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# Thinking Style Differences among Academic Librarians

Linda M. Golian-Lui, *Kennesaw State University*



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# **THINKING STYLE DIFFERENCES AMONG ACADEMIC LIBRARIANS**

by

Linda Marie Golian

A Dissertation Submitted to the Faculty of the  
Department of Educational Leadership, College of Education  
In Partial Fulfillment of the Requirements for the Degree of  
Doctor of Education

Florida Atlantic University

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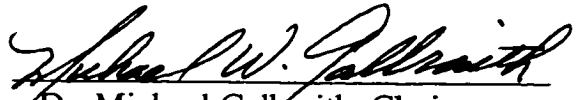
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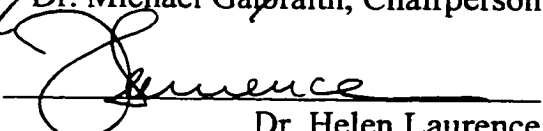
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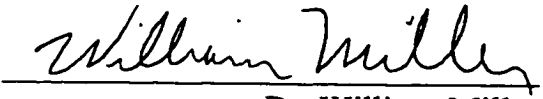
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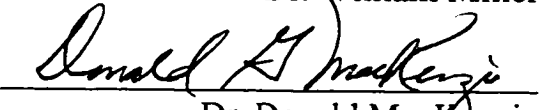
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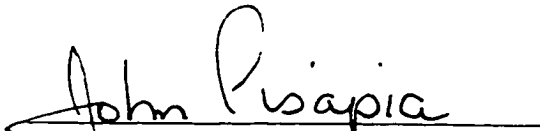
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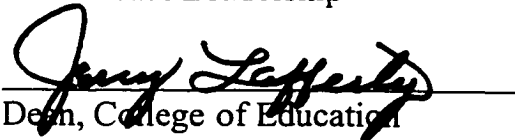
  
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Dr. William Miller

  
Dr. Donald Mackenzie

  
Chairperson, Department of  
Educational Leadership

  
Dean, College of Education

  
Dean of Graduate Studies and Research

7-15-98  
Date

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## **ABSTRACT**

**Author:** Linda Marie Golian  
**Title:** Thinking Style Differences Among Academic Librarians  
**Institution:** Florida Atlantic University  
**Dissertation Advisor:** Dr. Michael W. Galbraith  
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The purpose of this study was to investigate whether differences in thinking styles exist between senior level library administrators working in public and technical service areas in libraries with an institutional membership in the Association of Research Libraries (ARL). To facilitate this investigation, the Inquiry Mode Questionnaire (InQ) and a demographic data form were distributed in a nation-wide survey. The study achieved an 80.3% (106) return rate, with a total of 97 surveys used for data analysis.

The literature review is organized in three segments: definitional dilemma, theoretical framework, and review of previous research. The definitional dilemma addressed issues concerning four similar, but not interchangeable, terms of cognitive styles, learning styles, personality styles, and thinking styles.

Data analyses included five analyses of variance (ANOVAs) to determine relationships, differences, and interactions based upon the subject's administrative

role (public or technical), gender (female or male), and thinking style preference (synthesist, idealist, pragmatist, analyst, or realist). The dependent variable associated with this study was thinking style preference (synthesist, idealist, pragmatist, analyst, and realist). The two independent variables associated with this study were administrative role (public or technical service) and gender (female or male). As part of the ANOVA process, the interaction between gender and administrative role was analyzed. Data analysis also included descriptive information analysis, a cross tabulation computation, and a dyad comparison.

None of the 15 null hypotheses could be rejected based upon the ANOVA statistical computation using a .05 alpha level. However, the cross-tabulation and dyad analysis did reveal noteworthy findings, such as female library administrators were more likely to be idealist thinkers; male library administrators were more likely to be pragmatist and idealist thinkers; technical service administrators were more likely to be analyst, idealist, and pragmatist thinkers; and public service administrators were more likely to be idealist thinkers.

Five findings were summarized in this study. They are: (a) the sample had a preference towards the flat thinking style; (b) a relationship between gender and thinking style exist; (c) a relationship between area of administrative responsibility and thinking style exist; (d) a difference in preferred thinking styles among administrative peers in the same institution was uncovered; and (e) the



demographic analysis supported previous studies urging aggressive recruitment and diversity efforts for the library profession.

Seven conclusions were highlighted in the study. They are: (a) the potential for developing the flat thinking style among the librarians participating in the study, (b) the influence of gender upon thinking style preference, (c) the influence of organizational differentiation upon thinking style preference, (d) the lack of previous research connecting thinking style research with librarianship, (e) the effects of team-based management implementation upon thinking style preference, (f) the influence of a non-diversified organization upon thinking style preference, and (g) an explanation for generalizations and stereotypes among library administrative peers.

Recommendations for future study and enhancement of library management were included. Suggestions for improving library administration included incorporating thinking style research to help facilitate: (a) understanding among co-workers, (b) improving organizational communication, (c) providing opportunities for personal growth, and (d) providing opportunities for organizational growth.

**To Gary**

**x**

## TABLE OF CONTENTS

LIST OF TABLES .....	xvii
LIST OF FIGURES .....	xviii
CHAPTER I: OVERVIEW .....	1
Statement of the Problem .....	2
Purpose of the Study .....	6
Significance of the Study .....	7
Theoretical Foundation of the Study .....	7
Differentiation Theory .....	8
Organizational Information Processing Theory .....	9
Gender Theory .....	10
Thinking Style Theory .....	11
Research Questions .....	14
Hypotheses .....	14
Hypotheses 1: Synthesist .....	15
Hypotheses 2: Idealist .....	15
Hypotheses 3: Pragmatist .....	16
Hypotheses 4: Analyst .....	17
Hypotheses 5: Realist .....	18
Definition of Terms .....	18
Delimitations .....	29
Limitations .....	30
Assumptions .....	31
Organization of Future Chapters .....	32
Chapter Summary .....	32
CHAPTER II: REVIEW OF THE LITERATURE .....	34
Definitional Dilemma .....	35
Definitional Dilemma Background .....	35
Cognitive Styles .....	37
Learning Styles .....	41
Personality Styles .....	46
Thinking Styles .....	52
Summary of Definitional Dilemma .....	56

Theoretical Perspectives .....	57
Differentiation Theory .....	58
Organizational Information Processing Theory .....	60
Gender Theory .....	62
Thinking Style Theory .....	67
Churchman .....	67
Leibnizian Inquiry System .....	68
Lockean Inquiry System .....	68
Kantian Inquiry System .....	69
Hegelian Inquiry System .....	70
Singerian Inquiry System .....	70
Summary of Churchman's Topology .....	71
Buchler .....	72
Whitehead .....	73
Coleridge .....	73
Dewey .....	74
Descartes .....	75
Bentham .....	75
Summary of Buchler's Methodology .....	76
Jung .....	77
Thinking versus Feeling .....	78
Sensing versus Intuiting .....	78
Summary of Jung's Theory of Psychological Types .....	79
Harrison and Bramson .....	80
Summary of Harrison and Bramson .....	83
Review of Previous Research Studies .....	83
Studies Outside of Education Using the InQ .....	84
Malone .....	84
Yarbrough .....	86
K-12 Study Using the InQ .....	88
Higher Education Studies Using the InQ .....	90
Kienholz .....	91
Shank .....	92
Huang .....	94

Library Science .....	96
Frankie .....	97
Lowry .....	99
Choi .....	102
Johnson and White .....	103
Stein, Hand, and Totten .....	103
Squires, Hoopes, and Gillum .....	104
1992 ACRL Study .....	105
ARL Demographics Study .....	112
Summary of Related Research .....	113
Chapter Summary .....	116
 CHAPTER III: DESIGN OF THE STUDY .....	118
Restatement of the Research Questions .....	118
Sample Information .....	119
Selection of the Sample .....	119
ARL Membership .....	120
Administrative Level of Responsibility .....	122
Sample Size .....	125
Instrumentation .....	126
InQ Development and Background .....	126
Reliability .....	129
Validity .....	130
Scoring .....	133
Procedures .....	134
Pre-Survey Preparation .....	134
Survey Packets Contents .....	136
Post-Mailing Procedures .....	137
Confidentiality Procedures .....	139
To Increase Survey Participation .....	140
Data Analysis .....	141
Chapter Summary .....	142
 CHAPTER IV: RESULTS OF THE STUDY .....	143
Assistant Director Substitutions .....	143
Survey Response .....	145
Descriptive Sample Findings .....	147
Age .....	148
Race .....	148
Educational Background .....	148

Library Experience .....	150
Years of Professional Library Experience .....	151
Years of ARL Library Experience .....	151
Total Years of Library Experience (Including Paraprofessional) .....	152
Independent Variable Findings .....	153
Gender .....	153
Administrative Area of Responsibility .....	154
Hypothesis Findings .....	155
Strength of Thinking Preferences .....	155
Hypothesis 1: Synthesist .....	158
Hypothesis 2: Idealist .....	160
Hypothesis 3: Pragmatist .....	162
Hypothesis 4: Analyst .....	164
Hypothesis 5: Realist .....	166
Additional Statistical Analysis .....	168
Cross-Tabulation .....	168
Dyad Comparisons .....	171
Chapter Summary .....	172
 CHAPTER V: CONCLUSIONS OF THE STUDY .....	174
Highlights of the Findings .....	175
Flat Thinking Tendency .....	175
Gender and Thinking Style Preference .....	177
Area of Administrative Responsibility and Thinking Style Preference .....	178
Administrative Peer Differences .....	179
Demographic Profile .....	180
Summary of the Findings .....	180
Conclusions .....	181
Flat Thinking Potential .....	182
Gender Influence .....	183
Differentiation Influence .....	185
Lack of Previous Research .....	187
Implementation of Team Based Management .....	188
Influence of a Non-Diversified Organization .....	189
Impact of Peer Stereotypes .....	191
Summary of Conclusions .....	193

Recommendations .....	194
Future Thinking Style Research Using the InQ .....	195
Library Administration Improvement .....	196
Understanding Co-Workers .....	196
Improving Organizational Communication .....	197
Opportunities for Professional Growth .....	201
Opportunities for Organizational Growth .....	202
Recruitment and Diversification Assistance .....	203
Summary of Recommendations .....	206
Suggestions for Future Research .....	207
Chapter Summary .....	211
REFERENCES .....	214
APPENDIX A: Association of Research Libraries Membership List .....	229
APPENDIX B: Inquiry Mode Questionnaire (InQ) .....	232
APPENDIX C: Randomly Selected ARL Libraries Included in Study .....	237
APPENDIX D: Cover Letter Requesting Participation in Study .....	239
APPENDIX E: Consent Form .....	241
APPENDIX F: Demographic Data Form .....	244
APPENDIX G: Sample Survey Tracking Form .....	246
APPENDIX H: Florida Atlantic University's Internal Review Board Application Form .....	248
APPENDIX I: Participant's Request Form for Explanation of InQ Score and Executive Summary .....	251
APPENDIX J: Second Letter to Possible Participants (First Follow-up Letter) .....	253
APPENDIX K: Third Letter to Possible Participants (Second Follow-up Letter) .....	255

APPENDIX L: Fourth Letter to Participants (Thank You Letter) . . . . .	257
APPENDIX M: Executive Summary and Select Bibliography . . . . .	259
VITA . . . . .	262



## LIST OF TABLES

Table 2.1:	Summary of MBTI Personality Styles .....	51
Table 2.2:	Summary of Thinking Style Orientations .....	55
Table 2.3:	Summary of Definitional Dilemma Terms .....	57
Table 2.4:	Summary of Jung's Psychological Styles .....	79
Table 2.5:	Relationship of Thinking Styles, Thinking Modalities, and Thinking Methodology .....	81
Table 2.6:	1992 ACRL Study of Librarian Personality Styles .....	110
Table 3.1:	Test-retest Reliability and Subtest Intercorrelation Coefficients ..	130
Table 3.2:	Highest Positive Factor Loading on InQ Items .....	132
Table 3.3:	All Positive Factor Loading on InQ Items .....	132
Table 3.4:	Summary of InQ Thinking Style Preferences .....	134
Table 4.1:	Assistant Director Substitutions .....	144
Table 4.2:	Survey Response Rate .....	145
Table 4.3:	Usable Survey Data .....	147
Table 4.4:	Demographic Characteristics of the Sample .....	150
Table 4.5:	Library Experience of the Sample .....	152
Table 4.6:	Sample Demographics by Administrative Area and Gender ....	154
Table 4.7:	Strength of Preferences for a Specific Thinking Style .....	155
Table 4.8:	Mean Scores for InQ by Library Administrative Area and Gender	156
Table 4.9:	Mean Scores by Preference Scale .....	157
Table 4.10:	Analysis of Variance - Synthesist Thinking Style .....	158
Table 4.11:	Analysis of Variance - Idealist Thinking Style .....	160
Table 4.12:	Analysis of Variance - Pragmatist Thinking Style .....	162
Table 4.13:	Analysis of Variance - Analyst Thinking Style .....	164
Table 4.14:	Analysis of Variance - Realist Thinking Style .....	166
Table 4.15:	Variable in Cross Tabulation .....	169
Table 4.16:	Cross Tabulation Significance .....	170
Table 4.17:	Dyad Comparison .....	171
Table 5.1:	Quick Behavioral Clues to Help Recognize Thinking Styles ....	198
Table 5.2:	Thinking Style Behavioral Clues .....	200
Table 5.3:	Applications for Using Thinking Style Research .....	207

## **LIST OF FIGURES**

Figure 3.1: Typical ARL Library Organizational Structure .....	123
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## **CHAPTER I**

### **OVERVIEW**

Thinking is like breathing - we take it for granted. But how we think is just as vital to our success as leaders as breathing is to life. (*Thinking About Thinking*, 1993, p.70).

People think about things in different ways. Our thinking style is an interactive mix of inherited tendencies and conditioned responses to early behavioral experiences. As a result, each person favors a particular method of thinking. Our thinking style greatly affects how we approach the world, relate to others, reason, attain goals, organize, manage, solve problems, lead, and communicate (Bramson & Harrison, 1983; Bruner, Goodnow, & Austin, 1962; Cervetti, Franceschini, & Sojourner, 1989; Docket, 1968; Franceschini, Butler, Cervetti, Sojourner, Hughes, Reece, & Todd, 1989; Gough, 1991; Hanes, 1991; Harrison & Bramson, 1977; Hayes, Kienholz, Engel, & Mishra, 1993; Horak, 1990; Kienholz & Hritzuk, 1986; Krank, 1993; Parlette & Rae, 1993; Schwabbeuer, Weinholtz, Parlette, & Bramson, 1985; Sternberg, 1990; Watts & Pope, 1989). Our thinking style preferences also influence our decisions concerning career choices and desired responsibility within a chosen profession (Denis & Mackessy, 1982; La Pierre, 1992; McIntire & McIntire, 1980).

This research study concerns the investigation of thinking style preferences among academic librarians. Chapter I provides an overview of the study, and is organized into 12 sections. These sections include: (a) statement of the problem, (b) purpose of the study, (c) significance of the study, (d) theoretical foundation of the study, (e) research questions, (f) hypotheses, (g) definition of terms, (h) delimitations, (i) limitations, (j) assumptions, (k) organization of future chapters, and (l) chapter summary.

### **Statement of the Problem**

The first section of Chapter I concerns the statement of the research problem. Like most occupations, librarianship is a complex profession comprised of individuals with varying career objectives and comfort levels associated with job responsibilities. It is a profession filled with individuals from diverse social, managerial, educational, and philosophical backgrounds (Agada, 1984; Jonassen & Hodges, 1981; Nahl-Jakobovits, 1988; Parsons, 1995; Scherdin, 1994; Valejs, 1985; Wilder, 1995). A traditional professional denominator for librarians is the Master's of Library Science (MLS) degree. Although the MLS is a common educational factor, a vast diversity in undergraduate and postgraduate education is an additional characteristic typical of librarians.

Similar to educational and medical careers, librarianship is built upon a foundation of both generalists and specialists (Ochai, 1991). Librarianship is a flexible profession with ample opportunities for individualized preference in research interests, comfort in technical abilities, desired level of public service activities, expected level of technical service activities, and acceptance of administrative responsibilities. It is a profession known to use a wide assortment of instructional and communication techniques. Like the educational and medical vocations, librarianship is filled with practitioners who use various thinking styles in their daily routines (Choi 1989; Ferguson, 1989; Jaaskelainen, 1984; Kienholz, 1984; Lowry, 1988).

Although past research has documented behavioral differences between public service (i.e, general information, inter-library loan, and reference) and technical service librarians (i.e., acquisitions, binding, and cataloging), few scientific studies have been conducted to verify if these distinctions can be linked to a difference in cognitive styles (Choi & Washington, 1988; Lowry, 1988), with no prior research studies verifying whether these behavioral differences are linked to thinking style preferences. Therefore, a need exists to investigate whether variations in thinking style preferences actually do exist between two specific areas of library administration (public or technical).

Traditionally, large academic libraries are divided into work units that support the institution's mission. This division typically includes some type of distinction between public service departments (i.e., general information, inter-library loan, and reference), and technical service departments (i.e., acquisitions, binding, and cataloging) (Martin, 1994, 1996). A library's organizational success is dependent upon a rational, well-conceived understanding of the institution's management, mission, and vision by library leaders who supervise public and technical service activities. The ability to understand this complex library management process, and the diverse individualized differences among the professional staff, is crucial if library leaders are to transform input into output in order to produce effective organizational outcomes (Coughlin & Gertzog, 1992).

Intner (1993) indicated that the relationship between library public service and technical service departments is strained by many variables, including diversities in management orientations, differences in public service philosophies, and varying approaches towards descriptive cataloging. Xu (1996) concluded that the administrative area of responsibility (public or technical service) and the level of responsibility (i.e., director, associate director, assistant director, department head) had a direct relationship to communication behaviors of individuals within a library.

One undocumented assumption common in the field of library science is the belief that public service and technical service librarians think differently and therefore behave diversely. It is not uncommon during typical library administrative sessions to hear statements such as "You don't think like a cataloger!" "A reference librarian does not approach problem solving like that!" "You just don't understand!" "You don't comprehend our patrons' needs and how they conduct research!" These differences can create an abyss between public service and technical service librarians on issues of communication styles, bibliographic instruction theory, bibliographic control record integrity, and patron assistance philosophy (Intner, 1993).

Research has been conducted on behavioral differences between public service and technical service librarians and how these differences relate to conflict within a library organization (Frankie, 1980). Lowry (1988) concluded that most previous studies on behavioral differences and conflict within library organizations have been anecdotal accounts filled with brief and superficial references to organizational conflict literature. Although research documenting behavioral differences between public service and technical service librarians could be found in the literature, only two previous studies investigated the possibilities of thinking style differences among librarians (Choi & Washington, 1988; Lowry, 1988).

Thinking style research indicates that our cognitive preferences greatly influence how we relate and communicate (Parlette & Rae, 1993; Svendsen & Svendsen, 1995). Therefore, differences in thinking styles might contribute to organizational communication and institutional conflict. Since thinking preferences greatly influence our overall career choice (McIntire & McIntire, 1980), professions with great diversity, such as librarianship, should reveal significant differences in preferred thinking styles among the professionals in specific administrative areas such as public or technical services.

### **Purpose of the Study**

The next section of Chapter I concerns the purpose of the research study. The purpose of this study was to investigate scientifically the assumption that public and technical service librarians have different thinking style preferences. The study was designed to investigate whether differences in thinking style preferences actually do exist between two specific types of senior level library administrators (public or technical service) working in libraries with an institutional membership in the Association of Research Libraries (ARL). This study also investigated if gender had a statistically significant relationship to the preferred thinking style of senior level library administrators working in ARL institutions, and if a statistically significant interaction between administrative role (public or technical service) and gender (female or male) existed.



### **Significance of the Study**

The third section of Chapter I concerns the significance of the research study. The significance of this study was to strengthen the existing body of knowledge concerning effective academic library management and thinking style theory. The study will be of value to the fields of library administration and higher education by:

1. Contributing to the established body of knowledge regarding thinking styles in library administrative and higher education situations.
2. Providing information on how library leaders can incorporate an understanding of thinking style differences to improve communication and library management.
3. Suggesting areas for future studies regarding thinking styles and library administration.

### **Theoretical Foundations of the Study**

The fourth section of Chapter I concerns the theoretical foundations of the study. The research foundation of this study was a combination of differentiation, organizational information processing, gender, and thinking style theories. This section provides a brief highlight of each of these theories, with the literature review in Chapter II providing an in-depth focus and additional analysis.

## **Differentiation Theory**

The first theoretical foundation concept associated with this study is differentiation theory. According to the theory of differentiation, when organizations grow in size, they become more complex (Nicholson, 1995). In an attempt to manage the organization, subunits, such as library public and technical service departments are created. In time, these organizational subunits become more differentiated from other subunits in order to deal with specific work routines. It is not unusual for the managers and workers in these subunits to eventually develop differences in cognitive and emotional orientations (Daft, 1986). Conformity within the subunit is the desired norm, with individual members behaving, and possibly thinking, like the rest of their unit in order to be considered effective, successful, and part of the team. This splintering of work groups within an organization can act as a catalyst for communication and work-flow problems among subunits.

Libraries are differentiated organizations known for their systems of units and subunits (Lowry, 1988). To be considered a team member, individual librarians begin to align with the goals, missions, communication patterns, and managerial philosophies of their subunit (Dewey & Creth, 1993). Their professional success becomes contingent upon their ability to conform and think like the leaders and other members of their subunit.

### **Organizational Information Processing Theory**

The second theoretical foundation concept associated with this study is organizational information processing theory. The theory of organizational information processing views institutions, such as libraries, as open social systems that gather and interpret information in order to produce output (Coughlin & Gertzog, 1992; Xu, 1996). Each department develops its own functional specialization, goals, language, and frame of reference, which are maintained by individuals within each department who share similar values, beliefs, and thinking styles.

Communication nuances, whether formal or informal, written or non-written, are key elements in the theory of organizational information processing. Although libraries are viewed as open social systems, their formal communication patterns are typically controlled, with the majority of communication conducted within work units. Communication outside of specific subunits is typically conducted through middle and senior level administrators of the organizational hierarchy.

Svendsen and Svendsen (1995) have linked differences in thinking styles with differences in communication patterns and preferences. Their research reveals that thinking style differences can result in communication misinterpretations. In organizations such as libraries where communication

outside of specific subunits can be restricted because of organizational bureaucracy and differentiation, thinking style differences can contribute to ineffective library inter-unit interactions.

### **Gender Theory**

The third theoretical foundation concept associated with this study is gender theory. The belief that men and women differ from each other not only biologically, but sociologically and psychologically, form the basis of gender theory (Bem, 1987). Gender theory distinguishes between the terms sex and gender, with the latter term considered a more comprehensive concept that can be analyzed to explain differences in attributes and behaviors between men and women (Humm, 1995).

Many physiological differences between men and women are quite obvious. Other biological differences between men and women are not as obvious, with some researchers noting gender differences in brain development and human cognition (Belenky, Clinchy, Goldberger, & Tarule, 1986; Caplan, Crawford, Hyde, & Richardson, 1997).

During socialization, children learn how to act through a process of rewards and punishments. In this process, children are rewarded and punished according to their compliance with sex-appropriate behaviors. An individual's

gendered identity is formed and changed through interpretations made in social interactions with others (England, 1993).

According to Bem (1987), the first psychologist to ask how male and female are transmuted into acceptable concepts of masculine and feminine was Sigmund Freud. Since Freud's study of gender and psychological differences, most major source books in developmental psychology includes a discussion of sex typing within the review of psychoanalytic theory (the process of how a child identifies with the same-sex parent).

In an attempt to understand the impact of gender upon the profession, many librarians have conducted research, or included gender variables, concerning differences between male and female librarians (Scherdin, 1994). In addition to the studies conducted by library professionals, women's studies scholars provide citations to research concerning gender differences and similarities among men and women in communication patterns (Tannen, 1993 & 1994) and conflict interactions (Taylor & Miller, 1994). According to Harrison and Bramson, thinking style differences also contribute to these noted gender differences.

### **Thinking Style Theory**

The fourth, and final, theoretical foundation concept associated with this study is thinking style theory. Many definitions exist for the term "thinking," with Aristotle exploring the field of thinking theory as early as 400 B.C. Although

definitions are plentiful in the literature of psychology (Bruner, Goodnow, & Austin, 1962; Bruner & Tajfel, 1961; Harrison & Bramson, 1984) it is difficult to precisely define the process of thinking, and therefore thinking theory (Huang, 1993).

Mayer (1983) summarizes that thinking has been researched in various psychological contexts including social psychology (attitude formation and change), developmental psychology (cognitive development), personality (cognitive style), and testing and measurement (intelligence tests). The review of literature in Chapter II will provide additional highlights from each of these areas of thinking theory, with the exception of intelligence testing.

Mayer (1983) concluded that the existence of multiple psychological contexts leads to a definitional problem. Reasoning that since some psychologists define thinking as an external behavioral process, and other psychologists define thinking as an internal cognitive process, Mayer suggests that the best definition for thinking includes a combination of these two theoretical viewpoints.

Therefore, Mayer (1990) defines thinking as an internal cognitive process that, in some instances, can be viewed as an external behavioral process.

The literature discussion in Chapter II will review the various psychological aspects of thinking, with additional emphasis placed upon thinking style theory. This section of the literature review will focus upon the research

conducted by Justus Buchler and C. West Churchman in their development of individual methodologies in thinking style theory. Their research, along with Jung (1971) and Kolb (1984), formed the basis for the development of the Inquiry Mode Questionnaire (InQ) by Robert M. Bramson and Allen F. Harrison in 1977.

Harrison and Bramson (1982) defined thinking styles as characteristic modes of functioning which govern perceptions and intellectual activities in a highly consistent manner. Thinking styles influence the way individuals collect, process, interpret data, and communicate with co-workers (Stein, Hand, & Totten, 1986).

Differentiation, organizational information processing, gender, and thinking style theories provided the speculative basis for this study. Since the way a library is organized influences how managers communicate and solve problems, an individual's preferred thinking style should have a significant influence upon these activities. Although previous studies documenting differences in library administrators' work philosophies, perceptions, and personality styles exist (Choi & Washington, 1988; Lowry, 1988; Squires, Hoopes, & Gillum, 1992; Stein, Hand, & Totten, 1986; Stein & Totten, 1980; Varlejs, 1985), a void in thinking styles research is evident in library management literature.

## **Research Questions**

The next section of Chapter I concerns the research questions associated with this study. This study involved the investigation of three interrelated research questions:

1. Is there a significant relationship between preferred thinking style and library administrative roles (public or technical service) in senior library administrators working in libraries with Association of Research Libraries membership?
2. Is there a significant relationship between preferred thinking style and gender in senior library administrators (public or technical service) working in libraries with Association of Research Libraries membership?
3. Is there an interaction between administrative role (public or technical service) and gender in senior library administrators working in libraries with Association of Research Libraries membership?

## **Hypotheses**

The sixth section of Chapter I concerns the hypotheses of the study. The three research questions of this study generated a total of 15 null hypotheses. Three null hypotheses were developed for each of the five specific thinking style preferences as categorized by the Inquiry Mode Questionnaire. These hypotheses are:



### **Hypotheses 1: Synthesist**

1. There is no statistically significant difference between the administrative role (public or technical) in regard to the synthesist thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership.

2. There is no statistically significant difference between gender in regard to the synthesist thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership.

3. There is no statistically significant interaction between gender and administrative role (public or technical services) in regard to synthesist thinking style in senior level administrators working in libraries with an Association of Research Libraries membership.

### **Hypothesis 2: Idealist**

1. There is no statistically significant difference between the administrative role (public or technical) in regard to the idealist thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership.

2. There is no statistically significant difference between gender in regard to the idealist thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership.

3. There is no statistically significant interaction between gender and administrative role (public or technical services) in regard to the idealist thinking style in senior level administrators working in libraries with an Association of Research Libraries membership.

### **Hypothesis 3: Pragmatist**

1. There is no statistically significant difference between the administrative role (public or technical) in regard to the pragmatist thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership.

2. There is no statistically significant difference between gender in regard to the pragmatist thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership.

3. There is no statistically significant interaction between gender and administrative role (public or technical services) in regard to the pragmatist thinking style in senior level administrators working in libraries with an Association of Research Libraries membership.

**Hypothesis 4: Analyst**

1. There is no statistically significant difference between the administrative role (public or technical) in regard to the analyst thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership.

2. There is no statistically significant difference between gender in regard to the analyst thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership.

3. There is no statistically significant interaction between gender and administrative role (public or technical services) in regard to the analyst thinking style in senior level administrators working in libraries with an Association of Research Libraries membership.

### **Hypothesis 5: Realist**

1. There is no statistically significant difference between the administrative role (public or technical) in regard to the realist thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership.
2. There is no statistically significant difference between gender in regard to the realist thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership.
3. There is no statistically significant interaction between gender and administrative role (public or technical services) in regard to the realist thinking style in senior level administrators working in libraries with an Association of Research Libraries membership.

### **Definition of Terms**

The seventh section of Chapter I concerns the definition of terms used in this research study. Terminology from both the library science and education fields were used in this research study. The terms used in this research study are defined below:

**American Library Association (ALA):** Founded in 1876, the American Library Association is the oldest and largest library association in the world. It provides leadership in the education, development, promotion, and improvement of library and information services for all types of libraries including: (a) state, (b) public, (c) school, (d) academic, (e) municipal, (f) federal, and (g) special. The association maintains a close working relationship with more than 70 additional smaller library associations located in the United States and the world. On August 31, 1997, the Association had 27,750 organizational members and 57,226 personal memberships (Barber & Hodges, 1997).

**Analysis of Variance (ANOVA):** A type of inferential statistic that is used to test the null hypothesis when the means of two or more populations are equal to each other (Jaeger, 1990).

**Analyst Thinking Style (A):** A thinking style associated with abstracting facts into theories for problem-solving approaches (Kagan & Vigil, 1987).

**Association of College and Research Libraries (ACRL):** One of the 11 unique membership divisions comprising the American Library Association's organizational structure. ACRL provides leadership for professional development, promotion, and improvement of academic and research library resources and services facilitating learning, research, and the scholarly communication process.

**Association of Research Libraries (ARL):** The Association of Research Libraries is a not-for-profit membership organization comprising 120 libraries of North American research institutions (see Appendix A). The ARL mission is to shape and influence forces affecting the future of research libraries. The Association articulates the concerns of research libraries and their institutions, forges coalitions, influences information policy development, and supports innovations and improvement in research library operation. ARL operates as a forum for the exchange of ideas and as an agent for collective action.

**Carnegie Classification:** A higher education academic classification system developed by the Carnegie Foundation for the Advancement of Teaching that is used by research universities in the United States. The classification groups 3,389 institutions into 10 categories on the basis of the level of degree offered, ranging from prebaccalaureate to the doctorate, and the comprehensiveness of the institution's mission. The classification includes a specific component for academic and research libraries based upon the strengths of library collections, services provided, and annual budgets (Glassick, Huber, & Maeroff, 1997).

**Chi-Square:** A computation used in inferential statistics to test the statistical independence of two nominal variables. Depending on the value of a parameter called degrees of freedom, the chi-square statistic is compared to a known probability distribution for statistical significance (Jaeger, 1990). The  $X^2$  symbol is used to represent chi-square.

**Cognitive Development:** The process of how thinking patterns change over time (Merriam & Cafferella, 1991). This process is the result of factors including maturation and environmental variables (Piaget, 1971). Cognitive development is also referred to as developmental psychology (Mayer, 1983).

**Cognitive Style:** The preferred method(s) individuals use for conceptually organizing the world around them (Goldstein & Blackman, 1978) through a dynamic combination of distinct bipolar dimension (Letteri, 1977; Messick 1984).

**Combination Thinker:** A person with a predisposition towards using two or more of the five thinking styles in the InQ (Svendsen & Svendsen, 1995). Also known as a two-way thinker.

**Committee on the Status of Women in Librarianship (COSWL):** A standing committee of the American Library Association that serves as a monitoring council for the Association's officers, council, and executive board. COSWL also gathers, analyzes, and disseminates information concerning issues affecting women in library management (Ivy, 1987).

**Conflict:** A breakdown in the decision-making processes of an organization when making choices among alternatives (March & Simon, 1958). Conflict occurs when there is awareness of inconsistent inferences, preferences, and understanding by two or more individuals or groups that use and share identical information (Rahim, 1986).

**Critical Thinking:** A cognitive activity that entails calling into question the assumptions of our everyday, customary, habitual ways of thinking and acting (Brookfield, 1987).

**Cross-Tabulation:** A statistical computation displayed in a cross-classification table format with a cell, or box, representing every combination or category of the two or more nominal variables being examined (Norusis, 1986).

**Dependent Variable:** In research studies using inferential statistics, the dependent variable is the factor used to define the principal focus of the research investigation. This variable is analyzed to see how it is affected by one or more of the independent variables (Jaeger, 1990).

**Dyad:** Two people, or two groups of people, working together (Howell, 1982).

**Flat Thinker:** A person with a predisposition towards using all five of the thinking styles identified by the InQ with equal effectiveness (Svendsen & Svendsen, 1995).



**Human Systems Structure:** The basic interrelationship process of decision making in organizations. It is the process of how operating policies are translated from perceptions, goals, rules, and norms into actions (Senge, 1990).

**Ideal Thinker:** A person with a predisposition towards using only one of the five thinking styles identified by the InQ (Harrison & Bramson, 1984).

**Idealist Thinking Style (I):** A thinking style associated with focusing on process, aspirations, and values (Kagan & Vigil, 1987).

**Independent Variable:** Research conditions, either manipulated by the researcher or observed by the researcher, that are presumed to have an effect on the dependent variable.

**Inferential Statistics:** A branch of statistics involving making inferences about the value of one or more of the population parameters on the basis of sample statistics (Jaeger, 1990).

**Inquiry Mode Questionnaire (InQ):** An instrument designed by Harrison and Bramson in 1977 to measure individual preferences in the way people think based upon characteristics identified by Churchman (1971), Buchler (1961), Jung (1971), and Kolb (1976) (see Appendix B).

**Intelligence:** The mental ability to learn, perceive, reason, understand, acquire, retain knowledge, and to respond effectively to new problems or situations. It is an area of psychological study that typically involves standardized testing and measurement in a progressively graded difficulty scale (Mayer, 1983).

**Learning:** A complex cognitive process involving encoding of input information and experiences (Mayer, 1983).

**Learning Style:** The self-directed persistence (Kolb, 1984) and preferred method(s) individuals use to encode input information into the cognitive domain for comprehension, the ability to understand, and for the ease in replicating (Messick, 1984). It encompasses the entire learning situation as well as the learner (Cross, 1981), including the preferred way individuals desire to engage in and process information in learning activities (Galbraith, 1991). It is a process that includes the dimensions of cognition, affective preferences and physiological processes (Keefe, 1987; James & Blank, 1993).

**Librarian:** A professional with a master's degree in library and information science from an accredited American Library Association program. Depending upon the emphasis of the program, it is not uncommon for slight variations of the degree to be awarded. These variations include, but are not limited to: (a) Master's in Library and Information Science, (b) Master's in Information Science, or (c) Master's in Information Organization and Technology.

**Mean:** A sample statistic also known as the average or arithmetic average, the mean is calculated by summing the scores and then dividing the sum by the total number of scores (Jaeger, 1990).

