated in this research can impact any and all of these areas of professional concern across all disciplines.

Conclusions

The Organizational Engineering-based theory of intuition differs from other studies and theories by looking at intuition as a phenomenon arising naturally from information and decision-making processes. Individuals using an unpatterned method (the organization of data being input) combined with thought and action modes (the character of the intended output) arrive at decision options not necessarily following any of the standard, logical, and/or existing processes. When this happens, an outside observer could tend to attribute the unexpected idea as arising from some sort of insight process based on an intuition capability.

Organizational Engineering can assist in understanding how a process such as intuition influences how information is processed and decisions are made. It is this natural outcome of an information-processing pattern used to navigate life. Organizational Engineering explains the same phenomenon as do the psychologically oriented theorists and researchers; and do so with more clarity of thought and practical application of the concepts.

In conclusion, the findings of this research support the proposition that insight is a normal, probability-based phenomenon grounded in the information processing style of the individual. The numerous implications of this study's findings go beyond the scope of this dissertation and can extend to many other areas of human and organizational behavior.

APPENDIX A
I-OPT™ SURVEY INSTRUMENT

[http://www.iopt.com/IOpt%20Survey%20\(New\).htm](http://www.iopt.com/IOpt%20Survey%20(New).htm)

APPENDIX B
THE VALIDITY AND RELIABILITY OF ORGANIZATIONAL
ENGINEERING INSTRUMENTATION AND METHODOLOGY

APPENDIX B THE VALIDITY AND RELIABILITY OF ORGANIZATIONAL ENGINEERING INSTRUMENTATION AND METHODOLOGY

Face Validity

A expert panel of 50 professionals administered 14,655 surveys and found disagreement with the survey report in less than 1% of the cases (n=128, 0.87%). The group based TeamAnalysis™ was tested by 44 experts in 921 administrations and was found to be inaccurate in less than 1% of the cases (n=1, 0.1%). The face validity of both the instrument and the consolidation methodology as represented by TeamAnalysis™ is judged to be very high.

Construct Validity

Statistical evidence in the context of the differential population methodology was applied to 3 occupational categories involving 75 distinct groups and 887 people were compared to a database population (N~8,700). The findings are statistically significant at the .05 standard adopted in this study ($p = .0152$). In addition, the theory's use of only a single assumption minimizes exposures from undefined assumptions inherent in any theory. Overall, Organizational Engineering appears to meet or exceed the standards of construct validity within the discipline.

Content Validity

Content validity is more a matter of logic than of statistics. However, a nomological net demonstrates that between 84% and 92% of the survey responses can be directly traced to specific dimensions of the underlying theory. In addition, 100% of the 50 members of the expert panel agree that the response structure incorporated in the survey is not contaminated by respondent misunderstanding. These findings suggest that the content validity is at least equal and perhaps superior to other theories within the discipline.

Discriminant Validity

Discriminant validity was tested using an unsupervised learning method of cluster analysis. The PAM algorithm run with $k=3,887$ was able to discriminate between three groups that should be different at a $p < 10^{-29}$ significance level, a level substantially in excess of the generally accepted $p < .05$ standard of significance.

Concurrent Validity

This dimension of validity relied upon the judgment of the expert panel of 50 professionals. Between 32 and 48 experts responded to the various instruments and methodologies tested under Concurrent validity. The experts reported that in their administrations, the number of inaccurate reports was zero (0%). The concurrent validity of the instrumentation and methodologies is judged to be high.

Predictive Validity

The large number of individuals (N = 8,721) and groups (1,003) encompassed by the study provide assurance of generalizability. The statistical tests performed were shown to fully satisfy the proper criteria (e.g., identical dispersion, equality of variances, etc.) minimizing exposures based on statistical power. In addition, the cross-validation across multiple dimensions of validity amplifies the assurance of the validity of the underlying theory and its expression in instrumentation and methodology. In the author's judgment, the theory and methodology fully meet the standards of validity as applied within the discipline of organizational development.

Conclusion Validity

The large number of individuals (N = 8,721) and groups (1,003) encompassed by the study provide assurance of generalizability. The statistical tests performed were shown to fully satisfy the proper criteria (e.g., identical dispersion, equality of variances, etc.) minimizing exposures based on statistical power. In addition, the cross-validation across multiple dimensions of validity amplifies the assurance of the validity of the underlying theory and its expression in instrumentation and methodology. In the author's judgment, the theory and methodology fully meet the standards of validity as applied within the discipline of organizational development.

Reliability

Reliability is technically not a form of validity. The reliability of the instrument was tested for all pair wise combinations of the years 1994 through 1999 (15 individual contrasts) using the Kruskal-Wallis test. In all cases, the findings confirmed reliability by showing that differences in the data between years could not be established. The survey instrument is judged reliable by the accepted standards of the discipline.

Source: Robert Soltysik. Validation of Organizational Engineering Instrumentation and Methodology. Amherst: HRD Press, 2000.

APPENDIX C
PERMISSION LETTER

ORGANIZATIONAL ENGINEERING INSTITUTE, INC.

Est. 1992

226 South State Street, Suite 101A,
Ann Arbor, Michigan 48104



Voice Phone: 313-662-0250
Fax Phone: 313-662-0838

Mr. Ashley Fields
404 Timber Grove Place
Friendswood, TX 77546-8419

Dear Mr. Fields:

Please accept this letter as confirmation that you will be given permission for unrestricted access to the organizational database maintain by this organization for the purposes of completion of your doctoral dissertation.

You will be provided with an electronic copy of the database in Microsoft Excel format. In using this information, you will be bound by the terms and conditions of the confidentiality and non-compete agreement that you have executed.

We look forward to the successful conclusion of your scholarly work.

Sincerely,

Gary J. Salton, Ph.D.
President

APPENDIX D
CLASSIFICATION OF HIERARCHICAL LEVELS

The LeaderAnalysis™ database consists of entries by group reflecting the leader and his or her subordinates. The data is collected using the I-Opt™ instrument, which is used to collect self, described information on any organized collection of people by teams, departments, committees, workgroups and leadership role. Therefore, it is possible to have multiple entries for a single leader.

The database also contains the title of the leader as reported by the person requesting the analysis. Title information is not available in some cases due to oversight, refusal to provide the information, or lack of knowledge on the part of the person requesting the analysis.

The original database provided by the Organizational Engineering Institute for this study contains information for 470 groups. Eliminating duplicate entries for the same name and entries without titles reduced the available data to 438 groups headed by designated leaders.

The titles used can vary by organization. For example, one manufacturer of heavy equipment uses the title “Division Head” to designate a person who heads a distinct functional area such as Training and Development. In other firms a person with the title of Director could hold this same responsibility. A similar ambiguity exists between the titles of Director and Manager. Often the title Director is awarded as an acknowledgement of longevity or contribution rather than identifying a scope of responsibility. To standardize the varied designations, individuals in leadership positions are divided into four categories. They are:

President and CEO: These are people who head an organization and either own it or report to a board of directors. People in this category include the heads of Fortune 50 firms, startup DotComs, service firms and nonprofit organizations. The size of the firms ranges from 6 employees to over 30,000. Coding for statistical purposes was “0”.

Vice Presidents: These are people who have been designated as a vice president or above by their firms. Presidents of subsidiary companies are included in this category. These people carry the legal assumption of apparent authority and can be reasonably assumed to represent the senior management of a firm. Coding for statistical purposes was “1”.

Managers and Directors: These are people who head a functional area (e.g., Accounting, Federal taxes, Organizational Development, Sales, Human Resources, Information Technology, Customer, Service, Research & Development, etc.) or who have multiple managers reporting to them. These people are judged to be middle management. Coding for statistical purposes was “2”.

Supervisors: These are people who head an area under a manager (e.g., a reporting section in Accounting) or who are designated Team Leader within the database. People in this position are judged to represent the lower organizational rankings. Coding for Statistical purposes was “3”.

