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**A proposed paradigm of personality as explored through the
relationship between moral reasoning and cognitive flexibility**

Madgwick, Karen Isabel, Ph.D.

Andrews University, 1991

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Andrews University
School of Education

A PROPOSED PARADIGM OF PERSONALITY AS
EXPLORED THROUGH THE RELATIONSHIP
BETWEEN MORAL REASONING AND
COGNITIVE FLEXIBILITY

A Dissertation
Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

by
Karen I. Madgwick
August 1990

ABSTRACT

**A PROPOSED PARADIGM OF PERSONALITY AS
EXPLORED THROUGH THE RELATIONSHIP
BETWEEN MORAL REASONING AND
COGNITIVE FLEXIBILITY**

by

Karen I. Madgwick

Chair: Marion Merchant

ABSTRACT OF GRADUATE STUDENT RESEARCH
Dissertation

Andrews University
School of Education

Title: A PROPOSED PARADIGM OF PERSONALITY AS EXPLORED
THROUGH THE RELATIONSHIP BETWEEN MORAL
REASONING AND COGNITIVE FLEXIBILITY

Name of Researcher: Karen I. Madgwick

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Ph.D.

Date completed: August 1990

Problem

Personality, a construct representing the dynamic integration of the individual, remains complicated, both in theory and in research. The purpose of this study was to explore a conceptual paradigm of personality through the relationship between cognitive flexibility and moral reasoning.

Researchers had not looked at the relationship between cognitive flexibility, as measured by the Stroop Color and Word Test, and moral reasoning, as measured by the Defining Issues Test (DIT).

This study focused on the relationship between cognitive flexibility and moral reasoning. It looked for more than an understanding of the relationship, however,

thus affording beginning research in the development of the proposed paradigm.

Method

The DIT and the Stroop Test were administered to freshman and sophomore college students. Chi-square and descriptive analyses of the data from 133 subjects were calculated.

Results

Four directional research hypotheses predicted a necessary-but-not-sufficient relationship between cognitive flexibility and moral reasoning. Two hypotheses used the P score on the DIT while the other two involved the D measure. The findings supported two out of the four hypotheses: one on the P scores ($\chi^2 = 3.27$) and one on the D scores ($\chi^2 = 3.50$) from the DIT.

While the other two research hypotheses were not supported by the analyses, trends suggested by the data were studied by a number of t tests. These tests revealed significantly higher DIT means in the flexible group than the not flexible group in the third quartile D grouping ($t = 1.092$ with 43 degrees of freedom and $p < .05$) and in the upper quartile P grouping ($t = 2.502$ with 23 degrees of freedom and $p < .01$).

It is believed that this study contributes direct and indirect support of a necessary-but-not-sufficient

relationship between cognitive flexibility and moral reasoning. It may be said that cognitive flexibility is a prerequisite for higher moral development. It is not, however, the only component needed for such development.

The relationship between cognitive flexibility and moral reasoning can be taken as evidence for an interaction between the subsystems and cognitive mosaics within the context of the proposed paradigm.

In summary, this study provides beginning work on a personality paradigm and contributes both implications and applications of the findings.

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DEDICATION

To a committee who not only came along for the ride, but added their own creativity, time, and advice. To Dr. Marion Merchant who helped me turn paragraphs of thought into sentences. And especially to my dear parents and sister Candi, Eric, Talitha, Thesba, and Alexandra who stayed with me in the "deep end of the pool"--both crying and laughing with me as I fought to discover that life can indeed remain rewarding and worth the fight with chronic fatigue immune dysfunction syndrome. These gifts not only helped me complete my dissertation, but will remain with me forever.

CONTENTS

DEDICATION iii
LIST OF ILLUSTRATIONS vii
LIST OF TABLES viiii

Chapter

I. INTRODUCTION 1

 Background 1
 Definitions 4
 Description of Proposed Paradigm 7
 Statement of the Problem 14
 Delineation of Research Problem 15
 Purpose of the Study 16
 Statement of Research Hypotheses 16
 Importance of the Study 18
 Delimitations 19
 Limitations 19

II. LITERATURE REVIEW 20

 Introduction 20
 Theoretical Foundation for Hypotheses 20
 Wardell and Royce 21
 Robert Ornstein's "Multiminds" 33
 Proposed conceptual paradigm
 of personality 34
 The relationship described 34
 Human development 36
 Regression in the two concepts 36
 Cognitive Flexibility 39
 Defined 39
 Cognitive controls 40
 Cognitive style 41
 Metacognition 42
 Other related research 43
 The Stroop Color and Word Test 44
 Moral Reasoning 50
 Defined 50
 A summation of Kohlberg's theory 51
 Theoretical additions to Kohlberg 53
 Rest's contributions to
 moral reasoning 56
 Related studies involving the DIT 58

	Summary of Literature Review and Theoretical Background	64
III.	DESIGN OF THE STUDY	65
	Methodology	65
	Sampling	65
	Instrumentation	66
	The reliability and validity of the Stroop Test	66
	The reliability and validity of the DIT	68
	Procedure (Administration)	72
	Procedure (Post-Administration).	74
	Statistical Analysis	75
	Statement of Null Hypotheses	75
IV.	DATA ANALYSIS	77
	Description of the Sample	77
	Description of the Data	79
	Testing of the Hypotheses	83
	Hypothesis One	84
	Hypothesis Two	86
	Hypothesis Three	86
	Hypothesis Four	88
	Summary of Findings	89
	Discussion	91
	Support of the Second Hypothesis	91
	Support of the Third Hypothesis	91
	Failure to support the First and Fourth Hypotheses	92
	Integration of findings	101
V.	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS .	102
	Summary of Methodology	103
	Summary of Findings	103
	Conclusions	104
	Discussion of the results	105
	Personality paradigm	110
	Paradigm reviewed	111
	Cognitive flexibility	112
	Integration of proposed paradigm with findings	118
	Early development	121
	Continuing development	127
	Cognitive flexibility and behavior . .	128
	Summary	130
	Recommendations	131

Recommendations for practice	130
For further research	131
BIBLIOGRAPHY	133

LIST OF ILLUSTRATIONS

1.	A Representation of the Recency and Adaptation Continuums	9
2.	A Visual Interaction Between the Continuums and Cognitive Mosaics	11
3.	A Combination of the Previous Figures	13
4.	The Wardell and Royce Model of Personality	22
5.	P Quartile Grouping Frequencies	80
6.	D Quartile Grouping Frequencies	81
7.	D and Flexibility Score Means for Those Classified as "Flexible"	93
8.	D and Flexibility Score Means for Those Classified as "Not Flexible"	94
9.	P and Flexibility Score Means for Those Classified as "Flexible"	95
10.	P and Flexibility Score Means for Those Classified as "Not Flexible"	96

LIST OF TABLES

1. Stroop Test and DIT Scores	78
2. General Statistics	82
3. Descriptive Data Related to Hypotheses One . . .	85
4. Descriptive Data Related to Hypotheses Two . . .	87
5. Descriptive Data Related to Hypotheses Three . .	88
6. Descriptive Data Related to Hypotheses Four . .	90
7. Comparisons Between Flexible and Not Flexible Groups on P and D Scores	98

CHAPTER I

INTRODUCTION

Personality, a construct representing the dynamic integration of the individual, remains complicated, both in theory and in research. This study, while proposing a paradigm of one aspect of personality, primarily focuses on the empirical exploration within that paradigm of the relationship between cognitive flexibility and moral reasoning. The paradigm also provides a theoretical perspective on how, in one respect, an individual interacts with his environment.

This chapter includes background on the theoretical development, definitions of terms used in the dissertation, an explanation of the proposed paradigm, and statements delineating the focus of the investigation.

Background

Past trends in brain research have primarily focused on anatomical and hemispheric orientations. Brain research currently, however, looks also to an overall pattern of cognition. There has been a move,

therefore, from "part" or even "hemispheric" models to a focus on overall brain patterns.

The submitted paradigm evolved from a model developed by Wardell and Royce (1978), from this researcher's unpublished master's thesis involving hemispheric processing, and from a careful observation of individuals' reasoning abilities and limitations evident within varying situations.

Models provide ways of organizing and synthesizing information and, in addition, provide frameworks of understanding for other paradigms. Fulfilling both of these functions, Wardell and Royce's (1978) personality model (see Chapter 2) contributes both a beginning framework of understanding and a point of departure for the proposed paradigm. The Wardell and Royce model was discovered in an attempt to connect cognition and affect within the personality. Due to its similarity in conceptualizations of the mind and personality with the proposed paradigm, further investigation and inclusion in the dissertation of the Wardell and Royce model resulted.

While not serving such functions, Ornstein's multimind theory (1986) does provide support for the proposed paradigm (see Chapter 2). Ornstein's views on multiple minds and on movement between them in interacting within the environment is somewhat similar to the proposed paradigm. Both the Wardell and Royce and

Ornstein models offer representations of the mind and cognitive processes which have similar aspects to those of the proposed paradigm. Both models, in turn, lend theoretical support for this research. The two models and their relationship to the proposed paradigm will be explored in Chapter 2.

Personal research, itself, also prompted this study. The unpublished master's thesis shows significant differences in the types of processing used in the two hemispheres. Analyses and the implications of this information resulted in many new ideas. One idea, a realization of the many capabilities of the hemispheres, led to the conceptualization of "mosaics" (see page 5) and the dynamics of cognitive flexibility as defined in this study.

As mentioned, theory, research, and observations contributed to the development of this research. The observations of reasoning regression in several students in a graduate counseling program provided this third factor in the development of this research. A significant proportion of entering students who appeared to be creative, bright, and independent were observed to regress during their first two quarters in the program.

The behavioral manifestations of this regression included increasing questions regarding what the teacher thought important, increasing concern for what would be

on a test rather than more independent assimilation of covered topics, fewer verbalized applications of the material, fewer verbalized theorizations which differed from a framework under discussion, and other behaviors inappropriate for that level of graduate study. In general, these students appeared more dependent on the faculty, less creative, and less risk-taking; they had moved to a more sterile, "fill-in-the-blank" mentality.

This regression came during the highly stressful periods of entering and completing a graduate program. As the stress continued, however, differing adaptations to this tension were noted. Some moved past the regression; others, unfortunately, failed to do so--or appeared unable to return to the levels of flexibility they had when they entered graduate school.

This observation, contributions from other theorists, and this researcher's own work during her master's program led to the definitions, proposed paradigm, and chosen hypotheses which follow.

Definitions

So that the proposed paradigm and discussion of related studies and theories may be more fully understood, the following terms are defined:

- Brain patterns--a construct representing a unique combination of cognitive components used within a situation. It is recognized that cognition does not work

alone in personality. Cognitive-affective represents a better term. Lack of adequate prior research with this term, however, limits the exploration of this study to just the cognitive aspect of personality.

- Cognition--all various modes of knowing (perceiving, remembering, imagining, judging, etc.) in contrast to affective and conative dimensions of personality.

- Cognitive flexibility--involves the ability to utilize different cognitive mosaics or to create new ones as needed.

- Cognitive mosaic--a construct within the proposed paradigm referring to any particular brain pattern which is a combination of cognitive components.

- Cognitive style--broadly, the rather consistent manner in which a person thinks or knows; more specifically, a particular group of cognitive patterns. This study defines cognitive style as a unique combination of an individual's particular cognitive mosaics and cognitive flexibility. While new mosaics and/or changes in usage occur through growth or regression, it is believed that the gestalt remains fairly stable.

- Hierarchies--refers to cognitive mosaic hierarchies. The proposed paradigm consists of a cognitive mosaics repertoire with two hierarchical dimensions: (1) a dimension of individual adaptability (those mosaics

containing a similar degree of adaptability) and (2) a dimension of mosaic recency (those mosaics developed last are highest in hierarchy).

- Hierarchical regression--conscious/unconscious selection of an inappropriate mosaic. This usage proves less helpful or efficient in processing information regarding a particular situation.

- Model--a system of organization which provides a framework for understanding relationships and processes. For the purpose of this paper it refers to the system used by Wardell and Royce (1978).