**Median:** A sample statistic that is used as an indicator of the middle of a score distribution. The median is equal to the point on a score scale that divides a distribution exactly in half, with even distribution of scores falling below and above the median (Jaeger, 1990).

**Metrology:** The science of measurement (Churchman, 1971).

**Mode:** A sample statistic that is used to indicate a score value that occurs more often than any other score value in a distribution. It is possible for a distribution to have two or more modes when the same high frequency is attained for two different scores (Jaeger, 1990).

**Multiple Thinker:** A person with a predisposition towards using more than three thinking styles identified by the InQ with equal effectiveness (Svendsen & Svendsen, 1995). Also known as a four-way thinker.

**Nominal Value:** A numerical scale used to assigned categorical differences that merely serve as labels for the various construct categories under investigation. The nominal value given a category has no meaning in terms of amount or quantity (Jaeger, 1990).

**Paraprofessional:** An experienced library worker with specialized training and supervision in the library and information science field who does not possess a Master's in Library and Information Science degree.

**Personality Style:** The preferred behavioral pattern(s) of a generalized reaction or response that is predictable, specific to the individual, multi-dimensional, measurable, and consistent (Jung, 1971; Hughes & Franceschini, 1989).

**Power Analysis:** A statistical process used to test the probability that a false null hypothesis will be rejected in favor of a true alternative hypothesis (Jaeger, 1990).

**Pragmatist Thinking Style (P):** A thinking style associated with examining problems within their situational context (Harrison & Bramson, 1982).

**Public Service Librarian:** A professional librarian whose primary work responsibilities include providing patron assistance and services. These services typically include, but not limited to, reference, circulation, and inter-library loan.

**Reliability:** A measurement concept that represents the consistency of an instrument in measuring a given performance or behavior. Reliable instruments provide consistent results when a given individual is measured repeatedly under near-identical conditions (Jaeger, 1990)

**Realist Thinking Style (R):** A thinking style associated with emphasizing available resources and apprehendable facts (Kagan & Vigil, 1987).

**Spearman Rank Difference Coefficients:** A sample statistic or population parameter used to determine the degree of linear relationship between two variables that are measured on an ordinal scale, with values between +1.0 and -1.0 (Jaeger, 1990).

**Special Libraries Association (SLA):** An international library association created to meet the specific needs of librarians working in non-traditional library environments such as corporate banks, newspapers, and engineering firms.

**Synthesist Thinking Style (S):** A thinking style associated with concentrating on underlying assumptions and abstract ideas (Kagan & Vigil, 1987).

**Team Based Management (TBM):** An organizational management structure based on the design of bringing together people with a wide range of knowledge and skills to be applied toward specific activity or a project. In team based management, the entire team is responsible for results, with managers relying upon influence rather than authority vested in a position to achieve results (Dewey & Creth, 1993).

**Technical Service Librarian:** A professional librarian whose primary work responsibilities include support services for effective and efficient public assistance. These services typically include, but are not limited to, library material acquisition, receipt, cataloging, and physical processing.

**Temporal Stability:** A measure of reliability for instruments used in research studies based upon the scientific method. Instruments that have temporal stability have been tested, and retested with consistent results (Jaeger, 1990). Temporal stability provides consistent results when a given individual is measured repeatedly under near-identical conditions.

**Thinking:** A complex cognitive process involving the manipulation of perceived, learned, remembered, and encoded input information and experiences. It is an internal cognitive process that in some instances can result in an external behavioral process (Mayer, 1983).

**Thinking Style:** The preferred method(s) individuals use to manipulate and processes encoded information in order to act, reason, make decisions, inquire, communicate, infer, or create new knowledge (Mayer, 1983; Soper, 1990). It is a consistent preference for approaching, solving, and resolving situations (Harrison & Bramson, 1984).

**Three-Way Thinker:** A person with a predisposition towards using three of the five thinking styles identified by the InQ with equal effectiveness (Svendsen & Svendsen, 1995).

**Total Quality Management (TQM):** A nonhierarchical and nonbureaucratic culture, based upon an operating philosophy of employee involvement and commitment to meeting customer requirements through continuous organizational and staff improvement that can be measured by a variety of analytical tools (O'Neil, 1994).

**Type I Error in Hypothesis Testing:** A Type I error is committed when a true null hypothesis is incorrectly rejected (Jaeger, 1990).

**Type II Error in Hypothesis Testing:** A Type II error is committed when a false null hypothesis is incorrectly retained (Jaeger, 1990).

**Validity:** A measurement concept that is concerned with the degree to which an instrument actually measures what it purports to measure (Jaeger, 1990).

**Web Boards:** A method of communication using a specially designed hypertext homepage for organizing and responding to electronic messages.

### **Delimitations**

The eighth section of Chapter I concerns the delimitations of the study. The sample for this study was limited to the head administrator for public services and the head administrator for technical services in libraries with an institutional

membership in the Association of Research Libraries located in the continental United States. Therefore, the results of this study may be generalizable only to library administrators working in libraries with Association of Research Libraries membership of similar attributes.

### **Limitations**

The next section of Chapter I concerns the limitations of the study. The limitations of the study included issues of confidentiality, statistical power analysis, and traditional library administrative staff turn-over. The following list describes the specific limitations of this study:

1. The design of the study allowed for confidentiality but it did not allow for anonymity, which may have influenced survey responses.
2. In an attempt to avoid a Type I and Type II hypothesis testing error (see definitions), the study sample was limited by the overall possible number of ARL institutions as of November, 1996 (n=120).
3. In an attempt to create a better defined homogeneous group of ARL administrators, only academic institutions residing in the continental United States were considered possible subject institutions (n=97). This increased the risk of a Type I and a Type II error by reducing the possible sample size.



4. Because libraries are dynamic organizations with typical staff turn-overs, some institutions did not have an assistant director for public service or technical service at the time of the survey. The head of reference and the head of cataloging were then consistently surveyed as alternative participants. These responses may have affected the collected data.

### **Assumptions**

The tenth section of Chapter I concerns the assumptions of the study. Assumptions were made concerning issues dealing with the professional accredited degree of the participant's and the instrument's validity and reliability. The following list states the specific assumptions of this study:

1. The library administrators completing the InQ have an accredited American Library Association master's degree in library science.
2. The library administrators completing the InQ are proficient in the English language.
3. The thinking styles used in this study are fairly constant, although changeable under purposeful instruction, individual desire, or behavioral reinforcement.
4. Voluntary agreement to complete the survey materials provided accurate reporting.

5. Assigning a third party research assistant to score and record the InQ and demographic information provided unbiased and reliable scoring results.
6. The InQ is both valid and reliable for the population used in this study.

### **Organization of Future Chapters**

The next section of Chapter I concerns the organization of future chapters. The information in Chapter I provides a foundation for understanding the relevance of information to be presented in Chapters II through V. Chapter II presents a comprehensive review of the literature related to this study. Chapter III reviews the research population, the sampling design, the variables, the testing instrument, and the data collection procedures. Chapter IV presents the results of the data analysis, and demographics of the population. Chapter V provides the conclusions from the findings, suggestions for practical applications by library administrators, and recommendations for further research.

### **Chapter Summary**

The last section is a summary of Chapter I and provided an overview and introduction for the study. Information concerning the purpose and significance of the research study on thinking style differences among academic librarians was provided. The theoretical background and rationale for this study was presented, with the research questions and hypotheses stated. The specialized terms of the study were defined, with the delimitations, limitations, and assumptions of the

study highlighted. The chapter concluded with a brief explanation concerning the organization of future chapters.

## **CHAPTER II**

### **REVIEW OF THE LITERATURE**

The purpose of this study was to investigate whether differences in thinking styles exist between senior level library administrators working in public service areas and senior level library administrators working in technical service areas in libraries with an institutional membership in the Association of Research Libraries (ARL). To facilitate a functional understanding of the relationship between thinking styles and library administration, a review of the related literature was necessary. The literature review presented in Chapter II is organized into three segments: (a) definitional dilemma, (b) theoretical framework, and (c) review of previous research.

The first section of the literature review addresses the definitional dilemma concerning four similar, but not interchangeable, terms essential to the theoretical foundation of this study. The terms cognitive styles, learning styles, personality styles, and thinking styles are summarized and defined as used in this study.

Next, a literature review of the four theoretical concepts introduced in Chapter I will be presented. This section will provide research-based information on the theories of differentiation, organizational information processing, gender,

and thinking styles, and emphasize how they create the conceptual foundation for this study.

A detailed review of previous research will follow. This section will summarize dissertations and other research studies that use the InQ instrument. This section includes miscellaneous dissertations and research studies from the field of library science related to this study. Chapter II will then conclude with a summary of these three sections.

### **Definitional Dilemma**

The first section of Chapter II concerns the definitional dilemma of several often confused, but related terms, essential to this study. This section of the literature review is organized into six sections: (a) background information, (b) cognitive styles, (c) learning styles, (d) personality styles, (e) thinking styles, and (f) summary of definitional dilemma. Although this section reveals overlapping characteristics among these four terms, the literature review shows how these terms are uniquely used and defined for the purpose of this research study.

#### **Definitional Dilemma Background**

The first section concerning the definitional dilemma associated with this study provides background information relating to the terminology of these four concepts. According to James and Blank (1993), anyone who thoughtfully

examines the terms cognitive styles, learning styles, personality styles, and thinking styles quickly perceives the complex and inter-related nature of these concepts. James and Blank conclude that although considerable research has been written concerning these terms, analysis has only begun to help practitioners understand these concepts.

One challenge in understanding these concepts is the lack of a widely agreed upon terminology (Gardner, 1984; Guiford, 1980; James & Blank, 1993; Kagen, 1989; Keefe, Monk, Letteri, Languis, & Dunn, 1989; Kagen & Kogan 1970; Keefe, 1987; Rybash, Hoyer, & Roodin, 1986; Tennent, 1988). Merriam and Caffarella (1991) concluded that the literature describing cognitive styles and learning styles is confusing, partly because of the tendency of some researchers to use the two terms interchangeably, while other researchers insist the terms should be considered unique. Literature reviews by Kagen and Kogan and Guiford note the interchangeable use of the terms cognitive styles and personality styles. Keefe's review of the literature documented that in addition to the lack of agreement on definitions, there was a tendency to incorrectly use the terms cognitive styles, learning styles, and personality styles interchangeably.

Intrigued by the lack of clarity for these terms, Harrison and Bramson (1982) began their literature analysis. They noted the confusion in the research literature concerning the terms cognition, inquiry (a.k.a. thinking), and

personality, and concluded a need for additional research and clarification on the relationship of cognition and behavior in the decision-making process. Their literature analysis supported the uniqueness of each of the concepts (thinking styles, learning styles, cognitive styles, and personality styles). This investigation led to the development of the InQ instrument used in this research project.

Despite much usage, the conceptual distinctions among these four terms remain muddled, with a need for further precision and clarification is needed to understand the parameters of these constructs (Bonham, 1987; Hanes, 1991; Long, 1983). For the purpose of this research study, the terms cognitive styles, learning styles, personality styles, and thinking styles are considered unique and not interchangeable. The following sections provide the definitional framework for these four terms as used in this research study.

### **Cognitive Styles**

The first term to be defined as part of the definitional dilemma section for this research study is cognitive styles. Studies of the human mind and cognition by the early Greek philosophers have been documented (Huang, 1993), with the term cognitive science first appearing in research studies in the 1970s (Gardner, 1984).. The concept of cognitive styles emerged in the mid-twentieth century through a convergence of several psychological theory bases including

behaviorist, Gestalt, and psychoanalytic traditions (Glade, 1993; Witkin, Dyk, Faterson, Goodenough, & Karp, 1962).

A variety of definitions for cognitive styles exist, with Goldstein and Blackman (1978) summarizing cognitive style as the way an individual conceptually organizes his or her environment. Cognitive style refers to the structure of thought, while thinking style is the use of context within the structure.

In an attempt to clarify the differences between cognitive styles and learning styles, Bonham (1987) conducted a literature review addressing issues of overlap. In this analysis, Bonham concluded several factors separated cognitive styles from learning styles:

1. Cognitive styles are more widely researched than learning styles.
2. Most cognitive style research includes testing done in laboratories while most learning style research is done in the classroom.
3. Cognitive style tests tend to be more bipolar and on a continuum scale while most learning style tests are interactive.
4. Cognitive styles tend to measure abilities while learning styles tend to measure self-reported preferences.
5. Learning styles tend to include a broader range of dimensions, such as affective and physiological, when compared to cognitive styles.



6. Learning style inventories are considered to have proven more helpful as both learners and instructors become aware of individual differences.

In a literature review concerning cognitive styles conducted by Cross (1976), the 1976 work by Messick and Associates, Individuality in Learning, was highlighted for providing a clear and concise definition of identified cognitive styles. Messick and Associates (1976) explained that cognitive styles were bipolar dimensions used to organize an individual's environment. These bipolar dimensions, associated with cognitive styles for the purpose of this study include: (a) cognitive complexity versus simplicity, (b) tolerance versus intolerance for ambiguity, (c) field-dependence versus field-independence, (d) narrow versus broad categorization, (e) focus versus non-focus, (f) reflectivity versus impulsivity, and (g) sharpening versus leveling.

These seven identified styles have been reviewed, defined, and redefined by a number of researchers, resulting in consistent agreement with the original 1976 research by Messick and Associates (Hanes, 1991; Guiford, 1980; Mayer, 1990; Messick, 1984; Rybash, Hoyer, Roodin, 1986; and Witkin & Goodenough, 1981). These analyses sometimes identify varying numbers of cognitive dimensions; however, the same theoretical concepts were consistently addressed in all dimensional schemas. The following brief explanation of the seven bi-polar

dimensional styles is included for additional definitional clarification for the purpose of this study:

**Dimension 1:** Cognitive complexity versus simplicity is defined as individual differences in how a person construes the world of social behavior in a multi-dimensional and discriminating way.

**Dimension 2:** Tolerance versus intolerance for ambiguity is considered a dimension of differential willingness to accept perception at variance with conventional experience.

**Dimension 3:** Field-dependence versus field-independence is a consistent mode of approaching the environment in analytical terms. It entails a tendency to experience items as discrete from their background and reflects the ability to overcome the influence of an embedded context.

**Dimension 4:** Narrow versus broad categorization is defined as a consistent preference for inclusiveness in establishing the acceptable range for specified categories.

**Dimension 5:** Focus versus non-focus is a consistent pattern of extensiveness, intensity, and awareness of attention deployed in experiencing a specific event. It includes individual variations for experiencing events and the necessary time span required for achieving awareness.

**Dimension 6:** Reflectivity versus impulsivity is the speed with which hypotheses are selected and information processed. Impulsive subjects tend to offer the first answer that occurs to them, even though it is frequently incorrect. Reflective subjects tend to look at various possibilities before deciding.

**Dimension 7:** Sharpening versus leveling is a reliable individual variation in the assimilation of memory. Subjects at the leveling extreme tend to blur similar memories and merge perceived objects or events with similar, but not identical, events recalled from previous experience. Sharpeners, at the other extreme, are less prone to confuse similar objects and by contrast may even judge the present to be less similar to the past than is actually the case.

. The literature reveals many viewpoints and definitions of cognitive style. For the purpose of this study cognitive styles is defined as the preferred method(s) individuals use for conceptually organizing their environment through a dynamic combination of distinct bipolar dimensions (Goldstein & Blackman, 1978; Letteri, 1977; Messick, 1984). For this study, the research by Messick and Associates (1976) is used as a foundational example of cognitive styles.

### **Learning Styles**

The second term to be defined as part of the definitional dilemma section for this research study is learning styles. Elements of learning styles research appear in the literature as early as 1892, with significant research conducted prior

to 1940 concentrating on the relationship between student memory and teaching methods (Keefe, 1987).

Like cognitive styles, there is no common definition of learning styles, nor is there a unified theory upon which this work is based (Merriam & Cafferella, 1991). However, several researchers independently have concluded that the concept of learning styles includes the multiple dimensions of cognition, affective preferences, and physiological aspects (James & Blank, 1993; Keefe, 1987; Smith, 1982). This study uses that premise.

As noted in the previous section, cognition includes several distinct bipolar dimensions as identified by Messick and Associates (1976) for organizing the environment around them through a dynamic combination of distinct bipolar dimensions. The second learning style dimension, affective preferences, is frequently associated with personality attributes such as the learner's curiosity, persistence, anxiety, and frustration levels. The third learning style dimension, physiological aspects, includes attributes such as gender issues, health status, time-of-day preferences, emotions, environmental conditions, and tolerance to sound (Keefe, 1987; Keefe & Monk, 1990).

Focusing upon the literature's diversity, Kolb (1976, 1984) developed a learning style model based upon experimental learning theory. His model conceptualized the learning process as a four-stage cycle that identifies four

unique learning styles based upon an individual's self-directed persistence (Kolb, 1984). Kolb's learning cycle includes concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). Kolb theorized that people learn from concrete experience, then concrete experience forms the basis for observation and reflection, which leads to the formation of abstract concepts and generalizations. The formation of concepts and generalizations allows the learner a choice of new experiences.

Kolb (1976) recognized two dialectic dimensions of the learning process, concrete / abstract (AC - CE) and active / reflective (AE - RO). According to Kolb's theory, in the process of learning, we tend to resolve this dialectic tension by accentuating one ability over the other, forming the basis of individual learning styles.

Kolb (1984) concluded that learning styles are adaptive and that they could be modified and accentuated in such a way as to match an individual's characteristics and environmental demands. This matching comes about in two ways. Either the environment engenders change in an individual's characteristics for adaptation, or the individual places them self in environments that are consistent with their characteristics. Based on this conceptual framework, Kolb devised an instrument called the Learning Style Inventory (LSI) to map an individual's learning style into the quadrants of accommodator, diverger,

converger, and assimilator. The following brief explanation of Kolb's four learning dimensions is included for additional definitional clarification:

**Dimension 1:** Accommodators are defined as people preferring learning situations with concrete experiences and active experimentation. They are good at carrying out plans, and are considered risk-takers. They are commonly found among people with business and management backgrounds, and are considered the opposite of assimilators.

**Dimension 2:** Divergers are defined as people preferring reflective and concrete learning modes. Divergers tend to be emotional and interested in people. The style is characteristic of people with humanities and liberal arts backgrounds. Divergers are considered the opposite of convergers.

**Dimension 3:** Convergers are defined as people preferring abstract and active learning modes. They have strengths in the practical application of ideas, and tend to be unemotional. They prefer to deal with things rather than people. The style is typical of individuals with engineering and physical sciences backgrounds.

**Dimension 4:** Assimilators are defined as people preferring abstract and reflective learning modes. They are less interested in people, and are also less concerned with the practical use of theories. Individuals with science careers or

information careers such as teachers, librarians, ministers, or university professors tend to have assimilative learning styles (Kolb, 1984).

The literature on learning styles consists of a variety of attributes including, but not limited to, (a) climates of collaboration, (b) environmental conditions, (c) variety of instructional methods, (d) personal motivators (Robinson, 1994), (e) physical characteristics (Young, 1996), and (f) emotional characteristics (Hiemstra & Sisco, 1990). For the purpose of this study, the broader definition of learning styles which includes the dimensions of cognitive, affective preferences, and physiological aspects is used (James & Blank, 1993). Learning styles is defined as the self-directed persistence (Kolb, 1984) and preferred method(s) individuals use to encode input information for comprehension, the ability to understand, and for ease in replicating (Messick, 1984). It encompasses the entire learning situation as well as the learner (Cross, 1981), including the preferred ways individuals desire to engage in, and process, information in learning activities (Galbraith, 1991). For this study, the research of David Kolb is used as the foundational example of learning styles. Kolb's work is also highlighted because of the significant impact it had on the literature analysis conducted by Harrison and Bramson (1984) in their development of the InQ instrument that is used in this research project.

## **Personality Styles**

The third term to be defined as part of the definitional dilemma section for this research study is personality styles. Prior to Messick's analysis of cognitive styles, and Kolb's research on learning styles, Swiss physician-psychologist Carl G. Jung developed a theory to explain human personality. Jung observed that behavior occurred in patterns, and formulated the theory that all conscious mental activity can be classified into dimensions. Jung believed that psychological styles could successfully be used to explain the patterns people prefer to use in perceiving, making judgements, and behaving (Jung, 1971).

In summarizing Jung's theory of psychological types, all conscious mental activity occurs in two perceptual processes (sensing and intuition) and two judgmental processes (thinking and feeling). Everyone uses all four processes, but differs in the degree of dominancy. The person who uses the dominant process mainly in the inner private world of ideas and thoughts has an introverted orientation, while the person who uses the dominant processes mainly in an outward world of action has an extroverted orientation.

Originally, Jung's personality theory consisted of the three dimensions of perception, judgement, and personality structure. In the early 1900s, another researcher named Katharine Briggs began developing a theory about human personality. With the translation of Jung's work into English in the 1920s, Briggs



realized the similarity between her work and Jung's, and began to expand Jung's theory to include a fourth dimension. While studying Jung's works, Briggs realized that this additional dimension (attitude taken towards the outer world) was present in Jung's original theory, but this dimension was not highlighted like the other three concepts (Lawrence, 1993). Briggs, and her daughter, Isabel Briggs Myers, then added a fourth dimension relating to a tendency for a person to either be judging and orderly, or perceiving and spontaneous. Additional research and collaboration between Briggs and Myers resulted in the development of the Myers-Briggs Type Indicator (MBTI) (Myers & McCaulley, 1985).

The four dimensions of the MBTI are extroversion versus introversion, sensing versus intuition, thinking versus feeling, and judgment versus perception. The following brief explanation of the four MBTI personality dimensions is included for additional definitional clarification:

**Dimension 1:** Sensing versus intuition was one of the first two dimensions identified by Jung, and is considered a perception process. In Jung's theory, sensing (S) is the term used for perception of observable situations by way of the human senses. Intuition (N) is the term used for perception by way of meaning, relationships, and insight.

**Dimension 2:** Thinking versus feeling was also one of the first two dimensions identified by Jung, and is considered a judging process. In Jung's

theory, thinking (T) is the term used for the logical decision-making process.

Feeling (F) is a term for making judgements in terms of a system of subjective and personal values. Thinkers tend to weigh facts objectively when making decisions, and are objective, impartial, and fair. Thinking types are attracted to areas where tough-mindedness and technical skills are needed. Feelers tend to make decisions on what matters most to themselves and other people. They tend to understand, empathize, and affiliate with others. Feelers are attracted to areas where understanding and communication with people are needed because they find interpersonal skills more interesting than technical skills.

**Dimension 3:** Extroversion versus introversion is the third dimension of Jung's original theory. The terms, created by Jung, were based upon Latin components, with extrovert referring to a tendency to turn outward, and introvert referring to the tendency to turn inward. According to Jung, everyone does both acts regularly and on a daily basis. For example, people turn outside themselves to act in the world, and turn into themselves to reflect. Both extraverting-action and introverting-reflection are essential, but everyone is not equally comfortable in action and reflection.

**Dimension 4:** Judging versus perceiving was not one of the originally highlighted dimensions by Jung. It is a dimension that was elaborated and extracted by Briggs and Myers in their continued research on Jung's work. This

fourth dimension is associated with the attitude one takes concerning the outer world. Judgers (T) have the drive to have things in their life decided, judged, settled, planned, organized, and managed. Perceivers (F) have the drive towards keeping things open to new perceptions. They thrive in situations where they can remain flexible so they can adapt to changing circumstances.

Combinations of these four dimensional pairs allow for 16 different personality styles. These types are typically represented by a combination of four letters (e.g., ENFJ). Table 2.1 presents a summary of these 16 combinations.

Building upon the work of Myers and Briggs, and Jung, Mok (1972) studied how situations or environments influence personality styles. Mok concluded that the environment had a direct relationship upon the appropriateness of the personality styles as defined by the MBTI. According to Mok:

**Thinkers:** Place a high value on logic, ideas, and systematic inquiry. They find satisfaction in identifying a problem, developing a variety of possible solutions, weighing them carefully, testing them, and monitoring them to see that the most logical and systematic approach is followed.

**Feelers:** Place a high value on human interactions. They seek and enjoy stimulation of contact with others and typically try to understand and analyze emotions. Their concern and understanding for people make them astute in “reading between the lines.”

**Sensors:** Place a high value on action. They thrive on getting things done without unnecessary time-consuming deliberations. They are considered down-to-earth with an energetic approach to life.

**Intuitors:** Place a high value on ideas, innovation, concepts, theory, and long-range thinking. They derive greatest satisfaction from possibilities, and their imagination acts as a catalyst for others. They value the continuous probing and reexamination process.

Research reveals that strong relationships exist among learning styles, cognitive styles, and personality styles (Lawrence, 1993; Mok, 1972). For the purpose of this study, personality styles are defined as the preferred behavioral pattern(s) of a generalized reaction or response by an individual that is predictable, specific to the individual, multi-dimensional, measurable, and consistent (Jung, 1971; Hughes & Franceschini, 1989). The research conducted by Myers and Myers (1993) is used as the foundational example of the various dimensions of personality styles for this study.

**Table 2.1**

**Summary of MBTI Personality Styles**

<b>ENTJ</b> Intuitive, innovative ORGANIZER; analytical, systematic, confident; pushes to get action on new ideas and challenges.	<b>ISFP</b> Observant, loyal HELPER; reflective, realistic, empathic,; patient with details, gentle and retiring; shuns disagreements; enjoys the moment.
<b>ESTJ</b> Fact-minded, practical ORGANIZER; assertive, analytical, systematic; pushes to get things done and working smoothly and efficiently.	<b>INFP</b> Imaginative, independent HELPER; reflective, inquisitive, empathic, loyal to ideals; more interested in possibilities than practicalities
<b>INTP</b> Inquisitive ANALYZER; reflective, independent, curious, more interested in organizing ideas than situations or people.	<b>ESFJ</b> Practical HARMONIZER and worker-with-people; sociable, orderly, opinioned; conscientious, realistic and well tuned to the here and now.
<b>ISTP</b> Practical ANALYZER; values exactness, more interested in organizing data than situations or people; reflective, a cool and curious observer of life.	<b>ENFJ</b> Imaginative HARMONIZER and worker-with-people; sociable, expressive, orderly, opinioned, conscientious; curious about new ideas and possibilities.
<b>ESTJ</b> REALISTIC ADAPTER in the world of material things; good natured, tolerant, easy going, oriented to practical, first hand experience; highly observant of details of things.	<b>INFJ</b> People-oriented INNOVATOR of ideas; serious, quietly forceful and persevering; concerned with the common good, with helping others develop.
<b>ESFP</b> REALISTIC ADAPTER in human relationships; friendly and easy with people, highly observant of their feelings and needs; oriented to practical, first hand experience.	<b>INTJ</b> Logical, critical, decisive INNOVATOR of ideas; serious, intent, highly independent, concerned with organization; determined and often stubborn.
<b>ISTJ</b> Analytical MANAGER OF FACTS AND DETAILS; dependable, decisive, painstaking and systematic; concerned with systems and organization; stable and conservative.	<b>ENFP</b> Warmly enthusiastic PLANNER OF CHANGE; imaginative, individualistic; pursues inspiration with impulsive energy; seeks to understand and inspire others.
<b>ISFJ</b> Sympathetic MANAGER OF FACTS AND DETAILS; concerned with people's welfare; dependable, painstaking and systematic; stable and conservative.	<b>ENTP</b> Inventive analytical PLANNER OF CHANGE; enthusiastic and independent; pursues inspiration with impulsive energy; seeks to understand and inspire others.

Source: Lawrence, G. (1993). People types and tiger stripes. (Third Edition)  
Gainesville, Florida: Center for Applications of Psychological Type, Inc.

## **Thinking Styles**

The fourth and last term to be defined as part of the definitional dilemma section for this research study is thinking style. The term thinking styles is not discretely distinguishable from cognitive styles. Some researchers consider thinking styles as part of the general term commonly known as cognitive styles (Kagan & Vigil, 1987; Kienholz & Hritzuk, 1986; Ryle, 1979; Vinacke, 1974).

Presseisen (1986) summarized that although scholars define thinking differently, many of them agreed that there are various types. Some researchers define thinking as a cognitive process (Belth, 1977), while others define it as exploration, searching, and inquiring (Schrag, 1988). Harrison and Bramson (1982) considered thinking a process of inquiring and exploration.

Believing that differences existed between cognition, learning, personality, and thinking, Harrison and Bramson (1982) began investigating inquiring systems. Drawing from the works of Buchler (1971), Churchman (1968, 1971), Jung (1971), Kelly (1963), Kolb (1976), and Neisser (1976), Harrison and Bramson created their unique theory of thinking styles.

As part of their research investigation, Harrison and Bramson conducted a series of seminars. From these seminars they inferred that the incongruities between learning and thinking were attributed to individual differences in ways of thinking rather than to attributes of personality (Bruvold, Parlett, Bramson, &

Bramson, 1983). Interested in the disparity they noticed between cognition and behavior in the decision-making process, Harrison and Bramson (1982) reasoned that thinking styles were integrated collections of perceptual and conceptual strategies. They used Buchler's and Churchman's works for identifying five specific approaches in the way an individual perceives, makes meaning, and communicates. The five dimensions of thinking identified by Harrison's and Bramson's InQ are synthesist, idealist, pragmatist, analyst, and realist. The following brief explanation of these five dimensions included for additional definitional clarification:

**Synthesist:** A dimension of thinking associated with concentrating on underlying assumptions and abstract ideas. The orientation of synthesist thinkers is focused on integration while their behavior is often viewed as challenging.

**Idealist:** A dimension of thinking associated with focusing on process, aspirations, and values. The orientation of idealist thinkers is focused on assimilation while their behavior is often viewed as receptive.

**Pragmatist:** A dimension of thinking associated with examining problems within their situational context. The orientation of pragmatist thinkers is focused on payoff while their behavior is often viewed as adaptive and incremental.

**Analyst:** A dimension of thinking associated with abstracting facts into theories and problem-solving approaches. The orientation is focused on method while behavior is often viewed as prescriptive and logical.

**Realist:** A dimension of thinking associated with emphasizing available resources and apprehendable facts. The orientation of realist thinkers is focused on the task at hand while their behavior is often viewed as empirical and objective.

Building upon the basic concepts of these five thinking styles, Table 2.2 provides additional information concerning the characteristics of each style. In addition, Table 2.2 also provides additional information concerning the strengths and liabilities for each of the styles.

Yarborough (1995) concluded that a chronology provides additional insight for the rationale of thinking styles. Analyst is the oldest style with its foundations beginning in the Enlightenment Period and the origin of the scientific method. The youngest style, pragmatist, begins less than a hundred years ago. The origins for the idealist style are connected to the rise of modern democracy, while the realist style of thinking has the Industrial Revolution and modern economics as its foundation (Harrison & Bramson, 1982). The least common method of thinking style, synthesist, has its foundation in the dialectical method that is more common in Europe and the United States (Mitroff & Pondy, 1974).



**Table 2.2**

**Summary of Thinking Style Orientations**

<b>Orientations</b>	<b>Synthesist</b>	<b>Idealist</b>	<b>Pragmatist</b>	<b>Analyst</b>	<b>Realist</b>
<b>Characteristics</b>	Integrative view.  Seeks conflict and synthesis.  Interested in change.  Speculative.	Holistic view.  Seeks ideal solutions.  Interested in values.  Receptive.	Eclectic view.  Seeks shortest route to payoff.  Interested in innovation.  Adaptive.	Deductive view.  Seeks "one" best way.  Interested in scientific solutions.  Prescriptive.	Empirical view.  Seeks solutions that meet current needs.  Interested in concrete results.  Corrective.
<b>Strengths</b>	Focuses on underlying assumptions.  Points out abstract conceptual aspects.  Good at preventing over-agreement.  Best in controversial situations.  Provides debate and creativity.	Focuses on process and relationships.  Points out values and aspirations.  Good at articulating goals.  Best in value-laden situations.  Provides broad view, goals, standards.	Focuses on payoffs.  Points out tactics and strategies.  Good at identifying impacts.  Best in complex situations.  Provides experimentation and innovation.	Focuses on method and plan.  Points out data and details.  Good at model building and planning.  Best in structured situations.  Provides stability and structure.	Focuses on facts and results.  Points out realities and resources.  Good at simplifying. "cutting-through."  Best in well-defined situations.  Provides drive and momentum.
<b>Liabilities</b>	May screen out agreement.  May seek conflict unnecessarily.  May try too hard for change, newness.  May theorize excessively.  Can appear uncommitted.	May screen out "hard data."  May delay from too many choices.  May try too hard for "perfect" solutions.  May overlook details.  Can appear overly sentimental.	May screen out long-range aspects.  May rush too quickly to payoff.  May try too hard for expediency.  May rely too much on what "sells."  Can appear over-compromising.	May screen out values.  May over-plan, over-analyze.  May try too hard for predictability.  May be inflexible, overly cautious.  Can appear "tunnel visioned."	May screen out disagreement.  May rush to over-simplified solutions.  May try too hard for consensus.  May over-emphasize perceived "facts."  Can appear too results-oriented.

Source: Harrison, A.F. and Bramson, R. M. (1988). InQ inquiry mode questionnaire: A measure of how you think and make decisions. Berkeley, CA: Bramson, Parlette, Harrison & Associates.

The research reveals strong relationships among the terms cognitive styles, learning styles, personality styles, and thinking styles. For the purpose of this study, thinking styles are defined as the preferred method(s) individuals manipulate and process encoded information in order to act, make meaning, infer, reason, make decisions, inquire, communicate, and / or create new knowledge (Mayer 1983; Soper 1990). It is a consistent preference for approaching and resolving situations (Harrison & Bramson, 1984).

### **Summary of Definitional Dilemma**

In this first section of the literature review, a plethora of definitions and definitional problems involving the terms cognitive styles, learning styles, personality styles, and thinking styles were highlighted. Many researchers agree that there is a need for additional studies to analyze the differences and similarities of these terms, and to formulate a common terminology (James & Blank, 1993). It is important to realize that cognition, learning and thinking are all activities that typically occur internally. In order for researchers to evaluate these activities, external (behavioral or personality) actions are used which add further confusion to the concepts (Kelly, 1963). For the purpose of this study, all four terms are considered unique, with Table 2.3 providing a summary of the definitions used.

**Table 2.3**

**Summary of Definitional Dilemma Terms**

<b>Term</b>	<b>Definition</b>
<b>Cognitive Style</b>	The preferred method(s) individuals use for conceptually organizing the environment around them (Goldstein & Blackman, 1978) through a dynamic combination of distinct bipolar dimensions (Letteri, 1976; Messick, 1984).
<b>Learning Style</b>	The self-directed persistence (Kolb, 1984) and preferred method(s) individuals use to encode input information into their cognitive domain for comprehension, the ability to understand, and for the ease in replicating (Messick, 1984). It encompasses the entire learning situation as well as the learner (Cross, 1981), including the preferred way individuals desire to engage in and process information in learning activities (Galbraith, 1991). It is a process that includes the dimensions of cognition, affective preferences, and physiological processes (Keefe, 1987; James & Blank, 1993).
<b>Personality Style</b>	The preferred behavioral pattern(s) of a generalized reaction or response that is predictable, specific to the individual, multi-dimensional, measurable, and consistent (Jung, 1971; Hughes & Franceschini, 1994)
<b>Thinking Style</b>	The preferred method(s) by which a person manipulates and processes encoded information in order to act, reason, make decisions, inquire, communicates, infer, and create new knowledge (Mayer, 1983; Soper, 1990). It is a consistent preference for approaching, solving, and resolving situations (Harrison & Bramson, 1984; Mayer, 1983).