Applying the above to TeamAnalysis™ database yielded the numerical counts in

Table 21
HIERARCHICAL DISTRIBUTION OF LEADER ANALYSIS™ DATABASE

HIERARCHICAL LEVEL	CODE USED FOR ANALYSIS	NUMBER	PERCENT OF DATABASE
President and CEO	0	26	6 %
Vice Presidents	1	93	21 %
Managers and Directors	2	276	63 %
Supervisors	3	43	10 %
Total		438	100%

REFERENCES CITED

- Agor, W. (1983b). Brain skills development in management training. Training and Development Journal, April, 78-83.
- Agor, W. (1984a). Using intuition to manage organizations in the future. Business Horizons, July-August, 49-54.
- Agor, W. (1984b). Intuitive management integrating left and right brain management. Englewood Cliffs, New Jersey: Prentice-Hall Inc.
- Agor, W. (1985a). Intuition: A bona fide occupational requirement. Personnel Management Journal. 14 (1), 15-24.
- Agor, W. (1985b). Managing brain skills to increase productivity. Public Administration Review, November/December, 864-868.
- Agor, W. (1986a). How top executives use their intuition to make important decisions. Business Horizons, January-February 29 (1), 49-53.
- Agor, W. (1986b). Managing brain skills to increase productivity. Personnel, August 42-46.
- Agor, W. (1986c). The logic of intuition: How top executives make important decisions. Organizational Dynamics, Winter, 5-18.
- Agor, W. (1986d). The logic of intuitive decision-making: A research-based approach for top management. New York: Quorum Books.
- Agor, W. (1987a). Managing brain skills: One key to increased productivity. PM, August 20-22.
- Agor, W. (1987b). Managing brain skills: The last frontier, Personnel Administrator, October, 54-60.
- Agor, W. (1988a). Finding and developing intuitive managers, Training and Development Journal, March, 68-70.
- Agor, W. (1988b). Nurturing executive intrapreneurship with a brain-skill management program. Business Horizons, May-June, 12-15.
- Agor, W. (1989a). The AIM Survey. El Paso: ENFP Enterprises.
- Agor, W. (1989b). Intuition & strategic planning, The Futurist, November-December 20-23.

- Agor, W. (1989c). Intuition in organizations: Leading and managing productively. California: Sage Publications, Inc.
- Agor, W. (1992a). (Speaker). The role of intuition in decision making [Video Recording]. El Paso: Global Intuition Network.
- Agor, W. (Speaker). (1992b). Using intuition practically to promote organizational change (World Future Society Conference in Anaheim, CA. August). [Cassette Recording #110-side 2]. Maryland: Chesapeake Audio/Video Communications, Inc.
- Agor, W. (1992c) (Producer). The role of intuition in decision-making script for Video. Minnesota: Charleston Research Foundation.
- Agor, W. (1992d). Intuition in decision-making: How to assess, use, and develop your intuitive powers for increased productivity. El Paso: The Global Intuition Network.
- Agor, W. (1993). Use intuitive intelligence to increase productivity, HR Focus, September 9.
- Agor, W. H. (1995a). How Top Executives Use Their Intuition To Make Important Decisions [in Michael Joyce, et. al., An Introduction to Creativity, pp. 64-70]. Acton, MA.: Copley Publishing Group.
- Argyris, C. (1973a). Some limits of rational man organizational theory, Public Administration Review, 33 (3), May/June, 253-267.
- Argyris, C. (1973b). Organizational man: Rational and self-actualizing, Public Administration Review, 33 (4), July/August, 354-357.
- Barnard, C.I. (1938/68). The functions of the executive. Cambridge: Harvard University Press.
- Behling, O. & Eckel, N. (1991). Making sense out of intuition. Academy of Management: The Executive, V (1), February 46-54.
- Blackwell, L. (1987). Dimensions of intuition in higher education. (Doctoral dissertation, Seattle University). Ann Arbor, MI: UMI Dissertation Services.
- Brown, A. (1990). The use of intuition in the decision-making processes of public school superintendents. (Doctoral dissertation, Texas A&M University). Ann Arbor, MI: UMI Dissertation Services.
- Brown, C. (1993). Intuition and introspection in the advertising decision process. (Doctoral dissertation, Stanford University). Ann Arbor, MI: UMI Dissertation Services.

- Cappon, D. (1993). Intuition. Psychology Today, 26 (3), 40-45,86-91.
- Cappon, D. (1994). Intuition & management-research and application. Connecticut: Quorum Books.
- Catford, L. (1987). Creative problem solving in business: Synergy of thinking, intuiting, sensing and feeling strategies. (Doctoral dissertation, Stanford University). Ann Arbor, MI: UMI Dissertation Services.
- Clark, F. (1973). Exploring intuition: prospects and possibilities. The Journal of Transpersonal Psychology, 2, 156-170.
- Cohen, M. & March, J. (1974). Leadership and Ambiguity. New York: McGraw-Hill Book Company.
- Cosier, R. & Aplin, J. (1982). Intuition and decision-making: Some Empirical Evidence. Psychological Reports, 51, 275-281.
- Dean, D., Mihalasky, J., Ostrander, S., & Schroeder, L. (1974). Executive ESP. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.
- Eisenhardt, K. (1989). Making fast strategic decisions in high-velocity environments. Academy of Management Journal, 32 (3), 543-576.
- Emery, M. (1994). Intuition workbook: An expert's guide to unlocking the wisdom of your subconscious mind. New Jersey: Prentice Hall.
- Emery, M. (Speaker). (1995). Intuition: How to use your gut instinct for greater personal power [Cassette Recordings-set of six audiocassettes]. Illinois: Nightingale-Conant.
- Encarta (1999). Funk & Wagnall's Corporation. 3(2), 267-299.
- Frantz, R., & Pattakos, A. (Eds.). (1996). Intuition at work. California: Sterling & Stone/New Leaders Press.
- Goldberg, P. (1983). The intuitive edge. New York: G. P. Putnam's Sons.
- Goleman, D. (1995). Emotional Intelligence: Why It Can Matter More Than IQ for Character, Health and Lifelong Achievement. New York: Bantam Books.
- Hermann, N., (1981). The creative brain. Training and Development Journal, October.
- Hermann, N., (1989). Hermann Brain Dominance Instrument. Lake Lure, North Carolina: Applied Creative Services, LTD.

- Hyde, M. & McGuinness, M. (1994). Introducing Jung. New York: Totem Books.
- Isaack, T. (1978). Intuition: An ignored dimension of management. Academy of Management Review, October, 917-922.
- Isenberg, D. (1984). How senior managers think, Harvard Business Review, November-December, 81-90.
- Isenberg, D. (1985). How managers think. (Reply to Briefings). Harvard Business Review, January-February, 185-186.
- Jackson, G. (1989). Executive ESP: Access your intuition for business success. New York: Pocket Books.
- Jung, C. G. (1971). Psychological types. Princeton University Press.
- Kanter, R. (1977). Men and women of the corporation. New York: Basic Books.
- Karpatschof, B. & Elkjaer, H. (2000). Yet the Bumblebee flies: The reliability of Ipsative scores – Examined by empirical data and a simulation study, Research Report, Department of Psychology, University of Copenhagen. Denmark: Humanistisk Fakultet, December.
- Keirse, D. & Bates, M. (1984). Please understand me: Character & temperament types. California: Prometheus Nemesis Book Company.
- Kirk, R.E. (1982). Experimental Design. Belmont, Ca.: Brooks/Cole.
- Kroeger, O. & Thuesen, J.M. (1992). Type talk at work. New York: Delacorte Press.
- Leavitt, H.J. (1975a). Beyond the analytic manager. California Management Review, 17, No.3.
- Leavitt, H.J. (1975b). Beyond the analytic manager: Part II. California Management Review, 17, No. 4.
- Livingston, J. (1971). Myth of the well-educated manager. Harvard Business Review, January-February, 79-89.
- Lynch, D. (1980). The case for disorderly conduct: How to get the most out of managerial manpower. Management Review, 69 (2).
- MacKinnon, D. (1962). The nature and nurture of creative talent. American Psychology, 17, 484-495.