- Moral reasoning--a construct referring to those special kinds of cognitive processing concerned with the "right" and "wrong" of behaviors. It is also defined here as the interaction between an individual's cognition and values.

- Necessary but not sufficient--this term is used frequently to describe a type of relationship within the proposed paradigm. In this usage the concept means that some ability (cognitive flexibility) is a necessary part of another ability (higher moral reasoning), but that the first ability (cognitive flexibility) is not the only ability, characteristic, or factor necessary for the resulting ability (higher moral reasoning). This term, with the same meaning, appears in research and theory to describe relationships.

● Paradigm--another term referring to a system of organization which provides a framework for understanding relationships and processes. For the purposes of this study, however, it refers to the system proposed by this researcher.

● Personality--the integrated, dynamic organization of physical, mental, moral, and social dimensions (impulses, habits, interests, complexes, opinions, sentiments, beliefs, etc.).

Description of Proposed Paradigm

In this paradigm it is proposed that a basic function for organizing information about relationships and processes exists at birth and that the individual's interaction with the environment prompts further organizational mosaics or patterns of processing.

A pattern consists of a unique combination of cognitive processes within the mind. As an acknowledgment that any pattern or mosaic does not occur within a vacuum, the pattern is described as a brain pattern. Cognition does not act alone within the personality. Cognition-affect represents a better term. Due to lack of adequate prior research under this term and the limits of this investigation, the study is focused on just the cognitive aspect of the personality. No distinction is therefore made between mind and brain. Whether such patterns are identifiable by physiological testing, or

whether subdivisions of mosaics are possible, remains unexplored.

The first pattern may be genetically tied and thus develops earlier than other patterns. It may even be that hand dominance, which occurs during the first few years of life, is a product of such a configuration. It is also this basic pattern which may allow the first interaction with the environment.

Once this first mosaic of processing is firmly established, the individual is able to interpret and utilize data from the environment. This pattern, therefore, exists as just one of many eventual patterns. Varied experiences (any experience from going to a circus, the first day in school or a church, positive interactions with peers, to child abuse), maturation, and learning prompt development of new ways of perceiving data.

The proposed paradigm includes a repertoire of mosaics involving the cognitive subsystem. It is believed that this repertoire has two dimensions: (1) a hierarchy of individual adaptability (those mosaics which contain a similar degree of adaptability--(see Figure 1) and (2) a hierarchy of mosaic recency (those mosaics developed last are highest in the hierarchy).

Figure 1 includes a dimensional continuum of adaptability. The factors listed in the middle (ranging

from affect to values) are varied experiences and learnings which prompt usage and/or creation of new mosaics.

This research defines more adaptive as an optimal interaction with the environment to produce beneficial results over time. While the components may nurture the move to more adaptive mosaics, some may act as a hindrance to movement in this direction. As mosaics are engaged, they become stronger. Some individuals use the less adaptive mosaics--some by choice, others unconsciously.

It is believed that training can lower the power or pull of less adaptive mosaics and those past experiences that reinforce an already existing barrier in the process of growth.

A potential starting point to choose to use more adaptive mosaics exists when the individual becomes aware of his own thinking and strives to use those characteristics associated with higher flexibility. Following this, usage of more adaptive mosaics would prompt an opposite force moving the person to the more adaptive end of the continuum.

The two dimensions and the placement of the mosaics is represented by Figure 2. The dots represent mosaics; the size of the dot represents the strength or pulling power of a particular mosaic. The dots also

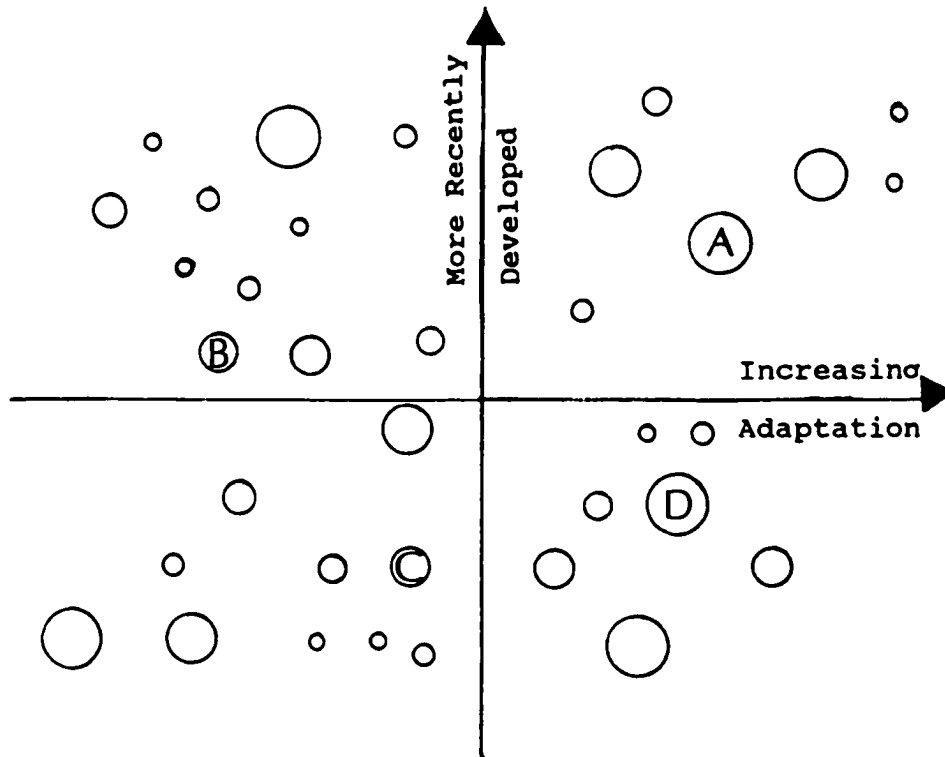


Figure 2. A visual interaction between the two dimensions of adaptation and recency and the cognitive mosaics. It is believed that the left side of the continuum represents a usage of mosaics which is less available to conscious awareness. In contrast, it is believed that increasing adaptation includes more usage of mosaics with conscious awareness. At this end of the continuum, therefore, usage of mosaics includes both conscious and unconscious processes. The dots represent mosaics; the size of the dots reflect the strength of a particular mosaic. Mosaics A or D, for instance has more strength than mosaic B or C.

represent mosaics both within a certain level of recency and level of adaptability.

Figure 3 incorporates the above dimensions and mosaics with levels of adaptation in this conceptualization. The left side of the figure shows the less adaptive mosaics with highly permeable developmental levels. This represents the belief that of the less adaptive mosaics there is less differentiation between mosaics developed at differing stages of life. In other words, an individual is more likely to use a more immature mosaic within the less adaptive range than when more adaptive mosaics are employed.

As with Figure 2, the size of the dots represent the strength of the mosaic and the factors listed previously in Figure 1 act as prompters or inhibitors to growth towards the right side of the figure.

As mentioned above, mosaics can exert differing attractions or pulling powers. In this proposed paradigm mosaics derive strength from usage. As an individual uses a mosaic, this increases the strength of the pattern. Therefore, when less adaptive mosaics are frequently used, this causes a pulling power away from growth of the individual. On the other hand, with awareness and choice, an individual can consciously strengthen the more adaptive mosaics. This has the effect of expanding and strengthening the entire

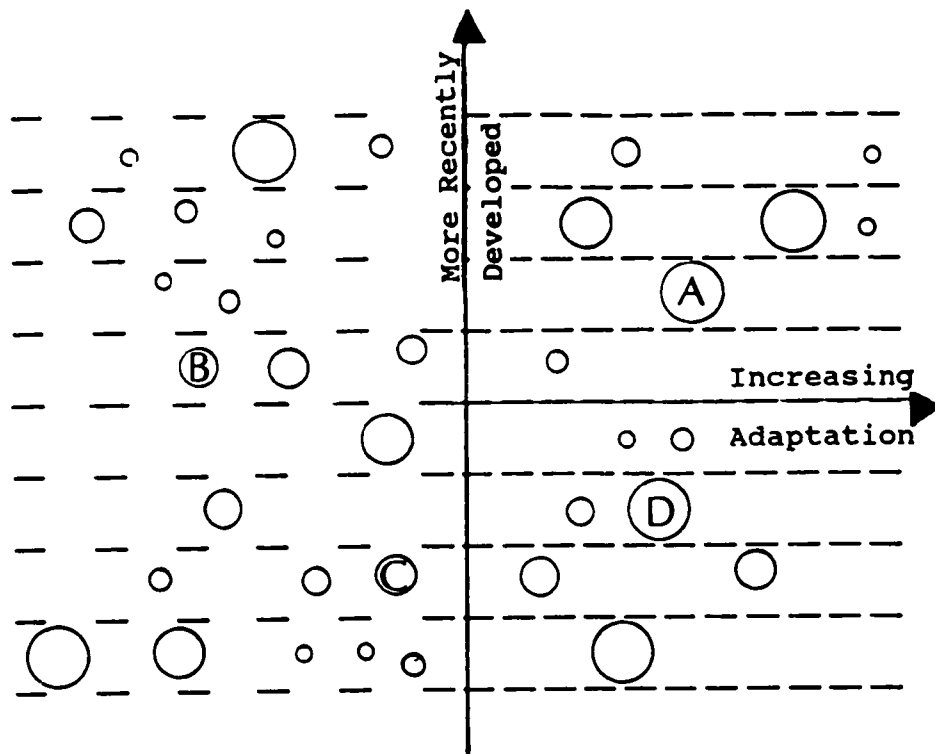


Figure 3. A combination of Figures 1 and 2 in addition to a visual representation of the levels of adaptation. It is noted that the left side of the figure, the less adaptive end of the continuum, shows less differentiation/more permeable levels. The more adaptive side, on the other hand, shows greater differentiation of the levels of recency. This also reflects a more conscious usage of mosaics--a definition of cognitive flexibility. For example, there is a more equal chance of using mosaic B or C than A or D.

repertoire--another definition of growth and increased flexibility.

Cognitive flexibility is the ability to utilize an appropriate pattern or to create other patterns as needed. It forms the core of the paradigm and describes the individual interacting with the environment. The types and usage of patterns exist within the cognitive aspect of the personality, yet influence other aspects of personality and behavior.

Statement of the Problem

The relationship between cognitive flexibility and cognitive styles, behaviors, and personality is not fully understood. It would appear, therefore, that the relating of cognitive flexibility with moral reasoning was warranted as an area of study.

Moral reasoning is an established area of current theory and research. A substantial proportion of this research uses the Defining Issues Test (DIT) in exploring the relationship between moral reasoning and cognition-affect, personality styles, and other constructs. Researchers had not, however, looked at its relationship with cognitive flexibility, as measured by the Stroop Color and Word Test. More specifically, there was no research which compared the Defining Issues Test and the Stroop Color and Word Test within any population.

Wardell and Royce (1978), providing a foundational model, stated the continued need for empirical studies in the area of personality. As theorists, they stated that empirical research may be some time in coming, but that such research remains necessary to the area of personality (Wardell & Royce, 1978).

It was not proposed that this study provides empirical support for the Wardell and Royce model. It was instead a beginning of empirical exploration of the proposed paradigm.

Delineation of Research Problem

Cognitive flexibility and moral reasoning are seen to exist as aspects within a holistic and dynamic concept of personality. Since there are differing abstractions of personality, this section will delineate briefly the structure of these elements as defined by this researcher.

The theoretical orientation for this study is a dynamic framework, as envisioned by this researcher and others (see Chapter 2). This study focused essentially on the cognition aspect of the personality and on flexibility within cognitive mosaics or patterns. Cognitive flexibility involves certain capacities within this area of the personality structure.

The cognitive area of the personality, in turn, underlies an individual's styles and values (Wardell &

Royce, 1978). This researcher believes that moral reasoning develops and exists within a fusion of a person's cognitive flexibility and values. From these integrated aspects, the personality is formed. Cognitive flexibility and moral reasoning, as measured by the Stroop Test and Defining Issues Test (DIT) instruments, constituted the personality dynamic under investigation.