**Theoretical Perspectives**

The second part of the literature review addresses the theoretical perspectives associated with this study. In this section, information concerning the theoretical concepts of differential theory, organizational information processing theory, gender theory, and thinking style theory will be analyzed as they pertain to this study.

### **Differentiation Theory**

The first foundational concept to be reviewed for this study is differentiation theory. Differentiation theory has been widely used and researched in the fields of biology, management, and psychology (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962). Jung (1971) noted the influence of differentiation in this research on personality styles, and defined differentiation as the development of differences that separates parts from a whole.

Lewin (1935) and Werner (1948) are noted for conducting major studies concerning differentiation theory. According to the theory of differentiation, when organizations grow in size their environments become more complex (March & Simon, 1958; Nicholson, 1995). Differentiation and integration are two important concepts for describing a system's response to environmental complexity. As an environment becomes more complex, it requires more specialists to deal with specific work needs (Carson, Carson, & Phillips, 1997). The degree of differentiation is an important characteristic of any system. Differentiation refers to the complexity of a system's structure. Less differentiated systems act in a relatively homogeneous structural state while a more differentiated structure acts in a relatively heterogeneous state. Specialization is a major characteristic of highly differentiated systems (Mastenbrock, 1993).

Power is a critical component in differentiation theory, because of the relationship among people, work units, and control issues (Mastenbrock, 1993). Position power is exercised in differentiated organizations by supervisors and peers. It has critical impact on how people and work units interrelate (Wilson, 1996).

When differentiation occurs, there is an attempt to manage the organization into subunits, such as the creation of public service and technical service departments within a library. In time, these organizational subunits become more differentiated from other subunits in order to deal with their specific work routines. When placed in the same subunit, people, however different, tend to produce similar results (Senge, 1990), with managers and workers in these subunits eventually developing differences in cognitive and emotional orientations (Daft, 1986). When this occurs, conformity becomes the desired norm. Individual members quickly realize the need to behave, and think, like the rest of the unit in order to be considered effective, successful, and part of the team.

Differentiation theory is an important foundational concept for this study because libraries are highly differentiated organizations well known for their systems of units and subunits (Lowry, 1988). To be considered a team member, individual librarians begin to align with the goals, missions, communication patterns, and managerial philosophies of their supervisors and subunit peers

(Dewey & Creth, 1993). Professional success becomes contingent upon the ability to conform, and think, like the leaders and other members of the subunits.

### **Organizational Information Processing Theory**

The second foundational concept to be reviewed for this study is organizational information processing theory. The theory of organizational information processing views institutions, such as libraries, as open social systems that gather and interpret information in order to produce output (Coughlin & Gertzog, 1992; Presthus, 1978; Xu, 1996). Each department develops its own functional specialization, goals, language, and frame of reference, which are maintained within each department by individuals who share similar values, beliefs, and thinking styles.

Organizational information processing theory focuses upon communication within a system or organization. These systems are comprised of individuals with unique behavioral (personality styles) and psychological (thinking style) variables (Kendron, Harris, & Key, 1975).

Organizational information processing is the transfer of meaning from one person to another in a specific work environment. In the simplest example, organizational information processing consists of four parts; Sender (S), Message (M), Receiver (R), and Environment (E) (Riggs, 1991). Extending this basic model, DeVito (1976) is credited for the all-inclusive definition of organizational

information processing. According to DeVito (1985), organizational information processing is the act of communicating within an organization. It is a process consisting of sending and receiving of messages, that are distorted by noise, occur within a context, have some effect on the organization, and provides opportunity for feedback.

According to DeVito's (1976) schema, noise is considered anything that may cause distortion to the original message. Attributes such as cognitive styles, learning styles, personality styles, work place environment, and thinking styles all are considered noise in DeVito's definition. Eric and Virginia Svendsen (1995) state that differences in thinking styles pose communication barriers that equal the seriousness of many cultural differences in work environments. When a message is communicated, it reflects our attitudes, expectations, values, feelings, past experiences, knowledge, cognitive styles, and personality styles (Matusak, 1996). We bring to the system a wide range of personal differences including our feelings, desires, motivations, fears, ambitions, values, self-image, likes, dislikes, and beliefs (Heyman, 1994; Huseman, Laheff, & Hartfield, 1976; Rae, 1993; Ricard, 1993; Schwarz, 1996). Misunderstandings occur in the system when we expect others to think like us (Putnam, 1988).

Today's expanding technology continues to complicate the process of organizational information processing. Helgesen (1995) notes how organizational

information processing patterns are changing due to new technologies such as web boards and electronic mail. Lipman-Blumen (1996) further concurs that the communication technology of today is obliterating boundaries of previously differentialized units in organizational information processing.

Organizational information processing theory is an important foundational concept for this study because libraries, like most organizations, depend upon practical application of organizational information processing theory to be productive. Developing effective communication and organizational workflow is a prerequisite for accomplishing output (Turner & Weed, 1983). Supervisors need an understanding of organizational information processing theory and must exhibit this understanding in a consistent manner with co-workers.

### **Gender Theory**

The third foundational concept to be reviewed for this study concerns gender theory. Gender theory is the concept that men and women differ from each other not only biologically, but psychologically and sociologically (Bem, 1987). Gender theory supports the use of scientific studies to measure, analyze, and explain differences in attributes and behaviors between men and women (Humm, 1995). For this study, the sociological differences between men and women that has be supported by gender theory will be emphasized.



Psychologically, gender theory involves connections with cognitive studies (Belenky, Clinchy, Goldberger, & Tarule, 1986; Tannen, 1991). Research exploring gender differences has focused on particular domains of cognitive functioning such as mathematics, spatial concepts, and verbal abilities. For example, these studies reveal that men outperform women in mathematical abilities while women outperform men in verbal abilities (Tannen, 1994). Previous thinking style research has implied that differences may also be gender related (Harrison & Bramson, 1984).

Sociologically, gender theory involves how society and culture influences behavior patterns of men and women based upon the acceptable norms of a race, culture, organization, or society. Gender research studies conducted by librarians and women's studies scholars provide citations to research concerning the differences and similarities among men and women in conflict interactions (Taylor & Miller, 1994), communication patterns (Coats, 1993; Tannen, 1986, 1993 & 1994), and management issues (Bartol, 1973; Helgeson, 1990).

Feminist studies researchers have investigated the influence of gender and sociological influences in work place conflict. According to Taylor and Miller (1994), work place conflict issues can neither be understood or resolved without consideration of the whole context, and the whole context includes gender theory. Tannen (1986, 1993) explains that much of work place conflict is a direct result of

differences in communication patterns between men and women. In support of this stance, Tannen (1994) cites major gender differences in conversation patterns, interruption patterns, and conversational strategies. Coats (1993) also noticed these gender differences in her research involving communication patterns and sociolinguistic variations.

In addition to conflict interactions and communication patterns, studies have been conducted concerning the differences in leadership and management styles between men and women (Helgeson, 1995). According to Helgeson (1990), there exists a great need for more research into the phenomenon of gender theory and management styles since everything we know about leadership has been deduced from studies concerning male leaders without considering the possibility that women lead differently than men.

In addition to psychological and sociological differences between men and women, gender theory has been used by feminists to explain and understand gender stereotypes. Librarianship is a profession filled with gender stereotypes.

When the job market in the United States first opened to women in the 1870s, librarianship (like nursing and education) was viewed as a suitable occupation for single women. Quickly, the stereotypical image of "Marian the Spinster Librarian" became entrenched in society (Scherdin, 1994). Marian worked hard behind the scenes, while typically a male library director was in charge of the

library. Today, a modernized version of this stereotype continues to exist, with technical service librarians viewed as elusive introverts, happy to work with library materials, but not library users.

In an effort to understand the profession, the stereotypical image of “Marian” quickly became the subject of many scientific research studies conducted by librarians beginning in the 1930s. These studies involved image issues and personality studies of both the men and women working as professional librarians (Newmyer, 1976). These studies included gender as a data variable.

In 1994 the Association of College and Research Libraries Division of the American Library Association (ACRL) published its findings concerning the personality profiles of professional librarians. The ACRL study concluded that behavioral differences do exist between female and male librarians, while noting additional behavioral differences between public service and technical service librarians (Scherdin, 1994).

Years of research revealing evidence of lower pay, inequity in promotions, sexist language in publications, and a growing awareness of the second-class citizen position many women held in both the American society and the library profession, prompted the American Library Association to form an ad-hoc committee to study the situation of negative gender stereotypes and discrimination in the profession. Though librarianship is a profession dominated by females, it

has a history of academic leadership positions traditionally held by males (Coughlin & Gertzog, 1992). This ad-hoc committee eventually became the Committee to Study Women in Librarianship (COSWL). COSWL's mission is to emphasize and advocate the diversity of women's opinion within ALA. COSWL has supported numerous studies involving how negative gender stereotypes affect the library profession, and provide suggestions for future research and improvement (Ivy, 1987).

Gender theory is considered an important foundational criterion for this study for several reasons. First, gender theory can be used to recognize and explain many psychological and sociological differences between men and women. This provides a basis for investigating if thinking style differences can be attributed to gender. Second, according to Helgeson (1995), most researchers ignore gender as an important social variable, although human cognition (including gender issues) is an important interface between biology and culture (Caplan, Crawford, Hyde, & Richardson, 1997). Since much research has been conducted involving situations where gender is an explicit or implicit element, little research specifically addresses the implications of gender theory (Taylor & Miller, 1994). For this reason, gender was incorporated as an independent variable in data collection and analysis.

### **Thinking Style Theory**

The fourth and final foundational concept to be reviewed for this study is thinking style theory. Although theories of thinking have roots dating back to 400 B.C., thinking style theory is a relatively new foundational concept.

Four major researchers have developed schema in the development of a foundation for thinking style theory. Harrison and Bramson (1982) are the most recent researchers exploring this theory, with their conclusions primarily based upon the collective research conducted by C. West Churchman, Justus Buchler, and Carl Jung. Therefore, this section of the foundational concepts is organized into four parts based upon the thinking style theory by these researchers: (a) Churchman, (b) Bulcher, (c) June, and (d) Harrison and Bramson.

#### **Churchman**

The first pioneer in the field of thinking style research to be investigated in this section of the literature review is C. West Churchman. Churchman (1968, 1971) attempted to identify thinking methodologies that could be considered attributes of certain historical thinkers and philosophers, and reconstructed the ideas of these individuals into five separate systems: Leibnizian, Lockean, Kantian, Hegelian, and Singerian.

**Leibnizian Inquiry System.** The first system of Churchman's topology is referred to as the Leibnizian System, and it forms the basis for the analyst thinking style of the InQ. The Leibnizian System is based on the work of the seventeenth century German philosopher, Gottfried Wilhelm Leibniz (1646-1716), and his lifelong quest to promote cooperative activity in scientific research and the systematic collection and arrangements of facts (Edwards, 1957). In the Leibnizian system of inquiry, knowledge is a systematic process, building up from simple to complex matters (Churchman, 1971). The Leibnizian System requires verifiable facts as a foundation that can produce clear givens for the thinker. Reality for this thinker is rational, predictable, and based upon sound theory. Problem solving is an attempt to remove randomness and obscurity (Churchman, 1968). The Leibnizian thinker is a model builder who constructs the truth from ideas that can be broken down into recognizable units (Shank, 1985). It is inquiry based upon deductive reasoning to arrive at the truth or reality.

**Lockean Inquiry System.** The second type of system according to Churchman's topology is the Lockean System, and it forms the basis for the realist thinking style of the InQ. The Lockean System is based upon the ideas of seventeenth century British realist John Locke (1632-1704) who believed that all ideas came from experience. In the Lockean System there are no preconceptions of the world, with knowledge being formed through the process of seeing, tasting,

touching, smelling, and experiencing. The Lockean thinker cannot work with theory or abstracts. It is a style based upon the use of human senses and inductive thinking to arrive at the truth or reality.

**Kantian Inquiry System.** The third system of Churchman's topology is referred to as the Kantian System, and it forms the basis for the idealist thinking style of the InQ. This theory is based upon the epistemology of the eighteenth century German philosopher Immanuel Kant (1724-1804). According to Kant, people do not perceive things as they really are, but rather, base knowledge upon how things (what he called phenomena) appear to them. Kant theorized that the mind has an inborn ability to order sensory experiences to provide the relationships that exist among data acquired by the senses (Barry, 1977).

Unlike Locke, Kant believed that thinking must have prior knowledge built into the foundation. For example, Kant believed that all thinking has a sense of kinematics (knowing when something is in place and when it is not in place) (Churchman, 1971). Like Locke, Kant believed in the power of experiences in building our knowledge base. However, unlike Locke, Kant believed that since all experiences are shaped by some known prior knowledge to make meaning, then all experiences become contingent truths (Barry, 1977; Shank, 1985). According to Kant's theory, people are more than passive receivers of sensory experiences. Once experiences are received, our minds have the ability to provide this data with

form according to the conceptual molds we already possess. Through an awareness of the relationship between our sensing data, and the mind's inborn ability to order and make relationships among this data, knowledge is created (Barry, 1977).

**Hegelian Inquiry System.** The fourth system of Churchman's topology is referred to as the Hegelian System, and it forms the basis for the synthesist thinking style of the InQ. The Hegelian System is based upon the works of the German philosopher Georg W. F. Hegel (1770-1831). According to this system, the only thing that is real is the mind since the world is in a constant state of change, flux, and process. Unlike Kant's theory, in which people are active receivers of sensory experiences due to their ability to provide the data with form according to the conceptual molds already possessed, Hegel believed that knowledge was a result of discovery. Hegel believed that people do not impose order or form on nature, but rather discover it (Barry, 1977), since order, form, and shape already exist in the order of things. Subjectivity thus becomes a key concept in the Hegelian System since all other possibilities must be examined in order to believe in a specific point of view.

**Singerian Inquiry System.** The fifth and final system of Churchman's topology is referred to as the Singerian System, and it forms the basis for the pragmatist thinking style of the InQ. The Singerian System is based upon the



writings of twentieth century philosopher, Edgar Arthur Singer Jr (1873-1955).

According to Shank (1985) this inquiry system appears to be the least developed by Churchman, with the Singerian System based in the science of metrology (the study of measurement).

According to Churchman (1971), measurement requires two initial conceptual decisions, the unit and the standard. The unit can be arbitrary, while the standard cannot be arbitrary since it consists of a set of operations, which in principle, resolve disagreements arising in the unit. In the Singerian System, progress is achieved by rejecting complacency and constantly endeavoring to improve upon accepted standards by the unit (Shank, 1985). Refinement is a key concept. In order to achieve refinement, as much information as possible is cumulated to allow for an interdisciplinary approach to problem solving in the Singerian Inquiry System. Thus, combining and continually updating our knowledge produces a pragmatic view of reality.

**Summary of Churchman's Topology.** C. West's Churchman's Design of Inquiring Systems (1971) presents five different, though related, systems of thinking based upon different philosophers' schemata for determining what is real and what is illusory. The Leibnizian Inquirer constructs reality by starting with the simplest units and building upon these foundational elements to construct a model into which everything can fit. The Lockean Inquirer relies upon a sense of data or

experience to determine reality. The Kantian Inquirer makes order from sensory experience based upon a priori concepts which influence relationship building. The Hegelian Inquirer discovers form and order in things to understand truth and thus produce synthesis. The Singerian Inquirer relies on an eclectic view of reality and a pragmatic, though non-complacent, acceptance of measuring standards.

Harrison and Bramson (1982) used these five philosophies in their research and development of a thinking style instrument. Information concerning the Leibnizian Inquirer was used in developing the analyst thinking style, the Lockean Inquirer concepts were used in developing the realist thinking style, the Kantian Inquirer facts were used in developing the idealist thinking style, the Helgelian Inquirer modalities were used in developing the synthesist thinking style, and the Singerian Inquirer doctrines were used in developing the pragmatist thinking style.

### **Buchler**

The second pioneer in the field of thinking style research to be highlighted in this section of the literature review is Justus Buchler. In a study conducted independently from Churchman, Buchler (1961) identified five distinct philosophical thinking methodologies. These five methodologies correlate with accuracy to Churchman's thinking topology (Harrison & Bramson, 1984).

Arguing that previous scholarly discussion of method was largely a form of discourse on specific methodology, Buchler wanted to determine what made a

method methodical, basing his arguments upon universal concepts. According to Buchler, a method is a power of manipulating natural complexes with purpose. His methodology is based upon a reproducible order of utterance. Like Churchman, Buchler's findings were based upon the synthesizing of a variety of works by influential historical thinkers and philosophers. Influential on Buchler's topology are the works of Whitehead, Coleridge, Dewey, Descartes, and Bentham.

**Whitehead.** The first methodology explored by Buchler was based upon the works of Alfred North Whitehead (1861-1947). Whitehead, an English mathematician and philosopher, taught the concepts of metaphysical theory at Harvard University in the 1920s. According to Whitehead, man's being is realized through the process of assimilation and manipulation. Man not only assimilates, or receives, the impact of all that is around, but man also manipulates, making an impact on all that is around. Therefore, Whitehead attests that the most rudimentary manifestations of method are reflected in assimilation and manipulation, and method arises when man realizes his role as synthesizer and manipulator.

**Coleridge.** The second methodology explored by Buchler was based upon the works of Samuel Taylor Coleridge (1772-1834). Coleridge was a lyrical poet, critic, and philosopher of the English Romantic Period of the early 1800s. Coleridge's system is based upon method as a way of transition, which is defined

as sequential movement of smaller steps. According to Coleridge, in all instances of method we attempt to classify and arrange. Above all, we forge ahead.

However, to move ahead is not enough. The passage, or movement, must have two further characteristics, (a) progress and (b) unity. Any arrangement must contain within itself a principle for progression. Method comes into being, according to Coleridge, when certain conditions of arrangement in the mind can be obtained.

**Dewey.** The third methodology explored by Buchler was based upon the works of John Dewey (1859-1952). Dewey, an American philosopher and educator, is considered the founder of the philosophical school of pragmatism and a pioneer in functional psychology. No philosopher of this century can be more closely identified with attention to method than Dewey (Buchler, 1961).

For Dewey the subject was part of a broad theory of ways and means. It involved the underlying investigation of how things varied, and yet, were related. For Dewey, method was synonymous with intelligence, or more specifically “intelligence in operation” or the method of intelligence. For Dewey, intelligence is what he considered directed operations, or the inquiry, which solves problems, transforms unsettled issues, and resolves doubtful situations.

**Descartes.** The fourth methodology explored by Buchler was based upon the works of Rene Descartes. Descartes was a 17<sup>th</sup> century French mathematician, scientist, and philosopher. He is known for the statement, “I think, therefore I am.”

Descartes's method is not about the nature of method, but about the values and forms of one method in particular, the method of rightly conducting the reason and search for truth in the sciences. He believed that the quest for truth, and the right conduct of reason, implied exactly the same thing. He believed that method consisted entirely in the order and supposition of the objects towards which our mental vision must be directed if we would discover truth. He defined intuition and deduction as routes and paths of apprehending and certifying the truth. He believed that man acquires method by first acquiring a sense of order.

**Bentham.** The fifth methodology explored by Buchler was based upon the works of Jermy Bentham (1748-1832). Bentham was an English philosopher, economist, and theoretical jurist, who is considered a chief expounder of Unitarianism.

Bentham's methodology provides a strikingly different approach from Coleridge (Buchler, 1961). Bentham's method is synonymous with the term methodization (a.k.a. arrangement). This action can be applied to objects or discourse. According to Bentham, method is the exercise of the tactic faculties and the process of logic. Bentham suggests that the three fundamental operations of invention, imagination, and abstraction are inherently linked together, with a method applied to bring about a particular useful end.

**Summary of Buchler's Methodology.** Buchler's Concept of Method

(1961) presents five different systems of thinking based upon different philosophies of methodology. In an attempt to determine universal truths and the nature of methodical activity, Buchler's premise concludes that a method is the power of manipulating natural complexes. Although using different foundational examples, Buchler arrived at five similar central conceptual conclusions when compared with Churchman's topology.

Taking the systems down to the broadest terms, Bentham's conception of method may be viewed as combinatorial and corrective, Coleridge's as propulsive and vitalistic, Descartes's as prescriptive, and Whitehead's as receptive and manipulative (Buchler, 1961). Dewey's conception of method may be viewed as logical and progressive (Elias & Merriam, 1984).

Harrison and Bramson (1982) used these five philosophies in their research and development of a thinking style instrument. Information concerning Bentham's utilitarianism concepts were used in developing the realist thinking style, Coleridge's transcendentalism beliefs were used in developing the idealist thinking style, Descartes's scientific method was used in developing the analyst thinking style, Whitehead's process philosophy was used in developing the synthesist thinking style, and Dewey's social doctrines were used in developing the pragmatist thinking style.

## **Jung**

The third pioneer in the field of thinking style theory research to be highlighted in this review of literature is Carl Gustav Jung (1875-1961). Jung critically investigated thinking in his studies of human behavior and personality styles. Jung's theory proposed that all conscious mental activity occurred in four dimensions: sensing versus intuition, thinking versus feeling, extroversion versus introversion, and judging versus perceiving. Of these four dimensions, the sensing versus intuition dimension and the thinking versus feeling dimension are related to thinking style theory.

Jung considered the dimension of thinking versus feeling a judgement process. According to Jung, thinkers use a logical decision-making process, while feelers make decisions in terms of a subjective system of personal values.

Jung considered the dimension of sensing versus intuition a perception process. According to Jung, sensors use perceptions of observable situations in their decision-making process, while Intuitors made decisions based upon inferred meaning from personal insight and relationships. The following brief explanation of the two dimensions associated with thinking style theory is included for additional clarification:

**Thinking Versus Feeling.** Thinking and feeling are two functions identified by Jung that are considered part of the judgement dimension. Thinking is considered a logical decision-making process, while feeling is considered a subjective decision-making process that includes personal views. An individual's preference towards either a logical decision-making process or a subjective decision-making process is a fundamental concept addressed by thinking style theory.

**Sensing Versus Intuiting.** Sensing and feeling are two functions identified by Jung that are considered part of the perceptual dimension. Sensing is considered the act of perceiving observable situations by one of the traditional human senses (i.e., touch, smell, sight). Intuition is considered the act of perceiving through nonobservable and inferred senses. In thinking theory, the reception and processing of these stimulants play a vital part in the decision-making process. Table 2.4 presents the functions and descriptions of these four basic psychological dimensions.



**Table 2.4**

**Summary of Jung's Psychological Styles**

Function	Description
Thinking	The intellectual process of connecting ideas with each other in order to arrive at a general concept, or to solve a problem.
Feeling	An evaluative emotional process that involves either the acceptance or rejection of an idea on the basis of whether the idea arouses a pleasant or unpleasant feeling.
Sensing	A perception of sensory input that is the sum of all conscious experiences produced by stimulation of the sense organs.
Intuiting	An experience which is immediately given a function of imagination and unconscious perceptions

Source: Jung, C. (1971). Psychological Types. Princeton, NJ: Princeton University Press.

**Summary of Jung's Theory of Psychological Types.** Jung's

psychological theory proposed that all conscious mental activity occurred in four dimensions: sensing versus intuition, thinking versus feeling, extroversion versus introversion, and judging versus perceiving. His theory of broad psychological types included four functions related to thinking style theory: (a) thinking, (b) feeling, (c) sensing, and (d) intuiting. Jung explained that these four psychological functions correspond to the manner in which consciousness obtains orientation to experience (determines reality).

Thinking, feeling, sensing, and intuiting were cognitive functions also studied by Harrison and Bramson (1982) in their research concerning personal

inquiry and in their later development of a thinking style instrument. They realized that although Jung's research focused upon four similar functions, Jung's research applications were significantly different than their research purposes. Jung focused upon how the thinking process could be successfully used to explain behavioral patterns, while Harrison and Bramson concentrated on how various strategies for approaching, solving, and resolving situations could be classified into different modes of thinking.

### **Harrison and Bramson**

Harrison and Bramson are the fourth and final pioneers in the field of thinking style research discussed in this section of the literature review. Their research into thinking styles was based on the premise that thinking was a process of inquiry and problem solving. Their theory of thinking styles was based upon the cumulative works of Buchler (1971), Churchman (1968, 1971), Jung (1971), Kelly (1963), Kolb (1976), and Neisser (1976). After analyzing and synthesizing these and other works, the central ideas of Buchler's methodologies and Churchman's modalities were selected as Harrison and Bramson's foundational core, with considerable additional influence by the works of Jung (1971), Myers and Myers (1993), and Kolb (1976). Table 2.5 provides a visual comparison of these three systems as concluded by Harrison and Bramson (1982).

**Table 2.5**

**Relationship of Thinking Styles, Thinking Modalities and Thinking**

**Methodologies**

<b>Harrison &amp; Bramson's Thinking Styles</b>	<b>Influences on Churchman's Central Ideas</b>	<b>Churchman's Central Ideas</b>	<b>Influences on Buchler's Central Ideas</b>	<b>Buchler's Central Ideas</b>
Synthesist	Hegel	Dialectic, Phenomenology	Whitehead	Process Philosophy
Idealist	Kant	Philosophical Idealism	S. T. Coleridge	Neoplatonic Transcendentalism
Pragmatist	E. A. Singer	Philosophical Pragmatism	Dewey	Pragmatism / Social Experiment
Analyst	Leibniz	Symbolic Logic	Descartes	Scientific Method
Realist	Locke	Empiricism	Bentham	Utilitarianism

Source: Harrison, A. & Bramson, R. (1982). The art of thinking. New York: Berkeley Books.

Once Harrison and Bramson concluded that thinking was a consistent preference for approaching, solving, and resolving situations through the process of inquiry, they began to search for an instrument to help them identify differences in thinking styles. They spent considerable time investigating and analyzing two specific instruments, Kolb's Learning Style Inventory, and Myers and Briggs's MBTI.

Sternberg (1988) concluded that Harrison and Bramson found Kolb's Learning Style Inventory unable to address inquiry situations unique to the process of thinking. Mitroff and Pondy (1974) noted that the formulation of Jung's

personality topology, and the subsequent creation of the MBTI, strongly parallels Churchman's inquiry mode rubric. Despite this similarity, Harrison and Bramson (1982) concluded that the MBTI did not adequately address thinking and inquiry, but rather addressed learning, intellectual style, matters of personal and social affiliation, and issues of vocational choice.

Subsequent studies have been conducted concerning the relationship and correlation of the MBTI and the InQ. Aware of the similarities noted above, Hughes and Franceschini (1989) conducted a study consisting of a mixed sample of 140 graduate and undergraduate students. They concluded that no significant relationship was found between any of the InQ styles and the MBTI dimension of introversion / extroversion, moderate to weak positive correlations were noted for realist and pragmatist styles with sensing and intuition. Moderate to weak correlations were noted for synthesist and idealist thinkers and intuitives, and the idealist style positively correlated with the feeling dimension, and the analyst style positively correlated with the thinking dimension.

Although some correlations could be found between the two instruments, Hughes and Franceschini concluded that the two instruments could not be used interchangeably as previously noted by Harrison and Bramson. They concluded that InQ is an instrument which differs from the MBTI since the InQ deals with

styles of thinking rather than interpersonal relations or personality (Yarbrough, 1995).

**Summary of Harrison and Bramson.** Believing that differences existed between cognition, learning, personality, and thinking, Harrison and Bramson (1982) began investigating inquiring systems. They believed thinking was a process of inquiry and problem solving, and they used the works of Buchler (1971), Churchman (1968, 1971), and Jung (1971) as their foundational core.

Harrison and Bramson (1982) reasoned that thinking styles were integrated collections of perceptual and conceptual strategies. They used Buchler's and Churchman's works for identifying five specific approaches for the way an individual perceives, makes meaning, and communicates. These five dimensions are synthesist, idealist, pragmatist, analysis, and realist. After researching the LSI and MBTI, these five dimensions were then used to create the InQ instrument used in the data collection phase of this study.

### **Review of Previous Research Studies**

The third section of Chapter II involves a review of previous research studies. In the early 1980s, dissertation studies using the InQ began appearing in the literature. This portion of the literature review clusters previous research studies using the InQ and other related thinking style studies not using the InQ, into the following four categories: (a) InQ studies conducted outside the field of

education, (b) InQ studies in elementary and secondary education, (c) InQ studies in higher education, and (d) related studies in library science.

### **Studies Outside of Education Using the InQ**

The first section reviewing previous research involves studies outside the field of education using the InQ. Two doctoral studies using the InQ outside the field of education were included in the literature review for this study. Malone's (1992) study involved law enforcement managers while Yarbrough's (1995) study involved health management managers.

#### **Malone**

Malone (1992) used the InQ to explore the relationship of thinking styles of local law enforcement managers and their supervisors. Malone explored law enforcement management theory, the relationship of problem solving to cognitive behavior theory, and the relationship of problem solving to preferred thinking styles.

Malone was unable to find research studies connecting thinking theory with the profession of law enforcement. This inability to link in thinking research and law enforcement management led Malone to incorporate research studies on cognition and problem solving in the literature review. Due to the plethora of cognitive research available, Malone limited the literature review to studies highlighting both cognitive behavior and problem solving.

Malone defined cognitive behavior as a choice of actions determined by perception, reasoning, and intuition. According to Malone, people adopt a set behavioral pattern based on their perception, reasoning, and intuition. Malone reasoned that cognitive behavior was a just standard for measuring thinking styles because Bramson (one of the co-founders of the InQ) defined cognitive behavior as an action that resulted directly from thinking. Malone reasoned that cognitive behavior was a satisfactory standard because the InQ is an instrument that is situational and behaviorally oriented, rather than an instrument strictly measuring thinking.

In Malone's study, the InQ and a demographic survey were administered to 543 law enforcement officers in supervisory positions in 11 different departments. Malone concluded that the mean scores for law enforcement workers were slightly higher in both the idealist style and the analysts style of thinking, with proximity of the overall InQ scores of the participants more closely fit the profile of flat thinkers.

Malone analyzed the data using mean, median, mode, and percentage statistics for each of the five thinking styles based upon specific groupings. The groupings Malone used included: (a) region of employment in the United States, (b) education level, and (c) educational discipline emphasis. Malone also

conducted a dyad analysis comparing the thinking styles of law enforcement officers and their supervisor(s).

Malone concluded that although specific thinking styles could be attributed to most participants, the relatively low preference for any one thinking style showed a tendency towards flat thinking. Malone summarized that the greatest strength of flat thinkers is thinking flexibility and creative ability. Based upon the officers' perceived managerial styles, Malone concluded that the flat thinking law enforcement workers were not taking advantage of their potential strengths in each of the remaining thinking styles. Although some trends were noted, Malone concluded that very low, or no, correlations existed between management styles, educational levels, and cognitive behavior in this study.

### **Yarbrough**

Yarbrough (1995) explored the relationship between thinking styles and perceptions in an organizational context. The study used the InQ to investigate how an individual's thinking style influences the organizational environment, and how the perceived organizational environment influences the individual.

Her literature review included a section on thinking styles in organizations. Yarbrough supported the notion that the degree of compatibility among individuals working together in an organization was dependent upon the similarities and differences of the individuals involved. This compatibility included how well



individual differences blended within an organizational environment. Yarbrough's study supported the theory of differentiation within institutions by revealing that organizational units tend to attract people with similar characteristics, such as thinking styles, although individuals with strong thinking style differences can be found within an organizational unit.

The three instruments used in Yarbrough's study were the: (a) Inquiry Mode Questionnaire, (b) Group Environment Scale-Real Form, and (c) Group Environment Scale-Ideal Form. The Group Environment Scale-Real Form was used to measure the actual or current social environment of a group, while the Group Environment Scale-Ideal Form was used to measure the preferred type of group for participants.

The participants for the study were employees of the University of Tennessee Medical Center at Knoxville. This facility was selected because of its interdisciplinary task-oriented management structure of the organization. A random sample of 335 employees was selected from the Medical Center's 4,300 employees, with 136 employees returning the surveys for data analysis.

Yarbrough analyzed the data using mean, standard deviation, Pearson Product Moment, T-test, and MANOVA. All of these analysis used a .05 alpha level for significance. The study's findings indicated that participants had a strong preference for a different group environment than the one in which they were

currently working. However, relationships between individual thinking styles and organizational environment did not produce significant differences, with only four out of 100 correlations statistically significant at the .05 alpha level.

In her summary of findings, Yarborough noted no significant relationships among the synthesist, idealist and pragmatist thinking styles and the ten GES subscales. Yarborough did note a relationship noted between the pragmatist thinking style and the leader support on the GES subscale, and a relationship between the realist thinking style and the innovation on the GES subscale.

Yarborough concluded that the participants in the study had a strong preference for a different group environment than the one in which they were currently working, that thinking styles were not related to actual or preferred organizational environment, and that no relationship existed between preferred group environment and thinking style.

Although the findings for relationships between thinking styles and organizational environments were not statistically significant, the study did add to the current body of knowledge by supporting information concerning what does and does not help improve organizational environments.

### **K-12 Study Using the InQ**

The second section reviewing previous research involves one study concerning K-12 educational leadership using the InQ. In conducting a literature

search, only one study was found using the InQ in with members of the elementary and secondary education field. Jaaskelainen (1984) used the InQ, the Edwards Personal Preference Schedule (EPPS), and a demographic questionnaire in a study designed to determine if school superintendents have a tendency to hire principals with manifest needs, demographic characteristics, and thinking styles similar to their own. The participants in this study were members of the Michigan Middle Cities Association, a consortium of 20 urban school districts in Michigan. Of the possible 20 consortium school districts, 10 districts were led by superintendents who hired principals. In these 10 districts, both the superintendents and the principals that they had hired were subjects of the study (N=27).

Jaaskelainen's study included a literature review of several of the demographic variables used in this study. The demographic variables used by Jaaskelainen included: (a) age, (b) marital status, (c) race, (d) educational level, (e) years in the classroom, and (f) years of administrative experience.

The study compared the thinking styles and five manifest needs, as defined by the EPPS, of superintendents and the principals they hired. The five manifest needs of the EPPS are: (a) achievement, (b) autonomy, (c) affiliation, (d) dominance, and (e) abasement.

Jaaskelainen analyzed the data using chi-square tests to determine if significant relationship between superintendents and the principals their hired

existed based upon the demographic characteristics. Jaaskelainen concluded that no significant relationships existed for the characteristics of age, years of classroom teaching, and years of administrative experience. Jaaskelainen concluded that significant relationships existed for the characteristics of marital status, race, and education level.

Using a .05 alpha level and a series of ANOVAs, Jaaskelainen concluded that the superintendents' and the principals' manifest needs of achievement, autonomy, affiliation, dominance, and abasement showed no significant difference. Jaaskelainen also concluded that the superintendents' and the principals' thinking styles of pragmatist, idealist, synthesist, and analyst revealed no significant difference. A statistical difference for the realist thinking style was proven between superintendents and principals. Jaaskelainen concluded with a suggestion for further studies investigating if a match in manifest needs and thinking styles in the selection of employees in other fields exist.

### **Higher Education Studies Using the InQ**

The third section reviewing previous research involves several studies using the InQ in higher education studies. One unpublished master's thesis and two dissertation studies using the InQ in higher education situations were found and included for this literature review.