- Maslow, A. (1954). Motivation and Personality. New York: Harper & Row.
- Maslow, A. (1970). Motivation and personality. (2nd Ed.). New York: Harper & Row.
- Mintzberg, H. (1973). The nature of managerial work. New York: Harper & Row.
- Mintzberg, H. (1975). The manager's job: folklore and fact. Harvard Business Review, July-August, 49-61.
- Mintzberg, H. (1976). Planning on the left side and managing on the right. Harvard Business Review, July-August, 49-58.
- Myers, I. B. (1983). Myers-Briggs Type Indicator. Palo Alto, CA.: Consulting Psychologists Press.
- Myers, I.B., & McCaulley, M.H. (1985). Manual: A guide to the development and use of the Myers-Briggs Type Indicator. Palo Alto, CA.: Consulting Psychologist Press.
- Naisbitt, J. & Aburdene, P. (1990). Megatrends 2000. New York: Morrow.
- Ornstein, R.E. (1972). The psychology of consciousness. New York: Penguin Books, Inc.
- Parikh, J. (1994). Intuition: The new frontier of management. Massachusetts: Blackwell Publishers.
- Peavey, R. (1963). "A Study of C. G. Jung's Concept of Intuitive Perception and Intuitive Type." Unpublished Doctoral Dissertation, University of Oregon. Cited by Thornton, J.M. (1971) Intuition: A conceptual spectrum for educators.
- Peters, T.J. & Waterman, R. H., Jr. (1982). In search of excellence. New York: Warner Books.
- Raudesepp, E. (1982). How to create new ideas. Englewood Cliffs, NJ: Prentice-Hall.
- Ray, M. & Myers, R. (1986). Creativity in business. New York: Doubleday.
- Riggs, G. (1987). The use of intuition by managers of major corporations in Washington State. (Doctoral dissertation, Gonzaga University). Ann Arbor, MI: UMI Dissertation Services.
- Rowan, R. (1986). The intuitive manager. Boston: Little, Brown and Company.

- Salton, G. (1994). I-Opt™ Survey, Ann Arbor, MI: Professional Communication Inc.
- Salton, G. (1996). Organizational Engineering. Ann Arbor, MI: Professional Communication Inc.
- Salton, G. (2000). The Manager's Guide to Organizational Engineering. Amherst, MA: HRD Press.
- Salton, G. & Fields, A. (1999). Understanding and Optimizing Team Learning. The Journal of Applied Management and Entrepreneurship, September, 48 – 60.
- Saville, P., & Willson, E. (1991). The reliability and validity of normative and ipsative approaches in the measurement of personality. Journal of Occupational Psychology, 64, 219-238.
- Senge, P. (1990). The fifth discipline: The art & practice of the learning organization. New York: Doubleday.
- Simon, H. (1973a). Applying information technology to organization design. Public Administration Review, 33 (3), May-June, 268-278.
- Simon, H. (1973b). Organizational man: Rational or self-actualizing? Public Administration Review, 33 (4), July-August, 346-353.
- Simon, H. (1977). [Review of The New Science of Management Decision]. Administrative Science Quarterly, 342-351.
- Simon, H. (1987). Making management decisions: The role of intuition and emotion. Academy of Management Executive, 1 (1), February, 57-64.
- Soltysik, R. (2000). Validation of Organizational Engineering. Amherst, MA: HRD Press.
- Spitzer, Q. & Evans, R. (1997). Heads you win: How the best companies think. New York: Simon & Schuster.
- Taggart, W. & Taggart-Hausladen, B. (1993). Personal style inventory: Gateway to personal flexibility. (Trainer's Manual). Florida: Psychological Assessment Resources, Inc.
- Talbot, R. (1989/90). Valuing differences in thinking styles to improve individual and team performance. National Productivity Review, 9 (1), Winter, 35-49.
- Taylor, E. (1988). The experience of intuition in management decision making A phenomenological inquiry and consolidation of a model. (Doctoral dissertation. Union Graduate School). Ann Arbor, MI: UMI Dissertation Services.

- Thornton, J. (1971). Intuition: A conceptual spectrum for educators. (Doctoral dissertation, Rutgers University). Ann Arbor, MI: UMI Dissertation Services.
- Tichy, N.M. (1997). The Leadership Engine: How Winning Companies Build Leaders at Every Level. New York: HarperCollins.
- Trochim, W. (1999). The Research Methods Knowledge Base (second edition). Internet.
- Vaughan, F. E. (1979). Awakening intuition. New York: Anchor Books.
- Westcott, M. (1961). On the measurement of intuitive leaps. Psychological Reports, 9, 267-274.
- Westcott, M. (1968). Toward a contemporary psychology of intuition: A historical and Empirical inquiry. New York: Holt Rinehart and Winston, Inc.
- Zdenek, M. (1983). The right- brain experience: An intimate program to free the powers of your imagination. New York: McGraw Hill.

BIBLIOGRAPHY

- Adams, J. (1999). What's Your Type?. HR Magazine. June, 8.
- Adams, J. (2000). Only one ingredient can transform work into art. HR Magazine. November , 10.
- Agor, W. (1983a). Using intuition in public management. Public Management, February, 2-6.
- Agor, W. (1983b). Brain skills development in management training. Training and Development Journal, April, 78-83.
- Agor, W. (1983c). Tomorrow's intuitive leaders. The Futurist, August, 49-53.
- Agor, W. (1984a). Using intuition to manage organizations in the future. Business Horizons, July-August, 49-54.
- Agor, W. (1984b). Intuitive management integrating left and right brain management. Englewood Cliffs, New Jersey: Prentice-Hall Inc.
- Agor, W. (1985a). Intuition: A bona fide occupational requirement. Personnel Management Journal. 14 (1), 15-24.
- Agor, W. (1985b). Managing brain skills to increase productivity. Public Administration Review, November/December, 864-868.
- Agor, W. (1986a). How top executives use their intuition to make important decisions. Business Horizons, January-February 29 (1), 49-53.
- Agor, W. (1986b). Managing brain skills to increase productivity. Personnel, August 42-46.
- Agor, W. (1986c). The logic of intuition: How top executives make important decisions. Organizational Dynamics, Winter, 5-18.
- Agor, W. (1986d). The logic of intuitive decision-making: A research-based approach for top management. New York: Quorum Books.
- Agor, W. (1987a). Managing brain skills: One key to increased productivity. PM, August 20-22.
- Agor, W. (1987b). Managing brain skills: The last frontier, Personnel Administrator, October, 54-60.

- Agor, W. (1987c). Wanted: The intuitive director, Directors and Boards, Spring, 13-15.
- Agor, W. (1988a). Finding and developing intuitive managers, Training and Development Journal, March, 68-70.
- Agor, W. (1988b). Nurturing executive intrapreneurship with a brain-skill management program. Business Horizons, May-June, 12-15.
- Agor, W. (1989a). The AIM Survey. El Paso: ENFP Enterprises.
- Agor, W. (1989b). Intuition & strategic planning, The Futurist, November-December 20-23.
- Agor, W. (1989c). Intuition in organizations: Leading and managing productively. California: Sage Publications, Inc.
- Agor, W. (1991a). How intuition can be used to enhance creativity in organizations, Journal of Creative Behavior, 225, (1), 11-19.
- Agor, W. (1991b). All about intuition, Boardroom Reports, December 15, pp.13-14.
- Agor, W. (1992a). (Speaker). The role of intuition in decision making [Video Recording]. El Paso: Global Intuition Network.
- Agor, W. (Speaker). (1992b). Using intuition practically to promote organizational change (World Future Society Conference in Anaheim, CA. August). [Cassette Recording #110-side 2]. Maryland: Chesapeake Audio/Video Communications, Inc.
- Agor, W. (1992c) (Producer). The role of intuition in decision-making script for Video. Minnesota: Charleston Research Foundation.
- Agor, W. (1992d). Intuition in decision-making: How to assess, use, and develop your intuitive powers for increased productivity. El Paso: The Global Intuition Network.
- Agor, W. (1993). Use intuitive intelligence to increase productivity, HR Focus, September 9.
- Agor, W. (Speaker). (1994). Intuitive decision making [Cassette Recording No. 1955]. San Francisco: New Dimensions Radio.
- Agor, W. (Speaker). (1994). Intuition as a skill [Cassette Recording No. 2020]. San Francisco: New Dimensions Radio.