Purpose of the Study

This study focused on the relationship between cognitive flexibility and moral reasoning. It looked for more than an understanding of the relationship, however, thus affording heuristic value.

Statement of Research Hypotheses

The Stroop Test and DIT testing manuals provide standardized administration instructions and practical norms for usage in research. The Stroop Color and Word Test consists of three tasks using the names of colors and colored print to create a novel assignment which involves something that the subject has never done prior to taking this test (see Chapter 3 for further description). Performance on these different tasks and comparisons between these performances produce a cognitive flexibility score.

The median of the sample's scores was used for dividing the population in terms of flexibility--those

above this measure are classified as flexible; those below this measure are classified as constricted or not flexible.

The Defining Issues Test consists of six vignettes involving moral reasoning dilemmas and statements reflecting levels of moral reasoning stages developed by Lawrence Kohlberg (see Chapter 2). An individual's response to these statements provide what are called P and D scores. The P score represents a weighted formula using responses from the top two levels of reasoning; the D score uses a weighted formula reflecting responses from all levels. Thus both scores reflect levels of moral reasoning.

The P score reflects the "'relative importance a subject gives to principled moral considerations in making a decision about moral dilemmas'" (Rest, 1979). In contrast, the D score reflects an "overall index of moral judgment development . . . the score is higher to the extent that the subject gives high ratings to high stage items, and the score is lower to the extent that the subject gives high ratings to low stage items" (Rest, 1986).

The P and D scores are divided into four groupings. Both P and D scores represent a general index of moral reasoning maturity. The following hypotheses reflect these suggested divisions and classifications.

1. Among those subjects with a P score of 35-46 on the DIT, there will be a significantly higher frequency of Stroop flexibility scores above the median of the sample than below the median.
2. Among those subjects with a D score of 21-27 on the DIT, there will be a significantly higher frequency of Stroop flexibility scores above the median of the sample than below the median.
3. Among those subjects with a P score of 47 or higher on the DIT, there will be a significantly higher frequency of Stroop flexibility scores above the median of the sample than below the median.
4. Among those subjects with a D score of 28 or higher on the DIT, there will be a significantly higher frequency of Stroop flexibility scores above the median of the sample than below the median.

Importance of the Study

The exploration of the proposed paradigm provides insights into this theory and the application of this theory. It also offers opportunities for further understanding of human processing and ideas for additional research in this and related areas of personality theory.

Delimitations

The study was delimited in terms of focus and population. It proposed to support a paradigm with the chosen hypotheses. The hypotheses were merely one focus, one empirical examination drawn from a conceptual paradigm. These hypotheses, however, provided valuable information on the relationship between moral reasoning and cognitive flexibility and information regarding the tentative paradigm. The population was delimited to beginning freshmen and sophomores in church-related colleges.

Limitations

Limitations included the inability to generalize to all populations. This was countered, however, in an interest in the tests themselves rather than in the population per se.

CHAPTER II

LITERATURE REVIEW

Introduction

This study focused on the relationship between cognitive flexibility and moral reasoning. Cognitive flexibility was operationally defined in terms of the Stroop Color and Word Test, and moral reasoning by the Defining Issues Test (DIT).

The highly conceptual and relatively extensive nature of the concepts emphasizes a need for a carefully chosen delimitation of the literature under discussion. This chapter first addresses the justification of the proposed paradigm and research question. Because of the prior description of this tentative paradigm and its relationship with the hypotheses, this chapter includes contrasts with some of the presented theories. With this background in mind, this chapter then explores the literature review of cognitive flexibility and moral reasoning and research involving the Stroop Test and the DIT.

Theoretical Foundation for Hypotheses

While the paradigm relating to this research is original with this study, other theories offered creative

ideas which further will be seen to justify the hypotheses' development. Wardell and Royce (1978), for example, provide a background model and central support to the paradigm. These theorists and Ornstein (1986) provide theories of mind and personality which both contrast and support this proposed paradigm and tested hypotheses.

Wardell and Royce

The Wardell and Royce model (1978) supplies a theoretical backdrop and points of reference for a system of unresearched ideas--the proposed paradigm.

The lowest systems of their model (sensory and motor--see Figure 4) consists of an individual's interaction with the environment. The cognitive and affective subsystems are at the next level underlying the person's style and value subsystems. Providing a comprehensive structure, a gestalt--the personality subsumes these various subsystems.

The subsystems interact with each other within the personality. For instance, an individual's lifestyle evolves from an interaction between affective and value subsystems; an individual's world view derives from the interaction of the cognitive and style subsystems; an interaction between the style and value subsystems creates a person's self-image. Therefore, there is interdependence between subsystems within the mind.

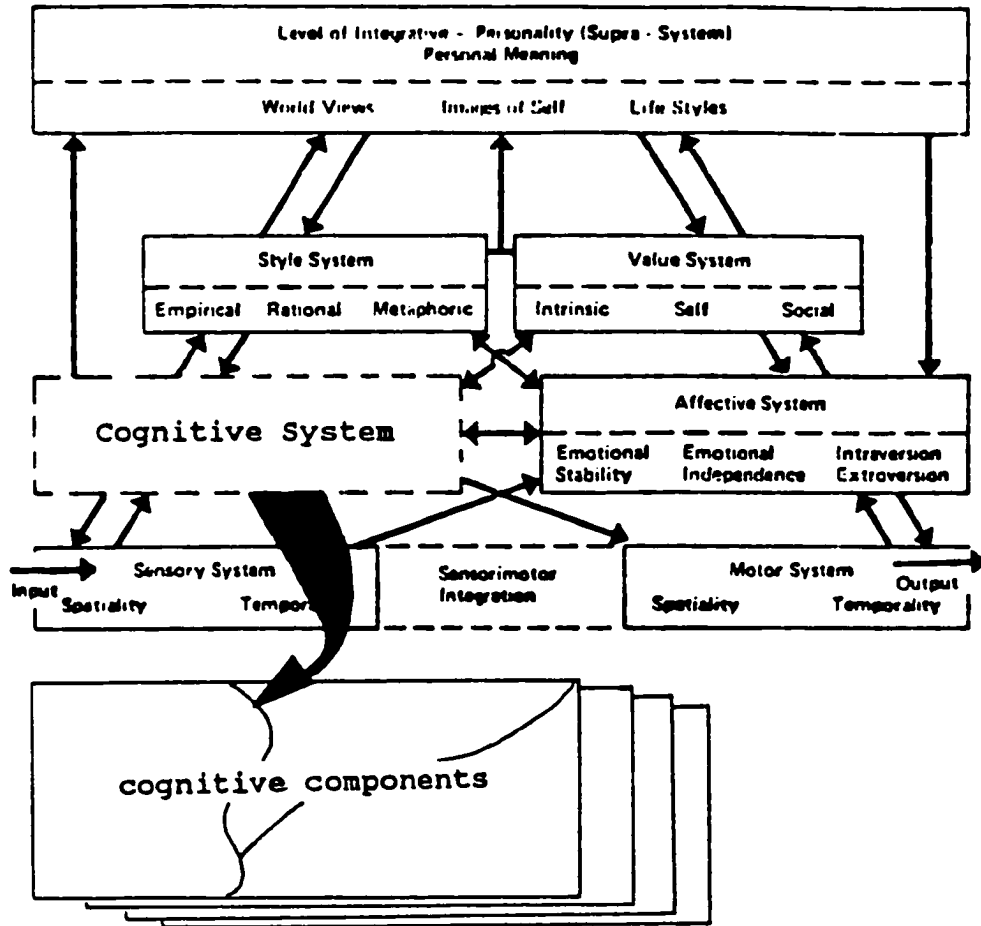


Figure 4. A visual representation of the proposed paradigm with the Wardell and Royce model. The insert depicts the cognitive subsystem; the layers of rectangles represent a potentially infinite number of cognitive mosaics. The abilities or aspects of any mosaic are not unique to that mosaic, but each mosaic does consist of a unique combination of abilities. (Adapted figure taken from Wardell & Royce, Journal of Personality, 1978, 474-505).

As mentioned earlier, the Wardell and Royce model provides a framework. The proposed paradigm focuses on the cognitive subsystem and its interactions with other subsystems (see Figure 4). Here cognitive mosaics would exist within the cognitive subsystem. This study's definition of moral reasoning equates it with the interaction between the values and cognitive subsystems.

With this relationship in mind, it is believed that further exploration of the conceptual similarities/dissimilarities between the model and the proposed paradigm will allow for a more complete understanding of this research.

Wardell and Royce's definition of cognitive style is one point of connectedness between these two models. The 1978 article focuses on the style subsystem and its interactions with cognition and affect. They describe cognitive styles, affective styles, and cognitive-affective styles. They define style as ". . . a characteristic mode or way of manifesting cognitive and/or affective phenomena" (Royce, 1973). These styles, as mentioned, affect and are affected by other subsystems within their personality model.

Wardell and Royce describe cognitive style in terms of a manifestation of cognition. Their cognitive styles include the (1) rational, (2) empirical, and (3) metaphoric.

This research, in contrast, defines cognitive style as the unique combination of an individual's cognitive mosaics and his flexibility.

In review, cognitive mosaics consist of a combination of cognitive components. Cognitive flexibility involves the ability to select or even create these mosaics which are appropriate to situational needs. A comparison of the Wardell and Royce model with this study's cognitive styles and eight substyles, therefore, involves relating the substyles to cognitive flexibility and cognitive mosaics.

For instance, certain cognitive substyles are associated with cognitive flexibility. This means that the description of a particular cognitive substyle also describes cognitive flexibility.

Other cognitive substyles relate to the cognitive mosaics. These substyles describe characteristics of any particular mosaic, or pattern. These substyles are seen, therefore, to reflect a combination of cognitive components. The direction (Wardell and Royce describe certain substyles in terms of polar opposites--e.g., abstract versus concrete) and/or intensity of these substyles seen in any pattern differs with the mosaic in question.

It is not proposed that these substyles exist within the cognitive system. It is proposed, however,

that this study's cognitive style combination of cognitive mosaics and cognitive flexibility underlies Wardell and Royce's eight cognitive substyles and the three cognitive styles.

Wardell and Royce's eight substyles or characteristics tie in with this study's conceptualization of cognitive style, cognitive mosaics, and cognitive flexibility as follows:

Cognitive complexity--

(Wardell and Royce definition): An individual with complexity ". . . makes greater use of his cognitive structure . . . he is . . . flexible, and more independent of the judgment of others."

(Association with proposed paradigm): This characteristic comes closest to the definition of cognitive flexibility. It parallels flexibility in the cognitive subsystem and reflects, therefore, the part of cognitive style associated with cognitive flexibility.

Differentiation--

(Wardell and Royce definition): This represents an inclination to ". . . pursue and use more detailed conceptualizations . . ."

(Association with proposed paradigm):

This reflects the part of cognitive style associated with the cognitive mosaic components.

Category width--

(Wardell and Royce definition): This involves ". . . broad versus narrow categorizing . . ."

(Association with proposed paradigm):

This reflects the part of cognitive style associated with the cognitive mosaic components.

Conceptual integration--

(Wardell and Royce definition): This reflects an ". . . inclination to explore and develop relationships among concepts." This concept may be considered a part of cognitive complexity.

(Association with proposed paradigm):

This reflects the part of cognitive style associated with cognitive flexibility.

Analytical versus relational--

(Wardell and Royce definition): This involves a preference for a type of concept--inferential versus relational.

(Association with proposed paradigm):

This reflects the part of cognitive style associated with the cognitive mosaic components.

Compartmentalization--

(Wardell and Royce definition): This reflects a " . . . tendency to compartmentalize ideas . . . in discrete categories . . ." (Messick & Kogan, 1963).

(Association with proposed paradigm):

This reflects that part of style associated with cognitive mosaic components.

Abstract versus concrete--

(Wardell and Royce definition): This involves the use of ". . . more information and more strategies to solve problems."

(Association with proposed paradigm):

It is believed that those with relatively more abstract style show greater cognitive flexibility in the cognitive subsystem. The basis for this belief lies in the established association between higher reasoning and the ability to work with abstract concepts. The abstract style reflects that aspect of cognitive style associated with flexibility.