Kienholz's (1984) master's thesis research used the InQ to compare thinking styles between students of architecture and students of medicine. Patricia Ann Shank (1985) used the InQ to investigate the preferred thinking styles of leisure instructors, while Jianhi Huang (1993) used the InQ to compare the relationship of cognitive styles, cognitive profiles, and thinking styles among Chinese and North-American adult graduate students. Huang's dissertation review also includes information concerning a post-doctoral study conducted with Chao (1994) using Japanese college students.

### **Kienholz**

Alice Kienholz is viewed as a pioneer in using the InQ in research studies, Kienholz's thesis has been cited by all doctoral studies used in this literature review. Kienholz is also responsible for additional studies on the validity and reliability of the InQ (Kienholz, Hayes, Mishra, & Engle, 1993).

Kienholz (1984) used the InQ instrument to determine if thinking style differences exist between architecture and medical students. She also examined the relationship between the Your Style of Learning and Thinking - From C (SOLAT) and the InQ, and investigated if SOLAT scores could be used to predict thinking styles based upon the InQ.

Kienholz's study included 59 architecture and 50 medical students attending the University of Calgary. Her study used two instruments, the InQ, and the

SOLAT. The SOLAT measures the asymmetrical functions of the cerebral hemispheres (right or left brain activities).

Kienholz used a variety of statistical analyses to examine the data including ANOVA, chi-square, and multiple regression. She used a .05 alpha level for all hypotheses testing.

Kienholz determined that significant differences for the SOLAT were consistently found in this study, with architecture students favoring right hemisphere brain activities, while medical students favored left hemisphere activities. ANOVA analysis of the InQ scores revealed that architecture students favored the idealist thinking style, with medical students favoring the realist thinking style.

Kienholz concluded that the SOLAT right, left, and integrated scores could not be used to predict InQ thinking styles. In her conclusions, she recommend using the InQ for team building within organizations.

### **Shank**

Shank (1985) used two questionnaires to study the relationship between preferred leisure conceptualizations and preferred thinking styles among college leisure instructors. The questionnaires used in this study were the InQ and a unique questionnaire design by Shank. Shank's instrument took approximately 10 minutes to complete and collected data concerning the instructors' leisure

philosophies and curriculum developments. The study was limited to instructors who taught leisure students on the undergraduate level.

This study included both qualitative and quantitative procedures in the methodology. The quantitative procedures included analyzing InQ scores by determining and comparing the absolute and relative frequencies based upon a .05 alpha level. Chi-square analysis was used to determine if a relationship existed between preferred conceptualizations of leisure and InQ thinking styles based on the same significance level.

Shank added qualitative procedures to generate greater in-depth information than traditional quantitative information could reveal. The qualitative procedures included interviewing representative participants from each of the five major thinking style categories (synthesist, idealist, pragmatist, realist, and analyst) concerning their stated leisure philosophies and actual practices. Follow-up case studies of randomly selected individuals who represented each of the five thinking styles were also conducted.

A total of 122 instructors were selected for the study, with 74 individuals participating. The study concluded that 57% of the sample group were one style thinkers, with 60% of all one style thinkers having a preference for the idealist thinking style. The least preferred thinking style was the synthesist, comprising 2% of all one style thinkers.

Shank's study supported Harrison and Bramson's (1982) conclusions that approximately 35% of the population are two-pronged thinkers, since 38% of her sample group showed a preference towards the two way thinking. All statistics were determined significant at the .10 alpha level, and she concluded that the preferred thinking style of a leisure instructor did enable prediction concerning that individual's preferred conceptualization of leisure.

### **Huang**

Huang (1993) was interested in the effect of increasingly larger numbers of international students upon universities located in the United States. Using the InQ, Huang investigated the relationship of thinking styles, cognitive styles, and cognitive profiles in Chinese and North-American adult students in higher education environments. Huang's study included demographic information concerning gender, age, major, credit hours, degree earned, and occupation from each participant.

The population for the study included North-American (mostly Caucasian) and Chinese graduate students, age 25 or older, attending the University of Wyoming. Huang included small number of Chinese scholars in the Chinese graduate student population because of the low number of subjects in this grouping. A total of 150 subjects (75 Chinese students and scholars and 75 North-American students) were selected for the study. Among the subjects, 96 of the



participants were males and 54 were females. Because of the low number of possible subjects, the Chinese participants were not randomly selected, while the North-American graduate students were randomly selected from records provide by the University of Wyoming's Registration Office.

Participants completed a battery of seven cognitive instruments including Groups Embedded Figure Test, Category Width Scale, and Role Construct Repertoire Test. The Inquiry Mode Questionnaire was also administered. The data was analyzed using mean, standard deviation, frequency distribution, and the Pearson product-Moment Correlation. All analyses was conducted using a .05 alpha level.

Several statistically significant relationships were found by the InQ regarding thinking styles in this study. A positive correlation was noted between country (United States or China) and the pragmatist thinking style. A positive correlation was noted between choice of major (engineering, natural science, social science / humanities) and the idealist, analyst, and realist preferred thinking styles (Huang & Sisco, 1994), and found no relationship between gender and preferred thinking styles.

Continuing the research in cultural influences upon thinking styles, Huang collaborated on a postdoctoral study investigating the preferred thinking styles of Japanese college students in America (Huang & Chao, 1994). In this study the

InQ was administered to 58 Japanese college students attending a private university in the United States to study the relationship between nationality and thinking styles. The study concluded that Japanese students preferred the idealist thinking style closely followed by the analyst thinking style.

Hung and Chao concluded that these results were consistent with the overall studies previously conducted by Harrison and Bramson (1982) concerning InQ score distributions among American. In their literature review, Huang and Chao noted the tendency for Americans to favor the idealist thinking style, and concluded that the tendency for Japanese students to exhibit a preference for the idealist thinking style was in direct relationship to the number of years the student had lived and studied in the United States.

### **Library Science**

The fourth section reviewing previous research involves research studies and dissertations from the field of library science. No previous studies using the InQ instrument with librarians were found during the literature review, although personality attributes of librarians have been frequently studied (Agada, 1984; Denis & Mackesy, 1982; Lowry, 1988; Scherdin, 1994). Two dissertations and several research articles concerning cognitive differences between public service and technical service librarians were reviewed for this chapter. In addition, the 1992 study sponsored by the Association of College and Research Libraries

Division of the American Library Association, and a 1995 demographic study of librarians working in Association of Research Libraries will be summarized.

### **Frankie**

Frankie (1980) based her study upon the theoretical belief that libraries are differentiated institutions built upon occupational subcultures that result in complex interactions between subunits. She hypothesized that measurable individual differences exist between members of the subunits, and that the use of job and worker analysis techniques make it possible to predict membership in a specific occupational group. She hypothesized that reference and cataloging librarians would reveal statistically significant differences in work and sub-culture preferences.

Frankie used the Job Analysis and Interest Measurement (JAIM) to examine the behavioral style differences between reference and cataloging librarians. Like the InQ, the JAİM has no right or wrong answers, since it is a personality inventory which is designed to measure personal qualities of a worker that can influence a job. The JAİM is an instrument that analyzes responses concerning background, interests, and work preferences in regard to six scales: (a) orderliness, (b) take leadership, (c) systematic-methodical, (d) social interaction, (e) act independently, (f) activity-frequent change, and (g) social service. The JAİM reveals three categories of personality variables: (a) behavioral styles, (b) work preferences, and

(c) values. Behavioral styles are defined by the JAIM as conscious and unconscious types of performances in various life situations.

The study consisted of three phases: (a) job analysis phase, (b) data gathering phase for worker analysis, and (c) worker analysis phase. The job analysis phase involved documenting what is done on a specific job and included systematic and scientific examination of work activities, equipment, and interactions. The data gathering phase for the worker analysis included administering the JAIM and a demographic data form to 313 subjects located in 16 large university libraries throughout the United States. Included in this group were 156 catalogers and 157 reference librarians.

Frankie analyzed the data using five statistical techniques: (a) T-test, (b) correlation analyses, (c) multiple regression, (d) factor analysis, and (e) binomial probability distribution. All analysis used a .05 alpha level.

Using t-tests and comparison of standard scores, Frankie noticed several significant differences between reference and cataloging librarians. Her study revealed that reference librarians scored higher on the JAIM scales of leadership, approval of others, status attainment, group participation, and activity-frequent change. Catalog librarians scored higher on the JAIM scales of orderliness, directive leadership, role conformity, work as an assistant, and systematic-methodical.

Frankie concluded that subcultures in library organizations exist, with members of the reference (public service) and cataloging (technical service) groups exhibiting different values, attitudes, behavioral styles, and work preferences. Frankie determined that the work environment had tremendous influence upon the individual librarian and recommended that university library administrators take a more active role in developing effective socialization mechanisms between members of various subunits. Frankie encouraged library administrators to help library professionals understand the different values, attitudes, and work preferences of various subunits and peers.

### **Lowry**

Howard Lowry (1988) investigated the cognitive styles and preferred conflict handling modes of cataloging and reference librarians in academic libraries. His research investigated four questions: (a) whether academic librarians working in cataloging and reference demonstrate differences in cognitive style, (b) whether the preferred cognitive style of cataloging and reference librarians correlated with job satisfaction and tenure, (c) whether academic librarians demonstrated consistent and characteristically preferred modes of handling conflict, and (d) whether preferred modes of handling conflict correlated with cognitive styles.

Lowry's study included 250 cataloging and reference librarians from 31 randomly selected academic libraries in California, Nevada, and Arizona within a 500 mile radius from the researcher's headquarters. The study used three instruments for data collection: (a) Group Embedded Figures Test, (b) the Thomas-Kilmann Conflict Mode Instrument, and (c) a questionnaire created by the researcher posing questions about the participant's type of library, primary and secondary job assignments, and job satisfaction.

The data was analyzed using mean, standard deviation, and ANOVA statistical computations. Lowry used a .05 alpha level for significance in all the analyses.

Lowry concluded from the literature review that libraries are highly differentiated organizations organized around task groups that make unique, but complementary, contributions to the organization. He concluded from the literature that librarianship is a diverse profession that attracts individuals with different cognitive styles as described by Messick and Associates (1976), and that these differences in cognitive styles result in vocational choices among librarians for specific job functions (public or technical service positions).

Lowry found no statistically significant differences in cognitive styles among cataloging and reference libraries as measured by the Group Embedded Figure Test. However, the data analysis concerning perceived cooperation levels

from other task groups supported conclusions drawn from the literature review that differences between cataloging and reference librarians do exist.

Lowry found that the results of cognitive style preferences between cataloging and reference librarians contradictory to the findings of a similar study by Johnson and White (1981) that investigated the preferred cognitive style of field dependence or field independence among library science students with preferences towards either cataloging or reference work. Lowry speculated that the different results of these studies could be attributed to the different populations, or more importantly, could be a reflection of the differences between expressed preferences or attitudes of library science students and actual performance of working professional librarians.

Based upon data analysis conducted on several items listed in the questionnaire, Lowry determined that both cataloging and reference librarians participating in the study were more satisfied with the cooperation they received from peers in their own respective subunits than other library administrative areas. Lowry recommended efforts to bridge negative assumptions and communication gaps between subunits, and concluded that additional studies are needed concerning cognitive styles of librarians working in different task areas.

## **Choi**

Choi (1989) used Kolb's Learning Style Inventory (LSI) to investigate learning style differences between public service and technical service librarians. Choi's 1989 study was based upon an earlier data collection conducted with Washington (1988) that distributed the LSI to 200 librarians working in 20 libraries with an institutional membership in the Association of Research Libraries. A total of 100 technical service librarians and 100 public service librarians were contacted through the mail, with 148 surveys returned for data analysis.

Data analysis revealed that 73 surveys were returned by technical service librarians (52%), and 67 surveys were returned by public service librarians (48%). The data analysis revealed 38.6% of all returned surveys were assimilators, 27.1% convergers, 19.3% divergers, and 15% accomodators.

Choi concluded from these results that academic librarians have strengths in the abstract conceptualization learning style, with neither library subunit (public service or technical service) showing a statistically significant preference towards any one specific learning style. No statistical differences were noted when learning style results were analyzed in association with gender, age, length of professional experience, or undergraduate major.



### **Johnson and White**

Johnson and White (1981) investigated the field-dependent versus field-independent cognitive style of library science students. Their study consisted of 179 College of Library and Information Sciences master's students attending the University of Maryland. They concluded that a diversity of students is attracted to the field of library and information science, and that people with different cognitive styles cluster within the library profession by function (administration, children's services, public services, and technical services), and by library type (academic, public, school, or special library).

### **Stein, Hand, and Totten**

In 1986 a three-member research team of Stein, Hand and Totten conducted a study comparing cognitive styles of library science students with the cognitive styles of health science / pre-health science students. This study used two instruments in the data collection phase, (a) the Educational Cognitive Style Interest Inventory and (b) the Educational Cognitive Style Test Battery for Undergraduate Health Science Students Inventory, which measures 28 various cognitive style elements.

A total of 71 library science students and 110 health science students participated in this study. Both student groups attended North Texas State University.

Based upon these two instruments, data analysis revealed substantial differences in preferred patterns of collecting, processing, interpreting, and communicating information between library science and health science students. Stein, Hand, and Totten concluded that library science students were oriented towards communication skills and preferred a written communication situations, while health science students preferred oral communication situations. Library science students used more nonverbal language as part of their communication process. The study revealed that library science and health science students reasoned with different conceptual approaches.

### **Squires, Hoopes, and Gillum**

Squires, Hoopes, and Gillum (1992) conducted a research study based upon the premise that awareness of thinking styles is vital to the success of any organization, especially libraries. The study was conducted at the Harold B. Lee Library of the Brigham Young University, with all 133 librarians, administrators, and paraprofessional staff members participating in the study.

The study used the Squires Thinking Style Test which is composed of two parts: (a) an analytical test that allows responses to eight questions to be analyzed documenting thinking and learning styles of the participant, and (b) an on-task activity allowing the participant self-expression either verbally or visually. The Squires Thinking Style Test puts people into nine distinctive characteristics:

(a) independent thinker, (b) extended thinker, (c) verbal convergent, (d) verbal divergent, (e) verbal visual, (f) orchestrated, (g) visual verbal, (h) total visual, and (i) abstract visual.

The study concluded that professional librarians were more verbally oriented and satisfied with their jobs than library administrators or library paraprofessionals. The paraprofessionals were more visually oriented, while most administrators were verbally divergent thinkers. Squires, Hoopes, and Gillum concluded that most visual thinkers tended to avoid computers, while verbal thinkers were attracted to tasks using computers.

### **1992 ACRL Study**

A significant research study to be included in this literature review is the 1992 study conducted by the Association of College and Research Libraries Division of the American Library Association. Under the direction of Anne K. Beaubien, ACRL 1991-1992 President, the ACRL organization approved financial support for the investigation of professional librarian profiles. The results were published in the edited work by Mary Jane Scherdin (1994), Discovering Librarians: Profiles of a Profession. This study investigated the personality and professional characteristics of librarians and summarized several significant research studies concerning profiles of professional librarians.

The study used three instruments in the data collection phase: (a) the Myers Briggs Type Indicator (MBTI), (b) the Strong Interest Inventory (SII), and (c) a demographic data questionnaire. The Strong Interest Inventory measures six criteria known as General Occupational Themes: (a) realistic, (b) investigative, (c) artistic, (d) social, (e) enterprising, and (f) conventional. The Strong Interest Inventory also measures interest in the Basic Interest Scales. The Basic Interest Scales are used to determine if a high or low interest is found in such areas as writing, music, law, science, nature, athletics, agriculture and many other occupational areas.

The sample included a selection of 3,500 librarians (750 from the Special Libraries Association and 2,750 from the 1991 American Library Association Membership). In order to compare ALA leaders with the general ALA membership, two separate samples were created from the ALA roster. First, 1,375 names were drawn from the 4,252 officers and committee members of the ALA. Then, 1,375 additional names were selected from the remaining 28,549 ALA membership. This unbalanced method of sampling (32% ALA leaders and 5% general ALA membership) was intentional in order to determine the direction in which the library science professional field was shifting (Scherdin, 1992), since it was theorized that surveying the current ALA leaders would provide a clearer picture of the direction the profession was shifting towards than a random

sampling of the general membership. Librarians with school, public, special, and academic career backgrounds were included in the study.

A statistical analysis of all collected data was performed by Todd Michael Frankie, Assistant Professor, School of Public Policy and Social Research, University of California at Los Angeles. The Myers-Briggs Type Indicator data was analyzed using the Selection Ratio Type Table (SRTT) originally written by Isabel Myers, comparing the ratio of people in each of the 16 Myers-Briggs types to the number that would normally be expected in each type.

Data analysis for the Strong Interest Inventory was based upon a total of 2,032 (58% of the total sample) responses. The SII scores were analyzed to answer the following questions: (a) did this sampling of the library profession reflect a change in the profile of librarians when compared to the general population, and (b) were there significant differences among the SLA members, ALA Leaders, and the ALA general membership.

Data analysis determined that no significant difference existed between the three sample librarian groups. All three groups were clearly dominant on Artistic Themes from the SII General Occupational Themes, while a balance of interests in many areas was noted from the SII Basic Interest Scales.

Scherdin (1992) concluded that when data from librarians new to the field were pulled out and studied separately, a higher interest in investigative activities was revealed. Scherdin speculated that by 2014, most of the participants from this study would have retired (since the mean age of participants in this study was 44), resulting in great differences in the profession from the Artistic trend found in younger librarians from the 1992 study.

The 1992 ACRL study used the Expanded Analysis Report (EAR) version of the MBTI. This instrument uses an expanded 131 question format compared to the commonly used 94 question MBTI inventory.

Scherdin commented that numerous research studies have previously been conducted on librarians using the MBTI. Therefore, the 1992 MBTI results were compared with data gathered from an analysis of MBTI studies conducted on librarians from 1971 to 1984. Scherdin concluded that earlier studies revealed a preference in the introverted, sensing, feeling, and judging types (ISFJ) among librarians, with the 1992 ACRL study revealing changes in these preferences. The 1992 MBTI study had a majority of librarians expressing introverted, intuitive, thinking, and judging preferences (INTJ).

Comparing librarians to the general population revealed more dramatic variances, with librarians having significant preferences from the general population on 14 of the 16 MBTI types. The greatest differences found between

librarians and the general population were in the extroversion / introversion dimension and the sensing / intuition dimension.

The 1992 ACRL MBTI study included additional analysis comparing male and female librarians, and librarians from different types of institutions (school, academic, public and special libraries). Other analysis compared MBTI scores among librarians with different years of experience. No outstanding findings were noted by Scherdin in any of these additional analyses.

Significant to this study on thinking style differences among academic librarians was the comparison of library specialization and MBTI preferences. The specializations noted by the ACRL study included technical service librarians (n=217), public service librarians working with adult patrons (n=489), public service librarians working with children (n=190), automation specialists (n=83), and library administrators (n=611). Table 2.6 shows the area of library specialization along with the preferred MBTI personality types as concluded by the 1992 ACRL study.

**Table 2.6**

**1992 ACRL Summary of Librarian Personality Styles**

Specialization	MBTI	Generalizations
Administration	ENFP ENTP ENTJ	more extroverts more intuitive more thinkers
Automation	INTP	more introverts more thinkers
Public Service, Adults	no significant differences found	no significant differences found
Public Service, Children	INFJ INFP ENFJ	more feeling
Technical Service	ISTJ ISFJ	more introverts more sensing more judging

Besides summarizing the personality styles of professional librarians, the 1992 ACRL study also concluded the following based upon the MTTI, Campbell Interest and Skill Survey, ACT Interest Inventory, and the Strong Interest Inventory:

1. Information gathered from instruments such as the MBTI, ACT, and SII has practical applications for the library profession.
2. The library profession needs more diversity, and the information gathered from the MBTI, ACT, and SII has implications for recruitment and retention of diverse populations in the profession.



3. Information gathered from the MBTI, ACT, and SII help the library profession fight negative images in society.
4. Library managers almost always come from the ranks.
5. Most librarians (93%) are satisfied with their careers.
6. The ACT Interest Inventory Survey concluded that librarians were primarily clustered into two categories: (a) the applied arts (visual) family in the arts job cluster, and (b) the social sciences family in the science job cluster, with librarians most comfortable acting as researchers and scholars.
7. The Campbell Interest and Skill Survey concluded that librarians have a strong tendency towards the creating category, scored lowest in the adventuring category, and relatively low in the Influencing Category (where most management occupations are found).
8. The Strong Interest Inventory concluded that librarians are dominant on the Artistic Theme, and scored low on Realistic, Enterprising, and Social Themes.
9. The MBTI is one of the most popular tools used to analyze librarians.
10. There is a concern that the profession is not attracting the versatile, intelligent, and creative people society needs for the library information specialists of the future.

### **ARL Demographics Study**

The final research study to be included in the literature review is a study concerning the demographics of librarians working in libraries with an institutional membership in the Association of Research Libraries conducted by Wilder (1995). The study analyzed information from two unpublished data sets collected by the Association of Research Libraries. These data sets included the 1990 and 1994 ARL salary surveys, which consisted of basic demographic figures for librarians employed in 108 libraries with an ARL institutional membership.

Wilder used the information to examine the shape and movement of the age profile of ARL librarians in an attempt to project changes in the library profession through 2020. Wilder ascertained that librarians, especially those working in ARL libraries, are older than members of most comparable professions, and the average age of librarians getting older at an alarming rate when compared to other professions. His study also concluded the following concerning the participants:

1. The percentage of ARL librarians age 34 and under is one third of individuals of the same age employed in comparable professions.
2. The percentage of ARL librarians age 45 and over is almost 75% higher than the percentage of those of the same age employed in comparable professions.

3. The age profile of ARL librarians has changed noticeably between 1990 and 1994, with the percentage of the population age 45 and over increasing from 48% to 58%.

4. Projections suggest that 16% of the 1995 ARL population will retire by 2000, another 16% will retire between 2000 and 2005, an additional 24% will retire between 2005 and 2010, and 27% will finally retire between 2010 and 2020.

5. The number of ARL cataloging librarians declined by 13% from 1990 to 1994, while the number of reference librarians rose by 7%.

6. ARL libraries recruit more experienced librarians ages 35 to 49 than they lose.

7. In 1994, ARL libraries had more librarians who began their career in 1967 than began in any year from 1990 forward.

8. Fifty-four percent of all ARL librarians who have 20 or more years of professional experience have worked at only one library in the course of their careers.

### **Summary of Related Research**

The fifth section concerning the review of previous studies is a summary of the related research. A total of 14 research studies were reviewed for this portion of the literature review. These studies were organized and presented in four categories: (a) InQ studies conducted outside the field of education, (b) InQ studies

in elementary and secondary education, (c) InQ studies in higher education, and (d) related research studies in the field of library science, with six InQ studies included in the first three categories.

The six InQ studies included research conducted by Huang (1993), Jaaskelainen (1984), Kienholz (1984), Malone (1992), Shank (1985), and Yarborough (1995). Eight studies from the field of library science included Choi (1989), Frankie (1980), Johnson and White (1981), Lowry (1988), Stein, Hand, and Totten (1996), Scherdin (1994), Squires, Hoopes, and Gillum (1992), and Wilder (1995).

Previous research by Choi (1989), Frankie (1980), Johnson and White (1981), Lowry (1988), Malone (1992), Scherdin (1994), and Yarborough (1995) revealed no patterns concerning thinking styles. Of these seven studies, two found statistically significant differences (Johnson & White, 1981; Scherdin, 1994), three found no statistically significant differences (Choi, 1989; Lowry, 1988; Malone, 1992), and two found statistical differences too small to be considered significant (Frankie, 1980; Yarborough, 1995).

The works of Johnson and White (1981) and the 1992 ACRL study edited by Scherdin concluded that differences among librarians do exist. Johnson and White's study specifically focused upon the field-dependence versus field-independence of library science students using the Group Embedded Figures Test.

They concluded that librarians with different cognitive styles cluster within the library profession by function (administration, children's services, public services, and technical services), and library type (academic, public, school, or special library). The 1992 ACRL Study also found significant differences among area of library specialization (administration, automation, adult public services, children public services, and technical services) in librarians based upon personality styles as tested by the MBTI.

Research conducted by Choi (1989), Lowry (1988), and Malone (1992) found no statistical differences. Choi found no statistical differences between learning styles and public service and technical service librarians using Kolb's LSI instrument, nor was a statistically significant difference noted between learning styles and gender. No statistically significant cognitive differences were found between cataloging librarians (technical service) and reference librarians (public service) using the Group Embedded Figures Test in Lowry's study. Lowry did conclude that perceived problems between public service and technical service subunits exists.

Malone used the InQ in a survey of law enforcement managers, and found no statistically significant differences. In her conclusions, Malone stated that the InQ scores revealed a tendency towards flat thinking among law enforcement

managers, which should be seen as an asset since flat thinkers are associated with flexibility and the ability to use the best thinking style based upon the situation.

Frankie (1980) and Yarborough (1995) found statistical differences too small to be considered significant to make specific conclusional statements based solely upon the data analysis. Based upon an analysis of the literature and the small differences noted in the data analysis, Frankie concluded that sub-cultures do exist in libraries, with reference librarians (public service) and cataloging librarians (technical service) exhibiting small differences in values, attributes, behavioral styles, and work preferences. Yarborough's study used the InQ to study the relationship between thinking styles and a relationship to the organizational environment. She concluded that the data did not produce highly significant differences among the various subject groups.

### **Chapter Summary**

The final section is a summary of Chapter II. The literature review presented in this chapter was organized into three segments: (a) definitional dilemma, (b) theoretical framework, and (c) review of related research studies.

The first section of the literature review addressed the definitional dilemma concerning four similar, but not interchangeable, terms essential to the theoretical foundation of this study. The terms cognitive styles, learning styles, personality

styles, and thinking styles were summarized and defined as used in this research investigation.

An in-depth literature review of the four theoretical concepts first introduced in Chapter I was then presented. This section provided research-based information on the theories of differentiation, organizational information processing, gender, and thinking styles, and emphasized how these theories provided the theoretical basis for this specific study.

Finally, a detailed review of dissertations and other related research studies using the InQ Instrument was summarized. In this section, miscellaneous thinking and management studies in the field of library science were also highlighted.

## **CHAPTER III**

### **DESIGN OF THE STUDY**

Chapter III discusses the design and methodology of the study, and is organized into six sections: (a) restatement of the research questions, (b) sample information, (c) instrumentation, (d) procedures, (e) data analysis, and (f) chapter summary. The chapter begins by restating the research questions and then explains the selection of the sample. The InQ instrument is introduced, with reliability and validity studies highlighted. The InQ scoring process is explained with detailed procedures necessary for replicating the study provided.

#### **Restatement of the Research Questions**

To understand the design of the study, the first section of Chapter III is a restatement of the research questions introduced in Chapter I. This study was designed to investigate whether a statistically significant relationship between preferred thinking styles and library administrative role (public or technical service) exists, and if a significant relationship between preferred thinking styles and gender (female or male) exists among the library administrators working in libraries with an institutional membership in the Association of Research Libraries. ANOVA was used to determine if an interaction between administrative role



(public or technical services) and gender (female or male) exists. The following are the specific research questions of this study:

1. Is there a significant relationship between preferred thinking style and library administrative role (public or technical service) in senior library administrators working in libraries with Association of Research Libraries membership?
2. Is there a significant relationship between preferred thinking style and gender (female or male) in senior library administrators (public or technical service) working in libraries with Association of Research Libraries membership?
3. Is there an interaction between administrative role (public or technical service) and gender in senior library administrators working in libraries with Association of Research Libraries membership?

### **Sample Information**

The second section of Chapter III provides information concerning the study's sample. This information is organized into two sections: (a) selection of the sample, and (b) sample size.

#### **Selection of the Sample**

The first section providing information concerning the study's sample involves procedures followed in the selection of the sample. The methodology of this study included establishing two criterion for selecting the most effective study

sample: (a) careful consideration of the type of library with an ARL institutional membership (i.e., academic, public, or special), and (b) level of library administrative responsibility (i.e., department head, assistant director, or director).

Librarians participating in this study are considered leaders in the library science field since they work in libraries with institutional membership in the Association of Research Libraries located in the continental United States. To help understand why librarians hold their peers working in libraries with an ARL institutional membership in such high professional regard, a brief explanation of the factors involved in selecting ARL institutional members has been included in this chapter.

### **ARL Membership**

The first criterion for sample selection, type of library, was satisfied by restricting the study to libraries with an institutional membership in the Association of Research Libraries. ARL is limited to research institutions sharing common goals, interests, and needs. The ARL bylaws specify that membership is extended by invitation only to university libraries with broadly-based collections and services that emphasize research and graduate instruction at the doctoral level and grant their own degrees. Upon careful consideration by the entire membership, exceptions have been made to include certain public libraries (New York Public and Boston Public) or specialized library institutions (Center for Research

Libraries, National Library of Medicine, National Agricultural Library, and Library of Congress) because of the depth and breadth of their collections and services.

ARL membership consists of three criteria, the first of which ensures similarity of parent institution characteristics. The second standard supports comparability of library size, with the final criterion guaranteeing diversity and significant contributions by new members to the Association.

The standard governing similarity of parent institutions is designed to ensure that university libraries being considered for ARL membership can contribute to the effective interchange of information among research libraries with similar characteristics and standards. To meet this criterion, the parent institution of the library must be classified as a Research University I or II in the Carnegie Classification (see definitions) at the time that the institution is invited for membership.

Similarity of collection size is the second requirement ensuring membership uniformity. A factor analysis of 22 categories of annually collected data from each ARL member library identified five most commonly held characteristics: (a) number of volumes held, (b) number of volumes added (gross), (c) number of current serials received, (d) total expenditures, and (e) number of professional, support, and paraprofessional staff. Based upon these categories, a library must have a factor analysis index score greater than -1.65 for each of the four years prior

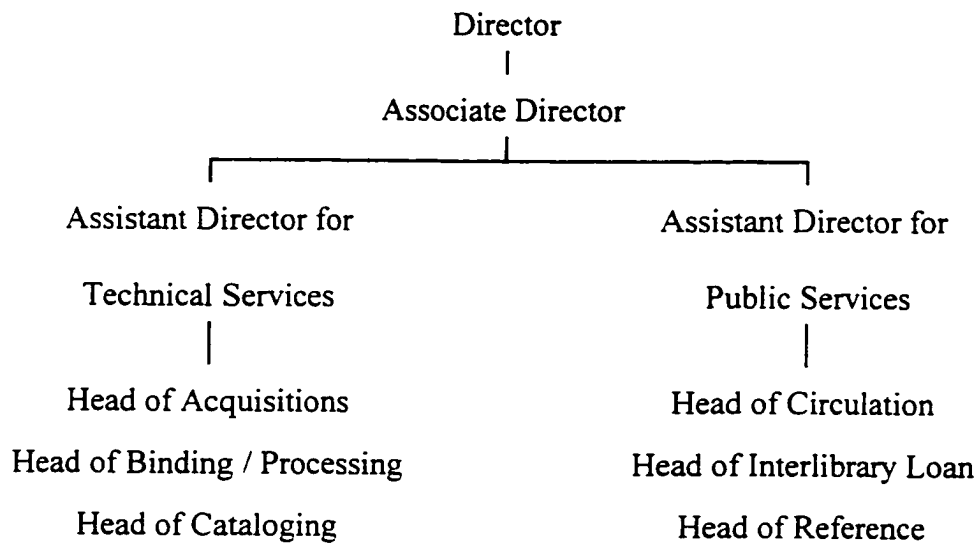
to, and including the year of application in order to qualify for membership. To ensure an Association with common purpose, current library members must maintain a factor analysis index score of at least -2.25. Falling below this level for four or more consecutive years disqualifies a library from future membership. If a university library is a Carnegie Research University, but does not satisfy the current index threshold of -1.65, membership can be extended if there is strong evidence that the Library makes a significant contribution to the distributed North American collection of research resources.

### **Administrative Level of Responsibility**

The second criterion for sample selection was administrative level of responsibility. This study targeted the senior public service library administrators and the senior technical service administrators working in libraries with membership in the Association of Research Libraries. To understand why librarians at this specific level of administrative responsibility were selected for this study, background information concerning the organizational structure of large academic libraries is helpful. Figure 3.1 provides a visual demonstration of this organizational matrix.

**Figure 3.1**

**Typical ARL Library Organizational Structure**



The complex hierarchical structure for large academic libraries typically includes a director of libraries, an associate university librarian (a.k.a. associate director), several assistant directors (i.e., technical service, public services, systems, library administration, and branches), and a level of administration commonly referred to as department head (i.e., reference, cataloging, inter-library loan, circulation, serials) (Coughlin & Gertzog, 1992; Martin, 1996). According to Martin (1996), this structure is basically the same throughout most large academic institutions despite differences in organizational missions and library director

leadership style. In this traditional hierarchal organizational structure, department heads report to their appropriate assistant directors (public or technical services), with the assistant directors for public and technical services reporting equally to either the library director or associate director.

In selecting the sample group for this study, careful consideration was given to the selection of librarians at the appropriate administrative level. Since librarians at the level of director and associate director typically manage on behalf of all library areas, not just a subunit, they were excluded from the study.

The next level of library administration, the assistant director level, provided the optimal match for this study. Librarians traditionally occupying positions at the assistant director level at libraries with membership in the Association of Research Libraries have carefully chosen their career paths, area of library expertise, and are typically promoted from within the organization (Wilder, 1995). They are seasoned professionals with specialization in the specific area they administer. Differentiation and organizational information processing research can be used to understand many of their managerial actions and communication patterns. For example, it is not unusual in this type of organizational structure for information to be shared by department heads in different areas of library administration (public or technical), to be routed up from the department head level to the appropriate

assistant director level, transfer from assistant director to corresponding assistant director, and then routed down to the department head level on the other side.

### **Sample Size**

The next section providing information concerning the study's sample involves the methodology used to determine the sample size. Once the population was determined, the next process involved determining the correct sample size for the study. This study was based upon the concepts of sampling and inferential statistics. In studies using inferential statistics, the data collection and analysis phases can be expedited by using a randomly selected sample, since results that are statistically computed for a sample population can be assumed for the entire population (Jaeger, 1990).

As of November, 1996, the Association of Research Libraries had a total membership of 120 institutions (see Appendix A). Since the focus of this study concentrated upon academic administrators with similar levels of responsibilities and backgrounds, the 15 Canadian institutions and the 8 non-university institutions were excluded. Timing considerations with mailing and receiving survey information from the University of Hawaii, the only non-continental United States ARL member, prompted the decision to exclude this institution from the possible sample group used for this study. This resulted in 97 possible institutions for the random selection sample in the survey portion of the study (see Appendix B).

To avoid a Type II error (failing to reject a false null hypothesis), a power analysis (see definitions) was conducted to determine the sample size. The power analysis indicated that a sample population required a minimum of 49 institutions (98 possible survey participants), with an effective maximum of 97 institutions (194 possible survey participants). A total of 66 institutions (132 participants) was selected since it was the median of these two choices.

### **Instrumentation**

The third section of Chapter III provides information concerning the instrumentation used in the study. This section is divided into four parts: (a) background information concerning the InQ, (b) instrument reliability, (c) instrument validity, and (d) scoring information.