- Agor, W. H. (1995). How Top Executives Use Their Intuition To Make Important Decisions [in Michael Joyce, et. al., An Introduction to Creativity, pp. 64-70]. Acton, MA.: Copley Publishing Group.
- Agor, W.H. (1995). Brain Skill Management, Research and Development Innovator, December, 1-3.
- Agor, W. (1997). The measurement, use, and development of intellectual capital to increase public sector productivity, Public Personnel Management, Summer, 175 -186.
- Agor, W. & Mishlove, J. (Speakers). (1992). Intuition in business [Video Recording]. Berkeley: Thinking Allowed Productions.
- Alreck, P. & Settle, R. (1985). The survey research handbook. Illinois: Irwin.
- Amason, A. C. (1996). Distinguishing the effects of functional and dysfunctional conflict on strategic decision-making: Resolving a paradox for top management teams. Academy of Management Journal, 39 (1), 123-148.
- Argyris, C. (1973a). Some limits of rational man organizational theory, Public Administration Review, 33 (3), May/June, 253-267.
- Argyris, C. (1973b). Organizational man: Rational and self-actualizing, Public Administration Review, 33 (4), July/August, 354-357.
- Arthur, W. B. (1996). Increasing returns and the new world of business, Harvard Business Review, July-August, 100-109.
- Babbie, E. (1992). The practice of social research. (6th Ed.). California: Wadsworth Publishing Co.
- Bagne, P. (1994). When to follow a hunch. Reader's Digest, May, 74-78.
- Banghart, R. (1985). How managers think. (Briefing to the Editor). Harvard Business Review, January-February, 184.
- Barker, J. A. (1992). Future edge. New York: William Morrow and Company, Inc.
- Barnard, C.I. (1968). The functions of the executive. Cambridge: Harvard University Press.
- Bass, B. (1983). Organizational decision-making. Illinois: Irwin.
- Basu, K. (1994). The traveler's dilemma: Paradoxes of rationality in game theory. AEA Papers and Proceedings, 84 (2), 393-395.

- Beasley, V. (Speaker). (1994). Intuition by design: Applying your intuitive Intelligence [Cassette Recording]. Berkeley: Conference Recording Service.
- Behling, O. & Eckel, N. (1991). Making sense out of intuition. Academy of Management: The Executive, V (1), February 46-54.
- Bennett, E. (1988). How do you justify an investment in technology? Financial Executive, September-October, 44-48.
- Bennett, R. (1997). Intuition and analysis: Toward better understanding of the deliberations and effectiveness of boards of directors. (Doctoral dissertation, The Florida State University). Ann Arbor, MI: UMI Dissertation Services.
- Bennis, W. (1989). On becoming a leader. New York: Addison-Wesley Publishing Co.
- Billingsley, L. (1995). I don't know: A dialogue on intuition. [Interview with Rob Rabbin]. Noetic Sciences Review, 33, 19-23.
- Blackwell, L. (1987). Dimensions of intuition in higher education. (Doctoral dissertation, Seattle University). Ann Arbor, MI: UMI Dissertation Services.
- Blakeslee, T. (1980). The right brain: A new understanding of the unconscious mind and its creative powers. New York: Doubleday.
- Blanchard, K. & Waghorn, T. (1997). Mission possible. New York: McGraw Hill Companies.
- Blankenship, M. (1985). How managers think. (Briefing to the Editor). Harvard Business Review, January-February, 184-185.
- Blattberg, R. & Hoch, S. (1990). Database models and managerial intuition: 50% model + 50% manager. Management Science, 36 (8), 887-899.
- Boccialetti, G. (1995). It takes two. California: Jossey-Bass Publishers.
- Bridges, W. (1992). The character of organizations using Jungian type in organizational development. Palo Alto, CA.: Davies-Black Publishing.
- Britz, E. (1991). The Sixth Sense, Entrepreneurial Woman, March, 58-60.
- Brock, S.A. (1994). Using Type in Selling: Building Customer Relationships with the Myers-Briggs Type Indicator. Palo Alto, CA.: Consulting Psychologists Press, Inc.
- Bromiley, P. (1999). Book Reviews [Debating rationality: nonrational aspects of organizational decision making edited by J.J. Halpern and R. N. Stern and

- Rational Choice theory and organizational theory: A critique by M Zey]. Academy of Management Review, 24(1), 157-159.
- Brown, A. (1990). The use of intuition in the decision-making processes of public school superintendents. (Doctoral dissertation, Texas A&M University). Ann Arbor, MI: UMI Dissertation Services.
- Brown, B. (1997). It's not just four letters... Journal of the Organization Development Network, 29 (2), 17-22.
- Brown, C. (1993). Intuition and introspection in the advertising decision process. (Doctoral dissertation, Stanford University). Ann Arbor, MI: UMI Dissertation Services.
- Brownsword, A.W. (1988). Psychological type: An introduction. San Anselmo, CA.: The Human Resources Management Press.
- Burke, L. & Miller, M. (1999). Taking the mystery out of intuitive decision making. Academy of Management Executive. 13 (4), 91-99.
- Camerer, C. (1981). General conditions or the success of bootstrapping models. Organizational Behavior and Human Performance, 27, 411-422.
- Cammarano, R. F. (1994). 3-D decision making. Success. June, 82.
- Cappacchione, L. (Speaker). (1994). Intuitive thinking [Cassette Recording No. 2097]. San Francisco: New Dimensions Foundation.
- Cappon, D. (1993). Intuition. Psychology Today, 26 (3), 40-45,86-91.
- Cappon, D. (1994). Intuition & management-research and application. Connecticut: Quorum Books.
- Cappon, Dr. D. (1989). Intuition: Harnessing the hidden power of the mind. Canada: Bedford House Publishing.
- Carson, N. (1992). The trouble with teams. Training, August, 38-40.
- Casebolt, V. (1985). How managers think. (Briefing to the Editor). Harvard Business Review, January-February, 184.
- Catford, L. (1987). Creative problem solving in business: Synergy of thinking, intuiting, sensing and feeling strategies. (Doctoral dissertation, Stanford University). Ann Arbor, MI: UMI Dissertation Services.
- Caudron, S. (1996). Teach downsizing survivors how to thrive, Personnel Journal, January, 38-47.

- Choquette, S. (1998). Your psychic pathway [Cassette Recording – set of 6 audiocassettes]. Niles, IL: Nightingale Conant.
- Clark, A. (1991). Commentary: “Trends” that will impact new products. Journal of Consumer Marketing, Winter, 8 (1), 35-40.
- Clark, F. (1973). Exploring intuition: prospects and possibilities. The Journal of Transpersonal Psychology, 2, 156-170.
- Cohen, M. & March, J. (1974). Leadership and Ambiguity. New York: McGraw-Hill Book Company.
- Contino, R. (1996). Trust your gut! New York: AMACOM.
- Cooper, A. (Speaker). (1994). The role of intuition in time management [Cassette Recording]. Berkeley: Conference Recording Service.
- Cooper, R. (1997). Applying emotional intelligence in the workplace. Training & Development, December, 31-38.
- Cosier, R. & Aplin, J. (1982). Intuition and decision-making: Some Empirical Evidence. Psychological Reports, 51, 275-281.
- Crainier, S. (1999). The 75 Greatest Management Decisions Ever Made. New York: AMACOM.
- Cravens, D. (1988). Gaining strategic marketing advantage. Business Horizons, 31 (5), September/October, 44-54.
- Crossman, M.M., Lane, H.W. & White, R.E. (1999). An organizational learning framework: From intuition to institution. Academy of Management Review, 24 (3), July, 522-537.
- Csikszentmihalyi, M. (1996). Creativity-flow and the psychology of discovery and intervention. New York: Harper Collins.
- Cullen, J. (1989). Creativity and intuition: A psychosynthesis approach. Monographs of the International Association for Managerial and Organizational Psychosynthesis, 15 (3).
- Cullen, J. (1994). An introduction to intuition: A psychosynthesis approach. Monographs of the International Association for Managerial and Organizational Psychosynthesis, 15 (A-1).
- Dahle, C. (1998). What’s your intuition about consultants? Fast Company, June-July, 50.