Leveling versus sharpening--

(Wardell and Royce definition): Leveling involves lessening "fine shades of distinction"; sharpening involves increasing distinctions between items.

(Association with proposed paradigm): This reflects the aspect of style associated with the cognitive mosaics combination.

Unlike the proposed paradigm, Wardell and Royce place flexibility within the affective subsystem. Here flexibility is one reaction to intrusive stimuli. Within their theory, apparent comfort with contradictory stimuli or interference describes flexibility. This study, in contrast, does not define flexibility in terms of affect or motivation (or at least affect alone).

Wardell and Royce propose that motivational (tolerance for the unconventional and constricted versus flexible) and emotional (reflection versus impulsivity and physiognomic versus literal) substyles contribute to rational, empirical, and metaphoric higher-order affective styles.

It has been acknowledged that cognitive mosaics and cognitive flexibility are involved in other subsystems. In fact, other researchers' descriptions of "flexible" individuals (see page 41) include apparent ease with emotional expression. It is not unexpected,

therefore, that Wardell and Royce's affective substyles also reflect characteristics of cognitive flexibility or parallel descriptions of cognitive mosaics.

The affective substyles in which these characteristics are noted are as follows:

Tolerance for the unconventional--

(Wardell and Royce definition): This reflects an ". . . acceptance of experiences which do not agree with what one knows to be true" (Gardner, Holzman, Klein, Linton, & Spence, 1959).

(Association with proposed paradigm): This reflects that aspect of cognitive style associated with cognitive flexibility.

Constricted versus flexible--

(Wardell and Royce definition): This is associated with automatization and ability to cope with interference.

(Association with proposed paradigm): As noted on the previous page, the use of the affective style subsystem and some of the traits of this style differ in certain aspects from the proposed study. For instance, Wardell and Royce define "constricted" individuals as those showing more aspiration to overcome

contradictory stimuli. This study would assign this characteristic to "flexible" individuals.

Reflection versus impulsivity--

(Wardell and Royce definition): This involves the amount of alternative hypotheses involved in problem analysis.

(Association with proposed paradigm): Reflection involves that part of cognitive style associated with cognitive flexibility.

Physiognomic versus literal--

(Wardell and Royce definition): This represents the preference for the dynamic and emotional versus literal aspects of objects and ideas.

(Association with proposed paradigm): This reflects that part of cognitive style associated with the cognitive mosaic components.

The constricted versus flexible control substyle makes up the rational affective style. Tolerance for the unconventional and reflection versus impulsivity substyles make up the empirical affective style. And metaphoric, the third higher-order affective style, consists of the physiognomic versus literal substyle.

These substyles or characteristics relate to cognitive abilities and/or affective traits. They also underlie the rational, empirical, and metaphoric styles at the cognitive-affective style level. This study does not concern itself with labeling or delineating these system's styles, but the above does compare/contrast with the proposed theory.

The proposed paradigm draws on the subsystems viewpoint and the dynamic nature of the personality. It also parallels the Wardell and Royce model on the sub-style characteristics--certain characteristics that make up a cognitive style relate to flexibility or the mosaics. The same applies to the affective domain.

On other points, the two models do not contrast nor necessarily agree with each other. Here the difference is one of focus.

On yet other points, the model and paradigm differ in their explanation or viewpoints. For instance, this study's definition of flexibility (as operationally defined by Golden in his Stroop Color and Word Test manual, 1978) is original with this study. Whereas, Wardell and Royce define flexibility in terms of an affective style, this study views flexibility in terms of cognitive mosaics--a dynamic combination creating cognitive style.

Another difference involves the dynamics within the subsystems. Wardell and Royce propose that values are more closely tied with the affective subsystem, whereas styles are more closely connected with the cognitive subsystem. In contrast, it is proposed that all arrows (connectors between the subsystems--see Figure 4, page 22) represent equal energy or influence.

These differences, both of a global and more detail-oriented nature, combine with both supportive and neutral aspects to better reflect the proposed paradigm.

In summary, the model and the paradigm do not agree on all points of interest (often simply due to differences in foci). The Wardell and Royce theory, however, does provide both a framework within which the proposed paradigm takes form and support for the theory and chosen hypotheses.

While credit goes to Wardell and Royce for their contributions to the study, the reader should note that cognitive mosaics, this study's definition of cognitive flexibility, and related theory are original with this research paradigm.

In summary, it is believed that the differences between the model and the paradigm do not detract from support of the study. Instead, it more clearly outlines and defines the theory and background for the research and the potential for empirical investigation.

Robert Ornstein's "Multiminds"

Ornstein goes beyond the popular "two brain"--two mind theme to a multimind view. He claims that there are many minds which are specialized and come into play as necessary by situational demands. Ornstein explains incognizance of this situation in terms of limited consciousness--only one mind operates, even though briefly, at a time within one's awareness. Here the mind consists of a number of minds, each a mixed structure of functions which operate to simplify information.

Ornstein delineates a hierarchical structure with an independent ability of governing which organizes, infers, interprets, and controls the mind processes. It fails to be omnipotent, however, in that lower minds may operate instead of minds higher in the hierarchy which are more adaptive to experiential demands. The lower levels within the structure are rigid in contrast to higher functions which are more "intelligent" and flexible.

As minds develop, capacity to meet environmental demands increases within the "governing" capacities and within a margin of error--a margin of error occurs when the wrong mind, as it were, steps in to process.

While he sees these minds as evolutionary, Ornstein states that experience can strengthen mental operating control and increase an individual's ability to choose higher order minds instead of reactive, smaller

minds. This aspect, in addition to a concept of multiple minds, supports similar aspects (mosaics) in the proposed paradigm.

The proposed paradigm stands in partial contrast to this theory since cognitive flexibility focuses on movement within process-oriented mosaics rather than Ornstein's intra-mind flexibility. While Ornstein presupposes flexibility between these minds, he views this as an absolute and sometimes inappropriate, intrapsychic movement.

He differs from the proposed paradigm in that he appears to outline a more inclusive personality aspect in his "minds" concept and that the minds appear within a consciousness/unconsciousness framework rather than a personality infrastructure.

These differences, however, did not detract from the foundation upholding the hypotheses and the paradigm proposed here.

Proposed conceptual paradigm of personality

The proposed paradigm consists of a hierarchy of many mosaics involving cognitive components. The ability to move within these mosaics enhances biological and psychological adaptation and survival. These mosaics can be used in describing the relationship, development, and regression involving flexibility and moral reasoning.

The relationship described. While described earlier (see Chapter 1), this section reiterates the suggested relationship between cognitive flexibility and moral reasoning for the ease of understanding.

The research focused essentially on the cognitive subsystem of the personality and on flexibility within cognitive mosaics or patterns.

This researcher defines cognitive flexibility as the ability to move from one pattern to another and to create other patterns as needed. It forms the core of the paradigm and describes the individual interacting with the environment.

The types and usage of patterns exist within the cognitive subsystem of the personality, yet influence other aspects of personality and behavior.

The cognitive subsystem of the personality, in turn, influences aspects of style and the value subsystems. Moral reasoning develops and exists within a fusion of cognitive flexibility in the cognitive subsystem and the value subsystem.

Moral reasoning pertains to those kinds of operations involving cognitive components to make decisions regarding the the "right" and "wrong" of behaviors. As such, it involves the value subsystem in the Wardell and Royce model (see Figure 4 page 22). Some individuals (e.g., Conn, 1987) claim that higher moral reasoning, in its usage of empathy, involves a cognitive-affective

operation (e.g., Thomson, 1989). This researcher agrees with this, and believes that the personality subsystems function within an interacting system. This is not, however, a matter of concern to this dissertation. From these and other integrated systems, the personality develops.

Human development. Both cognition and moral reasoning show qualitatively different phases in development over time and experience. Piaget, Kohlberg, and many others (Comalli, Wapner, & Werner, 1962; Goldstein, et al., 1978) support this aspect of development. While Piaget did not believe in regression of his broad stages, Kohlberg and researchers in other cognitive areas report regression in reasoning/cognition.

Regression in the two concepts. A further parallel of the relation between flexibility and moral reasoning within the paradigm exists in the noted regression (pages 3-4) and the following studies under stressful situations.

Serino (1977) researched the interaction between DIT scores and cognitive frustration. While he found insignificant effects, $F(2,6) = 3.56, p > .05$, he argues that regression remains possible within moral reasoning.

In contrast, Kohlberg and Kramer (cited in Rest, 1986) report regression in moral reasoning under the stress of a college experience. However, this and other

studies do not provide the support for this research as is found in studies on cognition.

In one study on cognition, Larcom (cited in Serino, 1977) found significant interaction between frustration and regression of cognitive abilities on a given task. Broverman and Lazarus (1958) found that task-induced stress reduced cognitive functions, with weaker cognitive "subsystems" temporarily unused. (In terms of this paradigm, such weaker systems may include those less practiced, younger, higher-order, and more flexible mosaics). Here these researchers describe "cognitive subsystems" as inherent tendencies of function which maintain organization while processing interfering stimuli--this necessitates flexibility or results in regression.

Using a modified Stroop Test, Commali, Wapner, and Werner (1962) reported a significant relationship $p < .01$ between age and interference/flexibility scores. They report increasing flexibility with age, a leveling off during adulthood, and a decrease in flexibility with older ages. They interpret the results of old age as lessened differentiation and hierarchical control--in other words, regression. While results with the elderly (e.g., Rush, Panek, & Russell, 1987) may actually reflect increased stress in many areas of living, it is best not to speculate on this aspect within the paradigm or changes or lack of change in morality after the age of

65. This study defines moral maturity in terms of adulthood (peak) flexibility.

The proposed paradigm interprets these studies in terms of intra-individual flexibility and stress. With stress, those individuals who show less cognitive flexibility may regress to a basic mosaic, but a mosaic that proves inappropriate given the individual's biological and psychological maturity.

Perhaps the inappropriate aspects of such processing result, in part, from the lesser usage of affective data, number of stimuli, and variety of external/internal cues seen in less flexible subjects. This study proposes that it is the unique qualities of flexibility that provide the necessary processing capabilities for higher order moral reasoning; higher order moral reasoning requires the ability to analyze a wide variety of data from diverse angles.

This conceptualization justifies the necessity of flexibility in higher moral reasoning without it necessarily being the only factor involved in such development. This idea, in addition to parallels in development and regression, describes the proposed paradigm in terms of the research hypotheses. This paradigm, the theory posited by Wardell and Royce, and Ornstein's recent "multiminds" substantiate theoretical support of the study. In moving from theoretical support to research

the following sections explore relevant studies in the area of cognitive flexibility and moral reasoning.

Cognitive Flexibility

Exploration of cognitive flexibility must include a definition of the term and discussion of related research classified under cognitive controls, cognitive styles, and metacognition terminology. Each area, in turn, adds to the understanding of this complex construct.

Defined

While cognitive flexibility exists as a construct within research and theory, its name and theoretical structure sometimes differs with individual researchers. Here the term cognitive flexibility is defined as the capacity to move from one pattern to another and to create new patterns as needed.

This study restricted flexibility to cognition and to the construct measured by the Stroop Color and Word Test. Golden (1978) says that the Stroop Test measures the basic ability to "select relevant information from one's environment in a flexible manner...such an individual is better able...to adapt to new circumstance to more effectively function in general." The interference score, used in this study, ". . .is thought to

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measure a pure dimension of cognitive flexibility" (Golden, 1978).

On defining cognitive flexibility in terms of personality, reference is made to Wardell and Royce (1978) who describe a dynamic, integrated personality consisting of subsystems and consider flexibility within the style subsystem. This study restricted flexibility to the cognitive system. It does use, however, the same theory of personality and definitions of subsystems. The following represents a summation of important, related work.

Cognitive controls

Cognitive controls, proposed by Klein (Gardner, Holzman, Klein, Linton, & Spence, 1959; Klein, 1970), are stable modes of interacting with the environment. Ludwig (1981) further defines such controls as conflict free, non-defensive aspects of the ego structure. Proposed controls consist of flexibility-constriction, leveling-sharpening, and equivalence range. Hartman (cited in Ludwig, 1981) defines controls as independent, innate capacities which develop according to the increasing demands as an individual grows older.