### **InQ Development and Background**

The first section on instrumentation provides development and background information concerning the InQ. The InQ is a thinking style inventory tool developed by Harrison and Bramson in 1977 and revised in 1980 (see Appendix C). The InQ is directed at quantifying differences in thinking style preferences as measured by behavioral actions in everyday life (Harrison & Bramson, 1982). It is designed to measure thinking styles in five major dimensions: (a) synthesist, (b) idealist, (c) pragmatist, (d) analyst, and (e) realist. The ways in which a person



attends to data, perceives problems, and chooses alternatives depends upon the extent to which each style of thinking is adopted by an individual.

The InQ instrument is comprised of 18 five-part questions (see Appendix C). For each question, a situation is described, with five available action alternatives listed. Participants of the study are required to rank their preferred actions from most preferred (5) to least preferred (1) among the alternatives. Within each question, the ranking of one, two, three, four, and five can only be used once. When tabulated, the scores provide data for determining preferred thinking styles.

Typical distribution of thinking styles among residents in the United States reveal that 50% of the population favor one thinking style, 35% favor two or more thinking styles, and 15% favor three or more thinking styles (Harrison & Bramson, 1982; Svendsen & Svendsen, 1995). People with a predisposition towards one of the five thinking styles, and are considered "Ideal" thinkers for that specific style.

Harrison and Bramson (1982) found that the idealist, analyst, and realist are the three most common thinking styles in the United States, noting that the idealist style is closely associated with accepted societal values in philosophy, government, and the political community. The analyst style reflects the foundations of the Western intellectual method. The realist style is closely tied to thought and activity in economics and production, also considered the empirical foundations of society.

The pragmatist style is generally associated with non-traditional, experimental, and progressive thinking and actions.

Many individuals completing the InQ have a predisposition towards a combination of two thinking styles. Research conducted by Harrison and Bramson (1982) indicate that the following 10 thinking style combinations are possible:

(a) synthesist-idealist, (b) idealist-realist, (c) synthesist-pragmatist, (d) pragmatist-realist, (e) synthesist-realist, (f) analyst-synthesist, (g) idealist-pragmatist, (h) analyst-pragmatist, (i) idealist-analyst, and (j) analyst-realist.

Svendsen and Svendsen (1995) supported Harrison's and Branson's statement concerning two thinking style combinations. They state that among these 10 possible combinations, the analyst-idealist, the analyst-realist, and the synthesist-idealist are the three most common combinations of two-way thinking styles.

Two additional type of thinkers are also identified by the InQ scores: the three-way thinker and the flat thinker. Studies reveal that less than 2% of all people, and 4% of all multiple thinkers, share the phenomenon of being a three-way thinker (Harrison & Bramson, 1985; Svendsen & Svendsen, 1995). Flat thinkers have InQ scores that are identified by relatively equal compositions in all five thinking styles. Flat thinkers comprise 26% of the multiple thinker population (Svendsen & Svendsen, 1995).

## **Reliability**

The next section concerning the InQ instrument involves the instrument reliability. Reliability is a concept that represents the consistency of an instrument. A measurement instrument is considered reliable if it provides consistent results when given to the same individual repeatedly under near-identical conditions (Jaeger, 1990).

The reliability of the subtests of the InQ was investigated by test-retest procedures, and was reported in a study by Bruvold, Parlette, Bramson, and Bramson (1983), that measured temporal stability (see definitions). Data obtained from 700 respondents in 1980, and again from these same respondents six weeks to two months later was used for the reliability testing. The data for reliability assessment are based on a different group, whose responses formed the basis of the item analysis. The test-retest coefficients for the five sub-tests were determined through the computation of Spearman Rank Difference Coefficients with a median coefficient of .75. All subtest test-re-test correlation coefficients were positive and significant at the .001 alpha level. The test-retest coefficients for the five subtests of the InQ inventory are represented in Table 3.1. The reliability results suggests an overall consistency which leads to further assessment of temporal stability in more heterogeneous groups of subjects than the original university students comprising the sample for the 1983 study.

**Table 3.1****Test-retest Reliability and Subtest Intercorrelation Coefficients**

	S	I	P	A	R
Synthesist	(0.75)	-0.05	-0.32	-0.30	-0.40
Idealist	-0.24	(0.52)	-0.12	-0.36	-0.49
Pragmatist	-0.24	-0.02	(0.65)	-0.41	-0.14
Analyst	-0.16	-0.16	-0.50	(0.70)	-0.10
Realist	-0.43	-0.43	-0.03	-0.18	(0.61)

Source: Bruvold, W. H., Parlette, N., Bramson, R. M., & Bramson, S. J. (1983). An investigation of the item characteristics, reliability, and validity of the inquiry mode questionnaire. Education and Psychological Measurement, 43, 483-493.

The InQ is intended primarily to provide a profile of scores for interpretation. These scores can reflect a flat profile, a single-peak profile, or a single-valley profile. Regardless of profile, reliability estimates were concerned with stability over time, with 87% of the subjects in the reliability study reflecting satisfactory stability necessary for individual profile interpretation (Kienholz, 1984).

**Validity**

The third section concerning the InQ instrument involves validity. Validity is a frequently used measurement concept that is concerned with the degree to which a measurement instrument actually measures what it purports to measure (Jaeger, 1990).

The validity of the InQ inventory was investigated using two approaches. The first approach was a factorial analysis structure of the 90 items composing the InQ Inventory scoring. The second approach was a subtest score profile analysis of various occupational groups taking the InQ inventory.

Standard factor-analytic procedures were used, followed by the quartimax rotation procedures designed to simplify rows for a factor matrix. In a factor analysis, clusters should form for the required factors. Therefore, when a factor analysis is run for the InQ, all 18 synthesist items should have their major positive loading on one factor, all 18 idealist items should have their major positive loading on one factor, all 18 pragmatist items should have their major positive loading on one factor, and so on.

Table 3.2 and Table 3.3 reveal the summary of the five cluster factor analysis conducted on the InQ (Harrison & Bramson, 1982). From these tables, Factor 4 clearly represents a synthesist factor, Factor 2 reveals a strong analyst factor, with Factor 3 predominantly representing the realist factor.

Idealist and pragmatist items are both represented by Factor 1, and has been statistically argued that this may be the result of the factor loading and rotation. Therefore, the results of Table 3.3 indicate that the idealist items are the major representation in Factor 1, and Factor 5 represents the pragmatist factor (Harrison & Bramson, 1977; Jaaskelainen, 1984; Kienholz, Hayes, Mishra, & Engel, 1993).

**Table 3.2****Highest Positive Factor Loadings of InQ Items**

<b>Factors</b>	<b>S</b>	<b>I</b>	<b>P</b>	<b>A</b>	<b>R</b>
Loading 1	0	(8)	(8)	3	3
Loading 2	2	1	0	(9)	5
Loading 3	1	1	5	4	(6)
Loading 4	(13)	6	0	1	0
Loading 5	2	2	5	1	4

Source: Harrison, A. F., & Bramson, R. M. (1977). InQ administration and interpretation manual. Berkeley: Bramson, Parlette, Harrison and Associates.

**Table 3.3****All Positive Factor Loadings of InQ Items**

<b>Factors</b>	<b>S</b>	<b>I</b>	<b>P</b>	<b>A</b>	<b>R</b>
Loading 1	1	(13)	10	13	8
Loading 2	9	8	3	(16)	6
Loading 3	2	3	11	14	(12)
Loading 4	(14)	12	4	9	1
Loading 5	9	11	(12)	6	10

Source: Harrison, A. F., & Bramson, R. M. (1977). InQ administration and interpretation manual. Berkeley: Bramson, Parlette, Harrison and Associates.

### **Scoring**

The fourth, and final, section concerning the InQ instrument provides information regarding scoring. The InQ is an 18 question, ranking-style, self-scoring instrument, with no right or wrong answers. Each item in the questionnaire is comprised of a statement that is followed by five possible responses. Participants rank the five possible responses in order, ranging from behavior which they believe is most like them (5) to behavior which is least like them (1). Within each question, a ranking of 1 to 5 can only be used once, even if the participant strongly believes there are two responses of equal strength. The five ranks correspond to the five thinking styles of synthesist, idealist, pragmatist, analyst, and realist. The total score for the instrument is 270, with the lowest possible score in any one thinking style is 18, and the highest possible score in any one thinking style being 90.

Table 3.4 provides a summary of thinking style preferences based upon InQ scores. Scores between 90 and 72 in any one style of thinking indicate a very strong preference for that style, with scores between 71 and 66 interpreted as a strong preference, and scores between 65 and 60 revealing a moderate preference for a specific thinking style. A score of 48 or less in any one style of thinking is considered a disregard for a thinking style, with scores between 48 and 43 considered moderate disregard, and scores between 42 and 35 considered strong

disregard for a specific thinking style. Scores of 34 or below are considered a virtual neglect of a specific thinking style. A neutral preference for a specific thinking style is noted by a score between 59 and 49. Differences between any two scores that are less than four points apart are considered too small to indicate a preferred thinking style (Harrison & Bramson, 1982).

**Table 3.4**

**Summary of InQ Thinking Style Preferences**

90-72	71-66	65-60	59-49	48-43	42-35	34-18
Very Strong Preference	Strong Preference	Moderate Preference	Neutral Preference	Moderate Disregard	Strong Disregard	Virtual Neglect

Source: Harrison, A. F., & Bramson, R. M. (1977). InQ administration and interpretation manual. Berkeley: Bramson, Parlette, Harrison and Associates.

**Procedures**

The fourth section of Chapter III concerns the procedures established for the research study. The study's methodology included a series of five inter-related procedures: (a) pre-survey procedures, (b) consistency of survey packets contents, (c) post-mailing procedures, (d) confidentiality procedures, and (e) procedures to increase survey participation.

**Pre-Survey Preparation**

The first set of procedures associated with this study involve pre-surgery preparation. Survey preparation was carefully planned and supervised, with



previous InQ dissertations reviewed and their methodology sections carefully examined. Senior research professors at Florida Atlantic University were consulted concerning proposed procedures to ensure a statistically sound research study. The pre-survey preparation for this study included the following procedures:

1. Contacting the Association of Research Libraries for a current membership list (see Appendix A).
2. Reviewing the ARL Membership list for institutional exclusions from the sample (nonacademic institutions and institutions not located within the continental United States) (see Appendix C).
3. Randomly selecting 68% (N=66) of the remaining ARL institutions for the study's sample of the population. Random selection was obtained by writing an individual institution name for each of the potential 97 member libraries, on slips of paper, and mixing the slips in a box. The first 66 institutions selected by the research assistant formed the sample group for this study.
4. Creating the cover letter (see Appendix D), consent form (see Appendix E), and Demographic Data Form (see Appendix F).
5. Purchasing sufficient quantities of the InQ Instrument and mailing supplies.

6. Verifying by telephone, or electronic mail, the correct mailing information for the 66 randomly selected institutions.
7. Verifying by telephone, or electronic mail, the correct name and specific job title for the public and technical service librarian participant at each institution (N=132).
8. Devising a confidential code number system for survey response tracking and data gathering.
9. Creating a chart to monitor responses based upon a confidential survey code number system (see Appendix G).
10. Organizing, collating, preparing, and mailing the survey packets.
11. Hiring a third-party research assistant to track survey returns, score InQ instruments, complete data tables, and contact study participants with a reminder letter(s) as needed.
12. Establishing a cut-off date for data collection (35 days after the last reminder letter was mailed).

### **Survey Packet Contents**

The second set of procedures associated with this study involved consistent preparation of the survey packet contents. A total of 132 personalized survey packets was mailed to the senior public service administrator and the senior technical service administrator at selected libraries with an institutional

membership in the Association of Research Libraries located in the continental United States (N=66). The following items were included in each survey packet:

1. Cover letter (introducing the researcher, explaining the purpose of the study, assuring confidentiality, and stating the deadline date for survey material return) (see Appendix D).

2. Copy of the Florida Atlantic University Internal Review Board Application (see Appendix H).

3. Eight-page InQ instrument (see Appendix B).

4. Demographic Data Form (see Appendix F).

5. Consent form (see Appendix E).

6. Pre-addressed, postage-paid envelope for material return.

7. Request form for: (a) participants interested in having their InQ scores tabulated and explained, (b) executive summary (see Appendix I).

8. A sharpened pencil.

9. A business card from the doctoral candidate.

10. A dollar bill attached to a post-it note stating "Thank you for completing these materials. Have a cup of coffee on me!"

### **Post-Mailing Procedures**

The third set of procedures associated with this study involved post-mailing processes. Data gathering work conducted after mailing the 132 surveys was

completed by a third-party research assistant. The research assistant was hired in response to a recommendation made by a statistical consultant to provide confidentiality protection for survey participants, and as a method to lessen the possibilities of researcher bias upon collected data. The following steps were completed in the post-mailing phase of the research study:

1. Instructing the third-party research assistant in scoring the InQ Instrument and tracking returned surveys.
2. Instructing the third-party research assistant on how to administer the first reminder letter (see Appendix J) to participants not returning survey materials within the established time period from the original survey mailing.
3. Instructing the third-party research assistant on how to administer the second reminder letter (see Appendix K) to participants not returning survey materials within the established time period from the first reminder letter mailing.
4. Having the third-party research assistant administer second mailing as needed.
5. Having the third-party research assistant score InQ Instruments and record all needed data from returned surveys.
6. Instructing the third-party research assistant to mail thank you letters (see Appendix L) to all participants returning a survey.

7. Having the third-party research assistant mail InQ score grid (part of InQ instrument) and InQ interpretation sheet (part of InQ instrument) to all interested participants.

8. Having the third-party research assistant mail an executive summary of the research study to all interested participants (see Appendix M).

### **Confidentiality Procedures**

The fourth set of procedures associated with this study involved steps to ensure confidentiality for all participants. The following steps were completed to increase survey confidentiality:

1. Assigning each participant a unique confidential survey code number.
2. Writing the confidential survey code number on the InQ instruments, demographic data forms, consent forms, and return envelopes for each of the 132 survey packets.
3. Mailing survey packets and all follow-up correspondence to participants with envelopes stamped “Confidential.”
4. Instructing the third party research assistant on how to match the confidential survey code number on each returned survey with the corresponding tracking forms (see Appendix G and Appendix L) to determine which participants required a reminder letter(s) (see Appendix J and Appendix K).

5. Keeping all files, lists, addresses, and returned surveys in a secured office.

### **Procedures to Increase Survey Participation**

The fifth set procedures associated with this study involved actions taken to increase survey participation. The following steps were completed to increase survey participation:

1. Contacting each randomly selected institution by telephone or e-mail for correct mailing information.
2. Confirming by telephone or e-mail, each randomly selected institution for the correct name, title (i.e., Mr., Mrs., Ms, or Dr.), and job title, for the identified public and technical service participant from that institution.
3. Including inside each packet a self-addressed, prepaid return mailing envelope.
4. Contacting participants not returning survey materials by the specified date with a reminder letter(s) (see Appendix J and Appendix K).
5. Providing a business card as proof that the doctoral student was a fellow professional librarian.
6. Informing participants that ARL was aware of the research project and unofficially supported the research project.

7. Including a crisp new dollar bill attached to a post-it note stating “Thank you for completing these materials. Have a cup of coffee on me!”

### **Data Analysis**

The fifth section of Chapter III provides information concerning the statistical analysis used upon the of collected data. Analysis for this study included separate procedures applied to the descriptive attributes of the sample population, the survey return rate, and the InQ instrument responses. Frequency counts and percentages were obtained for each of the demographic variables, with the mean and standard deviations calculated for each of the five InQ thinking styles.

The design of this study included a series of five factorial analyses of variance (ANOVAs) performed to examine the relationships among library administrative role, gender, and thinking style preference. All ANOVA analyses were conducted using the Statistical Package for the Social Sciences (SPSS/PC+ for Windows, Version 6.1). All hypotheses were tested at the .05 alpha level of statistical significance.

The first ANOVA was a two-by-two analysis, with the first factor administrative role (public or technical service), and the second factor gender (male or female) for the synthesist preferred thinking style. The second ANOVA performed was a two-by-two analysis, with the first factor administrative role, and the second factor gender for the idealist preferred thinking style. The third

ANOVA performed was a two-by-two analysis, with the first factor administrative role, and the second factor gender for the pragmatist thinking style. The fourth ANOVA performed was a two-by-two analysis, with the first factor administrative role, and the second factor gender for the analyst thinking style. The fifth ANOVA performed was a two-by-two analysis, with the first factor administrative role, and the second factor gender for the realist thinking style.

### **Chapter Summary**

The concluding section of this chapter is a summary of Chapter III. The chapter began by restating the purpose of the research study and the research questions. Information was provided concerning the background, reliability, validity, and scoring procedures of the InQ instrument. The study's procedures were detailed for possible future replication, with information provided on methods undertaken to assure confidentiality and increase survey participation. A listing of materials included in the survey mailing was provided. A brief highlight of the statistical analysis performed upon the data that will be discussed further in Chapter IV was also highlighted.



## **CHAPTER IV**

### **RESULTS OF THE STUDY**

The purpose of this study was to determine whether differences in thinking styles exist between senior level library administrators working in public service areas and senior level library administrators working in technical service areas in libraries with an institutional membership in the Association of Research Libraries (ARL). The design of this study included a series of five factorial analyses of variance (ANOVAs) performed to examine the relationships among library administrative role (public or technical service), gender (female or male), and thinking style preference (synthesist, idealist, pragmatist, analyst, and realist).

The information presented in Chapter IV concerns the results of the data analysis and is organized into six sections. These sections include: (a) assistant director substitution, (b) survey response, (c) descriptive sample findings, (d) independent variable findings, (e) hypothesis findings, (f) additional statistical analysis findings, and (g) summary of the chapter.

#### **Assistant Director Substitutions**

The first section of Chapter IV provides information concerning the number of assistant director substitutions occurring during the data collection phase of the

study. Although librarians working at the administrative level of assistant director were targeted for this study, it was understood that due to the continuous state of personnel flux in large academic libraries, several administrative positions randomly selected for this study would be vacant during the data collection phase. In 22 situations, either the head of reference was consistently substituted in institutions currently without an assistant director for public services, or the head of cataloging was consistently substituted for the assistant director for technical service.

Table 4.1 provides information concerning the assistant director substitutions of this study. This table, reveals that 16% of the sample (n=22) consisted of assistant director substitutions. The table also shows that an even amount of public and technical service administrator substitutions occurred during data collection.

**Table 4.1**

**Assistant Director Substitutions**

<b>Administrative Area</b>	<b>N</b>	<b>Percentage</b>
Public Services	11	8%
Technical Services	11	8%
Total	22	16%

## Survey Response

The second section of Chapter IV concerns the survey response. Chapter III explained how a total of 66 ARL institutions were randomly selected for inclusion in this study. At these 66 institutions the senior public service administrator and the senior technical service administrator were identified and then contacted (N=132) through the mail with survey packets. Of a possible 132 survey returns, a total of 106 surveys were returned for data collection, with an overall return rate of 80% obtained during the data collection phase of this study. The largest percentage (68.8%) of surveys were returned with no follow-up actions required. An additional 26 surveys (24.5%) were returned after one follow-up letter, with an additional five surveys (4.7%) returned after two follow-up letters. Table 4.2 provides a breakdown of the study's return activity.

**Table 4.2**

### Survey Response Rate

Activity	Number	%
Initial Mailing	73	68.8
Follow-up Letter 1	26	24.5
Follow-up Letter 2	5	4.7
Received after cut-off date	2	1.8
Overall Return Rate	106/132	80.3

Statistical analyses for this study required correctly completed InQ instruments and demographic data forms. Of the 106 returned InQ instruments, 104 surveys were returned within the time parameters established for data collection. Two correctly completed survey packets were received approximately 45 days after the established cut-off date. Since data analysis had already begun, these two survey packets were excluded from the data analysis, reducing the working sample to 104 survey responses.

Of the 104 surveys returned within the established cut-off period, six contained InQ instruments that were incorrectly completed by the participants. The scores from these six InQ instruments were excluded from the data analysis, reducing the sample to 98 usable responses.

For unknown reasons, one of the remaining 98 surveys indicated the participant's specific written response to not complete the demographic data form. Although some of the demographic data could be obtained (i.e., determining the participant's gender by analyzing the first name) responses not self-reported by a survey participant were omitted from the data analysis phase of this study to maintain statistical integrity. This reduced the working sample to 97 responses. Table 4.3 shows the breakdown of usable returned surveys for this study.

**Table 4.3****Usable Survey Data**

Total Surveys Received	106
Surveys Received After Cut-Off Date	2
Surveys with Incorrectly Completed InQ Instruments	6
Surveys with no Demographic Data Form Information	1
Usable Surveys for Data Analysis	97

**Descriptive Sample Findings**

The third section of Chapter V concerns the descriptive findings of the study's population. Table 4.4 visually presents the demographic characteristics of (a) gender, (b) age, (c) race, (d) area of administrative responsibility, and (d) education of the sample. Table 4.5 visually presents the demographic characteristics of (a) years of professional library experience, (b) years of ARL experience, and (c) years of library experience including paraprofessional experience.

In this section summarizing the demographic characteristics of the sample, age, race, education, and experience are highlighted. Since gender and area of administrative responsibility were used as independent variables for the study, they are highlighted in the next section.

### **Age**

The first demographic characteristics highlighted in Table 4.4 is age. Most participants in this study belonged in the 40-49 years of age category which comprised 45.4% (n=44) of the sample, with 43.3% (n=42) of the sample in the 50-59 years of age category. Only 3.1% (n=3) of the survey sample fell in the 30-39 years of age category, with 8.2% (n=8) of the survey sample in the 60-69 years of age category. No participants fell in the 70+ years of age category.

### **Race**

The second demographic characteristic highlighted in Table 4.4 is race. The majority of the survey respondents (94.8%) were self-identified as Caucasian (n=92). Of the study's sample, three participants were self-reported as African-Americans (3.1%) with one participant self-identified as Asian-American. There was one participant self-classified in the "Other" category. However, this person did not provide any additional explanation for this selection. The sample for this study did not include any Hispanic-American or Native-American participants.

### **Educational Background**

The third demographic characteristic highlighted in Table 4.4 is educational background. As assumed while planning the study, all survey participants did have a master's degree in library science, with approximately 40% of the survey

participants reporting additional educational degrees. Twenty-eight (28.9%) of those participants with supplementary educational experiences completed a second master's degree.

Although only one potential participant was previously identified as completing a doctoral program prior to the survey mailing (see step two under Procedures to Increase Survey Participation described in Chapter III), a total of eight (8.2%) participants responding to the survey indicated that they previously completed a doctoral program.

Four survey participants (4.1%) responded in the Other category for highest educational degree completed. Of these responses, one participant had completed an educational specialist degree. Three participants (3.1%) noted on their demographic data form that they expected the imminent completion of their doctoral programs. in their written comments (all stated that they had tentative dates for the dissertation defense) . Therefore, the "Other" category for highest educational degree completed was divided into "Other" (n=1) and "ABD" (n=3).

**Table 4.4****Demographic Characteristics of the Sample**

<b>Variable Value</b>	<b>Distribution</b>		<b>Variable Value</b>	<b>Distribution</b>	
	<b>f</b>	<b>%</b>		<b>f</b>	<b>%</b>
<b>Gender (n=97)</b>			<b>Administrative Responsibility (n=97)</b>		
Female	55	56.7	Public	49	50.5
Male	42	43.3	Technical	48	49.5
<b>Age (n= 97)</b>			<b>Highest Educational Level (n=97)</b>		
20-29	0	0	Master's	57	58.8
30-39	3	3.1	Second Master's	28	28.9
40-49	44	45.4	Doctorate	8	8.2
50-59	42	43.5	ABD	3	3.1
60-69	8	8.2	Other	1	1.0
70+	0	0			
<b>Race (n=97)</b>					
African American	3	3.1			
Asian American	1	1.0			
Caucasian	92	94.8			
Hispanic Amer.	0	0			
Native American	0	0			
Other	1	1.0			

**Library Experience**

In addition to demographic characteristics, the sample was analyzed in terms of library experience. Table 4.5 visually presents information concerning the fourth demographic characteristic highlighted in this section, library experience. The information in Table 4.5 provides information concerning



- (a) years of professional library experience, (b) years of ARL experience, and  
(c) years of library experience including paraprofessional experience.

### **Years of Professional Library Experience**

The first set of information concerning library experience is years of professional experience (post-MLS). Most survey respondents reported having 16-30 years of professional library experience. The analysis of the demographic data form revealed that 29 respondents (29.9%) constituted the 21-25 years of library experience category, with 26 respondents (26.8%) in the 16-20 years of library experience category, and 24 respondents (24.7%) in the 26-30 years of library experience category.

### **Years of ARL Library Experience**

The second set of information concerning library experience is years of ARL library experience including paraprofessional experience. Similar to the results in years of professional library experience category, most survey participants reported having 16-30 years of ARL library experience, including professional and paraprofessional employment. The analysis of the demographic data form responses revealed that a total of 30 respondents (30.9%) constituted the 21-25 years of ARL library experience category, with 20 respondents (20.6%) in the 16-20 years of ARL library experience category, and 12 respondents (12.4%) in the 26-30 years of ARL library experience category.

**Table 4.5****Library Experience of the Sample**

<b>Distribution</b>			<b>Distribution</b>		
<b>Variable Value</b>	<b>f</b>	<b>%</b>	<b>Variable Value</b>	<b>f</b>	<b>%</b>
<b>Years of Professional Library Experience (n=97)</b>			<b>Years of Library Experience Including Paraprofessional (n=97)</b>		
0-5	0	0	0-5	0	0
6-10	0	0	6-10	0	0
11-15	8	8.2	11-15	7	7.2
16-20	26	26.8	16-20	16	16.5
21-25	29	29.9	21-25	35	36.1
26-30	24	24.7	26-30	26	26.8
31-35	8	8.2	31-35	10	10.3
36-40	1	1.0	36-40	2	2.1
41-45	1	1.0	41-45	1	1.0
46+	0	0	46+	0	0
<b>Years of ARL Experience (n=97)</b>					
0-5	4	4.1			
6-10	4	4.1			
11-15	18	18.6			
16-20	20	20.6			
21-25	30	30.9			
26-30	12	12.4			
31-35	7	7.2			
36-40	1	1.0			
41-45	1	1.0			
46+	0	0			

**Total Years of Library Experience (Including Paraprofessional)**

The third set of information concerning library experience is total years of library experience including paraprofessional. Responses for the overall years of library experience were similar to the findings both in years of professional library

experience and years of experience in libraries with an institutional membership in the Association of Research Libraries. Most survey participants reported having 16-30 years of overall library experience (including paraprofessional experiences and professional time at non-ARL libraries). In this table it is important to note that 35 respondents (36.1%) in the 21-25 years of overall library experience category, 26 respondents (26.8%) in the 26-30 years of overall library experience category, and 16 respondents (16.5%) in the 16-20 years of overall library experience category.

### **Independent Variable Findings**

The next section of Chapter IV involves findings concerning the independent variables of the study. Gender and administrative area of responsibility (public or technical service) were used as independent variables in the statistical analysis of this study. Table 4.4 provided an additional breakdown of the survey responses for these two important variables.

#### **Gender**

The first independent variable analyzed for demographic characteristics for the sample was gender. Table 4.4 provides a visual representation of this information. Analyzing the 97 demographic data forms revealed that 56.7% of the sample was composed primarily of female library administrators (n=55). Data

analysis also indicated that 43.4% of the sample was composed of male library administrators (n=42).

### **Administrative Area of Responsibility**

The second independent variable analyzed for demographic characteristics for the sample was administrative area of responsibility. Table 4.4 provides a visual representation of this information. Data analysis of the 97 demographic data forms revealed an even distribution of senior public service library administrators (n=49 or 50.5%) and senior technical service library administrators (n=48 or 49.5%). Thirty-four female library administrators were responsible for public service activities (35%), with 21 female library administrators responsible for technical service activities (21.6%). Twenty-seven male library administrators were responsible for technical service activities (27.8%), with 15 male library administrators responsible for public service activities (15.4%).

**Table 4.6**

### **Sample Demographics by Administrative Area and Gender**

<b>Administrative Area</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
<b>Public Service</b>	15	34	49
<b>Technical Service</b>	27	21	48
<b>TOTAL Usable Survey</b>	42	55	97

## Hypothesis Findings

The following section of Chapter IV concerns the hypothesis findings of this study. This information is divided into six sections: (a) strength of thinking preferences, (b) synthesist hypothesis, (c) idealist hypothesis, (d) pragmatist hypothesis, (e) analyst hypothesis, and (f) realist hypothesisist.

### Strength of Thinking Preferences

The first section of the hypothesis findings concerns the strength of thinking preferences. Table 4.7 highlights the strength of preferred thinking preferences for the highest thinking style score for each of the 97 survey responses used in the analysis of variance statistical investigation. Almost 60% of the survey sample indicated a neutral (14.4%) to moderate (43.2%) preference towards their highest ranking thinking style as indexed by the InQ instrument. Data analysis revealed that the overall scores for all thinking styles fell in the moderate preference range.

**Table 4.7**

#### Strength of Preferences for a Specific Thinking Style (n=97)

	<b>Very Strong Preference 90-72</b>	<b>Strong Preference 71-66</b>	<b>Moderate Preference 65-60</b>	<b>Neutral Preference 59-49</b>
<b>Occurrences</b>	14	27	42	14
<b>Percentage</b>	14.4%	27.8%	43.2%	14.4%

Although a total of 106 surveys were returned, the hypothesis analyses for this study is based upon the 97 survey responses that included both correct InQ instrument completion and the demographic data form disclosure. Table 4.8 provides information concerning the mean scores of the five thinking styles by library area of administrative responsibility and gender.

It is important to note that of the 20 mean scores revealed in Table 4.8, five of the mean scores indicated a moderate preference in that specific thinking style, 12 of the mean scores indicated a neutral preference in a specific thinking style, and three of the mean scores indicated a moderate disregard for that specific thinking style. None of the mean scores indicated a very strong preference or a strong preference towards a specific thinking style. Table 4.9 provides a more detailed breakdown of this finding.

**Table 4.8**

**Mean Scores for InQ by Library Administrative Area and Gender**

Thinking Style (n=97)	Administrative Area	Male (n=42)		Female (n=55)	
		Mean	SD	Mean	SD
Synthesist	Public	48.67	9.36	47.94	9.52
	Technical	49.59	8.36	46.05	7.08
Idealist	Public	59.47	7.80	60.56	10.57
	Technical	54.74	7.95	58.43	8.40
Pragmatist	Public	57.07	6.46	54.65	8.23
	Technical	56.70	6.79	55.19	7.51
Analyst	Public	51.07	6.47	55.24	12.52
	Technical	54.78	8.02	55.10	10.52
Realist	Public	53.73	7.33	51.62	8.17
	Technical	54.19	7.09	54.81	6.91

**Table 4.9**

**Mean Scores by Preference Scale**

<b>Thinking Style</b>	<b>Moderate Preference 65-60</b>	<b>Neutral Preference 59-49</b>	<b>Moderate Disregard 48-43</b>
<b>Synthesist</b>	no scores in this category	Male Technical 49.59	Male Public 48.67 Female Public 47.94 Female Technical 46.05
<b>Idealist</b>	Female Public 60.56	Male Public 59.47 Male Technical 54.74 Female Technical 58.43	no scores in this category
<b>Pragmatist</b>	no scores in this category	Male Public 57.07 Male Technical 56.70 Female Public 54.65 Female Technical 55.19	no scores in this category
<b>Analyst</b>	no scores in this category	Male Public 51.07 Male Technical 54.78 Female Public 55.24 Female Technical 55.10	no scores in this category
<b>Realist</b>	no scores in this category	Male Public 53.73 Male Technical 54.19 Female Public 51.62 Female Technical 54.81	no scores in this category

### **Hypothesis 1: Synthesist**

The second section concerning the hypothesis findings concerns the synthesist thinking style. Table 4.10 provides information concerning the source of variation, sum of the squares, degrees of freedom, mean square, frequency, significance level ( $p < .05$ ), and residual of the factorial analysis of variance (ANOVA) performed to examine the relationship among library administrative role (public or technical service), gender (female or male), and the synthesist thinking style. It is important to note that using a .05 alpha level for the synthesist thinking style, no hypothesis could be rejected.

**Table 4.10**

#### **Analysis of Variance - Synthesist Thinking Style**

<b>Source of Variation</b>	<b>Sum of Squares</b>	<b>DF</b>	<b>Mean Square</b>	<b>F</b>	<b>P</b>
Administrative Role	10.839	1	10.830	.14	.71
Gender	109.940	1	109.940	1.45	.23
Role X Gender	43.984	1	43.984	.58	.45
Residual	7042.687	93	75.728		



### **Hypothesis 1.1 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant difference between the administrative role (public or technical) in regard to the synthesist thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership ( $p=.71$ ). Hypothesis 1.1 was not rejected.

### **Hypothesis 1.2 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant difference between males and females in regard to the synthesist thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership ( $p=.23$ ). Hypothesis 1.2 was not rejected.

### **Hypothesis 1.3 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant interaction between gender and administrative role (public or technical services) in regard to the synthesist thinking style in senior level administrators working in libraries with an Association of Research Libraries membership ( $p=.45$ ). Hypothesis 1.3 was not rejected.

### **Hypothesis 2: Idealist**

The third section concerning the hypothesis findings concerns the idealist thinking style. Table 4.11 provides information concerning the source of variation, sum of the squares, degrees of freedom, mean square, frequency, significance level ( $p < .05$ ), and residual of the factorial analysis of variance (ANOVA) performed to examine the relationship among library administrative role (public or technical service), gender (female or male), and the idealist thinking style. It is important to note that using a .05 alpha level for the idealist thinking style, no hypothesis could be rejected.

**Table 4.11**

#### **Analysis of Variance - Idealist Thinking Style**

<b>Source of Variation</b>	<b>Sum of Squares</b>	<b>DF</b>	<b>Mean Square</b>	<b>F</b>	<b>P</b>
Administrative Role	237.00	1	237.00	2.90	.09
Gender	135.79	1	135.79	1.66	.20
Role X Gender	37.28	1	37.28	.45	.50
Residual	7592.44	93	81.64		

### **Hypothesis 2.1 - Not Rejected**

Based on an .05 alpha level, there was no statistically significant difference between the administrative role (public or technical) in regard to the idealist thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership ( $p=.09$ ). Hypothesis 2.1 was not rejected.

### **Hypothesis 2.2 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant difference between males and females in regard to the idealist thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership ( $p=.20$ ). Hypothesis 2.2 was not rejected.

### **Hypothesis 2.3 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant interaction between gender and administrative role (public or technical services) in regard to the idealist thinking style in senior level administrators working in libraries with an Association of Research Libraries membership ( $p=.50$ ). Hypothesis 2.3 was not rejected.

### **Hypothesis 3: Pragmatist**

The fourth section concerning the hypothesis findings concerns the pragmatist thinking style. Table 4.12 provides information concerning the source of variation, sum of the squares, degrees of freedom, mean square, frequency, significance level ( $p < .05$ ), and residual of the factorial analysis of variance (ANOVA) performed to examine the relationship among library administrative role (public or technical service), gender (female or male, and the pragmatist thinking style. It is important to note that using a .05 alpha level for the pragmatist thinking style, no hypothesis could be rejected.