- Davidow, W. H., & Malone, M. S. (1992). The virtual corporation. New York: Edward Burlingame Books/ HarperBusiness.
- Dawes, R. & Corrigan, B. (1974). Linear models in decision making. Psychological Bulletin, 81 (2), 95-106.
- Day, L. (Speaker). (1996). Practical intuition [Cassette Recording]. New York: Harper Audio.
- Day, L. (Speaker). (1997a). Practical intuition for success [Cassette Recording]. New York: Harper Audio.
- Day, L. (Speaker). (1997b). The logic of intuition [Cassette Recording No. 2612]. California: New Dimensions Foundation.
- Dean, D., Mihalasky, J., Ostrander, S., & Schroeder, L. (1974). Executive ESP. Englewood Cliffs, New Jersey: Prentice-Hall, Inc.
- Diamond, D. (1997). What comes after what comes next. Fast Company, December-January, 74-80.
- DiTiberio, J.K. & Hammer, A.L. (1993). Introduction to type in college. Palo Alto, CA.: Consulting Psychologists Press, Inc.
- Doktor, R. & Hamilton, W. (1973). Cognitive style and the acceptance of management science recommendations. Management Science, 19 (8), April, 884-894.
- Einhorn, H. & Hogarth, R. (1975). Unit weighting schemes for decision making. Organizational Behavior and Human Performance, 13, 171-92.
- Eisenhardt, K. (1989). Making fast strategic decisions in high-velocity environments. Academy of Management Journal, 32 (3), 543-576.
- Eisenhardt, K. (1990). Speed and strategic choice: How managers accelerate decision making. California Management Review, 32 (3), Spring, 39-54.
- Eisenhardt, K., Kahway, J. & Bourgeois, L. J. III. (1997). How management teams can have a good fight. Harvard Business Review, July-August, 77-85.
- Emery, M., Franquemont, S. & Rosanoff, N. (Speakers). (1994). Training the trainers-Pt. I: Successful techniques [Cassette Recording-2 tapes]. Berkeley: Conference Recording Service.
- Emery, M., Franquemont, S. & Rosanoff, N. (Speakers). (1994). Training the trainers-Pt. II: Future vision session [Cassette Recording]. Berkeley: Conference Recording Service.

- Emery, M. (1994). Intuition workbook: An expert's guide to unlocking the wisdom of your subconscious mind. New Jersey: Prentice Hall.
- Emery, M. (Speaker). (1995). Intuition: How to use your gut instinct for greater personal power [Cassette Recordings-set of six audiocassettes]. Illinois: Nightingale-Conant.
- Etzioni, A. (1989). Humble decision-making. Harvard Business Review, 67 (4), July-August, 122-126.
- Everett, E. (1983). Improving creativity-one organization's approach. Public Management, February, 7-8.
- Farkas, C. & DeBacker, P. (1998). Maximum Leadership. Perigee Books.
- Fisher, M. (1981). Intuition: How to use it for success and happiness. New York: Dutton.
- Flannery, J. (1985). How managers think. (Briefing to the Editor). Harvard Business Review, January-February, 184.
- Ford, C. (1996). A theory of individual creative action in multiple social domains. The Academy of Management, 21 (4), October, 1112-1142.
- Franquemeont, S. (1999). You already know what to do. New York: Penquin.
- Franquemont, S. (1999). Intuition: your electric self [Cassette Recording – set of six audiocassettes]. Boulder, CO: Sounds True.
- Frantz, R., & Pattakos, A. (Eds.). (1996). Intuition at work. California: Sterling & Stone/New Leaders Press.
- Frantz, R., Drissel, A., Mancini, B., Roulac, S., & Youngers, M. (Speakers). (1994). Business leaders and intuition [Cassette Recording]. Berkeley: Conference Recording Service.
- Freedman, R. & Stumpf, S. (1978). What can one learn from the learning style inventory? Academy of Management Journal, 21 (2), 275-282.
- Freedman, R. & Stumpf, S. (1980). Learning style theory: Less than meets the eye. Academy of Management Review, 5 (3), 445-447.
- Freedman, R. & Stumpf, S. (1981). Learning style theory: Still less than meets the eye. Academy of Management Review, 6 (2), 297-299.
- Friedman, M.(Speaker). (1994). "Poltergeist:" An intuitive view of American politics [Cassette Recording]. Berkeley: Conference Recording Service.

- Friedman, M. (1995). Intuitives in Washington. Intuition, 7, 21-27.
- Fritz, R. (1989). The path of least resistance. New York: Fawcett Columbine.
- Fuller, B. (1972). Intuition. New York: Doubleday & Company, Inc.
- Garfield, C. (1986). Peak performers: The new heroes of American business. New York: Avon Books.
- Gelatt, H. (1991). Creative decision-making: Using positive uncertainty. California: Crisp Publications, Inc.
- Gelatt, H. B. (1989). Positive uncertainty: A new decision-making framework for counseling. Journal of Counseling Psychology, 36 (2), 252-256.
- Gelatt, H. B. (1993). Future sense: creating the future. The Futurist, 27 (5), September-October, 9-13.
- George, J. & Lyon, T. (2000). The Intuitive Businesswoman. New York: Random House.
- Glaser, M. (1995). Measuring intuition. Research Technology Management, 38 (2), March-April, 43-46.
- Goldberg, P. (1983). The intuitive edge. New York: G. P. Putnam's Sons
- Goldberg, P. (1988). 10 tips to improve your intuition. The Journal of Intuitive Discovery, 1, Fall, 8-13.
- Goldberg, P. (Speaker). (1994). Intuition, imagination & intelligence [Cassette Recording No. 1847]. San Francisco: New Dimensions Foundation.
- Goldhaber, G. M. (1986). Organizational communication. Iowa: Wm. C. Brown Publishers.
- Goleman, D. (1995). Emotional Intelligence: Why It Can Matter More Than IQ for Character, Health, and Lifelong Achievement. New York: Bantam Books.
- Grandori, A. (1984). A prescriptive view of organizational decision making, Administrative Science Quarterly, 24, 192-209.
- Grey, M. (1983). Creative thinking. Public Management, February, 10-15.
- Gustavsson, B. & Harung, H. (1994). Organizational learning based on transforming collective consciousness. The Learning Organization, 1 (1), 33-41.

- Halpern, J. & Stern, R. (1998). Debating Rationality: Nonrational Aspects of Organizational Decision Making. Ithaca, NY: Cornell University Press.
- Hambrick, D., Cho, T. & Chen, M. (1996). The influence of top management team heterogeneity on firms' competitive moves. Administrative Science Quarterly, 41, 659-684.
- Hamel, G. & Prahalad, C. K. (1994). Seeing the future first. Fortune, September 5, 64-70.
- Harding, G. & Craft, K. (date unknown). Stratified systems research. Organization Productivity and Human Development.
- Harper, S.C. (1988). Intuition: What separates executives from managers. Business Horizons, September-October.
- Harrison, J. & March, J. (1984). Decision-making and post-decision surprises. Administrative Science Quarterly, 29, 26-42.
- Hayashi, A.M. (2001). When to trust your gut. Harvard Business Review, February.
- Heinberg, R. (1999). Intuition by the book [Book review of You Already Know what to do by Sharon Franquemont]. Intuition, 28, 38.
- Hendricks, C.F., (1991). The limits of rationality. HR Magazine, September, 144.
- Hermann, N., (1981). The creative brain. Training and Development Journal, October.
- Hermann, N., (1989). Hermann Brain Dominance Instrument. Lake Lure, North Carolina: Applied Creative Services, LTD.
- Herron, S., Jacobs, L. & Kleiner, B. (1985). Developing the right brain's decision making potential. Supervisory Management, March, 6-22.
- Higgings, J. (1994). 101 creative problem solving techniques: The handbook of new ideas for business. Florida: The New Management.
- Hill, N. (1993). Put the brakes on decision-making momentum. Business Management, April, 23-24.
- Hilmer, F. & Donaldson, L. (1996). The trivialization of management. The McKinsey Quarterly, 4, 26-37.
- Hirsh, S.K. (1996). Work It Out: Clues for Solving People Problems at Work. Palo Alto, CA.: Davies Black Publishing.