Controls, therefore, are adaptive functions, and all of these equate with a person's cognitive style (Hartman, 1951; Klein, 1970).

Researchers (e.g., Gardner et al., 1959; Klein, 1970; Moran, 1984) use the Stroop Test to contrast subjects chiefly using the flexible pole of the cognitive control versus subjects employing the constricted aspect. These studies report that those classified as constricted by Stroop measurements appeared to dislike ambiguity, utilized few feelings in consciousness, had more apparent difficulty in communicating with others, and categorized reality through cognition rather than through both cognitive and affective means.

Apparent ease of expression of affect, indifference to ambiguity, and other contrasts described those labeled flexible by their performance on the Stroop Test. The flexibility-constricted control exists as one among several functions. As mentioned earlier, this grouping of employed patterns leads to the next distinction--that of cognitive style.

Cognitive style

The construct cognitive style pertains to "the course of adaptation to particular situations" (Smith & Klein, 1953, p. 183). In other words, the type and unique usage of particular collective patterns make up the cognitive styles.

While cognitive styles develop slowly through experience (Messich, 1976), some researchers refer to these styles as relatively stable over both time and

situations (Gardner, 1953; Messich, 1976; Smith & Klein, 1953). Showing the overlap between cognitive and other subsystem flexibility, Messich (1976) includes flexibility as one dimension of the cognitive style.

The definitions of researchers (Broverman & Lazarus, 1958; Broverman, 1960a; Broverman, 1960b; Broverman & Lazarus, 1964; Dockett, 1968; Gardner, 1953; Goldstein & Blademan, 1978) describe a consistent, inclusive aspect of the personality which maintains an active relationship with the environment.

Definition of cognitive flexibility now moves to educational application under the term, metacognition.

Metacognition

In that it is believed that an individual's unique experiences and genetics form cognitive style, it cannot be taught. However, formal environmental training fosters it through the use of cognitive strategies. Such strategies are found in the area of metacognition in educational research. Flavell (cited in Wang & Richarde, 1985) describes metacognitive knowledge as a learner's self-awareness as to what can or cannot be done cognitively. Moreover, the following research supports the likelihood that self-awareness can be learned.

Control, in addition to awareness, brings this term closer to cognitive flexibility. Educators and other theorists imbue metacognition with the ability to

direct processing of information and behavior to one or the other hemispheres according to task requirements (Hall & Esposito, 1984; Holowinsky, 1984; Way, 1985).

The proposed paradigm differs in not segmenting the systems under control. In the depiction of mosaics involving the brain as a whole, it differs from the hemispheric emphasis still employed by some theorists. It would further emphasize the accessing quality of the control--Moore (1982) comes closest with his inclusion of reflective and multiple access in his definition of metacognition.

While debate over the metacognition construct exists (Holowinsky, 1984), research continues (e.g., Moore, 1982; Slife, 1985; Wang & Richarde, 1985; Way, 1985). As noted, this present construct does not agree with certain conceptualizations of metacognition. Furthermore, unlike the more application-oriented studies, this study is an exploration of the paradigm's dynamic structure.

Other related research

Mention may be made of other studies which are indirectly related to this research. These studies include exploration of experts versus novices (Glaser, 1985), automization (Broverman & Lazarus, 1964; Hartman, 1951), and training in response widening (Kane & Arnold, 1986).

The Stroop Color and Word Test

The Stroop Color and Word Test, based on Ligon's (Ligon, 1932; Stroop, 1935) color-naming theory, has been used in personality, cognitive, and psychodiagnostic research and with populations of adults, children, developmentally disabled, and those diagnosed with mental disorders.

The test consists of three timed sections. The first involves reading the names of colors printed in black ink on white in a 5 by 20 matrix. The second consists of reading the colors in a 5 by 20 matrix. The last part consists of reading the color of the ink in which the words are printed, not the word shown. For instance, the person would say "blue" when the word "red" was printed in blue ink. This also exists in a 5 by 20 matrix. A formula involving these sections produces a flexibility score.

While exact administration and scoring procedures have differed among researchers in the past, a standardized manual now exists. The instrument is prepared for either individual or group administration. Chapter 3 includes procedures used in this research.

Important studies using the Stroop Test have been mentioned, and hundreds of others exist. Researchers report mixed results of the Stroop Test relative to various aspects of personality (Callaway, 1959; Hochman, 1971; Jensen, 1965; Lowe, 1985, Ludwig, 1981; Podell &

Phillips, 1959; Rush, Panek, & Russell, 1987; Stein & Langer, 1966; Thurstone & Mellinger, 1953; Williams & Nulty, 1986; etc.).

Broverman and Lazarus (1964), however, report pertinent information in reference to personality regarding the relationship between results on the Stroop Test and two projective tests, the Thematic Apperception Test and the Rorschach Test. They found significant correlations between scores on the Stroop Test and the number of highly integrated responses and indications of ego strength in the two projectives.

Another important study focusing on personality (Stein & Langer, 1966) compared personality characteristics with flexibility scores on a variant of the Stroop Test (Color Phonetic Symbol Test--covert incongruity as compared to the Stroop Test's overt incongruity). These researchers report low cognitive interference from the incongruity of the Stroop Test and significantly higher intra- and interpersonal effectiveness.

If the level of anxiety and the coping mechanisms affects, in part, an individual's efficacy, then the following study finds similar results. Dawkins and Furnham (1989) explored those using a repressive coping process and low and high anxious individuals. Those classified as high anxiety on the State-Trait Anxiety Inventory showed a decrement in performance compared to the low anxious group, but did better than those

classified as using repressive coping styles by the Marlowe-Crown Social Desirability Scale.

Wapner and Warner (cited in Stein & Langer, 1966) compared scores on this same instrument with the Adjustment Check List and report significantly less psychological disturbance and less deviation in personality with higher flexibility scores. Thus, the value of the Stroop Test in personality research depends on the aspect of personality under investigation and the other instrument being used.

Another construct studied with the Stroop Test is cognition. Studies examining possible relationships between its scores and cognition include cognitive control studies, discussed above, and other research. Jensen and Rohwer (1966) found no significant relationship between color naming speed and intelligence, nor between flexibility scores and intelligence. He did, however, find a significant correlation between word naming and intelligence ($p < .01$).

Wheeler (1977) studied brain functioning involved in the interference-flexibility scores. He found that when college students were asked to respond with pushing buttons instead of silent or audible verbal responses, the Stroop Test interference reaction disappeared! Moreover, this occurred with usage of either hand. This researcher and others (e.g., MacLeod & Dunbar, 1988; Nealis, 1973) note the competition of tasks involved in

creating the "novel" situation--the third Stroop task must involve conflict along a dimension of meaning in order for a new type of processing to occur. The conflict comes in responding to the color of the ink used for a word versus the meaning of the word itself. Individual responses to this processing results in differences in flexibility scores. When used according to the manual's directions, the Stroop Test produces significant interference scores--even when answers are unspoken (Wheeler, 1977).

While the Wheeler (1977) study explored using dominant versus non-dominant hands, others have looked to investigating differences between the hemispheres themselves. Koenig (1989), using 108 right-handed males of 7 - 15 years of age, found that there was a right-visual field advantage for all age groups.

Exploring the hemispheres introduces advances in the practice and research of the Stroop Test in the area of neuropsychology. Its value as part of a thorough neuropsychological battery is recognized at Crownsville Hospital Center in Maryland and other providers of mental health care services.

The Stroop Test's contribution to the battery is its acknowledged reflection of frontal lobe processing--that area associated with higher reasoning functions. Frontal dysfunction differences between those with schizophrenic versus affective (depressive and/or manic-

depressive) processes were studied by Tal (1989) and Todd (1989). Both studies indicated that these disorders showed significant frontal lobe dysfunction as measured by the Stroop Test and other instrumentation.

Other neuropsychological research comes under topics of memory (Pickering, 1990) and cognitive inhibition (Beech, 1990), and general studies of brain dysfunction diagnosis (e.g., Das, 1970; Golden, 1978; Perret, 1974). The Stroop Test, therefore, is used as one measure of higher reasoning within the context of normal brain functioning.

Of interest in all psychological/neuropsychological testing, Sheehan, Donovan, and MacLeod (1988) note that the Stroop interference effect is "notoriously difficult to modulate". Under hypnosis, they found that the Stroop effect increased. However, when the role of the hypnotist included assisting the subject in focusing attention on the novel task, those highly susceptible to hypnosis showed a sharp reduction of the Stroop effect, whereas those with lower susceptibility experienced only slight reduction of the effect.

Other areas studied include creativity, where Golden (1978) found a significant relationship between creativity and scores on the Stroop Test. Additional studies include drug-related research (Hooker & Jones, 1987; McKeon, 1986; Ragade, 1990), autonomic nervous system (Frankenhaeuser et al., 1967; Houston, 1969; Oken

et al., 1962; Regard, 1983), hormone levels (Franken-
haeuser et al., 1967), interactions with nutrition (Nayak
& Dash, 1987; Channon, Hensley, & deSilva, 1988) and many
more. The Stroop Test has been used with varying popula-
tions (e.g., Hama & Hashimoto, 1985; Karchmer, 1981;
Watts, McKenna, Sharrock, & Trezie, 1986; Yamazaki, 1985)
and under varying conditions (e.g., Connor, Franzen, &
Sharp, 1988; Hugdahl & Franzor, 1987; MacKinnon, Geisel-
man, & Woodward, 1985; MacLeod & Dunbar, 1988; Sheehan,
Donovan, & MacLeod, 1988; Smith & Broadbent, 1985; Wil-
liams, & Broadbent, 1986; Williams & Nultry, 1986), and
by researchers from several fields of investigation.

There is a Chinese (Ji & Jiao, 1987) and a German
version of the Stroop Test (Hunger, Leplow, & Kleim,
1987), and a substantial number of modified Stroop tests
(Cook, Jones, & Johnston, 1989; Foreman, Barraclough,
Moore, & Mehta, 1989; Hayashi, 1988; Mogg, Mathews, &
Weinman, 1989; Richards & Millwood, 1989) used in pain,
anxiety, and a myriad of other research interests.

Continuing research also considers the Stroop
effect itself, hypothesizing about the factors and pro-
cesses involved (Franzen, 1989; MacLeod & Dunbar, 1988;
Panek, 1985).

Established usage of the instrument supported
utilization in this study. It does not, however,
replace reliability and validity data (see Chapter 3).

Moral Reasoning

There is much current research and theory formulation within the area of moral development, reasoning, and behavior. In view of the great quantity of existing studies, and in relation to the proposed paradigm, this researcher focuses on moral reasoning theory and research employing the DIT. Moral reasoning must be defined, explored in terms of pertinent research, and described in terms of the Defining Issues Test.

Defined

As mentioned earlier (see page 6), moral reasoning involves those kinds of operations using cognitive components to make decisions regarding the "right" and "wrong" of behaviors.

Many theorists and researchers have explored moral reasoning and incorporated the concept in studies, educational theories (e.g., Blakeney & Blakeney, 1990; DeVuyt, 1989; Gielen, 1987; Vokey, 1990); other theories (e.g., Wilson, 1990), and philosophies. Early work with moral reasoning includes Baldwin's writings (published at the turn of the century) and Piaget's work (published 1932) (Boom, 1989) both of whom focused on cognition and development. Also using a cognitive-developmental approach, Kohlberg researched the concept using justice as a basis for moral reasoning (1958, 1986).

A summation of Kohlberg's theory

Kohlberg researched and authored much of the current theory on moral reasoning. He fully admits that he never considered that his work would represent a universal theory; he also declared that he himself was not an example of his highest stage of moral maturity! His dissertation, "The Development of Modes of Moral Thinking and Choice in the Years 10 to 16" (1958) is but one exposition of his model development and research.