**Table 4.12**

#### **Analysis of Variance - Pragmatist Thinking Style**

<b>Source of Variation</b>	<b>Sum of Squares</b>	<b>DF</b>	<b>Mean Square</b>	<b>F</b>	<b>P</b>
Administrative Role	.56	1	.56	.01	.92
Gender	83.44	1	83.44	1.50	.22
Role X Gender	4.55	1	4.55	.08	.75
Residual	5149.57	93	55.37		

### **Hypothesis 3.1 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant difference between the administrative role (public or technical) in regard to the pragmatist thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership ( $p=.92$ ). Hypothesis 3A was not rejected.

### **Hypothesis 3.2 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant difference between males and females in regard to the pragmatist thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership ( $p=.22$ ). Hypothesis 3.2 was not rejected.

### **Hypothesis 3.3 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant interaction between gender and administrative role (public or technical services) in regard to the pragmatist thinking style in senior level administrators working in libraries with an Association of Research Libraries membership ( $p=.75$ ). Hypothesis 3.3 was not rejected.

#### **Hypothesis 4: Analyst**

The fifth section concerning the hypothesis findings concerns the analyst thinking style. Table 4.13 provides information concerning the source of variation, sum of the squares, degrees of freedom, mean square, frequency, significance level ( $p < .05$ ), and residual of the factorial analysis of variance (ANOVA) performed to examine the relationship among library administrative role (public or technical service), gender (female or male), and the analyst thinking style. It is important to note that using a .05 alpha level for the analyst thinking style, no hypothesis could be rejected.

**Table 4.13**

#### **Analysis of Variance - Analyst Thinking Style**

<b>Source of Variation</b>	<b>Sum of Squares</b>	<b>DF</b>	<b>Mean Square</b>	<b>F</b>	<b>P</b>
Administrative Role	69.07	1	69.07	.67	.42
Gender	122.63	1	122.63	1.11	.28
Role X Gender	64.81	1	64.81	.63	.43
Residual	9650.96	93	103.77		

#### **Hypothesis 4.1 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant difference between the administrative role (public or technical) in regard to the analyst thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership ( $p=.42$ ). Hypothesis 4.1 was not rejected.

#### **Hypothesis 4.2 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant difference between males and females in regard to the analyst thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership ( $p=.28$ ). Hypothesis 4.2 was not rejected.

#### **Hypothesis 4.3 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant interaction between gender and administrative role (public or technical services) in regard to the analyst thinking styles in senior level administrators working in libraries with an Association of Research Libraries membership ( $p=.43$ ). Hypothesis 4.3 was not rejected.

### **Hypothesis 5: Realist**

The sixth section concerning the hypothesis findings concerns the realist thinking style. Table 4.14 provides information concerning the source of variation, sum of the squares, degrees of freedom, mean square, frequency, significance level ( $p < .05$ ), and residual of the factorial analysis of variance (ANOVA) performed to examine the relationship among library administrative role (public or technical service), gender (female or male), and the realist thinking style. It is important to note that using a .05 alpha level for the realist thinking style, no hypothesis could be rejected.

**Table 4.14**

#### **Analysis of Variance - Realist Thinking Style**

<b>Source of Variation</b>	<b>Sum of Squares</b>	<b>DF</b>	<b>Mean Square</b>	<b>F</b>	<b>P</b>
Administrative Role	92.69	1	92.69	1.65	.20
Gender	9.65	1	9.65	.17	.68
Role X Gender	41.54	1	41.54	.74	.39
Residual	5220.28	93	56.13		



### **Hypothesis 5.1 - Not Rejected**

Based on a .05 alpha level, there was no statistically significant difference between the administrative role (public or technical) in regard to the realist thinking style in senior level library administrators working in libraries with an Association of Research Libraries membership ( $p=.20$ ). Hypothesis 5.1 was not rejected.

### **Hypothesis 5.2 - Not Rejected**

Based upon a .05 alpha level, there was no statistically significant difference between males and females in regard to the realist thinking style among senior level library administrators (public or technical) working in libraries with an Association of Research Libraries membership ( $p=.68$ ). Hypothesis 5.2 was not rejected.

### **Hypothesis 5.3 - Not Rejected**

Based upon a .05 alpha level, there was no statistically significant interaction between gender and administrative role (public or technical services) in regard to the realist thinking style in senior level administrators working in libraries with Association of Research Libraries membership ( $p=.39$ ). Hypothesis 5.3 was not rejected.

### **Additional Statistical Analysis**

The sixth part of Chapter IV concerns the additional statistical analysis conducted upon the data collected in this study. After examining the results of the 15 ANOVAs, it was determined that additional statistical applications could provide supplementary insights for the findings of this research study. Using a cross-tabulation analysis and dyad comparison, thinking style preferences based upon nominal variables were conducted. For statistical consistency, these analyzes were conducted using the Statistical Package for the Social Sciences (SPSS/PC+ for Windows, Version 6.1), with an .05 alpha level used for statistical significance ( $p < .05$ ).

#### **Cross-Tabulation**

The first additional statistical analysis conducted on the data for this study was a cross-tabulation. A cross-tabulation is a statistical computation that is displayed in a cross-classification table format. Each table cell of a cross-tabulation represents every combination or category of the nominal variables being examined (Norusis, 1986). The success of a cross-tabulation depends upon creating the most accurate number of descriptive cells that will provide effective results. Using too many cells in a cross-tabulation results in a high number of missing observations that lessen the significance of the data analysis. Using too

few cells in a cross-tabulation results in a data analysis that provides little additional insight.

The cross-tabulation used in this data analysis had a total of 28 cells. These cells represented seven InQ thinking styles (synthesist, idealist, pragmatist, analyst, and realist, and the inclusion of two-way thinkers and three-way thinkers), gender (females and males), and administrative area of responsibility (public or technical). Unlike the factorial analysis of variance, the interaction between gender and administrative area was not calculated. Table 4.15 displays the corresponding number of cells and the frequency of cases found for each category. In this table it is important to note the high cell numbers corresponding to the idealist thinking style.

**Table 4.15**

**Variables in Cross-Tabulation**

<b>Administrative Area</b>	<b>Gender</b>	<b>S</b>	<b>I</b>	<b>P</b>	<b>A</b>	<b>R</b>	<b>2 Way</b>	<b>3 Way</b>
Technical	Male	3	4	8	6	4	0	2
Technical	Female	0	7	2	7	4	1	0
Public	Male	1	7	4	1	2	0	0
Public	Female	1	19	3	8	1	2	0
Total		5	37	17	22	11	3	2

Once the cell count has been identified, a chi-square was calculated to assess whether there was an association between thinking style and either administrative area (public or technical services) or gender (female or male). Results of this analysis are displayed in Table 4.16. It is important to note that using a .05 alpha level both administrative role and gender did reveal a statistical relationship with thinking style.

**Table 4.16**

**Cross Tabulation Significance**

<b>Source of Variation</b>	<b><math>X^2</math></b>	<b>DF</b>	<b>P</b>
Administrative Role	12.47	4	.01418
Gender	15.85	4	.00323

The chi-square test indicated the existence of a statistically significant association between administrative role (public or technical) and preferred thinking style in senior level library administrators working in libraries with Association of Research Libraries membership, since the significance level of .01418 was lower than the .05 alpha level. The chi-square test indicated a statistically significant association between gender (female or male) and preferred thinking style in senior level library administrators working in libraries with Association of Research

Libraries membership exists since the significance level of .00323 was smaller than the .05 alpha level.

### **Dyad Comparisons**

The second additional statistical analysis conducted on the data collected for this study was a dyad comparison that used the cell formulations of the cross-tabulation. Reviewing the 97 returned surveys, it was concluded that 64 surveys (65%) were eligible for the dyad comparison analysis. These 64 surveys were returned by both the public service and technical service library administrators working at the same ARL library (n=32). This provided 32 dyads for statistical comparison. Table 4.17 illustrates the data analysis. It is important to note that 84.4% of the administrative peer dyads revealed differences in preferred thinking styles.

**Table 4.17**

#### **Dyad Comparison**

<b>Thinking Comparison</b>	<b>f</b>	<b>%</b>
Total Dyad Returns	32	
Number of Dyads with Same Thinking Style	5	15.6
Number of Dyads with Different Thinking Styles	27	84.4

Using an additional cross-tabulation analysis of these 32 dyads it was concluded that 5 dyads (15.6%) of librarian administrators working in the same institution had similar thinking styles, while 27 dyads (84.4%) of library administrators working in the same institution had different thinking styles. While the data analysis of the cross-tabulation and dyad comparison is not statistically significant, the information provided is considered noteworthy and will be addressed in the conclusions of the next chapter.

### **Chapter Summary**

The last part of this chapter is a summary of Chapter IV. A series of five factorial analyses of variance (ANOVAs) were performed to examine the relationships among library administrative role (public or technical service), gender (female or male), and thinking style preference (synthesist, idealist, pragmatist, analyst and realist). All ANOVA analyses were conducted using the Statistical Package for the Social Sciences (SPSS/PC+ for Windows, Version 6.1). Using an alpha level of .05, the 15 null hypotheses of this study could not be statistically rejected.

A cross-tabulation analysis using self-reported thinking styles was then performed using the same statistical software and alpha level as the ANOVA analyses. A chi-square test indicated statistically significant associations between administrative role (public or technical) and preferred thinking style, and gender

(female or male) and preferred thinking style, in senior level library administrators working in libraries with Association of Research Libraries membership.

Using the information from the cross-tabulation analysis, a dyad comparison was also completed. Of the 32 data pairs available for comparison, 27 dyads (84.4%) revealed differences in thinking style preferences among library administrators (senior public and technical service administrators) working in the same library.

## **CHAPTER V**

### **CONCLUSIONS OF THE STUDY**

The purpose of this study was to investigate whether differences in thinking styles exist between senior level library administrators working in public service areas and senior level library administrators working in technical service areas in libraries with an institutional membership in the Association of Research Libraries (ARL). The significance of this study was to strengthen the existing body of knowledge concerning effective academic library management and thinking style research.

To facilitate this investigation, the InQ instrument was distributed in a nation-wide survey. Five ANOVAs were used to determine relationships, differences, and interactions based upon the subject's administrative role (public service or technical service), gender (female or male), and thinking style preference (synthesist, idealist, pragmatist, analyst, and realist). Secondary data analysis included examination of the descriptive information of the sample, a cross tabulation computation including a chi-square test, and a dyad comparison.



Chapter V presents the conclusions of the research study. The information of this chapter is organized into five sections: (a) highlights of the findings, (b) conclusions, (c) recommendations, (d) suggestions for future research, and (e) chapter summary.

### **Highlights of the Findings**

The first section of Chapter V provides highlights of the study's findings. Based upon the data analysis, summary of the literature review, and a synthesis of the theoretical foundations of the study, five significant findings were identified. The findings of this research study revealed the following for the participants of the study: (a) a flat thinking style tendency, (b) a relationship between gender and thinking style preference, (c) a relationship between area of administrative responsibility and thinking style preference, (d) a difference in preferred thinking style among administrative peers in the same institution, and (e) a homogeneous demographic profile concerning age, race, and gender.

### **Flat Thinking Tendency**

The first finding involves an even score distribution that indicates a tendency for the librarians participating in this study towards the development of the flat thinking style. Based upon the ANOVA analysis, none of the 15 null hypotheses could be rejected. This finding can be explained by the relatively low preference or disregard for any specific thinking style, and an evenness among all

five InQ thinking style scores, for 57.6% of the senior library administrators participating in this study since even score distribution implies a potential for the flat thinking style (Harrison & Bramson, 1982).

Prior to the ANOVA calculations (see Table 4.7) the raw scores from the InQ instruments indicated that 57.6% of the sample had a moderate to neutral preference for the most preferred thinking style. After calculating the 20 mean scores necessary for the ANOVA analysis (see Table 4.9), a neutral preference for 16 thinking styles (80%) was noted. Four of the mean scores (20%) revealed either a moderate preference, or a moderate disregard, for a specific thinking style. These four scores included: (a) female public service librarians with idealist thinking preferences in the moderate preference category, (b) male public service synthesist thinkers in the moderate disregard category, (c) female public service synthesist thinkers in the moderate disregard category, and (d) female technical service synthesist thinkers in the moderate disregard category.

Although four of the mean scores revealed either a moderate preference or a moderate disregard for a specific thinking style, the ANOVA computations revealed no statistically significant differences based upon gender or administrative area for the participants of the study. This finding, compounded by the finding that 57.6% of the population have an even score distribution for the five InQ thinking

styles, indicates a potential for developing and using the flat thinking style for the participants of this study.

### **Gender and Thinking Style Preference**

The second finding of this study involves a relationship between gender and thinking style preference. The ANOVA analyses found no statistically significant differences in thinking style preference based upon gender. To further investigate this finding, additional statistical analyses were performed, with the results from the cross-tabulation and chi-square analyses finding a noteworthy relationship between gender and thinking style preference.

When calculating the chi-square test, two-way and three-way thinking styles were added to the cell formations because of identical thinking style scores for two or three of the five InQ thinking styles of several participants. Therefore, the cross tabulation study was based upon the seven thinking styles of synthesist, idealist, pragmatist, analyst, realist, two-way, and three-way thinkers.

The chi-square test was used to indicate a relationship between gender (female or male) and the preferred thinking style. In the chi-square test for gender and thinking style preference, the significance level of .00323 was less than the .05 alpha level. This supported the finding that a noteworthy relationship between gender and thinking style does exist for the librarians participating in this study.

The chi-square test revealed that female library administrators participating in this study preferred the idealist thinking style (n=26). Male library administrators participating in this study showed a preference towards the pragmatist (n=12) and idealist (n=11) thinking style.

### **Area of Administrative Responsibility and Thinking Style Preference**

The third finding of this study involves a relationship between administrative area and thinking style preference. The ANOVA analyses found no statistically significant differences in thinking style preference based upon administrative area. To further investigate this finding, additional statistical analyses were performed. The results from the cross-tabulation and chi-square analyses found a noteworthy relationship between administrative area and thinking style preference.

When calculating the chi-square test, two-way and three-way thinking styles were added to the cell formations because of identical thinking style scores for two or three of the five InQ thinking styles of several participants. Therefore, the cross tabulation study was based upon the seven thinking styles of synthesist, idealist, pragmatist, analyst, realist, two-way, and three-way thinkers.

The chi-square test was used to indicate a relationship between administrative role (public or technical) and the preferred thinking style. In the chi-square test, the significance level of .01418 was lower than the .05 alpha

level. This supported the finding that a noteworthy relationship between administrative responsibility (public or technical services) and thinking style does exist for the librarians participating in this study.

The chi-square test revealed that the public service librarians participating in this study preferred the idealist (n=26) thinking style. The chi-square test also revealed that technical service administrators preferred the analyst (n=13), idealist (n=11), and pragmatist (n=10) thinking styles.

### **Administrative Peer Differences**

The fourth finding of this study concerns thinking style differences among administrative peers working in the same ARL institution. Using information from the cross-tabulation analysis, a dyad comparison was conducted comparing the thinking styles of the public service library administrator to his or her peer technical service library administrator working at the same ARL institution. Of the 97 returned surveys, 64 surveys (65%) were from pairs of librarians working at the same institution. This provided 32 pairs for the dyad comparison.

The findings revealed that 84.4% (27 dyads) of the administrative peers identified by this study (a public service administrator and a technical service administrator working in the same ARL institution) demonstrated differences in thinking style preferences. Five dyads (15.6%) of the administrative peers identified by this study demonstrated similar thinking style preferences

### **Demographic Profile**

The final finding of this study involves a description of the demographic profile of the participants. The demographic information concerning the age, gender, and race for the participants of the study were examined carefully.

Data analysis revealed that 95% of the participants of this study were Caucasian, with 96.9% of the participants were between the ages of 40 and 60. An analysis of the demographic characteristics further revealed that 56.7 % of the ARL library administrators participating in this study are female while 43.3% of the librarians participating in this study are male.

### **Summary of the Findings**

In summary, the study provided five significant findings. The first finding revealed that the senior library administrators participating in this study had even score distributions that indicated a tendency towards the flat thinking style. A relationship between gender and thinking style, and a relationship between administrative area and thinking style were also noted based upon the chi-square analysis. The study revealed that most public service and technical service administrators working in the same ARL library had differences in thinking style preferences compared with their administrative peer. For the participants of the study, the demographic findings revealed that 95% were Caucasian, 96.9% were between 40 and 60 years of age, and that 56.7% were female.

## **Conclusions**

With the five significant findings of the study highlighted, Chapter V proceeds with an overview of conclusions that can be drawn from this research study. The conclusions are based upon the data analysis, incorporation of the four theoretical foundations, synthesis of the literature review, and analysis of the five predominant findings. The conclusions of the study include: (a) the potential for the development of the flat thinking style among the librarians participating in the study, (b) the influence of gender upon thinking style preference, (c) the influence of organizational differentiation upon thinking style preference, (d) the lack of previous research connecting thinking style research with librarianship, (e) the effects of team-based management implementation upon thinking style preference, (f) the influence of a non-diversified organization upon thinking style preference, and (g) an explanation for generalizations and stereotypes among library administrative peers.

The most critical question that needed to be answered concerning the findings of this research study centered around the question, “What can be concluded since no statistical significant was found for the 15 null hypotheses?” To answer this question, further analysis of the InQ data was necessary. These additional analyses included a cross-tabulation calculation, a chi-square test, a dyad analysis, and a review of the InQ score distributions for each participant.

### **Flat Thinking Potential**

The first conclusion drawn from this study concerns the inability to reject any of the null hypotheses based upon the ANOVA statistical calculations. An additional analysis of the InQ score distribution revealed that a tendency towards even score distribution among the five InQ thinking styles (synthesist, idealist, pragmatist, analyst, realist) was present for 57.6% of the participants.

Even score distribution implies a potential for the flat thinking style (Harrison & Bramson, 1982). This inclination toward the flat thinking style should be viewed as an asset for the library profession since research shows that flat thinkers are more flexible, creative, and better adapted to using the best thinking style to resolve problems based upon the situation (Harrison & Bramson, 1977; Malone, 1992; Svendsen & Svendsen, 1995). It is important to realize that of the five InQ thinking styles (synthesist, idealist, pragmatist, analyst, and realist) one style is not considered better than the other. However, the ability to use all five thinking styles with equal ease is considered an ideal skill and organizational asset since this method of thinking is considered to be more flexible, creative, and sensitive to diverse opinions (Harrison & Bramson, 1982; Malone, 1992; Svendsen & Svendsen, 1995). According to Harrison and Bramson (1982) the ability exists in everyone to change and develop their thinking style.



Although 57.6% of the participants of this study revealed a tendency towards an even score distribution among the five InQ thinking styles, it cannot be concluded that the librarians participating in this study be considered flat thinkers. The librarians participating in the study could not be considered flat thinkers because 42.4% of the participants had either a moderate or strong preference for, and / or a moderate or strong disregard towards, a specific thinking style or styles. In addition, although 57.6% of the participants of the study revealed even score distribution, some of these scores indicated more than a four point difference which Harrison and Bramson (1988) notes could indicate a specific thinking style preference.

With 57.6% of the participants of the study revealing a tendency towards even score distribution, it can be concluded that the librarians participating in this study have the potential to become flat thinkers. Similar to Malone's 1992 study, it can be concluded that additional understanding of thinking style research and organizational support would help in the development of this thinking style.

### **Gender Influence**

The second conclusion drawn from this study concerns the effect of gender upon thinking style preferences among library professionals. Although the ANOVA analysis found no statistical differences in thinking style preference based upon gender, the cross-tabulation and chi-square analysis found a noteworthy

relationship between gender and thinking style preference. It can therefore be concluded from the supplemental data analysis and synthesis of the literature review that a relationship does exist between gender and thinking style preference among library professionals participating in this study. However, it can also be concluded that additional research is needed to fully understand the relationship between gender and thinking style preference.

This conclusion concerning a relationship between gender and thinking style preference is supported by gender theory literature. Gender theory acknowledges that men and women differ from each other not only biologically, but psychologically, and sociologically (Bem 1987; Goldberger, Tarule, Clinchy, & Belenky, 1996; Vinacke, 1974; Walsh, 1987). Research studies exploring cognitive functions reveal that differences in spatial concepts and verbal abilities between men and women exist (Coates, 1998; Tannen, 1994). According to Blackman and Kenway (1993), gender also influences behaviors and policy choices of academic administrators. These studies support the conclusion that gender can influence thinking style preference.

Gender theory research also acknowledges that differences between men and women can be attributed to acceptable sociological norms within an organization (Bem, 1987). Behaviors, attitudes, conversational patterns, and organizational attributes that are appropriate for men are not always viewed as

appropriate for women (Tannen, 1991). Harrison and Bramson (1982) concluded that thinking style preferences are an interactive mix of inherited tendencies and conditioned responses to behavioral experiences. According to gender theory experiences and responses are influenced by an individual's gender (Bem, 1987; Goldberger, Tarule, Clinchy, & Belenky, 1996; Tannen, 1991; Vinacke, 1974; Walsh, 1987), supporting the conclusion that a relationship does exist between gender and thinking style preference.

### **Differentiation Influence**

The third conclusion drawn from this study concerns the effect of a differentiated organization upon thinking style preferences among library professionals. Although the ANOVA analysis found no statistical differences in thinking style preference based upon administrative area of responsibility (public or technical service), the cross-tabulation and chi-square analysis found a noteworthy relationship between administrative area of responsibility and thinking style preference. It can therefore be concluded from the supplemental data analysis and synthesis of the literature review that a relationship does exist between administrative area of responsibility and thinking style preference among the library professionals participating in this study. However, it can also be concluded that additional research is needed to fully understand the relationship between organizational subunits and thinking style preference.

This conclusion concerning the influence of differentiated organizations upon thinking style preferences is supported by previous research conducted by Frankie (1980) and Lowry (1988). Their independent research studies deduced that libraries are highly differentiated organizations which foster differences regarding attitudes, beliefs, and values among staff working in library subunits. Harrison and Bramson (1982) concluded that the attitudes, beliefs, and values held by individuals affect thinking style preferences. It can therefore be concluded that differentiated organizations influence the thinking style preference of individuals based upon the culture of the organizational subunit.

This conclusion of the study is supported by previous research which concluded that thinking style preference influences our decisions concerning career choices and desired levels of responsibility within a profession (Denis & Mackessy, 1982; La Pierre, 1992; McIntire & McIntire, 1990). This conclusion of the study is further supported by the research studies conducted by Johnson and White (1981) and Scherdin (1994). Johnson and White concluded that librarians with different cognitive styles cluster within the library profession by function (administration, children's services, public services, and technical services), and by library type (academic, public, school, or special library). Scherdin concluded that significant differences existed between librarians in their self-selected areas of library specialization (administration, automation, adult public services, children

public services, and technical services) based upon the personality styles of the librarians tested by the MBTI (see Table 2.6).

### **Lack of Previous Research**

The fourth conclusion drawn from this study was prompted by an analysis of library related studies collected for the literature review. In examining the literature, a lack of previous research and publication linking thinking style research and the library profession was found. The literature review revealed numerous studies analyzing library professionals using either the Myers-Briggs Type Instrument or Kolb's Learning Style Instrument. Many of these research studies provided recommendations on how to use this research and these instruments for effective library administration. The literature review also found a few research studies investigating the cognitive styles of library professionals. However, no previous studies linking thinking style research and librarians were found in the professional library literature review.

It can be concluded that this void in the professional library literature concerning the use of thinking style research in library administration had limited the implementation of this powerful self-awareness and administrative tool. Librarians must first become aware of thinking style research before they can attempt to understand and then incorporate thinking style research into library administration. It can be speculated that as additional research concerning the

effective use of thinking style theory is conducted, and reaches, the professional library literature, more library administrators will employ thinking style theory for personal, professional, and managerial development.

### **Implementation of Team-Based Management**

The fifth conclusion drawn from this study concerns the impact of the changing managerial structure in large academic libraries upon the thinking style preference of library professionals. The literature review found that many large academic libraries use a traditional managerial hierarchy similar to the example in Figure 3.1 (Martin 1996). It has been concluded that this type of hierarchy fosters a differentiated organization that supports a system of subunits within a library (Frankie, 1980; Johnson & White, 1981; Lowry, 1988; Martin, 1996). It has also been concluded based on the chi-square analysis for the participants of this study, that a noteworthy relationship exists between thinking style preference and administrative area of responsibility.

The literature review also reveals that academic library organizations are slowly changing their managerial patterns and are adopting a more team-based management approach (Dewey & Creth, 1993; Martin 1996). Today's library management language includes terms like alliances, teams, empowerment, options, opportunities, and initiative (Hessellbein, Goldsmith, & Bichhard, 1996). Since this study concluded that a noteworthy relationship exists between administrative

area and thinking style preference. Therefore, it can be concluded that any changes in the managerial structure of academic libraries should influence thinking style preferences. It can be speculated that as library organizations are transformed from the traditional hierarchical system identified in Figure 3.1, to that of team based management institutions, organizational support for developing and supporting the flat thinking style should increase because team-based management requires flexibility and new thinking approaches (Dewey & Creth, 1993).

### **Influence of a Non-Diversified Organization**

The sixth conclusion drawn from this study concerns the influence of a non-diversified work force upon the thinking style preference among library professionals. The findings revealed that 95% of the participants of this study are Caucasian, with 96.9% of the participants between the ages of 40 to 60. It can be concluded that this lack of race and age diversification within the individual library organizations can influence the thinking style preference of the librarians participating in this study.

According to Scherdin (1994) age, gender, and race diversity is an important issue facing the library profession today because of the increased need to be more empathetic and responsive to a rapidly diversifying society. In her conclusions to the 1992 ACRL study, Scherdin strongly urged the library profession to take a more aggressive approach towards diversifying the profession by providing

promotional opportunities for minorities. In addition, according to Matarazzo (1989), one of the most critical issues facing librarianship today is the profession's potential inability to replace the number of librarians leaving the profession due to retirement and a rapidly aging professional workforce.

Although 96.6% of the participants of the study were between the ages of 40 to 60 years, this finding was not considered significant. The study focused upon senior level library administrators. These positions typically require many years of professional service and career development to achieve this level of library administrative responsibility (Martin, 1996). Therefore, although Matarazzo concludes that the library profession is facing a potential inability to replace the numbers of librarians leaving the profession, this particular demographic finding for the participants of the study is not as alarming for the profession.

On a positive note, the findings of this study revealed that 56.7% of the ARL library administrators participating in this study are female while 43.3% of the librarians participating in this study are male. This finding of the study is encouraging for the members of the American Library Association's Committee on the Status of Women in Librarianship who have been trying to increase the professional status, and the numbers, of women in higher academic library administration in the past ten years (Ivy, 1987).



Age, gender, and race diversity enhances the organization by providing a variety of attitudes, beliefs, perspectives, and values (Dewey & Creth, 1993). By encouraging age and race diversity in the library profession, library organizations can become more flexible, tolerant, and understanding of different thinking styles. It can be speculated that as library organizations become more diverse in regards to race and age through aggressive recruitment efforts, organizational support for the development and support of the flat thinking style should increase.

### **Impact on Peer Stereotypes**

The last conclusion drawn from this study involves an explanation for generalizations and peer stereo-typing based upon thinking style preference among library professionals. Assumptions concerning co-workers are common practice in most organizations, with many of these assumptions based upon wrong or negative generalizations and stereotypes concerning peers in different subunits (Carson, Carson, & Phillips, 1997). Stereotypes undermine the foundational core of effective team-based management because they promote a differentiated organization (March & Simon, 1958).

In this study, 84.4% of the analyzed dyads revealed differences in thinking style preferences among administrative peers. In addition, the literature review revealed that 54% of all ARL librarians with 20 or more years of professional experience have worked at only one library in the course of their careers (Wilder,

1995). This study did not collect demographic information concerning the number of libraries the participants had worked in during the course of their careers.

However, it can be speculated that since this study used a sub-set of Wilder's 1995 population, this finding should also stand true for this study.

Incorporating Wilder's findings, it can therefore be concluded that approximately 54% of the librarians included in this study have worked in only one library over the course of their professional careers. It can be concluded that working in only one organization during the course of a career can limit the professional exposure for library administrators to a variety of managerial situations and peer relationships.

It can also be concluded that this limited experience fosters generalizations, stereotypes, and a myopic view concerning administrative peers and library subunits which can be untrue and negative. For example, a public service administrator with limited peer relationships may generalize that all technical service administrators have the same thinking style preference as their current technical service academic peer in the same institution. It can also be speculated that as thinking style research increases in the professional library literature, these generalizations and stereotypes should decrease.

### **Summary of Conclusions**

In summary, it was concluded based upon the results of the ANOVA analysis that the librarians participating in this study do not favor any one specific thinking style preference based upon gender or administrative area of responsibility. However, further analysis noted the potential for developing the flat thinking style among many of the participants of this study.

According to Dewey and Creth (1993) librarians are experiencing an exciting and challenging period, in which every aspect of the library profession will undergo considerable change. These changes include shifts in managerial organization, responses to patron needs, and advances in technology.

In this new library environment, librarians need to acquire new knowledge and skills. They need to exercise flexibility, embrace diversity, foster creativity, encourage critical thinking, and learn to make decisions in an effective and timely manner. Being able to utilize thinking style research is one essential tool that can help library professionals in this transition, with the ability to develop a flat thinking style an ideal professional and personal skill.

Librarians will need to create new visions for information services (Dewey & Creth, 1993; Senge, 1990). More than ever librarians need to be able to work together to build collaborative work teams to solve problems and to design new systems and services. Decision-making in this period of constant change makes it

imperative that library professionals develop their understanding of the process of communication, peer understanding, and team decision-making skills.

Understanding thinking style research, and supporting the development of the flat thinking style among library professionals is one skill that can help in building this new library environment.

As additional publication concerning the implementation of thinking style research in libraries increases, additional research concerning the relationship of gender upon thinking style preferences, and additional investigations concerning the relationship of differentiation theory upon thinking style preferences, practical application of thinking style research in the library profession. As academic libraries move towards the implementation of team-based management, support for the flat thinking style among library professionals should increase. As academic libraries become more diversified, support for the flat thinking style should also increase.

### **Recommendations**

The third section of Chapter V presents recommendations based upon the literature review, findings, and conclusions of the study. These suggestions are organized into three sections: (a) recommendations to support future thinking style research using the InQ, (b) recommendations to improve library management, and

(c) recommendations to help in the recruitment and diversification of the library profession.

### **Future Thinking Style Research Using the InQ**

The first set of recommendations is provided to support future thinking style research using the InQ. Based upon the experience of using the InQ instrument, two specific recommendations can be made for future InQ studies.

The first suggestion involves clarifying the directions for completing the InQ. This would help participants correctly complete the questionnaire in the absence of an instrument administrator. This study involved mailing the InQ to participants with no opportunity for verbal clarification of InQ directions. Of the 106 returned surveys, six were incorrectly completed, and had to be omitted from the data analysis of this study. While this number was not significant for this study since an 80.3% return rate was achieved, incorrectly completed surveys could affect future studies by other researchers with lower return rates.

The next suggestion to support future thinking style research using the InQ involves creating a method for computerized scoring of the InQ. Scoring the InQ is a time-consuming task that can include human error. Developing a computerized scoring system could save research time, reduce scoring errors, and provide additional confidentiality measures.

## **Library Administration Improvement**

The second set of recommendations provides suggestions to improve academic library administration. These suggestions are organized into four categories: (a) understanding co-workers, (b) improving organizational communications, (c) providing opportunities for personal growth, and (d) supporting opportunities for organizational growth.

### **Understanding Co-Workers**

The first set of recommendations based upon this study to improve library administration involves using thinking style research to help library staff better understand themselves and their co-workers. People use different styles of thinking, with most people using a blend of the five thinking styles identified by the InQ (Shank, 1995). As we gain insight into the way we think, and the way others think, we could work more productively.

When people understand differences in thinking styles, they are less apt to personalize work situations (Harrison & Bramson, 1982). Understanding thinking style research can help library professionals to concentrate and focus upon the content of the message, not the tone or body language used when communicating the message. For example, when co-workers realize that a synthesist thinker prefers to argue theoretical points, they are less likely to take the argumentative tone personally. This insight helps to reduce organizational conflict.

Fostering an understanding of thinking style differences can help library administrators successfully build work teams that solve problems and effectively communicate within the organization. By helping staff understand their thinking style and the thinking styles of others, effective work environments can quickly develop, since people begin to use and appreciate thinking styles normally not used (Svendsen & Svendsen, 1995). The behavioral clues in Table 5.1 are useful to increase awareness of the thinking styles and communication preferences of co-workers based upon thinking style research.

Implementing and using thinking style research in library administration helps build mutual understanding and a shared vision among subunits. Thinking style research aids library staff in understanding how all subunits contribute to the overall success of the organization. Using thinking style research can also help in the communication, and in the building of a shared vocabulary, vision, and knowledge-base among library subunits.

### **Improving Organizational Communication**

The second set of recommendations based upon this study for improving library administration involves using thinking style research to help improve organizational communication. Effective staff communication in library organization is essential for organizational success (Emery, 1975).

**Table 5.1**

**Quick Behavioral Clues to Help Recognize Thinking Styles**

Thinking Style	Behavioral Clues
Synthesist	bounces from topic to topic in a conversation asks "what if" questions argues theoretical points and talks a lot speculates about new ideas and concepts
Idealist	is a good and interested listener talks about long range goals, values and ideals wants to please you so you won't be upset often sounds disappointed in others
Pragmatist	interested in a quick payoff quick-witted and quick on their feet playful and cheerful interested in a short time frame
Analyst	insists on technical data generally appears neat and orderly asks detailed and concrete questions is reluctant to change from the tried-and-true
Realist	is direct and frank seems impatient and restless and interrupts a lot says ... If you look at the facts ... Do we really need it? states opinions as if they were facts is quick to provide solutions to issues

Source: InQ Educational Materials, Inc. (1994). Workbook for recognizing and influencing others' thinking styles. Berkeley: Holland Parlette Associates.

Naisbitt (1982) states that although people and organizations are drowning in information, they are starved for knowledge and understanding. Using thinking style research in an organization helps lessen communication problems and fosters shared vision and knowledge among the subunits. Using the InQ, Svendsen and Svendsen (1995) recommend a three-step process to support effective communication in work environments.



**Step 1: Observe and Identify:** Take the time to reflect upon the type of thinker you are. Try to become aware of the strengths and weakness of your personal style, and learn how to incorporate other thinking styles into your work routine. Make an attempt to understand the thinking styles of those around you.

**Step 2: Select Co-Workers:** Notice within your organization which individuals work well together, which individuals do not work well together, and which individuals have problems working as team members. Try to form productive work groups, by creating a balance of different thinking styles within each team.

**Step 3: Facilitate:** Use thinking style behavioral clues to facilitate effective face-to-face communication, meetings, and training sessions. Table 5.2 provides additional behavioral clues to help facilitate effective communication, shared vision, and organizational understanding of the roles of subunits.