- Hirsh, S.K. & Kummerow, J. M. (1990). Introduction to Type in Organizations. Palo Alto, CA.: Consulting Psychologists Press, Inc.
- Hirshberg, J. (1998). The creative priority: Driving innovative business in the real world. New York: HarperBusiness.
- Hof, R. (1995). The education of Andrew Grove. Business Week. January 15, 1995, 60-62.
- Howard, P. & Howard, J. (1995). Buddy, can you paradigm? Training & Development, 49 (9), 28-34.
- Hummel, R. (1990). Intuition and the public manager. [Review of Intuition in organizations: Leading and managing productively.] Public Administration Review, July-August, 458-460.
- Huysmans, J. (1970). The effectiveness of the cognitive-style constraint in implementing operations research proposals. Management Science, 17 (1), September, 92-104.
- Hyde, M. & McGuinness, M. (1994). Introducing Jung. New York: Totem Books.
- Intuition, (1999) Microsoft® Encarta. Funk & Wagnall's Corporation. 3(2), 267-299.
- Isaack, T. (1978). Intuition: An ignored dimension of management. Academy of Management Review, October, 917-922.
- Isenberg, D. (1984). How senior managers think, Harvard Business Review, November-December, 81-90.
- Isenberg, D. (1985). How managers think. (Reply to Briefings). Harvard Business Review, January-February, 185-186.
- Jackson, G. (1989). Executive ESP: Access your intuition for business success. New York: Pocket Books.
- Jackson, S. & Dutton, J. (1988). Discerning threats and opportunities. Administrative Science Quarterly, 33, 370-387.
- Jacobs, R. (1989). Getting the measure of management competence. Personnel Management, 21 (6), 32-38.
- James, B. (1988). Marketing: In search of a competitive role model. Journal of Marketing Management, 4 (1), 1-13.
- Janis, I. (1989). Crucial decisions-Leadership in policymaking and crisis

- management. New York: The Free Press.
- Jaques, E. & Cason, K. (1994). Human capability: A study of individual potential and its application. Virginia: Cason Hall & Co.
- Jaques, E. (1990). In praise of hierarchy. Harvard Business Review, January-February, 127-133.
- Jaworski, J. (1996). Synchronicity. New York: Berrett-Koehler.
- Johansson, J. & Nonaka, I. (1997). Relentless: The Japanese way of marketing. New York: Harper Business.
- Johnson, P. & Daumer, C. (1993). Intuitive development: Communication in the nineties. Public Personnel Management, 22 (2), 257-268.
- Johnson, V. (1993). Intuition in decision-making, Successful Meetings (3M Meeting Management Institute), February, 14-15.
- Johnston, D. (1983). Flip of the coin. (Commentary). Public Management, February, 17-18.
- Jung, C. G. (1934). Modern man in search of a soul. New York: Harcourt, Brace.
- Jung, C. G. (1971). Psychological types. Princeton University Press.
- Kanter, R. (1977). Men and women of the corporation. New York: Basic Books.
- Karpatschof, B. & Elkjaer, H. (2000). Yet the Bumblebee flies: The Reliability of Ipsative scores – Examined by empirical data and a simulation study, Research Report. Department of Psychology, University of Copenhagen. Denmark: Humanistisk Fakultet, December.
- Kirk, R.E. (1982). Experimental Design. Belmont, Ca.: Brooks/Cole.
- Keirsey, D. & Bates, M. (1984). Please understand me: Character & temperament types. California: Prometheus Nemesis Book Company.
- Kellar, E. (Ed.). (1983) .Commentary. Public Management. 65, (2), 17-19.
- Kellar, E. (Ed.). (1983). Editor's notes. Public Management. 65, (2).
- Kennedy, C. (1991). Instant management. New York: William Morrow and Company, Inc.
- Kepner, C. (1996). Calling all thinkers. HR Focus, October, 3.

- Kerlinger, F. (1986). Foundations of behavioral research. (3rd Ed.). Orlando: Holt, Rinehart and Winston, Inc.
- Kolb, D. (1981). Experiential learning theory and the learning style inventory: A Reply to Freedman and Stumpf. Academy of Management Review, 6 (2), 289-296.
- Kondracke, M. (1991). Senator Lazarus. [America On-line].
- Kramer, P. (1996). Sizing up the jury. Intuition, 11, 8-13,54.
- Kroeger, O. & Thuesen, J.M. (1992). Type talk at work. New York: Delacorte Press.
- Kummerow, J., Barger, N., & Kirby, L. (1997). Work types. New York: Warner Books.
- Laabs, J. (1999). Personality Fit: A New Approach to Recruiting. Workforce, August, 89-90.
- LaBarre, P. (1997). Everything you wanted to know about the future...but never thought to ask. Fast Company, December-January, 50-54.
- Langley, A. (1995). Between paralysis by analysis and extinction by instinct. Sloan Management Review, Spring, 63-76.
- Lank, A. & Lank, E. (1995). Legitimizing the gut feel: The role of intuition in business. Journal of Managerial Psychology, 10 (5), 18-24.
- Lawrence, G. (1979). People Types and Tiger Stripes: A Practical Guide to Learning Styles. Gainesville, FL: Center for Applications of Psychological Type, Inc.
- Leavitt, H.J. (1975a). Beyond the analytic manager. California Management Review, 17, No.3.
- Leavitt, H.J. (1975b). Beyond the analytic manager: Part II. California Management Review, 17, No. 4.
- Leonard, D. & Straus, S. (1997). Putting your company's whole brain to work. Harvard Business Review, July-August, 111-121.
- Levine, A. (1995). When can intuitions on counterfactual cases be trusted? 1-11. Internet.
- Licauco, J.T. (1991). Intuitive Management: The Battle for the Manager's Mind, World Executive Digest, October, 29-35.

- Linkow, P. (1999). What gifted strategic thinkers do. Training & Development, July, 34-37.
- Livingston, J. (1971). Myth of the well-educated manager. Harvard Business Review, January-February, 79-89.
- Lundquist, K. (1996). Midlife: From crisis to quest. Intuition, 14, 18-25.
- Lynch, D. (1980). The case for disorderly conduct: How to get the most out of managerial manpower. Management Review, 69 (2).
- Macher, K. (1988). Empowerment and the bureaucracy. Training & Development, 42 (9), September, 41-45.
- MacKinnon, D. (1962). The nature and nurture of creative talent. American Psychology, 17, 484-495.
- Macy, J. (Ed.), (1995). Using the Intuition Network. Noetic Sciences Bulletin. Winter, 1994-5.
- Maljers, F. (1990). Strategic planning and intuition in Unilever. Long Range Planning, 23 (2), April, 63-68.
- March, J. (1996). Continuity and change in theories of organizational action. Administrative Science Quarterly, 41, 278-287.
- March, J. G. (1994). A primer on decision making-How decisions happen. New York: The Free Press.
- Markoff, G., Douglas, M., Lillie, I. & Shuman, J. (Speakers). (1994). Intuition in financial forecasting [Cassette Recording]. Berkeley: Conference Recording Service.
- Markova, D. (Speaker). (1997). How we learn [Cassette Recording No. 2610]. California: New Dimensions Foundation.
- Maslow, A. (1954). Motivation and Personality. New York: Harper & Row.
- Maslow, A. (1970). Motivation and personality. (2nd Ed.). New York: Harper & Row.
- Mattimore, B. (1994). How to be right 95% of the time. Across the Board, 31 (5), May, 45-47.
- Mauro, C. (1989). Intuition and psychotherapy: An Interview with Frances Vaughan, Ph.D. Intuition, 1(2), 6-9.

- Mauro, C. (Ed.). (1995). Worldwide news. Intuition, 8, 6-7.
- McGinnis, W. (1983). Decision-making process. (Commentary). Public Management, February, 17.
- McNeill, B. & Guion, C. (Eds.). (1991). The case against competition [from a talk by Alfie Kohn]. Noetic Sciences Collection: 1980 to 1990 Ten years of consciousness research. California: The Institute of Noetic Sciences, 84-94.
- Meisgeier, Charles, Murphy, E., & Meisgeier, Constance. (1989). A Teacher's Guide to Type: A New Perspective on Individual Differences in the Classroom. Palo Alto, CA.: Consulting Psychologists Press.
- Meyer, M. W. & Zucker, L. G. (1989). Permanently failing organizations. California: Sage Publications, Inc.
- Meyer, P. (Ed.). (1994). Develop trust in your intuition. The Leadership Advantage. 1, (11).
- Milne, T. (1989). Left hand, right brain, wrong career? Personnel Management, 21 (1), 40-44.
- Mintz, S. (1999). Getting Real. CFO. November, 52 – 60.
- Mintzberg, H. (1989). Mintzberg on management-Inside our strange world of organizations. New York: The Free Press.
- Mintzberg, H. & Quinn, J. (Eds.). (1992). The strategy process: Concepts and contexts. New Jersey: Prentice-Hall.
- Mintzberg, H. (1973). The nature of managerial work. New York: Harper & Row.
- Mintzberg, H. (1975). The manager's job: folklore and fact. Harvard Business Review, July-August, 49-61.
- Mintzberg, H. (1976). Planning on the left side and managing on the right. Harvard Business Review, July-August, 49-58.
- Mintzberg, H. (1979). An emerging strategy of 'direct' research. Administrative Science Quarterly, 24, 582-589.
- Mintzberg, H., Raisinghani, D. & Theoret, A. (1976). The structure of 'unstructured' decision processes. Administrative Science Quarterly, 21, June, 246-275.
- Mishlove, J. (1994). Intuition: The source of true knowing. Noetic Sciences Review. 29, Spring, 31-36.