Kohlberg's research and theorizing developed from his questioning of an earlier event in which he was involved. During a lecture in Tokyo he spoke of his experiences in illegally transporting Jews to post-World War II Israel and the questions he had regarding all areas of human dignity and justice. Kohlberg stated that "Equal respect for human dignity seemed to me the essence of justice" (1986, p. 6). Within his dissertation he described six moral types, evaluating them by eight characteristics (values, choice, sanction, negative standards or rules, self-image and role, authority, content, and justice).

These types or stages can be outlined as follows (parentheses identify labels used in his 1958 dissertation):

Level I:	Premoral (Premoral Level)
Stage 1	punishment and obedience (heteronomous type)

Stage 2	instrumental-relativist (hedonistic egoism)
Level II:	Conventional (Generalized Conformity Level)
Stage 3	"good boy/good girl" ("good boy" orientation)
Stage 4	law and order (type 3)
Level III:	Principle (Autonomous Level)
Stage 5	social contract (democratic legalists)
Stage 6	universal ethical principles (conscience)

Kohlberg (1973) later suggested a seventh stage, but full development and inclusion of this stage never occurred. Carter (1987) claims that this Kohlbergian stage shifts the emphasis from justice to agape love and an understanding of the cosmic perspective. Carter, however, argues that Kohlberg's stage seven is the foundation of all moral stages--not a stage higher and separable from preceding stages.

Kohlberg reported (1986) that over 50 cross-cultural studies had produced the following: stages one through four are found in most societies, and stage five is found in urban societies with sophisticated systems of education, rather than in less-sophisticated societies.

Prior to his death, Kohlberg lectured, worked for the development of democratic programs in high schools, and did other important work within the moral reasoning field. While he admitted that he was still learning from

experience, he claimed that, "I'm beginning to think I have something to say" (1986, p. 10).

Theoretical additions to Kohlberg

Gilligan's theory (Brabeck, 1987; Conn, 1987; Gilligan & Attanucci, 1988; Gilligan, Ward, Taylor, & Bardige, 1989; Sprinthall, 1987), supplementing Kohlberg's, suggests that subjective attachment proves a more appropriate basis of evaluating moral maturity for the female population. She further asserts that there are different moralities and moral psychologies between the sexes (Brabeck, 1987). Gielen (1987), however, asserts that Gilligan's work overlooked statistical information. Gielen cites Thoma and Rest's (1985) analysis of 6,000 subjects from 56 DIT studies which clearly fails to support Gilligan's allegations.

Brabeck (1987) cites meta-analysis, longitudinal research, and reviews (e.g., Brabeck, 1983) in countering the sex bias claim, instead stating that any noted differences exist due to differences in educational and work experience in the samples.

This area of inquiry remains controversial and under continued research. Sprinthall (1987), however, anticipates that an increasing "thaw" of the definition of morality will incorporate the information and orientation of Gilligan.

Joy represents one of several theorists, rather than researchers, who build new perspectives on Kohlberg's foundations (Joy, 1983) and/or view his ideas from a different perspective. While Joy agrees that justice is the basis for moral reasoning, he adds to Kohlberg's structure the concepts of (1) noumenal function, (2) God, (3) faith, and (4) the acceptance of "evil" in individuals. Joy, however, questions the equating of immorality with underdevelopment. Instead, he theorizes that morality exists apart from God and that the inclusion of free will necessitates the understanding of moral failure. This Wesleyan curriculum planner is but one of several theorists to re-formulate Kohlbergian theory.

Schmidt (1983), speaking from a Lutheran perspective, is less generous with Kohlberg. Schmidt claims that Kohlberg has become a substitute for the gospel, and as such he is an "offense." He also points out the need for recognizing motivation for moral reasoning; he cites the gospel as such a force.

Such a supernatural power is in Moore's analysis (1983). She cites perception and knowledge from God as energizers, and she further points out that Kohlberg's work considers only thinking, apparently omitting feeling and doing. Moving beyond Kohlberg, Sholl (1983) proposes that Christian relational strengths constitute a more appropriate basis for moral reasoning than justice.

Because of the nature of the moral reasoning construct, these perspectives provide material for interesting dialogue.

The religious background of these theorists does suggest, however, an underlying theme of addition--that of the power behind moral reasoning. Perhaps many of the contentions above spring from Kohlberg's views on the progressive and innately motivated development of moral reasoning. Is Kohlberg, indeed, naive in his assumption? Does the omission of God present insurmountable difficulties in his theory? The theorists above provide additional perspectives and possible extensions of Kohlbergian conceptualizations.

This study focused on moral reasoning, which innately involves a cognitive operation, rather than on behavior. Moreover, a striving for growth is considered inborn with natural and supernatural influences towards development, tempered by experience and choice. As such, this researcher asserts that Kohlberg's theory remains an adequate foundation for instrumentation.

Possible addendums are acknowledged. For example, Turiel (cited in Thomas, 1989), Gert (cited in Thomas, 1989), Gilligan (cited in Brabeck, 1987; Conn, 1987; Gilligan & Attanuci, 1988; Killen, 1987; Thomas, 1989), Perry (Thomas, 1989), and Rest (see below), are just some of the other theorists and/or researchers who add to the ideas offered by Kohlberg.

While these individuals theorize, research, write, and have their varied critics and supporters, some moral reasoning analysts claim that these individuals need not compete with each other. Nor do they negate one another's work. Instead, they merely add dimensions and emphases to Kohlbergian theory (e.g., Sprinthall, 1987). Their theories and possible delimitations of the Kohlbergian foundation of the DIT, therefore, are not considered to be limitations to this research.

Rest's contributions to moral reasoning

In addition to developing the Defining Issues Test, James Rest has researched and/or authored articles, books, and sections of books on moral reasoning. Rest explored the hierarchical nature of moral reasoning, the components of moral reasoning, and the development of an instrument different from Kohlberg's interview.

Rest's research (1973) supported the hierarchical nature of moral reasoning. He used the DIT, with Kohlberg's interview as a pre-testing instrument. Rest found that a level of comprehension of statements tended to cluster around a particular stage, that comprehension of moral statements was cumulative (subjects understood those statements from previous stages--that comprehension increased without taking away understanding of previous stages), and that comprehension fell progressively with stages of higher moral reasoning. Rest, Turiel, and

Kohlberg (1969) found significantly higher comprehension of one stage rather than two stages above an individual's reasoning (based on Kohlberg Interview).

In addition, Rest reports that responses to the four dilemmas, rated in respect to Kohlbergian stages, showed statistically significant age discrimination on stages one through four (Carroll & Rest, 1981). Interestingly, the study also found a rejection of lower stages with increasing age. Obviously this involved more than an aspect of moral reasoning comprehension.

Rest (Rest, 1973; Rest, Turiel, & Kohlberg, 1969) explains moral reasoning in terms of preference and comprehension. Comprehension sets the upper limits of moral reasoning; preference sets the lower limits of moral reasoning acceptable to the individual. Rest's (1973) research supports both concepts within a developmental framework.

Corresponding to these components of moral reasoning, Rest's model involves four processes: (1) moral evaluation, (2) interpretation of morally relevant situations, (3) setting priorities (the first three reflecting the usage of cognitive mosaics), and (4) implementation of plan of action (Gielen, 1987). He states that the DIT focuses on moral evaluation among these processes.

Beyond these contributions, Rest developed the Defining Issues Test--a test shown to be more than just another variant of Kohlberg's interview (Davison &

Robbins, 1978). The Defining Issues Test consists of six vignettes designed to measure moral reasoning. The instrument can be given to large groups of individuals, with each individual rating and ranking statements pertaining to the vignettes. The scores provide a group stage profile, a consistency check, two indices of moral judgment development, and other information depending on the needs of the researcher.

While research (Rest, Cooper, Coder, Masanz, & Anderson, 1974) showed a correlation ($r = .68$) between the DIT and Kohlberg's Moral Judgment Interview, and although both claim to measure the same construct, the DIT is a unique instrument. It differs from Kohlberg's instrument in both methodology and on theoretical issues.

For instance, differences include usage of spontaneous (Kohlberg) versus standardized statements (DIT), subjective researcher scorings (Kohlberg) versus objective researcher scorings (DIT), labeling (Kohlberg) versus overall index of moral maturity (DIT), no validity measure (Kohlberg) versus the M check (DIT), and other contrasts which clearly support the individuality of the DIT--a uniqueness supported by other researchers.

Related studies involving the DIT

In addition to studies mentioned earlier, other research includes exploration of moral reasoning, as

defined by the Defining Issues Test, and cognitive/personality constructs.

One such study explored the relationship between Piagetian cognitive stages and moral development in adolescents in a necessary but not sufficient hypothesis (Howard, 1986). In this case a necessary but not sufficient relationship means that cognitive development must reach certain Piagetian cognitive levels in order for certain levels of moral reasoning to potentially develop. The "potential" term refers to the fact that the level of cognitive development is not the only factor involved in higher moral development. Cognitive development is necessary but not sufficient to produce higher moral development. Their hypothesis held for the formal operational, but not for the concrete operational stage among adolescents (scores from instruments measuring cognitive factors did not significantly predict moral reasoning scores).

Couch (1986) examined this same assumption using a deaf population with mixed results. Similarly, other studies (Adams, 1987; Weiss, 1986) show mixed results depending on the instrumentation and focus of study.

Studies comparing the DIT and IQ found correlations as high as .60's and .70's (Rest, 1979); however, the studies above do not support equating moral reasoning with cognition. In other words, cognition does not explain nor account for moral reasoning. It merely

supports the understanding of a necessary but not sufficient relationship between cognition and moral reasoning. This study, was concerned with an interaction between the value and cognitive subsystems, and not just the cognitive subsystem itself.

Of a practical nature, Schaepli, Rest, and Thoma, (1985) used the DIT to explore various methods of moral reasoning training. Using junior/senior high school, college/graduate students, and other adults, they found that dilemma discussion and psychological development programs of 3 - 12 weeks produced significant increases in moral reasoning. They found that social studies and humanities courses did not show this effect. Of the programs that did work, it worked best with those 24 years of age and older.

Along the lines of training, some research has addressed moral reasoning among therapists--one of the experiences which prompted this study. For instance, Reeves, Bowman, and Cooley (1989) explored the relationship between client's moral reasoning level and the empathy expressed by counseling students. They found that higher moral reasoning counseling students showed significantly higher empathy responses to lower versus higher moral reasoning client statements.

The moral reasoning of both the client and the counselor, therefore, is related to the amount of empathy

exhibited by the counselor. Due to the nature of the study, unfortunately, it cannot be said that high moral reasoning is a prerequisite to high empathy responses.

Fortunately, however, Curtis, Billingslea, and Wilson, (1988) used the California Psychological Inventory Empathy and Socialization scales, a questionnaire which rated types of authority, and the DIT with 105 undergraduates. They found that subjects obtaining high empathy and socialization scores also exhibited higher moral reasoning. They also report that the individuals with higher moral reasoning tended to visualize authority/"authority figures" in a negative manner. These statements will prove important in the applications of this study in Chapter 5.

Authority and related implications have also been an issue of discussion/debate within the area of religion. Cullman (1989) hypothesized that more mature individuals will express less need for formal religion. Her research hypothesis was supported--religiosity was negatively correlated with psychological maturity as measured by the DIT, Religious Belief-Behavior Questionnaire, Bond Defense Style Questionnaire, and Valliant's Semi-structured Interview Schedule. Religiosity was found to be an important factor in both moral and emotional maturity. Cullman even suggested that religiosity may hinder maturity.

Some individuals have questioned the usage of the DIT instrument with certain religious populations. They charge that the DIT is biased so that individuals within these populations receive lower moral reasoning scores. The question is valid. Buier, Butman, Burwell, and Van Wicklin (1989), however, report that norms of both a cross-sectional and longitudinal nature at three Christian colleges were within general college DIT norms.

Looking not at just the population, but at an evaluation of the items on the DIT, Richards (1989) explored the test using 833 members of a Mormon church and 822 general population subjects. Richards reports that his interpretation suggests that 25 out of the 72 DIT items are biased for this population and that this population scored within low moral reasoning P score (the P score uses just moral reasoning stage 5 and 6 responses) ranges on the DIT. However, when these items were removed, the P score differences did not fully disappear.