**Table 5.2****Thinking Style Behavioral Clues**

<b>Behavioral Clues</b>	<b>Synthesist</b>	<b>Idealist</b>	<b>Pragmatist</b>	<b>Analyst</b>	<b>Realist</b>
Apt to appear	Challenging, skeptical, amused.	Attentive, receptive, supportive.	Open, sociable, humorous.	Cool, studious, hard to read.	Direct, forceful, quick nonverbal expression.
Apt to say	On the other hand ...  No, not necessarily ...	It seems to me...  Don't you think...	I'll buy that...  That's one sure way...	Logically...  It stands to reason...	It's obvious to me...  Everybody knows that ...
Apt to express	Concepts, opposite points of view.	Feelings, ideas about values, what's good.	Non-complex ideas, personal anecdotes.	General rules, supporting data.	Opinions, factual anecdotes.
Tone	May sound argumentative, sardonic.	May sound tentative, hopeful, resentful.	May sound insincere, enthusiastic.	May sound stubborn, careful, dry.	May sound dogmatic, forthright, positive.
Enjoys	Intellectual, philosophical arguments.	Feeling-level, discussions.	Brainstorming, lively give-and-take.	Rational examination of issues.	Short, direct, factual discussions.
Apt to use	Parenthetical expressions, qualifying phrases, adjectives.	Indirect questions, aids to agreement.	Case examples, illustrations, popular opinions.	Long, discursive, well-formulated sentences.	Direct, pithy, descriptive statements.
Dislikes	Talk that seems too simplistic, superficial, mundane.	Talk that seems too factual, conflictive, dehumanizing.	Talk that seems too dry, dull, humorless, "nit-picking."	Talk that seems too irrational, aimless, "far-out."	Talk that seems too theoretical, sentimental, impractical.
Under stress	Pokes fun.	Looks hurt.	Looks bored.	Withdraws.	Becomes agitated.

Source: InQ Educational Materials, Inc. (1994). Workbook for modifying your thinking profile. Berkeley: Holland Parlette Associates.

### **Opportunities for Professional Growth**

The third set of recommendations based upon this study to improve library administration is to use thinking style research to encourage personal growth for all library staff. Research shows that thinking styles can be modified when change and growth are considered important for professional growth (Harrison & Bramson, 1982). In addition, research shows that individuals who strive to utilizing the thinking style most appropriate for the situation have greater flexibility and creativity and are more effective problem-solvers (Harrison & Bramson, 1977; Malone, 1992; Svendsen & Svendsen, 1995).

Benfari (1991, 1995) created a four step plan to modify skills for effective professional growth. In his plan, Benfari recommends taking the time to understand yourself, your co-workers, and your organization's culture. Only when understanding is achieved can modification begin. Benfari's four steps, modified to include thinking styles, include:

**Reflect:** Take the time to understand yourself and others in terms of strengths and weaknesses concerning thinking style preferences.

**Identify:** Find work situations in which you have been effective and those in which you have been ineffective.

**Determine:** Recognize what aspects of your thinking styles play a role in both the positive and negative outcomes in these situations.

**Modify:** Work to achieve positive outcomes at all times by using the thinking style most appropriate for the situation, and try to align these outcomes with the mission of the organization. For example, when a personnel issue needs to be addressed, the good listening behaviors of the idealist thinker can be essential to understanding the central issues, while the ability to quickly resolve problems of the pragmatist thinker is helpful in crisis situation such as a bomb threat.

### **Opportunities for Organizational Growth**

The final set of recommendations based upon this study to improve library administration involves opportunities for organizational growth. Effective library administrators understand that the organizational structure, definition of roles, and division of responsibility must support interpersonal work relationships among individuals and subunits (Robinson, 1995; Sheldon, 1991).

When thinking style awareness is used with daily work routines, improved work effectiveness for individuals and the organization can occur. By encouraging workers to learn and reflect upon how thinking styles are viewed by others in the organization, library administrators help support team-based management and total quality management in their organizations.

Enlightened library administrators realize that easy answers to an organizational problem often lead back to applying comfortable solutions (DeBono, 1971; Senge, 1990). Encouraging the use of different thinking styles for

problem-solving helps staff realize that small changes can produce big results for the organization. For example, when an analyst thinker is aware that their tone can be perceived as being harsh, dry and stubborn, they can try to modify their statements with qualifiers and adjectives that would soften their statements.

According to Senge (1990) organizational improvement may not be obvious if we do not learn to think differently. Different pieces of the problem must be approached in a variety of ways. Developing the ability to use an assortment of thinking styles allows librarians to select the style that is the best “fit” for the situation, not what is most comfortable for the individual.

Finally, organizational self-discovery is a method many library directors are using to effectively incorporate team-based management into traditional hierarchal organizations. To accomplish this change, many library directors are supporting the use of self-awareness instruments such as the Myers-Briggs Indicator or Kolb’s Learning Style Indicator to foster organizational understanding and change. It is recommended that the InQ be included in these self-awareness learning activities.

### **Recruitment and Diversification Assistance**

The final set of recommendations based on this study involves using thinking style research to help recruit new members and to help diversify the library profession. The findings of this study supported previous research

indicating that aggressive steps for recruitment and diversification were needed for the library profession.

Harrison and Bramson (1977) conducted studies concerning the thinking style preferences of the American population. They concluded that 50% of the American population has a tendency towards only one thinking style, and that the most predominant thinking styles used for one-style thinkers are idealist.

Research shows that people in different professions prefer various thinking styles (Denis & Mackessy, 1982; LaPierre, 1992; McIntire & McIntire, 1980). For example, people in the medical profession prefer the analyst thinking style (Kienholz, 1984), architects prefer the synthesist and idealist thinking styles (Kienholz & Hritzuk, 1986), and engineers have a preference for the realist thinking style (Huang, 1993).

Research also shows that nationality can influence thinking style. Hung (1993) concluded that Chinese students prefer the pragmatist thinking style, while a follow-up study with Chao (1994) concluded that Chinese and Japanese college students exhibit a preference for the idealist thinking style in a direct relationship to the number of years they have lived in the United States.

Yarborough (1995) concluded that most professions are most effective in attracting people with similar thinking styles. However, this does not always support diversity within a profession.

One way to attract minorities to the library profession would be to create promotional recruitment campaigns using a variety of thinking styles. These campaigns can be designed using phrases and behavioral clues of thinking styles other than the traditional idealist style used by most Americans. For example, since research by Huang (1993) shows that Chinese students prefer the pragmatist thinking style, promotional campaigns can be developed around their playful and cheerful behaviors and their desire to work in organizations that would appeal to their ability to react quickly to situations.

Another way to attract minorities to the library profession is to incorporate thinking style research into the curriculums of library science programs. Library science programs can utilize thinking style research and celebrate to support diversity of thought among potential librarians. These programs could be designed to first introduce potential librarians to the concepts of thinking styles, and then help potential librarians learn how to develop their potential to become effective flat thinkers. In addition, the curriculum can help library science students learn how using thinking style research to become more effectively with patrons in public service situations, and with their library peers.

### **Summary of Recommendations**

In summary, the literature supports the concept that thinking styles can be modified and changed for personal and organizational growth (Harrison & Bramson, 1977; Svendsen & Svendsen, 1995). With a little effort, thinking style research can be incorporated into the daily work routine of library administrators in academic organizations.

According to Stewart (1997) the intellectual capital of an organization is one of its most vital assets for success. Learning organizations use knowledge, experience, and intellectual abilities to create organizational wealth. Organizational wealth helps prevent burn-out and supports staff in their goal of achieving organizational success by providing a variety of skilled professionals to resolve situations. The utilization of thinking style research in library organizations is one additional tool library directors can use to build this organizational wealth. The producers of the InQ instrument suggest the following six applications in Table 5.3 for using thinking style research to improve organizational and personal growth.



**Table 5.3**

**Applications For Using Thinking Style Research in Organizations**

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1. To broaden and deepen individual competencies in thinking, problem-solving, and influencing others.
  2. To support team-building since the process has been proven to be a non-threatening way of identifying collaborative resource.
  3. To coach others by helping them to strengthen under-used strategies and modify styles that are over-used.
  4. As an aid in the selection of key personnel, especially for providing strengths that are needed for enabling teams and the organization to work more effectively.
  5. In integrating new employees to the organization by using the selection-process data to plan how best to orient and supervise new staff.
  6. In matching persons to projects so that thinking styles and experiences can be applied to tasks appropriately.
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Source: InQ Educational Materials, Inc. (1994). Workbook for modifying your thinking profile. Berkeley: Holland Parlette Associates.

**Suggestions for Future Research**

The third section of Chapter V presents suggestions for further research. While the findings of this study answered some questions concerning thinking style differences among academic librarians, the findings also raised many additional questions and concerns. These suggestions for future research might help to answer some of these new questions and concerns.

The first suggestion for future research is to replicate the study. The literature review revealed that this study was the first research investigation analyzing the

thinking styles of librarians using the InQ instrument. Replication would provide the necessary data that would either verify or contradict the results of this study.

The second suggestion for future research is to conduct a follow-up study using a larger sample. The design of this study included a series of five factorial analyses of variance to examine the relationship among library administrative role (public or technical service), gender (female or male), and thinking style preference (synthesist, idealist, pragmatist, analyst, and realist). An expanded sample would provide adequate data for additional independent variable analysis such as culture, age, and years of experience. Previous studies using the InQ show that many people have a predisposition towards a combination thinking style (Svendsen & Svendsen, 1990). An expanded sample would provide adequate data for additional dependent variable analysis such as synthesist-idealist, idealist-analyst, and pragmatist-realist thinkers.

The third suggestion for future research is to expand the sample of the original study. One way to expand the study is to include areas of academic library administration not included in the first study (i.e., systems, human resources, instructional support, collection development, etc.). Perhaps more significant thinking style differences would be noted with a broader group comprising the independent variable.

Another way to expand the study is to include non-academic administrative librarians (i.e., public, school, and special). This expansion could investigate if thinking style differences exist among administrative librarians in other areas of librarianship. Expanding the sample to include librarians from a variety of administrative settings (i.e., academic, public, school, and special) should provide a more thorough understanding of the individuals that comprise the library profession similar to the 1992 study sponsored by the Association of College and Research Libraries.

The fourth suggestion for future research includes designing a longitudinal study concerning preferred thinking styles and librarians. The literature suggests that thinking styles can be modified and changed (Svendsen & Svendsen, 1990). The theory of differentiation also notes the possible influence of subunit cultures upon the individual. A longitudinal study would allow for the tracking of thinking styles to analyze what influences changes in thinking styles. The study could track the preferred thinking styles of individuals upon entering library school, at graduation, after completing their first year of professional work, and then at regular intervals (i.e., every 5 or 10 years) to see if, and when, significant thinking style changes occur.

The fifth suggestion for future research is to design a study that incorporates a qualitative approach like the 1995 study conducted by Shank. Qualitative

information concerning professional philosophies and actual practices could be collected and analyzed. This would allow a greater in-depth understanding of differences, and perceived differences, among library administrators.

The sixth suggestion for future research is to investigate if librarians in a subunit share the same thinking style as their supervisor. The theory of differentiation notes the influence of subunit cultures upon the individual. Similar to Malone's 1992 study, this new investigation could provide data revealing the influences of a library supervisor upon the hiring practice for a subunit. One question that could be researched in this study is, "Do subunit supervisors hire librarians with the same thinking styles as their own?"

The seventh suggestion for future research concerns revisions to the demographic data form. Based upon written comments from survey participants, the demographic data form would have been more accurate if it included the choices of Specialist and All But Dissertation (ABD) in the "Highest Educational Level Completed Category." Several new categories should also be included in a revised form to allow for the comparison with the national ARL demographic study conducted by Wilder (1995). For example, the data form should include a category for participants to self-reveal how many institutions they have worked in over the course of their career.

The eighth suggestion for future research concerns further investigation into the relationship between gender and thinking style preference. The literature review revealed that gender theory acknowledges that men and women differ from each other biologically, psychologically, and sociologically. The findings of this study also noted a relationship between gender and thinking style. Additional research is needed to better understand the nature of this relationship between gender and thinking style preference.

The final suggestion for future research involves the definitional issues addressed in Chapter II. There is a tremendous need for theorists and researchers to come to a consensus, and provide better definitions, for the four concepts of cognitive styles, learning styles, personality styles, and thinking styles. An agreed upon terminology would help practitioners use these terms in a consistent manner, and communicate more effectively in research studies.

### **Chapter Summary**

The fourth section is a summary of Chapter V. The chapter began by restating the purpose of this study, and by explaining how the data were collected and analyzed.

Next, a summary of the findings was highlighted. Although the ANOVA procedures could not reject any of the 15 null hypotheses, the neutral preference of the mean scores indicated a potential for library professionals to develop the flat

thinking style. The chi-square analysis noted thinking style differences based upon gender (female or male) and administrative area of responsibility (public or technical service), while the dyad analysis concluded that 84.4% of all institutions were supervised by senior library administrators with thinking styles which differed from those of their professional peers in the same library.

The conclusions of the study were then summarized. They included: (a) the potential for the development of the flat thinking style among the librarians participating in the study, (b) the influence of gender upon thinking style preference, (c) the influence of organizational differentiation upon thinking style preference, (d) the lack of previous research connecting thinking style research with librarianship, (e) the effects of team-based management implementation upon thinking style preference, (f) the influence of a non-diversified organization upon thinking style preference, and (g) an explanation for generalizations and stereotypes among library administrative peers.

Chapter V then presented specific recommendations for application in library organizations. These recommendations were organized into three areas: (a) to support future thinking style research using the InQ, (b) recommendations to improve library management, and (c) recommendations to help in the recruitment and diversification of the library profession.

The chapter concluded with 10 suggestions for future research studies using the InQ were also provided. Suggestions such as replicating the study and d expanding the population were highlighted.

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**APPENDIX A:  
ASSOCIATION OF RESEARCH LIBRARIES MEMBERSHIP LIST  
(AS OF NOVEMBER 1996)**

**United States Members**

Arizona State University  
Auburn University  
Boston Public Library \*  
Boston University  
Brigham Young University  
Brown University  
Case Western Reserve University  
Center for Research Libraries \*  
Colorado State University  
Columbia University  
Cornell University  
Dartmouth University  
Duke University  
Emory University  
Florida State University  
Georgetown University  
Georgia Institute of Technology  
Harvard University  
Howard University  
Indiana University  
Iowa State University  
John Hopkins University  
Kent State University  
Library of Congress \*  
Linda Hall University  
Louisiana State University  
Massachusetts Institute of Technology  
Michigan State University  
National Agricultural Library \*  
National Library of Medicine \*  
New York Public Library \*  
New York State University  
New York University  
North Carolina State University  
Northwestern University  
Notre Dame University  
Ohio University  
Ohio State University  
Oklahoma State University  
Pennsylvania State University  
Princeton University  
Purdue University  
Rice University  
Rutgers University  
Smithsonian Institution Libraries \*  
Southern Illinois University  
Stanford University  
State University of New York at Albany  
State University of New York at Buffalo  
State University of New York at Stony Brook

Syracuse University  
Temple University  
Texas A & M University  
Tulane University  
University of Alabama  
University of Arizona  
University of California - Berkeley  
University of California - Davis  
University of California - Irvine  
University of California - Los Angeles  
University of California - Riverside  
University of California - San Diego  
University of California - Santa Barbara  
University of Chicago  
University of Cincinnati  
University of Colorado  
University of Connecticut  
University of Delaware  
University of Florida  
University of Georgia  
University of Illinois at Chicago  
University of Illinois at Urbana  
University of Iowa  
University of Hawaii \*  
University of Houston  
University of Kansas  
University of Kentucky  
University of Maryland  
University of Massachusetts  
University of Miami (Florida)  
University of Michigan  
University of Minnesota  
University of Missouri  
University of Nebraska at Lincoln  
University of New Mexico  
University of North Carolina  
University of Oklahoma  
University of Oregon  
University of Pennsylvania  
University of Pittsburgh  
University of Rochester  
University of South Carolina  
University of Southern California  
University of Tennessee  
University of Texas  
University of Utah  
University of Virginia  
University of Washington  
University of Wisconsin  
Vanderbilt University  
Virginia Polytechnic Institute & State University



Washington State University  
Washington University (Missouri)  
Wayne State University  
Yale University

**Canadian Members**

Canada Institute for Scientific & Technical  
Information \*  
Laval University \*  
McGill University \*  
McMaster University \*  
National Library of Canada \*  
Queen's University \*  
University of Alberta \*  
University of British Columbia \*  
University of Guelph \*  
University of Manitoba \*  
University of Saskatchewan \*  
University of Toronto \*  
University of Waterloo \*  
University of Western Ontario \*  
York University \*

\* institution not part of sample

**APPENDIX B:**  
**INQUIRY MODE QUESTIONNAIRE (InQ)**

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**INQUIRY MODE QUESTIONNAIRE**  
**A Measure of How You Think and Make Decisions**

By Allen F. Harrison, D.P.A., Robert M. Bramson, PhD.,  
Susan Bramson & Nicholas Parlette M.PH.

**DIRECTIONS**

This questionnaire has no right or wrong answers. It is a tool which can help you identify your preferred modes of thinking, asking questions, and making decisions. To be of maximum value to you, it is important that you respond as accurately as possible in terms of the way you believe you actually behave, not as you think you should.

Each item in this questionnaire is made up of a statement followed by five possible endings. Indicate the order in which you believe each ending applies to you. In the blank box to the left of each ending, fill in the number 5, 4, 3, 2, or 1, indicating the degree to which an ending is most like you (5) or least like you (1). Do not use any number more than once for any group of five endings. Even if two or more endings seem equally like you, rank them anyway. Each ending must be ranked, 5, 4, 3, 2, or 1. **Remember 5 is most like you, 1 is least like you.**

**EXAMPLE**

Please fill in this example:

WHEN I READ A REPORT, I AM MOST LIKELY TO PAY ATTENTION  
TO:

1. The quality of the writing
2. The main ideas in the report
3. The table of contents
4. The back-up materials and tables
5. The findings and recommendations

Once you are sure you understand the directions given above,  
please turn the page and proceed.

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A: WHEN I HEAR PEOPLE ARGUE OVER AN IDEA, I TEND TO FAVOR THE SIDE THAT:

1. Identifies and tries to bring out the conflict
2. Best expresses the values and ideals involved
3. Best reflects my personal opinions and experience
4. Approaches the situation with the most logic and consistency
5. Expresses the argument most forcefully and concisely

B: WHEN I BEGIN WORK ON A GROUP PROJECT, WHAT IS MOST IMPORTANT TO ME IS:

1. Understanding the purposes and value of the project
2. Discovering the goals and values of individuals in the group
3. Determining the steps to be taken to get the project done efficiently
4. Understanding how the project will pay off for myself and others
5. Getting the project organized and under way

C: GENERALLY SPEAKING, I ABSORB NEW IDEAS BEST BY:

1. Relating them to current or future activities
2. Applying them to concrete situations
3. Concentration and careful analysis
4. Understanding how they are similar to familiar ideas
5. Contrasting them to other ideas

D: FOR ME, THE BACK-UP DATA IN A BOOK OR REPORT ARE USUALLY:

1. Very important if they demonstrate the truth of the findings
2. Important only for checking on the accuracy of the facts that are cited
3. Useful, if supported and explained by the narrative
4. Important only in terms of the conclusions to be drawn from them
5. No more and no less important than the narrative

E: IF I WERE PUT IN CHARGE OF A PROJECT, I WOULD PROBABLY START BY:

1. Trying to fit the project into broad perspective
2. Deciding how to get it done with the available time and money
3. Speculating about what the possible outcomes might be.
4. Determining whether or not the project should be done at all
5. Trying to formulate the problem as thoroughly as possible

F: IF I WERE ASKED TO GATHER INFORMATION FROM PEOPLE, I WOULD PREFER TO:

1. Form my own opinion on the facts and issues and then ask specific questions
2. Hold an open meeting and ask them to air their views
3. Interview them in small groups and ask general questions
4. Meet informally with key people to get their ideas
5. Ask them to give me their information in writing

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G: I AM LIKELY TO BELIEVE THAT SOMETHING IS TRUE IF IT:

1. Has held up against opposition
2. Fits in well with other things that I hold to be true
3. Has been shown to hold up in practice
4. Make sense logically and scientifically
5. Can be personally verified by observable facts

H: I CAN CONTRIBUTE THE MOST WHEN I'M ASKED TO:

1. Identify the goals and objectives of a project
2. Identify priorities between competing projects
3. Identify how to save time and money on a project
4. Identify the practical effects of a project
5. Identify and assign the resources needed to carry out a project

I: WHEN I READ A NON-FICTION BOOK I PAY MOST ATTENTION TO:

1. The relation of the conclusions to my own experience
2. Whether or not the recommendations can be accomplished
3. The validity of the findings, backed up by data
4. The writer's understanding of goals and objectives
5. The inferences that are drawn from the data

J: WHEN I HAVE A JOB TO DO, THE FIRST THING I WANT TO KNOW IS:

1. What the best method is for getting the job done
2. Who wants the job done and when
3. Why the job is worth doing
4. What effect it may have on other jobs that have to be done
5. What the immediate benefit is for doing the job

K: I USUALLY LEARN THE MOST ABOUT HOW TO DO SOMETHING NEW BY:

1. Understanding how it is related to other things I know
2. Starting in to practice it as soon as possible
3. Listening to differing views about how it is done
4. Having someone show me how to do it
5. Analyzing how to do it in the best way

L: IF I WERE TO BE TESTED, I WOULD PREFER:

1. An objective, problem-oriented set of questions on the subject
2. A debate with others who are also being tested
3. An oral presentation covering what I know
4. An informal report on how I have applied what I have learned
5. A written report covering background, theory and method

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M: PEOPLE WHOSE ABILITIES I RESPECT THE MOST ARE LIKELY TO BE:

1. Philosophers and consultants
2. Writers and teachers
3. Business and government leaders
4. Economists and engineers
5. Entrepreneurs and journalists

N: GENERALLY SPEAKING, I FIND AN IDEA USEFUL IF IT:

1. Fits in well with ideas that I have learned
2. Explains things to me in a new way
3. Can systematically explain a number of related situations
4. Serves to clarify my own experience and observations
5. Has a practical and concrete application

O: WHEN SOMEONE MAKES A RECOMMENDATION, I PREFER THAT HE OR SHE:

1. Show clearly what benefits will be realized
2. Show how the recommendation can be implemented
3. Back up the recommendation with data and a plan
4. Show how the recommendation will support overall goals
5. Take into account the drawbacks as well as the benefits

P: I WOULD MOST LIKELY READ A BOOK ON AN UNFAMILIAR TOPIC BECAUSE OF:

1. An interest in improving my technical knowledge
2. Having been told it would be useful by someone I respect
3. A desire to know more about how others think
4. A desire to find ideas that would challenge me
5. A wish to learn if the specific subject could benefit me

Q: WHEN I FIRST APPROACH A PROBLEM, I AM MOST LIKELY TO:

1. Try to relate it to a broader problem or theory
2. Look for ways to get the problem solved quickly
3. Think of a number of opposing ways to solve it
4. Look for ways that others might have solved it
5. Try to find the best procedure for solving it

R: GENERALLY SPEAKING, I AM MOST INCLINED TO:

1. Find existing methods that work, and use them as well as possible
2. Speculate about how dissimilar methods might work together
3. Strive for quality regardless of the cost
4. Look for new ways to do things
5. Be dissatisfied until I've found the best method

Tear off pages 1,2 & 3 at the perforation line to expose the score boxes

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**APPENDIX C:  
RANDOMLY SELECTED MEMBERS OF THE ASSOCIATION OF  
RESEARCH LIBRARIES INCLUDED IN STUDY**

Arizona State University	University of Minnesota
Auburn University	University of Missouri
Brigham Young University	University of Nebraska at Lincoln
Brown University	University of New Mexico
Colorado State University	University of North Carolina
Columbia University	University of Oklahoma
Cornell University	University of Oregon
Dartmouth University	University of Pennsylvania
Duke University	University of Pittsburgh
Emory University	University of South Carolina
Florida State University	University of Utah
Georgetown University	University of Washington
Georgia Institute of Technology	University of Wisconsin
Harvard University	Vanderbilt University
Howard University	Virginia Polytechnic Institute & State University
Iowa State University	Yale University
Kent State University	
Massachusetts Institute of Technology	
Michigan State University	
New York University	
North Carolina State University	
Northwestern University	
Notre Dame University	
Ohio State University	
Pennsylvania State University	
Princeton University	
Purdue University	
Rice University	
Rutgers University	
Southern Illinois University	
State University of New York at Albany	
State University of New York at Buffalo	
State University of New York at Stony Brook	
Temple University	
Tulane University	
University of Alabama	
University of California - Davis	
University of California - Irvine	
University of California - San Diego	
University of California - Santa Barbara	
University of Colorado	
University of Connecticut	
University of Delaware	
University of Florida	
University of Illinois at Chicago	
University of Illinois at Urbana-Champaign	
University of Kansas	
University of Kentucky	
University of Maryland	
University of Massachusetts	
University of Miami (Florida)	
University of Michigan	



**APPENDIX D:**  
**COVER LETTER REQUESTING PARTICIPATION IN SURVEY**

**Linda Marie Golian, Serials Department Head**

Florida Atlantic University - Wimberly Library

777 Glades Road

Boca Raton, Florida 33431-0992

(561) 367-3933

October 26, 1996

Dear Fellow Librarian:

My name is *Linda Marie Golian*. I am a doctoral student in the Department of Educational Leadership at Florida Atlantic University, and I also work as the Serials Department Head for FAU's Wimberly Library. Presently I am engaged in my dissertation research and would appreciate your participation in completing the enclosed forms. *As a library administrator working in an Association of Research Libraries institution, you have been randomly selected for data collection for my dissertation study entitled "Thinking Style Differences Among Academic Librarians."*

I would appreciate your answering the enclosed Inquiry Mode Questionnaire (InQ), Demographic Data Form, and Consent Form. The InQ is an 8 page, 18 question, thinking style inventory. These materials will take approximately *15 minutes to complete*, and I assure you, your participation will remain completely confidential.

It is important that you **return the completed InQ instrument, Demographic Data Form, and Consent Form by November 6, 1996**. A stamped, self-addressed envelope, is enclosed for your convenience. Please note, *do not score* your InQ, a third party will do this for you.

A total of 66 Association of Research Libraries have been randomly selected for this study. One technical and one public service administrator has been selected per institution. *You are one of a total of 132 librarians* receiving this survey, and your assistance and participation is crucial for the successful completion of my dissertation.

If you would like to receive a confidential interpretation of your InQ score and / or receive an executive summary of my research findings, please complete the lime green form attached to your InQ. I thank you in advance for your cooperation.

Sincerely,

Linda Marie Golian

Serials Department Head, Florida Atlantic University Libraries

Doctoral Student, College of Education, Department of Educational Leadership  
enclosures

**APPENDIX E:  
CONSENT FORM**

## Human Subjects Institutional Review Board Florida Atlantic University Consent Form

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**Title of the Research Project:** Thinking Style Differences Among Academic Librarians  
**Investigators:** Dr. Michael W. Galbraith and Ms. Linda Marie Golian

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### **Explanation of Research Project to Subject:**

**PURPOSE:** The purpose of this proposed research project is to analyze the thinking style preferences of higher-level administrative librarians by surveying librarians working in Association of Research Libraries (academic institutions such as Harvard, Yale, Princeton, Brown, Emory).

**PROCEDURES:** The sample will be limited to the senior technical-service library administrator and the senior public-service administrator in 66 (n=132) randomly selected Association of Research Libraries located in the continental United States. Survey packets will be mailed to 66 senior technical-service library administrators and 66 public-service library administrators in Association of Research Libraries located in the continental United States.

Each packet will include:

1. letter introducing the researcher (requesting participation, explaining the purpose of the study, assuring confidentiality, and stating the 10 day deadline for the return of the completed survey)
2. copy of the eight-page InQ survey
3. consent form
4. pre-addressed, postage-paid envelope for the return of the survey
5. self-addressed, postage-paid post-card for participants interested in receiving survey results.

Detailed procedures include:

1. Randomly selecting 60% of Association of Research Libraries (n=66).
2. Checking the American Library Directory for specific addresses, names and administrative titles of the 132 randomly selected survey participants.
3. Mailing packets.
4. Creating chart to monitor response rate and track Confidential Survey Code.
5. Third-party collecting un-opened returned surveys and updating response chart.
6. Third party instituting second mailing.
7. Third party telephoning participants not returning survey after reminder letter.
8. Third party checking InQ scoring of all returned surveys.

**RISKS AND DISCOMFORTS:** Participants are subjected to the minimal risk of discrepancies between their perceived thinking style and actual thinking style as indicated by the INQ score.

**BENEFITS:** The benefits of this proposed research project to *science and/or society* include strengthening the existing body of knowledge concerning thinking style preferences and higher education management. The proposed research project will also initiate the concept of thinking style and library administration inter-relation. The *benefit to the subjects* include personal insights concerning their specific thinking style preference, and assistance in understanding how other administrators might think differently from information included in the INQ instrument. It is hoped that the results of this study can act as a catalyst for providing practical insight into improving communication and leadership patterns in higher education management.

**ALTERNATIVE TREATMENTS:** There are no alternative treatments available.

---

**THIS CONSENT FORM CONTINUES ON THE REVERSE SIDE**

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If you want to talk to anyone about this research study because you think you have not been treated fairly, or think you have been hurt by joining the study, or you have any other questions about the study, you should call the principal investigator, Linda Marie Golian, at 561-367-3933, or call the Office of Sponsored Research at Florida Atlantic University at 561-367-2321. Either the investigator or the people in the Committee office will answer your questions and/or help you to find medical care for any injury you feel you have suffered. Florida Atlantic University does not have any programs to provide compensation to you if you experience injury or other bad effects which are not the fault of the investigators.

**If you agree to join this study, please sign your name below.**

**Note: Signed copies of this consent form must be retained on file by the Principal Investigator and given to the subject.**

**APPENDIX F:  
DEMOGRAPHIC DATA FORM**

## DEMOGRAPHIC DATA FORM

**Directions:** Please check ONE response for each item.

**Gender**

- ☐ Female ☐ Male

**Age**

- ☐ 20-29 ☐ 50-59  
☐ 30-39 ☐ 60-69  
☐ 40-49 ☐ 70+

**Race**

- ☐ African American ☐ Hispanic  
☐ Asian ☐ Native American  
☐ Caucasian ☐ Other: \_\_\_\_\_

**Highest Educational Level Completed**

- ☐ Master Degree ☐ Doctorate  
☐ Second Masters ☐ Other: \_\_\_\_\_

**Current Area of Administrative Responsibility**

- ☐ Public Services  
☐ Technical Services

**Years of Professional Experience (post ALA approved degree)**

- ☐ 0-5 ☐ 26-30  
☐ 6-10 ☐ 31-35  
☐ 11-15 ☐ 36-40  
☐ 16-20 ☐ 41-45  
☐ 21-25 ☐ 46+

**Years of Experience in an Association of Research Library, Including Paraprofessional**

- ☐ 0-5 ☐ 26-30  
☐ 6-10 ☐ 31-35  
☐ 11-15 ☐ 36-40  
☐ 16-20 ☐ 41-45  
☐ 21-25 ☐ 46+

**Total Years of Library Experience, Including Paraprofessional**

- ☐ 0-5 ☐ 26-30  
☐ 6-10 ☐ 31-35  
☐ 11-15 ☐ 36-40  
☐ 16-20 ☐ 41-45  
☐ 21-25 ☐ 46+

**APPENDIX G:  
SAMPLE SURVEY TRACKING FORM**



	DATE MAILED	DATE SECOND LETTER MAILED	DATE PHONE CALL	DATE OTHER	DATE SURVEY RECEIVED	DATE SCORED	DATE SCORE SENT	DATE THANK YOU SENT	DATE SUMMARY SENT
001-01-0									
002-01-1									
003-02-0									
004-02-1									
005-03-0									
020-10-1									

**APPENDIX H:**  
**FLORIDA ATLANTIC UNIVERSITY'S**  
**INTERNAL REVIEW BOARD APPLICATION FORM**

**INSTITUTIONAL REVIEW BOARD (I.R.B.)  
APPLICATION FOR THE REVIEW OF RESEARCH INVOLVING  
HUMAN SUBJECTS**

**19. Describe the objectives and significance of the proposed research.**

A person's thinking style is an interactive mix of inherited tendencies and conditioned responses. Thinking styles greatly affect the way in which we approach the world, relate to others, reason, attain goals, solve problems, and communicate.

The *objective* of this proposed research project is to analyze the thinking style preferences of higher-level administrative librarians by surveying librarians working in libraries which belong to the Association of Research Libraries (academic institutions such as Harvard, Yale, Princeton, Brown, Emory).

The *significance* of this proposed research project is to further strengthen the existing body of knowledge concerning thinking style preferences and to link this information with library and higher education management. The results of the study will provide practical insight into improving communication and leadership patterns in higher education management.

**20. Describe methods for selecting subjects and assuring that their participation is voluntary. Attach a copy of the consent form that will be used. If no consent form will be used, explain the procedures used to ensure that participation is voluntary.**

The sample will be limited to the senior technical-service library administrator and the senior public-service administrator in 66 (n=132) randomly selected libraries with membership in the Association of Research Libraries located in the continental United States.

**21. Describe the details of the procedures that relate to the subject's participation. Attach copies of all questionnaires or test instruments.**

Survey packets will be mailed to 66 senior technical-service library administrators and 66 public-service library administrators in libraries with membership in the Association of Research Libraries located in the continental United States. Each packet will include:

1. letter introducing the researcher (requesting participation, explaining the purpose of the study, assuring confidentiality, and stating the 10 day deadline for the return of the completed survey)
2. copy of the eight-page INQ survey
3. consent form
4. pre-addressed, postage-paid envelope for the return of the survey
5. self-addressed, postage-paid post-card for participants interested in survey results

**22. Describe the methods that will be used to ensure the confidentiality of all subjects' identities and the stored data. Confidentiality of data is required.**

Research procedures will include these steps to ensure confidentiality:

1. each administrator will be assigned a Confidential Survey Code Number
2. each survey will be assigned an identical code number
3. third-party will match the code on each returned survey to the corresponding Confidential Survey Code Number in order to determine which administrators require a reminder letter and/or phone call.

Detailed procedures include:

1. Randomly selecting a minimum of 60% of libraries with membership in the Association of Research Libraries located in the continental United States (n=66).
2. Checking the American Library Directory for specific addresses, names and administrative titles of the 132 randomly selected survey participants.
3. Mailing packets.
4. Creating chart to monitor response rate and track Confidential Survey Code.
5. Third-party collecting un-opened returned surveys and updating response chart.
6. Third party instituting second mailing.
7. Third party telephoning participants not returning survey after reminder letter.
8. Third party checking INQ scoring of all returned surveys.

**23. Describe the risks to the subjects and precautions that will be taken to minimize the risks to subjects. Risk goes beyond physical risk and includes risks to the subject's dignity and self-respect, as well as psychological, emotional, employment, legal and/or behavioral risk. (Note: There is always minimal risk(s) associated with a project.**

Participants are subjected to the minimal risk of discrepancies between their perceived thinking style and actual thinking style as indicated by the INQ score.

**24. Describe the benefits of the project to science and/or society. Also describe benefits to the subject, if any exist. The IRB must have sufficient information to make a determination that the benefits outweigh the risks of the projects.**

The benefits of this proposed research project to *science and/or society* include strengthening the existing body of knowledge concerning thinking style preferences and higher education management. The proposed research project will also initiate the concept of thinking style and library administration inter-relation. The *benefit to the subjects* include personal insights concerning their specific thinking style preference (personalized InQ survey results and an executive summary of the dissertation will be shared with all participants expressing a desire to receive this information), and assistance in understanding how other administrators might think differently from information included in the INQ instrument. The results of this study can act as a catalyst for providing practical insight into improving communication and leadership patterns in higher education management.