- Mishlove, J. (1995). Intuition at work: A gathering of colleagues. Intuition, 6, 48.
- More, B. (1999). Acting on "In Q" Profile on Sharon Franquemont]. Intuition, 27, 8-13.
- Morgan, G. (1993). Imaginization-the art of creative management. California: Sage Publications.
- Moussavi, F. (1991). Beyond organizational rationality: Toward a more relevant image of organizations. Journal of Management Education, 15 (4), November, 465-477.
- Myers, I. B. (1983). Myers-Briggs Type Indicator . Palo Alto, CA.: Consulting Psychologists Press.
- Myers, I.B. (1987). Introduction to Type, Revised Edition. Palo Alto, CA.: Consulting Psychologists Press, Inc.
- Myers, I.B., & McCaulley, M.H. (1985). Manual: A guide to the development and use of the Myers-Briggs Type Indicator. Palo Alto, CA.: Consulting Psychologist Press.
- Myers, J. (1982). Hemisphericity Research: An overview with some implications for problem solving. The Journal of Creative Behavior, 16 (3), Third Quarter, 197-211.
- Nadel, L. (1990). Sixth sense: The whole brain book of intuition, hunches, gut feelings and their place in your everyday life. New York: Prentice-Hall.
- Naisbitt, J. & Aburdene, P. (1990). Megatrends 2000. New York: Morrow.
- Naparstek, B. (1997). Your sixth sense: Activating your psychic potential. San Francisco: Harper.
- Nelson, B., Good, L. & Hill, T. (1997). Motivate employees according to temperament. HRMagazine, March, 51-56.
- Nevis, E., DiBella, A. & Gould, J. (1995). Understanding organizations as learning systems. Sloan Management Review. 36, (2), Winter, 73-85.
- Norris, C. & Achilles, C. (1988). Intuitive leadership: A new dimension for education leadership. Planning and Changing, Summer, 664-668.
- Nugent, P. (1981). Management and modes of thought. Organizational Dynamics, Spring, 45-59.

- Nutt, P. (1984). Types of organizational decision processes. Administrative Science Quarterly, 29, 414-450.
- Olson, P. & Bosserman, D. (1984). Attributes of the entrepreneurial type. Business Horizons, May-June, 53-56.
- Oman, Maggie. (1998). Sacred shapes. Intuition, 22, 14-19.
- Ornstein, R.E. (1972). The psychology of consciousness. New York: Penguin Books, Inc.
- Ortmeyer, G. (1996). Making better decisions faster. Management Review, June, 53-56.
- Osborne, R. (1995). The essence of entrepreneurial success. Management Decision, 33 (7), 4-9.
- Overman, S. (1994). Decision making by the book. HR Magazine, 39 (10), 62-66.
- Page, I. (1978). Science, intuition, and medical practice. Post Graduate Medicine. 64(5), 217-221.
- Palmer, H. (Ed.) (1998). Inner Knowing. New York: Tarcher-Putnam.
- Parikh, J. (1994). Intuition: The new frontier of management. Massachusetts: Blackwell Publishers.
- Payne, J., Bettman, J. & Johnson, E. (1988). Adaptive strategy selection in decision making. Journal of Experimental Psychology, 14 (3), 534-552.
- Peak, M. (Ed). (1996). Editor's note: Mission control: Command and control promotes the growth of policy manuals. Management Review. April.
- Peavey, R. (1963). "A Study of C. G. Jung's Concept of Intuitive Perception and Intuitive Type." Unpublished Doctoral Dissertation, University of Oregon. Cited by Thornton, J. M. (1971). Intuition: A conceptual spectrum for educators.
- Peirce, P. (1997). The Intuitive Way. Hillsboro, Oregon: Beyond Words Publishing Inc.
- Peters, T. (1984). Strategy follows structure: Developing distinctive skills. California Management Review, 26 (3), Spring, 111-125.
- Peters, T.J. & Waterman, R. H., Jr. (1982). In search of excellence. New York: Warner Books.

- Piattelli-Palmarini, M. (1995). Mental tunnels, Across the board, February, 27-30.
- Posner, B. & Schmidt, W. (1992). Values and the American manager: An update updated. California Management Review, 34 (3), Spring, 80-94.
- Prietula, M. & Simon, H. (1989). The experts in your midst. Harvard Business Review, January-February, 120-124.
- Quinn, J., Anderson, P. & Finkelstein, S. (1996). Leveraging intellect. The Academy of Management Executive, 10 (3), November, 7-27.
- Ranshaw, J. (1998). What is your write type? Performance Improvement, 37 (9), November-December, 28-29.
- Raudsepp, E. (1981). Can you trust your hunches? Administrative Management, October, 34-49.
- Raudesepp, E. (1982). How to create new ideas. Englewood Cliffs, NJ: Prentice-Hall.
- Ray, M. & Myers, R. (1986). Creativity in business. New York: Doubleday.
- Reddy, W. (1994). Intervention skills: Process consultation for small groups and team. San Diego: Pfeiffer & Co.
- Reeves, K. (1992). Scaling the invisible wall: Business mentors give owners a boost. Houston Business Journal, July 20, 1992.
- Riggs, G. (1987). The use of intuition by managers of major corporations in Washington State. (Doctoral dissertation, Gonzaga University). Ann Arbor, MI: UMI Dissertation Services.
- Robey, D. & Taggart, W. (1981). Measuring managers' minds: the assessment of style in human information processing. Academy of Management Review, 6 (3), 375-383.
- Robins, J. (1987). Organizational Economics: Notes on the use of transaction-cost theory in the study of organizations. Administrative Science Quarterly, 32, March, 68-86.
- Rockart, J. (1979). Chief executives define their own data needs. Harvard Business Review. March-April, 81-93.
- Rockenstein, Z. (1988). Intuitive processes in executive decision making. The Journal of Creative Behavior, 22 (2), 77-84.
- Rosanoff, N. (1994). Worldwide news. Intuition, 5, 6-7.

- Rosanoff, N. (1996). Intuition workout. Intuition, 10, 8-9.
- Rosanoff, N. (1999). Intuitive Investing. Intuition, 27, 14-21.
- Rosanoff, N., Hall, L. & Shankland, S. (Speakers). (1994). The role of intuition in conflict management [Cassette Recording]. Berkeley: Conference Recording Service.
- Ross, A. (1992). The long view of leadership. Canadian Business, May.
- Rowan, R. (1986). The intuitive manager. Boston: Little, Brown and Company.
- Rowan, R. (Speaker). (1987a). The intuitive manager [Video Recording]. Chicago: MTI Film & Video.
- Rowan, R. (1987b). The intuitive manager participants workbook. Illinois: MTI Film & Video.
- Rowan, R. (1987c). The intuitive manager leader's guide. Illinois: MTI Film & Video.
- Ruchilis, H. (with S. Oddo). (1990) Clear thinking: A practical introduction. New York: Prometheus Books.
- Salton, G. (1994). I-Opt™ Survey, Ann Arbor, MI: Professional Communications Inc.
- Salton, G. (1996). Organizational Engineering. Ann Arbor, MI: Professional Communication Inc.
- Salton, G. (2000). The Manager's Guide to Organizational Engineering. Amherst, MA: HRD Press.
- Salton, G. & Fields, A. (1999). Understanding and Optimizing Team Learning. The Journal of Applied Management and Entrepreneurship, September, 48 – 60.
- Saville, P. & Willson, E. (1991). The reliability and validity of normative and ipsative approaches in the measurement of personality. Journal of Occupational Psychology, 64, 219-238.
- Schipper, F. (1996). Rationality and the philosophy of organization. Organization, 267-289.
- Schmitt, N. & Limoski, R. (1991). Research methods in human resources management. Cincinnati: South-Western Publishing Co.
- Schoemaker, P. & Russo, J. (1992). Managing overconfidence. Sloan

Management Review, Winter, 7-17.