In support of the DIT, Richards did not find any difference between the Mormon versus other subject population on the D score (the D score is a weighted combination of all moral reasoning stage responses) of the DIT. It is important to note that he feels that the D score does not underestimate the moral reasoning of this conservative religious group. Current literature appears to

favor usage of the D score on the DIT. This research adds further empirical support of this usage.

Other studies examined locus of control (Bloomberg, 1974; Carey, 1990; Howard, 1986), the relationships between dimensions of psychopathology (Hunter, 1985; Mohr, 1987), parent socialization (Alvarez, 1986; Finn, 1978; Forder, 1973), affect (Aron, 1972, Conn, 1987; Sturtevant, 1986), self-concept (Kelly & Choven, 1985), education (Bebeau & Brabeck, 1987; Blumenfeld, Pintrich, & Hamilton, 1987; Bouhmama, 1988; Bowman & Allen, 1988; Gfellner, 1986; James, 1984; Johnston & Lubomudrov, 1987; Keith, 1987; Kuhmerker, 1988; Okatahi & Parish, 1987; Rest, 1987; Shaver, 1987; Thoma & Rest, 1987), culture and/or race (Boyes & Walker, 1988; Locke & Tucker, 1988; Moon, 1986; Zeidner, 1988), and other personality and/or cognitive dimensions (Harris, Mussen, & Rutherford, 1976; Lawrence, 1987; Page & Handley, 1988). These studies comprise just a limited listing of research conducted with a wide variety of populations.

The studies cited above, in general, do not involve moral reasoning in a personality paradigm. They are concerned, instead, with describing populations in terms of moral reasoning, relationships of moral reasoning to major, isolated constructs, and analyzing methods

of training. As such, however, they provide foundational knowledge regarding constructs in the proposed paradigm.

The area of moral reasoning remains popular and the review above represents an overview of the areas under investigation and those of relevance to the research.

Summary of Literature Review and Theoretical Background

Related research and theoretical work supports choice of the DIT and the Stroop Color and Word Test for use within the proposed study. Beyond support of these instruments, this background confirmed the promise of the proposed paradigm and the relevance of the hypotheses.

CHAPTER III

DESIGN OF THE STUDY

This chapter details the methodology, design, and null hypotheses of this study.

Methodology

The research explored a tentative paradigm in terms of the relationship between cognitive flexibility and moral reasoning. This study focused, however, on the empirical exploration. The following sections reflect this organization.

Sampling

Sampling consisted of intact groups--voluntary subjects from college classes. This method is justified based on the emphasis of the study--the interest lay in the relationship between two instruments/constructs and not in any particular population. While descriptive data are included, it is as additional information with noted limitations.

With these considerations, acceptability of the sampling methods is assumed.

Instrumentation

The research utilized the six-story version of the DIT and the Stroop Color and Word Test. Since the instruments have already been described and related research has been explored above, the following sections are concerned only with the reliability and validity of these tests.

The reliability and validity of the Stroop Test

While literature shows varied administrations and scorings, Golden (1978) published and established a standard usage of the instrument. In addition, there have been reliability and validity studies which speak to the credibility of the Stroop Test.

Jensen (1965) reports test-retest reliabilities of .88, .79, and .71 on the word score, color score, and color-word task scores, respectively. Administration of the Stroop Test to a group of subjects yielded test-retest results of .89, .84, and .73 ($N = 450$) and individual administration results of .86, .82, and .73 ($N = 30$) in Golden's study (1975).

Supporting this, Golden reported reliabilities of .85, .81, and .69 ($N = 60$) for subjects' scores on individual and group administered tests. This finding suggests the practical and reliable alternative of group administration to the individual administration method,

thus supporting this aspect of the methodology used in this study.

Validity data consist of content validity and factor analysis studies which support the flexibility construct and the Stroop Test as a measure of that.

Content validity exists primarily in the inherent nature of the task presented by the Stroop Test --the instrument demands that the subject create a response in order to process a novel situation. This very task defines flexibility. Beyond this definition of the process, the behavioral descriptors of those classified by the Stroop Test as constricted, and the comparison of Stroop Test results on other personality/cognition tests (see Chapter 2, pages 40-49) provide a supportive nomenclological net for both the construct and the Stroop Test.

Factor analysis studies show three factors of interference, word, and color (Golden, 1978; Jensen, 1965). Golden's analysis of the Stroop Test tasks factored out three factors, one of which was identified and labeled as an interference factor--a factor with non-significant loadings from word and color-naming scores. This factor, measured by the Stroop Test interference score, does not duplicate measurement of word reading or color naming abilities. Instead, this interference score reflects a previously unexperienced demand for a differential processing organization.

This processing is seen as the selection of an appropriate mosaic (it is believed that this selection actually involves the creation of a mosaic for this unique task). The Stroop interference score measures flexibility versus inflexibility in terms of the ability to do this Stroop Test task relative to the other task scores. This study classifies this selection as cognitive flexibility within a cognitive mosaic repertoire. Golden's study, therefore, supports the measurement of flexibility as an ability separate from reading/naming abilities, and supports the Stroop Test as a valid measure of this study's definition of cognitive flexibility.

Thus, reliability and validity information supports the Stroop Color and Word Test as a research instrument. Killian (in Test Critiques, 1985) not only considers the Stroop Test as highly valid and reliable but suggests that the instrument be included in the basic psychological battery. The construct measured by this instrument, flexibility, finds support in research and conceptualizations within personality theory and related fields of study.

The reliability and validity
of the DIT

Test-retest studies (Davison & Robbins, 1978) yield .70 and .80 reliability coefficients for the overall index of moral judgment development (P). The stage

scores, in contrast, show reliabilities in the .50's and .60's (Rest, 1986). The DIT manual recommends use of stage scores only within context of group means and when using the six-story version of the DIT. Davison and Robbins (1978) obtained alpha coefficients of internal consistency .71 to .82.

The publishers note that the DIT offers objective scoring--the researcher merely works with the rankings given by the subject. This characteristic shows consistency of measurement with the six-story version. However, it does not support the validity of the instrument.

The Mental Measurement Yearbook claims that "a wide variety of evidence attests to the DIT's validity" (Vol. 9, p. 441). Studies examining concurrent validity with other moral reasoning measurements (e.g., Rest et al., 1974) report correlations up to the .70's. In contrast, researchers report non-significant correlation with non-moral mental development. This information supports the construct measured by the instrument.

In addition to P and D scores, the DIT offers a validity check. Moreover, McGeorge (1975) found college students were unable to fake good reasoning.

The DIT shows additional validity through longitudinal-change studies (e.g., Davison & Robbins, 1978) which show subjects giving higher importance to higher stage moral issues over time. This contrasts with

studies showing nonsignificant results from moral education programs (Rest, 1979). Their ineffectiveness, however, does not detract from other significant findings relating to the validity of the DIT nor does it influence this research.

Contesting the validity of the DIT, two main studies looked to (1) a language sophistication or (2) an action dimension as an explanation of scores on the DIT rather than moral reasoning. The first, proposed by Moran and Joniak (cited in Rest, 1980), claimed that the DIT merely reflected preference for more sophisticated language with age.

Rest (1980) countered with claims that (1) the researchers used incorrect age groups for such a study, (2) that earlier studies using restatement measurements showed an emphasis on meaning rather than sophistication, (3) that the DIT uses a validity check which weeds out responses to pretentious statements, and (4) very few subjects reach the highest stages.

Researchers equating the DIT with an action orientation (Martin, Shafto & Van Deirse, 1977) report that in two of six stages they found that a decision-making construct correlated more closely with age than the DIT P score. Interpreted, this means that subjects' responses appeared to be given based on decisions and not

merely in terms of responses that seemed relatively more action-oriented than others.

Rest answered that (1) one cannot separate moral reasoning from behavior, (2) not all statements involve action, and (3) P does not use all stages for its score. Cooper (1972), in turn, found a correlation of .34 between action and P scores. In other words, moral reasoning is related, but certainly not reduced, to action.

Of particular interest to this study, Buier, Butman, Burwell, and Wicklin (1989) found no significant differences between scores at three Christian colleges versus general college norms on the DIT. While Richards (1989) reports that the P score is biased for a Mormon population (see page 63), he found that the D score did not underestimate the moral reasoning of this conservative religious group. As mentioned above, this study focused on the relationship between the two tests and not on the populations. With this focus and the results of these studies in mind, it is believed that the DIT proves valid for the religious college population used in this research.

The validity research, in addition to reliability findings, supports the usage of the DIT. The significant amount of usage of the instrument in current studies and the reviews and research corroborate the acceptance of the DIT for moral reasoning assessment.

Procedure (Administration)

1. Each subject received a cover letter which described the voluntary nature of the experiment and the methods used to protect anonymity.

2. Those subjects volunteering (no prospective students declined) to participate took both the Stroop Test and the DIT--half of the subjects took the Stroop Test first, the other half took the DIT first. This controlled for treatment interaction effects on validity.

3. The subjects heard standardized instructions regarding general testing procedures. This included the protection of anonymity which was ensured with the use of numbers. Included on the top sheet of the first testing materials was a removable, colored slip with an identifying number. This number coincided with a number written on the pages of the instrument itself. The subjects were instructed to keep this number in a place of their choice until the next test was given. The subjects were told to write in this number on the second set of materials given to them.

4. The subjects heard the standardized instruction included in test manuals for group administration, after receiving the appropriate materials.

5. Administration of the Stroop Test.

- a. Each student received a stapled booklet containing the three sheets.

- b. The subject was given standardized instructions before doing each task.
 - c. The student was asked to do each task silently, correcting mistakes.
 - d. Each task was timed for 45 seconds.
 - e. After calling "Stop", the subject was instructed to circle the word that he was reading at the time.
 - f. The student was instructed to turn to the next sheet of the booklet.
- Instructions b through f were repeated.

6. Administration of the DIT.

- a. Each subject received a booklet containing written instructions and six dilemmas.
- b. Instructions were given as outlined by the DIT manual.
- c. The subject was given 50 minutes to complete the instrument.
- d. Manual instructions were followed in answering questions from subjects.

7. Subjects were debriefed and questions answered.

Procedure (Post-Administration)

1. Raw data from the DIT were sent to the Center for the Study of Ethical Development.
2. Data from the Stroop Test were hand-scored as prescribed by the manual's formulas.
3. Prior to statistical analysis, each subject was checked for acceptability. A subject was discarded if:
 - a. there was a raw score of 8 or above on the M scale of the DIT;
 - b. there were more than eight errors in a single story and/or more than two stories with inconsistencies on the DIT;
 - c. the color naming was equal to or greater than word-naming score on the Stroop;
 - d. the color-word score on the Stroop was equal to or greater than either the word naming or color naming score;
 - e. the color-word score on the Stroop was below 20; or
 - f. the researcher noted that the subject used more than a 45-degree rotation of the Stroop Test papers.

Statistical Analysis

The analysis focused on the differences in frequency between those subject scores in certain categories of moral reasoning and cognitive flexibility. A chi-square analysis was used to test the null hypotheses. For the test of each hypothesis the value of alpha was set at .05 on a one-tailed test. In addition, descriptive data were analyzed and presented.

Statement of Null Hypotheses

1. Among those subjects with a P score of 35-46 on the DIT, there will fail to be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median.
2. Among those subjects with a D score of 21-27 on the DIT, there will fail to be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median.
3. Among those subjects with a P score of 47 or higher on the DIT, there will fail to be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median.

4. Among those subjects with a D score of 28 or higher on the DIT, there will fail to be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median.

CHAPTER IV

DATA ANALYSIS

This chapter reports and interprets the data gathered from a sample of freshman and sophomore students from two coastal eastern and western colleges in North America.

Description of the Sample

The sample initially included 168 subjects. Rejections based on Stroop's manual (see post-administration procedures in Chapter 3) amounted to 27 subjects. No rejections were made based on the DIT's M rating; however, 8 additional rejections were based on the DIT's consistency check.