**APPENDIX I:  
PARTICIPANT'S REQUEST FORM FOR  
EXPLANATION OF INQ SCORE AND  
EXECUTIVE SUMMARY**

Confidential Code Number: \_\_\_\_\_

Would you like to have an independent third party send you a summary of your InQ score?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

Would you like to receive an executive summary of the doctoral study upon completion in 1997?

\_\_\_\_\_ Yes

\_\_\_\_\_ No

**APPENDIX J:**  
**SECOND LETTER TO POSSIBLE PARTICIPANTS**  
**(FIRST FOLLOW UP LETTER)**

**Nicole Abaid, Research Assistant For  
Linda Marie Golian, Serials Department Head**  
720 SW 17th Street Boca Raton, Florida 33486  
(561) 391-5743

November 16, 1996

Dear Librarian:

My name is *Nicole Abaid*, and I am assisting Linda Marie Golian in her doctoral study by receiving and tracking responses to her dissertation research survey mailed on October 28, 1997. As of November 15, 1997, 66 responses have been received, giving the study a return rate of 50%. ***However, my records indicate that we have not received your completed InQ Instrument, Demographic Data Form, and Consent Form.***

Your completion of the InQ Inventory, Demographic Data Form, and Consent Form is vital to the successful completion of Linda Marie Golian's dissertation research on thinking style differences among academic librarians. *A total of 66 Association of Research Libraries have been randomly chosen for this study, with one technical and one public service administrator selected per institution. You are ONE of a total of 132 librarians randomly selected for inclusion in this study, and every response is critical in establishing statistical significance for this research project. Although a return rate of 50% is considered good, a return rate of 70% or higher will give this doctoral study added credibility, reliability, and validity. We are so close in reaching this goal, and need YOUR help in achieving this research objective!*

I strongly encourage you to locate the materials mailed in mid-October and complete the InQ Inventory, Demographic Data Form, and Consent Form. These three items should take approximately ***15 minutes to complete***, and your participation will remain completely confidential. Note: please do not score your InQ, I will be happy to do this for you, and send you a confidential interpretation of your scores if desired.

If for some reason you have not received the initial mailing with these materials, or if you have mistakenly misplaced the packet, please contact me at 407-391-5743 after 3 PM EST, or e-mail at [Abaid@acc.fau.edu](mailto:Abaid@acc.fau.edu). I will gladly send you another set of these materials.

On behalf of the primary researcher, Linda Marie Golian, I thank you for your assistance in this very important research study. ***I look forward to receiving your completed forms by DECEMBER 2, 1996.***

Sincerely,

Nicole Abaid  
Research Assistant

PS. If this letter crosses in the mail and you have already returned these forms, please accept our apologies for sending this reminder.



**APPENDIX K:  
THIRD LETTER TO POSSIBLE PARTICIPANTS  
(SECOND FOLLOW-UP LETTER)**

**Nicole Abaid, Research Assistant For  
Linda Marie Golian, Serials Department Head**  
720 SW 17th Street Boca Raton, Florida 33486  
(561) 391-5743

December 14, 1996

Dear Librarian:

My name is *Nicole Abaid*, and I am assisting Linda Marie Golian in her doctoral study by receiving and tracking responses to her dissertation research survey mailed on October 28, 1997. As of December 13, 1997 a total of 99 responses have been received, giving the study a return rate of 75%. On November 16, 1997 the first survey reply reminder letter was mailed to librarians who had not responded by the original deadline. ***My records indicate that we have not received your completed InQ Instrument, Demographic Data Form, and Consent Form.***

Your completion of the InQ Inventory, Demographic Data Form, and Consent Form is vital to the successful completion of Linda Marie Golian's dissertation research on thinking style differences among academic librarians. *A total of 66 Association of Research Libraries have been randomly chosen for this study, with one technical and one public service administrator selected per institution. You are ONE of a total of 132 librarians randomly selected for inclusion in this study, and every response is critical in establishing statistical significance for this research project. Although a return rate of 75% is outstanding, a higher response percentage will give this doctoral study added credibility, reliability, and validity. We need YOUR help in achieving these research objectives!*

***It is not too late to participate in this important research project!*** Just complete the InQ Inventory, Demographic Data Form, and Consent Form and return them by December 31, 1996. These three items should take approximately ***15 minutes to complete***, and your participation will remain completely confidential. If for some reason you have not retained these materials, please contact me at 561-391-5743 after 3 PM EST, or e-mail me at [Abaid@acc.fau.edu](mailto:Abaid@acc.fau.edu). ***I will gladly send you another set of these materials.***

Please note, the data collection phase of this project will end on December 31, 1996. Any responses received after that date cannot be included in the study. On behalf of the primary researcher, Linda Marie Golian, I thank you for your assistance in this very important research study. ***I look forward to receiving your completed forms by DECEMBER 31, 1996.***

Sincerely,

Nicole Abaid  
Research Assistant

PS. If this letter crosses in the mail and you have already returned these forms, please accept our apologies for sending this reminder.

**APPENDIX L:  
FOURTH LETTER TO PARTICIPANTS  
(THANK YOU LETTER)**

Mr. J. E. Doe, Librarian  
Excellent Library  
123 Library Blvd  
Liberty, FL 12345

June 30, 1998

Dear Mr. Doe:

Thank you for taking the time to complete the InQ instrument and the Demographic Data Form for my dissertation study on thinking style differences among academic librarians. Approximately 81% of all 132 library administrators contacted for this study responded to the first mailing, with approximately 69% of all 132 administrators responding to this study in total. Information collected from the InQ instrument and the Demographic Data Form will be statistically analyzed in using the factorial analysis of variance (ANOVAs) statistical applications to examine the relationships among library administrative role, gender, and thinking style preference. This dissertation will be completed over the next few months.

I have enclosed a summary of your InQ score, an interpretation guide for your own personal information, and an executive summary of the study. As mentioned in the consent form, all information is considered strictly confidential and will not be given to anyone.

If you are interested in any further information related to my dissertation, please call me at (941) 590-7632, or e-mail me at [lgolian@fgcu.edu](mailto:lgolian@fgcu.edu). Again, I would like to express my gratitude to you for helping me with this important project.

Sincerely,

Linda Marie Golian  
Education Librarian, Florida Gulf Coast University  
Doctoral Student, College of Education, Department of Educational Leadership,  
Florida Atlantic University

enclosures

**APPENDIX M:**  
**EXECUTIVE SUMMARY & SELECT BIBLIOGRAPHY**

## **Thinking Style Differences Among Academic Librarians**

### **Executive Summary**

The purpose of this study was to investigate whether differences in thinking styles exist between senior level library administrators working in public service areas, and senior level library administrators working in technical service areas, in libraries with an institutional membership in the Association of Research Libraries (ARL). To facilitate this investigation, the InQ instrument was distributed in a nation wide survey, with the scores analyzed using a series of two by two analysis of variance (ANOVA) statistical computation.

For this study, five analysis of variance (ANOVAs) were used to determine relationships, differences, and interactions based upon the subjects' administrative role (public or technical), gender (female or male), and thinking style preference (synthesist, idealist, pragmatist, analyst, and realist). The dependent variable associated with this study was thinking style preference (synthesist, idealist, pragmatist, analyst, and realist). The two independent variables associated with this study were administrative role (public or technical service) and gender (female or male). As part of the ANOVA process, the interaction between gender and administrative role was also analyzed. Data analysis included descriptive information analysis regarding the subjects, a cross tabulation computation, and a dyad comparison.

A total of 66 Association of Research Libraries were randomly selected for the sample of this study. The senior public service administrator and the senior technical service administrator for each institution were sent a survey packet (N=132). A total of 106 surveys were returned for data collection, with 97 surveys usable for the statistical computations.

None of the 15 null hypotheses could be rejected using a .05 alpha level. However, cross-tabulation and dyad analysis did reveal noteworthy findings, showing female library administrators were more likely to be idealist thinkers; male library administrators were more likely to be pragmatist and idealist thinkers; public service administrators were more likely to be analyst, pragmatist, and realist thinkers; and technical service administrators were more likely to be idealist thinkers.

Five findings were summarized in this study for the participants. They are: (a) a preference towards the flat thinking style, (b) a relationship between gender and thinking style, (c) a relationship between area of administrative responsibility and thinking style, (d) a difference in preferred thinking styles among administrative peers in the same institution was uncovered, and (e) demographic characteristics that support previous studies urging aggressive recruitment and diversity efforts for the library profession.

Seven conclusions were highlighted in the study. They are: (a) the potential for developing the flat thinking style among the librarians participating in the study, (b) the influence of gender upon thinking style preference, (c) the influence of organizational differentiation upon thinking style preference, (d) the lack of previous research connecting thinking style research with librarianship, (e) the effects of team-based management implementation upon thinking style preference, (f) the influence of a non-diversified organization upon thinking style preference, and (g) an explanation for generalizations and stereotypes among library administrative peers.

The following bibliography is recommend for additional information concerning thinking styles:

Harrison, A. F., & Bramson, R. M. (1984). The art of thinking. New York: Doubleday.

Intner, S. S. (1993). Interfaces: Relationships between library technical and public services. Englewood, Colorado: Libraries Unlimited.

Lowry, H. M. (1988). An Investigation of cognitive style and preferred conflict handling mode of cataloging and reference librarians in academic libraries. (Doctoral dissertation, University of New York at Buffalo, 1988). Dissertation Abstracts International, 49, 1073A.

Svendsen, E., & Svendsen, B. (1995). Building bridges: Using thinking styles to facilitate communication. Colorado Springs: Held Desk Institute.

**VITA**



**LINDA MARIE GOLLAN**  
Education Librarian  
Florida Gulf Coast University  
Work: (941) 590-7632  
Fax: (941) 590-7609  
E-Mail: lgolian@fgcu.edu  
URL: <http://www.fgcu.library>

## **EDUCATIONAL BACKGROUND**

**BACHELOR OF ARTS.** University of Miami, Coral Gables, Florida. Majors: Sociology and Criminal Justice. Minors: American History, Communications, and Religion. *Degree awarded May 1986, Cum Laude.*

**MASTER OF LIBRARY AND INFORMATION STUDIES.** Florida State University, Tallahassee, Florida. Areas of specialization: Academic Librarianship and Technical Services. *Degree awarded April 1988.*

**EDUCATIONAL SPECIALIST.** Florida Atlantic University, Boca Raton, Florida. Department of Educational Leadership. Areas of Specialization: Adult & Community Education, Geriatric Education, Life-Long Learning, and Education Management & Leadership. *Field Project: Facilitating Effective Literary Discussion Groups for Older Adults. Degree awarded April 1995.*

**DOCTORATE IN EDUCATION.** Florida Atlantic University, Boca Raton, Florida. Area of Specialization: Adult Education and Education Management & Leadership. Areas of Specialization: Adult Education, Community Education, Curriculum Development, Educational Leadership, and Higher Education Management. Dissertation involved a nation wide survey of library administrators working in libraries with an institutional membership in the Association of Research Libraries. Data collection for national survey completed January 8, 1997, data analysis completed March 7, 1997, and dissertation defended June 8, 1998. Dissertation Title: *Thinking Style Differences Among Academic Librarians.* *Degree awarded August 1998.*

## **LIBRARY ACADEMIC APPOINTMENTS**

**EDUCATION LIBRARIAN,** *Florida Gulf Coast University, Fort Myers, Florida, June 1997 to date.* Coordinate collection development activities with education faculty to develop library instruction components for targeted courses. Evaluate the collection and make recommendations for purchases of monographs, serials, and electronic resources that support the curricular offerings in the field of education. In cooperation with other librarians, develop web based general instructional materials for undergraduate students and develop procedures for the reference service desk.

**SERIALS DEPARTMENT HEAD,** *Florida Atlantic University, Boca Raton, Florida, January 1993 to May 1997.* Responsible for managing a combined technical and public service Serials Department including conversion project supervision, annual report coordination, and intra-departmental communications. Accountable for the integrity and quality of serials control and record management for 4,500+ current serial titles including holdings data, receipt and claiming. Coordinate branch library claims and problem solving. Supervise 2 part time professional librarians, 5 paraprofessionals, 120+ hours of student assistant workers, and assist in providing work assignments for other Technical Service paraprofessionals and volunteers upon request.  
**ACTING SERIALS DEPARTMENT HEAD,** January 1993 through October 1993.

**SERIALS LIBRARIAN**, *Florida Atlantic University, Boca Raton, Florida, January 1990 - December 1992*. Supervised all activities of a combined technical and public service Serials Unit of varying staff size. Staff annually accomplished checking-in 160,000 items, claiming 1,300 issues, updating 8,000 records, assisting 25,000 patrons, circulating 200 pieces, and reshelving 223,000 items.

**SERIALS CONTROL LIBRARIAN**, *University of Miami Law Library, Coral Gables, Florida, May 1987 - December 1989*. Managed all operations of a combined Serials / Acquisitions Department including binding and physical processing with a staff of 2 professionals, 4 paraprofessionals and various student assistants. Supervised looseleaf filing for 900+ subscriptions contracted out to a professional filing service, and approved and fund coded all invoices for a \$1.3 million budget.

## **OTHER PROFESSIONAL EXPERIENCE**

**ADJUNCT INSTRUCTOR**, *Florida Atlantic University, Division of Continuing and Distance Education, Boca Raton, Florida, October 1993 to May 1997*. Designed a 6 hour CEU Continuing Education Course and accompanying 47 page workbook entitled *Learning How to Study* for the Adult Re-entry Program. Responsible for facilitating course 2 to 3 times annually and periodic curriculum updating. Designed a 6 hour CEU Continuing Education Course entitled *Implementing Successful Volunteer Programs*.

**ADJUNCT INSTRUCTOR**, *University of South Florida, Tampa, Florida, April 1994 to date*. Guest lecturer for various Master of Library Science courses including: Library Management and Collection Development. Designed a three credit graduate course in Serials Management. Facilitate course on a per need basis. Supervise field projects and internships for students interested in serials librarianship on a per need basis. Worked with the East Coast Extension Program from April 1994 to May 1997, South Florida Extension Program August 1998 to date.

**PROGRAM SPECIALIST**, *Marriott Statford Court, Boca Raton, Florida, April 1994 to March 1996*. Designed and facilitated adult literary discussion program for a senior living community. Responsible for researching biographical information, selecting reading materials, incorporating multi-media presentations, and encouraging lively discussions.

**SERIALS CONSULTANT**, *SIRS, Boca Raton, Florida, July 1996 to May 1997*. Provide guidance and serials expertise in developing a combined acquisitions and serials module for a library OPAC.

**VOLUNTEER FAMILY LITERACY SPECIALIST**, *Aid to Victims of Domestic Assault, Delray Beach, Florida, August 1994 to January 1996*. Co-designed a family literacy program involving children's storytelling, reading assistance and various additional activities. Acquired gift reading materials for center's library. Trained and certified Laubach Literacy Volunteer.

## **LIBRARY FUNCTIONAL EXPERIENCE**

**ACQUISITIONS MANAGEMENT**: Experience establishing standing orders, on demand subscriptions, and coding invoices for payment against appropriate fund codes. Solid working relationship with major vendors such as Faxon, Ebsco, UMI, Ambassador, Gale, Moody's, BNA, and CCH. Familiarity with monographic approval plans. Experience coordinating a major serial vendor change with approximately 2,000 standing order titles.

**AUTOMATION EXPERIENCE:** Hands-on technical service expertise using INNOPAC and NOTIS, with additional public service knowledge of CARYLE OPAC. Skilled user of FAU's PCSA network, SEFLINK and Wimberly Library's Reference Department LAN. Proficient in searching and assisting patrons with a wide variety of CD ROM data bases including full text products. E-mail, Internet, and Cybernet efficient. Familiar with Telnet, FTP, and Gopher information retrieval. Basic understanding of WWW searching for library patron assistance and experienced using Netscape and Mosaic and writing HTML documents. Subscriber to several library list servers including: SERIALST, COLLDEV-L, LIBPLN-L, FCLLIST, PRICES-L, and NOTISACQ. Computer experience includes: knowledge of OCLC, CARL and RLIN searching; basic understanding of DOS and Windows applications: Word Perfect 5.1 and 6.0 expertise; Harvard Graphics and desk top publishing training; ability to utilize Lotus for statistical record keeping; and Paradox database familiarization. Comfortable working with rapidly changing technology, and eager to learn and utilize latest innovations.

**BIBLIOGRAPHIC INSTRUCTION ABILITIES:** Experience conducting library tours and orientation seminars. Skilled in producing path finders, annotated bibliographies, signage, exhibits and other library aids. Planned and coordinated professional level library workshops. Experienced in providing bibliographic instruction to large academic classes for specialized library collections and assignments. Developed and conducted graduate and undergraduate level educational presentations and programs. Proficient speaker with international exposure. Experience creating bibliographic aids for complex library collections such as American Periodical Series. Guest lecturer for several MLIS classes in the Broward Extension Program of the University of South Florida. Skilled literary discussion group leader, with expertise working with older adults, and adults with physical and learning disabilities. Competent children's story teller / book reader and literacy volunteer.

**BINDING PROFICIENCY:** Coordinated all activities for monographic and serial binding including pulling materials, ordering replacements and physical processing. Experienced with making library retention decisions based upon serial format. Familiar with pre-bound periodical materials and locating out-of-print serial materials. Skilled in acquiring serial back files from various sources such as Jaeger, Ebsco Missing Copy Bank, US Book Exchange and Serials-Quest.

**CATALOGING EXPERIENCE:** Knowledge of AACR2 rules and conversion process. Experience with utilizing NST, NUC, OCLC, FAXON, EBSCO, ULRICH and UMI sources for title change and journal history information. Participated in University of Miami, Richter Library CONSER Project. SOLINET Certificates include: Successful Searcher (1996) and Interpreting the OCLC MARC Record (1996).

**COLLECTION DEVELOPMENT BACKGROUND:** Skilled in collecting and utilizing price, indexing and format information for collection development decisions. Unique background in legal looseleaf material selection and management. Selection experience with approval plan materials. Active member of Continuations Committee which establishes purchasing priorities and budgets for a varying library allocation of \$1.1 to \$3 million. Continual participation in serial cancellation project, involving 2,000+ serial cancellations, resulting in an estimated savings of \$900,000+. Comfortable working with university faculty in selecting and deselecting library materials.

**GRANTSMANSHIP AND FUND RAISING BACKGROUND:** Basic understanding of FUND RAISING tools and procedures. Recipient of several grants including: Florida Library Association's Baker & Taylor's Grassroots Grant (1987), American Library Association's NMRT 3M Professional Development Grant (1995), and Kappa Delta Phi Hill Grant for Dissertation Assistance (1996). Participated in several fund raising activities such as library book sales, lecture series and dinners. Chair of 1993 American Library Association's NMRT Local Arrangements Committee which raised over \$5,000 locally donated door prizes in a three month time period.

**LOOSELEAF MANAGEMENT AND COORDINATION:** Experience with all aspects of looseleaf management including ordering, check-in, claiming, vendor relations, filing and material management. Experienced with supervising activities of an outside filing company for 900+ looseleaf subscriptions.

**MICROFORM MANAGEMENT:** Proficient in selecting and evaluating microform reader printers, fiche to fiche duplicators and other A/V equipment. Vendor trained to provide patron assistance and preventative maintenance on Minolta, Cannon, Bell & Howell and Kodak equipment. Knowledgeable in microform preservation issues and equipment service contracts. Experience supervising patron assistance and access to a 1.7+ million fiche and 40,000+ film collection.

**PRESERVATION EXPERIENCE:** Familiar with preservation issues for paper and microform serial materials. Hands on experience working with water damaged and mildewed library materials. SOLINET Certificates include: Administrative Issues in Preservation (1994), Attack of the Giant Mold Spore (1995), Beating the Critter Jitters (1995), To Fume or Not to Fume (1995), and Preserving Collections in a Hostile Environment (1994).

**PUBLIC SERVICE PROFICIENCY:** Execute daily supervision and long range planning for active serials public service desk, which provides over 1,600 telephone and 25,000 patron assistance requests annually. Manage and coordinate all activities including shelving, shifting, weeding and shelf reading projects. Develop and foster effective and cooperative intra-departmental working relationships with Interlibrary Loan, Reference, and Circulation Units for serial related issues. Support cross-training efforts for improved patron service and library staff development. Strength in providing assistance with serial indices. Capable of providing basic reference and government document public service assistance.

**SERIALS EXPERTISE:** Experience supervising all areas of technical service serials control including: budgeting, jobber ordering, check-in, claiming, binding, invoice approval, record revision, depository material management, exchanges, gifts processing, creation of bibliographic lists, routing, and trouble shooting. Completed two manual-to-automated serial check-in conversion projects. Supervised FAU's serials NOTIS automated check-in conversion project for Boca, Broward, and Palm Beach campuses, creating over 8,000 O/P/R records to date. Assist in coordinating cancellation information of 2,500+ titles throughout all areas of Technical Services including: serials, acquisitions, cataloging and physical processing. Assisted in establishing a periodical adoption program, journal gift retention policy and the electronic journal selection policy.

**SUPERVISORY SKILLS:** Accomplished high energy level administrator who produces dependable and consistent results, who strives to create an environment of trust and respect to maximize staff participation and performance. Accustomed to supervising a varying staff of 1-3 professionals, 3-6 paraprofessionals, 5-8 student assistants, volunteer help, and staff members from a contracted professional filing service. Able to create policy and procedure manuals, monitor supply needs, maintain equipment, establish budgets, and utilize collected statistics for short and long range planning. Skilled in selecting, firing, reprimanding, managing and evaluating library employees. Experienced in developing in-house staff development opportunities and creating team-based work environments.

## **PROFESSIONAL ASSOCIATIONS**

American Association for Adult and Continuing Education (1993 to date)  
American Association of University Women (1993 to date)  
American Library Association (1989 to date)  
ACRL, ALCTS, LAMA and RUSA Divisions  
CLENE, IFRT, LIRT, LRRT, NMRT and SORT Round Tables  
Association for Supervision and Curriculum Development (1995 to 1996)  
Association of Library and Information Science Educators (1994 to date)  
Broward County Library Association (1991 to 1997)  
Dade County Library Association (1985 to date)  
Florida Council for the Aging (1993 to 1996)  
Florida Library Association (1986 to date)  
International Mentoring Association (1995 to 1997)  
International Platform Association (1997 to date)  
Laubach Literacy Volunteers of America (1993 to 1997)  
National Association of Female Executives (1992 to date)  
National Library Association (1993 to 1996)  
National Organization of Women (1994 to date)  
North American Serials Interest Group (1988 to date)  
Palm Beach County Library Association (1990 to 1997)  
South Florida Association of Law Librarians (1987 to 1997)  
Southeastern Library Association (1987 to date)  
South West Florida Library Network (1994 to date)  
Special Libraries Association (1988 to date)

## **PROFESSIONAL ACTIVITIES**

### **American Library Association**

#### **Association for College and Research Libraries Division**

Liaison, YALSA's Committee for Outstanding Books for the College Bound (1996 to date)  
Member, Women's Studies Section, Communications Committee (1994 to date)  
Poster Session Co-Presenter, "Family Literacy" (7th National Conference, Pittsburgh, 1995)  
Roundtable Discussion Moderator (8th National Conference, Nashville, 1997)

#### **Association for Library Collections & Technical Services Division**

Co-Moderator, Serials Section "Town Meeting" (Mid-Winter Conference, San Antonio, 1996)  
Serials Section Liaison to ALISE (1997 to 1999)  
Member, Serials Section, Committee to Study Serials Standards (1995 to 1997)  
Member, Serials Section, Education Committee (1997 to 1999)  
Member, Serials Section, Nominations Committee (1994)

**Committee on the Status of Women in Librarianship (COSWL)**

Invited Member (1997-1999)

**New Members Round Table**

Chair, Local Arrangements Committee (1993/4)

Chair, Library School Outreach Committee (1994/5 to 1997)

Liaison, LAMA PAS (1994/6)

Vice-President / President Elect (July 1997 to date)

Volunteer New Member Mentor, Mentor Committee (1993 to date)

**Staff Organizational Round Table**

Speaker, "Older Volunteers" (Annual Conference, Chicago, 1995)

**Florida Library Association**

Chair, Serials Caucus (1991/2)

Chair, Serials Caucus, Serials Librarian Award Committee (1992/3)

Member, Serials Caucus, Steering Committee (1991 to 1999)

Member, Registration Committee (1988)

Poster Session Presenter, "Family Literacy" (1995 Conference)

Speaker, "FirstSearch and University Libraries" (1998 Conference)

Speaker, "Managing Microforms in Tough Times" (1993 Conference)

Speaker, "Serials Automation" (1990 Conference)

**North American Serials Interest Group**

Co-Chair, Mentoring Committee (1996 & 1997 Conferences)

Member, Continuing Education Committee (1995 to 1997)

Member, Evaluation Committee (1993)

Speaker, "Serials Mentorship" (1995 Conference)

Speaker, "Looseleaf Management" (1990 Conference)

Speaker, "Serials Automation" (1989 Conference)

**Special Libraries Association, Florida Chapter**

Affirmative Action Officer (1990-1992)

Education / Student Relations Officer (1991-1992)

**FLORIDA GULF COAST UNIVERSITY ACTIVITIES**

Library Selection Committee, Adjunct Librarian (1997-1998)

Library Selection Committee, LTA Supervisor Circulation (1997)

Library Selection Committee, Reference / Technical Service LTA (1998)

Senate Library Representative (1998-2000)

Member, Ad-Hoc Committee for Faculty Work Load (1998-1999)

Undergraduate Curriculum Committee (1998-1999)

**FLORIDA ATLANTIC UNIVERSITY ACTIVITIES**

President, FAURA (Florida Atlantic University Research Association) (1995 to 1997)

Graduate Research Committee (1995 to 1997)

Member, Selection Committee for International Travel Grants (Fall 1995, Spring 1996, Chair Fall 1996)

Member, Selection Committee for 1996 Researcher of the Year

Member, Selection Committee for 1996/97 Research Initiative Awards

Member, Selection Committee for 1996/97 Subventions  
Senate Library Representative (1990 to 1994)  
Senate Libraries and Learning Resources Committee (1992 to 1994)  
Task Force on the Adult Learner (1996 to 1997)  
College of Education Department of Educational Leadership Advisory Board (1994 to 1997)  
Wimberly Library Collection Development / Continuations Committee (1990 to 1997)  
Member, Ad-Hoc Committee for Serials Review and Cancellation (1995)  
Member, Ad-Hoc Committee for Electronic Serials (1993)  
Wimberly Library Disaster Squad (1992 to 1997)  
Wimberly Library Exhibits Committee (1993 to 1995)  
Wimberly Library Merit Criteria Committee (1997)  
Wimberly Library Search Committee, Cataloging Librarian (1991)  
Wimberly Library Search Committee, Reference Librarian (1992)  
Wimberly Library Search Committee, Reference Librarian / Education Liaison (1994)  
Chair, FAU Wimberly Library, Toys for Tots annual charity collection (1990 to 1993)  
Co-chair, FAU Wimberly Library, Aid to Victims of Domestic Violence annual charity collection (1994, 1995)

## PUBLICATIONS

### Book Chapters and Journal Articles:

Golian, Linda Marie. "The Florida East Coast Railway and the Establishment of the Yamato Farming Colony," FACS: Florida Atlantic Comparative Studies, Vol. 2, no. 1, Fall 1992.

Golian, Linda Marie. *Strategies and Resources for Effective Mentoring*. In Galbraith, Michael and Cohen, Norm (Eds.) *Mentoring: New Challenges and Visions*, v. 66 of New Directions for Adult and Continuing Education. San Francisco: Jossey-Bass, Summer 1995.

Golian, Linda Marie & Galbraith, Michael. *Creating Effective Mentoring Programs For Professional Library Development*. In Gardner, E. (Ed.) v.15 of Advances in Library Administration and Organization. Chicago: JAI Press, Fall 1996.

Golian, Linda Marie & Pellen, Rita. "Helping Re-Entry Women Develop Library Technical Skills and Research Strategies." Feminist Collections, V.17, no. 2 (Winter 1996).

Golian, Linda Marie & Pellen, Rita. "Women, Libraries, and Literacy." Convergence, Fall 1994.

Golian, Linda Marie & Wiler, Linda Lou. *Older Adults: Problems and Needs*. In McNeil, Elizabeth and Johnson, Denise (Eds.) Patron Behavior in Libraries: A Handbook of Positive Approaches to Negative Situations. Chicago: American Library Association, 1995.

Golian, Linda Marie & Wiler, Linda Lou. *Training Library Volunteers*. In Glogowski, Maryruth (Ed.), Academic Libraries and Training, v.29 of Foundations in Library and Information Science. Chicago : JAI Press, 1994.

Wiler, Linda Lou & Golian, Linda Marie. *Library Services for Older Adults*. In Hill, Kathleen (Ed.), Diversity and Multiculturalism, v.30 of Foundations in Library and Information Science. Chicago : JAI Press, 1994.

### Book Reviews

Textbook Controversy by John Herliky. Kappa Delta Pi Magazine. Fall 1994.

Serials Control Systems by Trisha Davis and James Huesman. Specialist. Spring 1995

### Other Publications

Ginanni, Katy, recorder. "Preparing Tomorrow's Serial Leaders: Creating New Alliances Among Library Schools, Libraries, and Serial Professionals," Serials Librarian, Vol. 28:no.3/4 (1996). (Highlights of a workshop given by Linda Golian at the 10th Annual NASIG Conference, Duke University, Durham, North Carolina, June 1-4, 1995)

Rieke, Judith L., recorder. "The Nuts and Bolts of Managing a Looseleaf Collection," Serials Librarian, Vol.19:no.3/4 (1991). (Highlights of a workshop given by Linda Golian at the 5th Annual NASIG Conference, Brock University, St. Catharine's, Ontario, Canada, June 2-5, 1990)

Sommer, Deborah, recorder. "Serials Automation: Before, During and After," Serials Librarian, Vol.17:no.3/4 (Winter 1990). (Highlights of a workshop given by Linda Golian at the 4th Annual NASIG Conference, Scripps College, Claremont, California, June 3-6, 1989).

### HONORS AND AWARDS

Listed in International Who's Who of Professionals

Listed in Outstanding Young Women of America

Listed in Who's Who in America

Listed in Who's Who of American Women

Listed in Who's Who in American Education

Listed in Who's Who in the South and Southwest

Listed in Who's Who in the World

Florida Atlantic University, College of Education, Educational Leadership, Outstanding Graduate Student, 1996/97

American Library Association / Association of College and Research Libraries, Lazerow Fellowship for Research, 1997

Kappa Delta Pi, Educational Foundation, Hill Scholarship / Grant for Dissertation Studies, 1996

Promotion in rank from FAU Associate University Librarian to FAU University Librarian, 1996

Florida Atlantic University, College of Education, Educational Leadership, Outstanding Graduate Student, 1994/95

American Library Association / New Members Round Table, 3M Professional Development Grant, 1995

Florida Library Association, Florida Serials Librarian of the Year, 1994

Promotion in rank from FAU Assistant University Librarian to FAU Associate University Librarian, 1993

Florida Atlantic University, Wimberly Library, Outstanding Achievement Award, 1990

Florida Library Association, Baker and Taylor Grassroots Grant, 1987

Member, Gamma Chapter, **Beta Phi Mu** (1988 to date)

Member, University of Miami, **Golden Key Honor Society** (1986 to date)

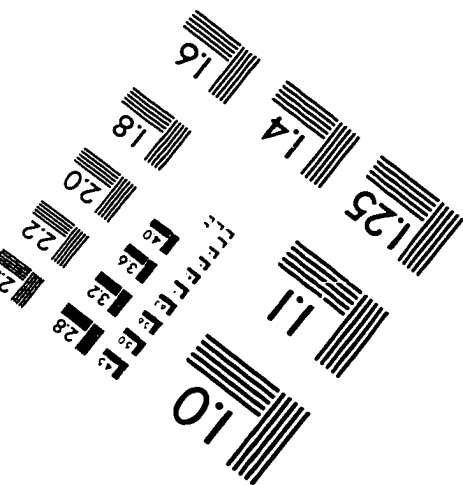
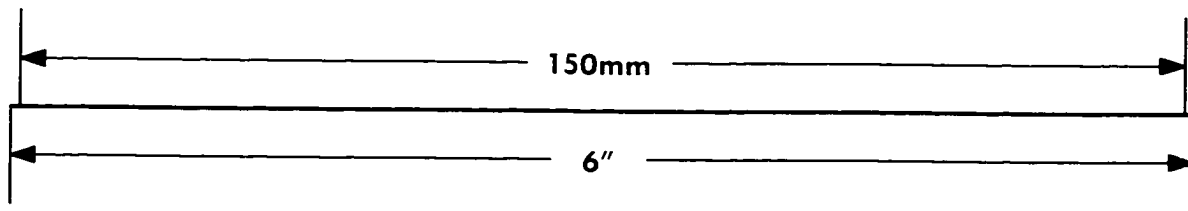
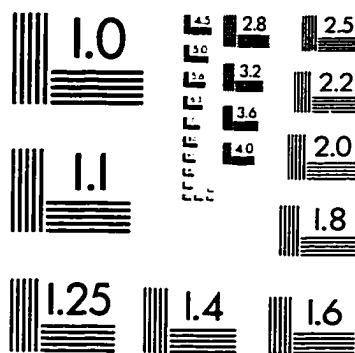
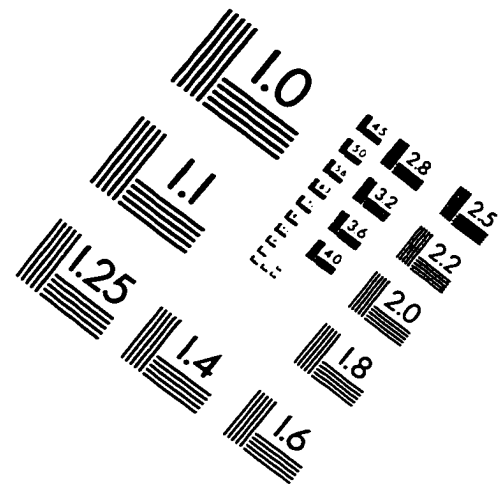
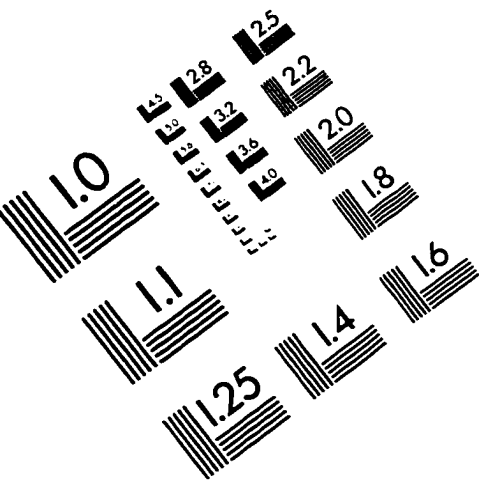
Member, Rho Omega Chapter, **Kappa Delta Pi** (1992 to date)

Member, **Phi Delta Kappa** (1993 to date)

Member, **Phi Kappa Phi** (1993 to date)



# IMAGE EVALUATION TEST TARGET (QA-3)



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