Schoemaker, P. & Russo, J. (1993). A pyramid of decision approaches. California Management Review, 36 (1), 9-31.

Schultz, B. (1994). Intuition in business. Intuition, 5, 14-21.

Schultz, R. (1979). Unconventional wisdom. New York: Harper Business.

Schultz, R. (1994). Intuition: Your Most Powerful Tool, Self Magazine, March, 128-131.

Schwartz, S. (Speaker). (1994). Practical intuition: From the laboratory to the boardroom [Cassette Recording]. Berkeley: Conference Recording Service.

Scott, W. (1996). Do historical facts speak for themselves? Imagination and intuition in management history. Journal of Management History, 2 (3), 85-90.

Seal, K. (1995). Tune your intuition! Self, August, 60.

Senge, P. (1990a). The fifth discipline: The art & practice of the learning organization. New York: Doubleday.

Senge, P. (1990b). The leader's new work: building learning organizations. Sloan Management Review, 32 (1), 7-23.

Shapira, Z. (1995). Risk taking: A managerial perspective. New York: Russell Sage Foundation.

Shapiro, S. & Spence, M.T. (1997). Managerial intuition: A conceptual and operational framework. Business Horizons, 40 (1), January/February, 63-68.

Sharratt, J. (1989). The impact of the information explosion on management innovation. Industrial Management + Data Systems, 3, 22-26.

Siemasko, D. (1992). 12 Steps to jump-starting your programs. Training & Development, May, 97-106.

Silver, W. & Mitchell, T. (1990). The status quo tendency in decision making. Organizational Dynamics, 18, Spring, 34-46.

Simon, H. (1973a). Applying information technology to organization design. Public Administration Review, 33 (3), May-June, 268-278.

Simon, H. (1973b). Organizational man: Rational or self-actualizing? Public Administration Review, 33 (4), July-August, 346-353.

- Simon, H. (1977). [Review of The New Science of Management Decision]. Administrative Science Quarterly, 342-351.
- Simon, H. (1987). Making management decisions: The role of intuition and emotion. Academy of Management Executive, 1 (1), February, 57-64.
- Smith, J.H. (1994). Coping with stress: The implications of leader personality. The Journal of Leadership Studies, 1 (3), 26-36.
- Solomon, C. (1996). Report from Hong Kong-Futurist inspires HR leaders. Personnel Journal. September, 78-85.
- Soltysik, R. (2000). Validation of Organizational Engineering. Amherst, MA: HRD Press.
- Sorensen, K. (Speaker). (1994). Instant intuition [Cassette Recording]. Berkeley: Conference Recording Service.
- Spitzer, Q. & Evans, R. (1997). Heads you win: How the best companies think. New York: Simon & Schuster.
- Sprecher, L. (1983). Intuition, anyone? Public Management, February, 18. Spring, 5-21.
- Stavrou-Costea, E. (unknown). Saving our hierarchy. OD Practitioner, 32-40.
- Steer, S. B. (1989). Now I know I am Okay. Bryan, TX: C.G. Jung educational Center.
- Stipp, D. (1997). Richard Saul Wurman: The king of access. Fortune, June 23, 106-116.
- Stokes, G. (1998). Freeing Your Intuition: A Beginner's Guide. London, England: Headway-Hodder & Stoughton.
- Stuller, J. (1997). EQ edging toward respectability, Training, June, 43-48.
- Swift, W. (1999). Shapeshifter. Intuition, April, 29-33, 56.
- Taggart, W. & Robey, D. (1981). Minds and managers: On the dual nature of human information processing and management. Academy of Management Review, 6 (2), 187-195.
- Taggart, W. & Taggart-Hausladen, B. (1993). Personal style inventory: Gateway to personal flexibility. (Trainer's Manual). Florida: Psychological Assessment Resources, Inc.

- Taggart, W. & Valenzi, E. (1990). Assessing rational and intuitive styles: a human information processing metaphor. Journal of Management Studies, 27 (2), March, 149-172.
- Taggart, W., Robey, D. & Kroeck, K. G. (1985). Managerial decision styles and cerebral dominance: An empirical study. Journal of Management Studies, 22 (2), 175-192.
- Taggart, B. (Speaker). (1994). Harmonizing our rational and intuitive styles [Cassette Recording]. Berkeley: Conference Recording Service.
- Talbot, R. (1989/90). Valuing differences in thinking styles to improve individual and team performance. National Productivity Review, 9 (1), Winter, 35-49.
- Taninecz, G. (1996). Following the music. Industry Week, 245 (15), August 19, 111-114.
- Taylor, E. (1988). The experience of intuition in management decision making A phenomenological inquiry and consolidation of a model. (Doctoral dissertation. Union Graduate School). Ann Arbor, MI: UMI Dissertation Services.
- Tesolin, A. (2000). How to Develop the Habit of Intuition. Training and Development. March, 76.
- Thompson, H. L. (1996). Jung's Function-Attitudes explained. Watkinsville, GA.: Wormhole Publishing.
- Thornton, J. (1971). Intuition: A conceptual spectrum for educators. (Doctoral dissertation, Rutgers University). Ann Arbor, MI: UMI Dissertation Services.
- Tichy, N.M. (1997). The Leadership Engine: How Winning Companies Build Leaders at Every Level. New York: HarperCollins.
- Trochim, W. (1999). The Research Methods Knowledge Base (second edition). Internet.
- Truman, P. (1996). Intuitively yours (intuition and decision- making). Management Services, 40 (10), 16-18.
- Twist, L., & Garfield, C. (Speakers). (1994). The spirit of service [Cassette Recording No. 2514]. San Francisco: New Dimensions Foundation.
- Van Cauwenbergh, A., Durinck, E., Martens, R., Laveren, E. & Bogaert, I. (1996). On the role and function of formal analysis in strategic investment decision processes: Results from an empirical study in Belgium. Management Accounting Research, 7 (2), 169-185.

- Vaughan, F. E. (1979). Awakening intuition. New York: Anchor Books.
- Venn, S. (1995). The ABC's of your IQ2. Intuition, 6, 19,36.
- Walker, R. G. (1989). The imperative of leaders to create leaders. Directors & Boards, 13 (2), 21-26.
- Wally, S. & Baum, J. (1994). Personal and structural determinants of the pace of strategic decision making. Academy of Management Journal, 37 (4), 932-956.
- Weber, L. (1996). Worldwide News. Intuition, 11, 6-7.
- Weber, L. (1997). Dean Radlin: Notes from the scientific frontier. Intuition, 16, 26-29.
- Westcott, M. (1961). On the measurement of intuitive leaps. Psychological Reports, 9, 267-274.
- Westcott, M. (1968). Toward a contemporary psychology of intuition: A historical and Empirical inquiry. New York: Holt Rinehart and Winston, Inc.
- Weston, V.L. (1999). Intuition: one on one. [Cassette recording – set of two audiocassettes]. Atlanta: Zoie Films and Moonfish Entertainment.
- White, R., Hodgson, P., & Crainer, S. (1996). The Future of leadership. Pitman Publishing.
- Whitney, J. (1996). Strategic renewal for business units. Harvard Business Review, July-August, 84-98.
- Wild, R. (1998). Find your \$1 Million idea. Success, June, 52-56.
- Wren, D. (1987). The evolution of management thought. (3rd Ed.). New York: John Wiley and Sons.
- Zdenek, M. (1983). The right- brain experience: An intimate program to free the powers of your imagination. New York: McGraw Hill.
- Zey, M. (Ed.). (1992). Decision-making: Alternatives to rational choice models. California: Sage Publications, Inc.
- Zey, M. (1998). Rational Choice Theory and Organizational Theory: A Critique. Thousand Oaks, CA: Sage.
- Zink, J.C. (1998). Go with that gut feeling. Power Engineering, 102(9), September, 3.

Zinker, J. (1994). In search of good form: Gestalt therapy for couples and families. San Francisco: Jossey-Bass Publishers.