The resulting sample included 133 subjects. La Sierra College students comprised 99 of this number; the remaining 34 subjects were students at Columbia Union College. This bi-coastal sample consisted of 68 (51.1%) females and 65 (48.9%) males. Their mean age was 18.99 years with a range of 17 to 40 years of age.

Table 1 describes general sample characteristics on the Stroop Test and DIT. The cognitive flexibility and moral reasoning P and D score percentages

Table 1

Stroop Test and DIT scores

Category	Mean	Range	SD
Stroop Test Scores	47.518	29.000-70.000	5.008
DIT Scores			
P	40.585	6.700-75.000	6.203
D	23.537	7.025-40.400	2.889

appear in Figures 5 and 6. As mentioned earlier, these are quartile groupings suggested by the DIT manual for use in research. A directional chi-square analysis and other varied descriptive analyses were completed on the sample. The chi-square test was to be used to compare observed and expected frequencies of flexible/not flexible individuals as measured by the Stroop Test within each of the upper two quartile groupings on the DIT. To obtain the expected frequencies required for the chi-square necessitated using the median rather than the mean as the division point between flexible and not flexible individuals. The following sections detail the results.

Description of the Data

The frequencies of scores on the DIT and the Stroop Color and Word Test formed the basis for testing the null hypotheses. In particular, rejection or failure to reject the null hypotheses depended on the frequency of more flexible (above the median score on the Stroop Test for the sample) versus less flexible (below the median score on the Stroop Test for the sample) and scores within the two upper quadrants of DIT scores. Further description of the data is given in terms of this relationship.

Table 2 gives the mean, range, and standard deviation of the data for the sample, as broken down by both the flexible-inflexible classification ("CF"

P QUARTILE GROUPING FREQUENCIES

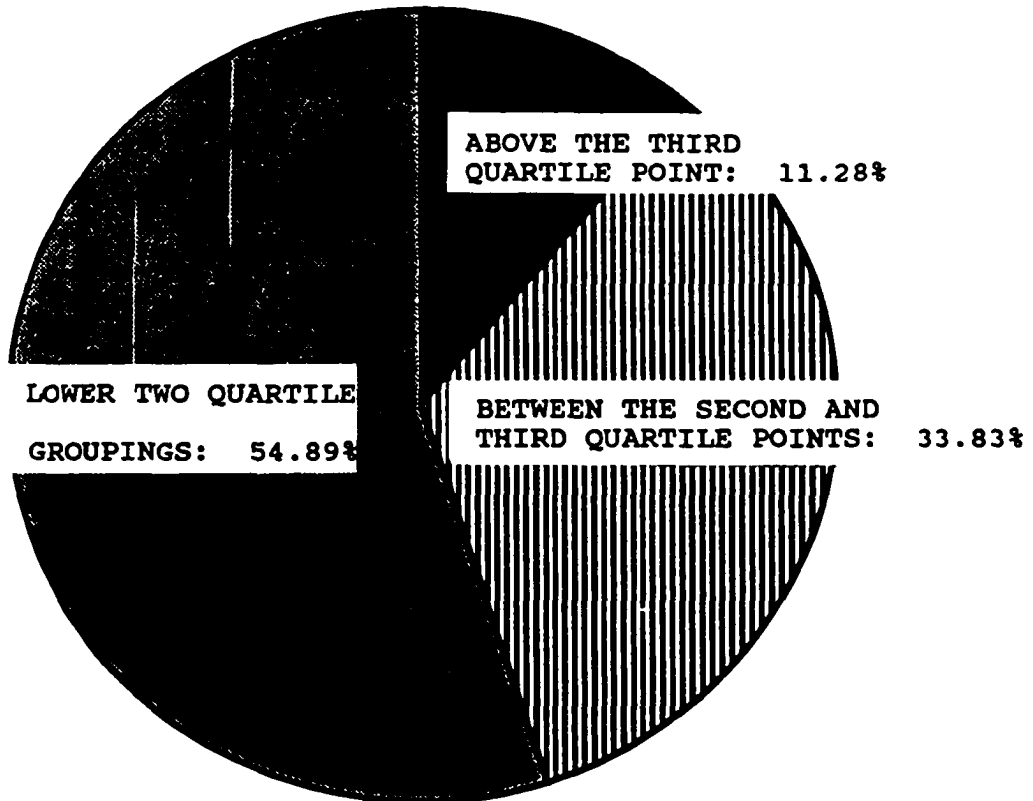


Figure 5. Percentages of the sample receiving scores in the different P quartile groupings on the DIT.

D QUARTILE GROUPING FREQUENCIES

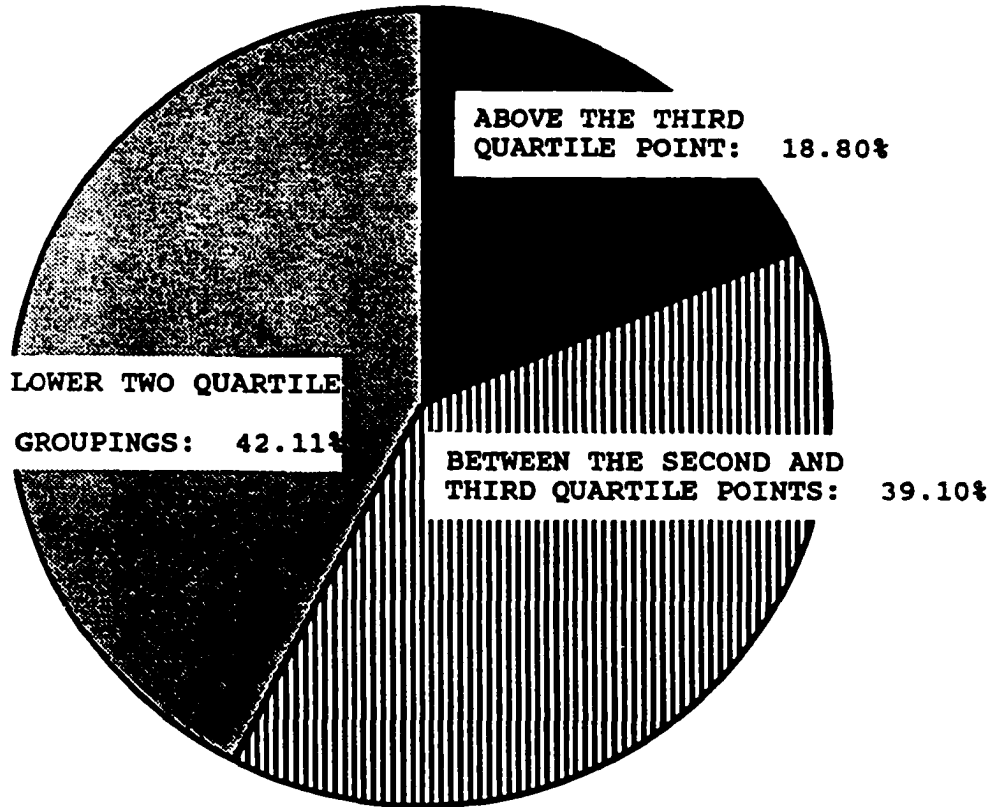


Figure 6. Percentages of the sample receiving scores in the different D quartile groupings on the DIT.

Table 2

**Stroop Test and DIT Statistics Per Cognitive Flexibility
and Moral Reasoning Levels**

Flexible			Not Flexible		
(≥ 48 on the Stroop Test)			(< 48 on the Stroop Test)		
Mean	Range	SD	Mean	Range	SD
Above the Third Quartile Point on D Score					
CF: 53.714	46.0-62.0	5.306	CF: 41.727	35.0-47.0	2.273
D: 33.038	27.8-40.4	3.663	D: 29.673	27.8-35.0	2.168
Between the Second and Third Quartile Points on D Score					
CF: 53.870	46.0-70.0	4.916	CF: 38.227	29.0-47.0	5.884
D: 23.893	21.4-28.3	1.847	D: 22.880	20.8-27.0	2.146
Below the Second Quartile Point					
CF: 38.600	46.0-66.0	4.765	CF: 41.882	29.0-47.0	5.618
D: 15.687	7.02-18.8	3.338	D: 18.776	07.8-18.4	4.183
Above the Third Quartile Point on P Score					
CF: 53.000	46.0-62.0	5.907	CF: 39.600	29.0-46.0	6.846
P: 54.740	46.7-75.0	9.014	P: 51.820	46.7-80.0	10.120
Between the Second and Third Quartile Points on P Score					
CF: 54.282	46.0-64.0	4.962	CF: 43.295	29.0-46.0	5.201
P: 40.450	35.0-45.0	3.658	P: 38.766	38.0-45.0	2.983
Below the Second Quartile Point					
CF: 54.923	46.0-70.0	4.859	CF: 40.031	29.0-46.0	5.156
P: 28.310	06.7-33.0	5.720	P: 24.026	05.0-33.0	8.421

represents cognitive flexibility) and the D and P scores ("D" and "P" in Table 2) of the DIT.

An individual's score in relation to the sample median on the Stroop Test operationally defines the flexible-inflexible classification. Those above the median (greater than or equal to a score of 48 for this sample) were classified as flexible; those below the median (less than a score of 48 for this sample) were classified as inflexible.

Testing of the Hypotheses

The results noted above give a general description of the sample. Analysis of the four null hypotheses, however, necessitated testing the significance of frequency differences.

Using the median of the sample, the expected frequency of individuals above the median should be equal to the number below the median in the top two quartile groupings of both the DIT's P and D sample results. A one-tailed chi-square test was used to analyze the differences between the expected frequencies and the observed, or actual, frequencies.

A one-tailed chi-square analysis requires a correction factor in chi-square tables. A non-directional analysis with one degree of freedom with $p < .05$ requires a chi-square of 3.84. Chi-square

tables, however, work with a two-tailed model not directly applicable to directional analysis.

The hypotheses in this study look not only to significant differences in the frequencies, but also to the direction (direction here referring to flexible versus not flexible) of the greater frequencies. This makes the analysis directional. Corrections for this difference involve using the two-tailed, $p < .10$ chi-square of 2.71 instead of 3.84 for each of the hypotheses (Ferguson, 1981). The reader will note that future references to $p < .05$ will represent a corrected chi-square figure for a directional test with one degree of freedom.

Hypothesis One

Among those subjects with a P score of 35-46 (between the second and third quartile points) on the DIT, there will fail to be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median.

Table 3 shows descriptive data and the contingency table information related to this hypothesis. Calculation of a chi-square on the P scores in this range resulted in a chi-square of .20 with one degree of freedom and $p > .05$. This failed to meet the .05 statistical significance level. Thus null hypothesis one is retained. There are no significantly more flexible than

Table 3

Descriptive Data Related to Hypothesis One

Number of subjects scoring between the second and third quartile points on P				45
Subjects classified as "Flexible"				24
Subjects classified as "Not Flexible"				21
Mean of P scores				
	Flexible			40.45
	Not flexible			38.77
Stroop Test score	Observed	Expected	$(O-E)^2 / E$	
Above median ≥ 48	24	22.5	0.1	
Below median < 48	21	22.5	0.1	
Chi-square = 0.20; $p > .05$ non-significant finding				

inflexible individuals between the second and third quartile points on the P score of the DIT.

Hypothesis Two

Among those subjects with a D score of 21-27 (between the second and third quartile points) on the DIT, there will fail to be a significantly higher frequency of Stroop flexibility scores above the sample median than below it.

Table 4 shows descriptive data and the contingency table information related to this hypothesis. A chi-square of 3.50 with one degree of freedom and $p < .05$ were found for this range of scores which meets the .05 statistical significance level. Thus null hypothesis two is rejected. There are more flexible than inflexible individuals between the second and third quartile points on the D score of the DIT.

Hypothesis Three

Among those subjects with a P score of 47 or higher (above the third quartile point) on the DIT, there will fail to be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median.

Table 5 shows descriptive data and the contingency table information related to this hypothesis. Calculation of a chi-square on the P scores in this range

Table 4

Descriptive Data Related to Hypothesis Two

Number of subjects scoring between the second and third quartile points on D			56
Subjects classified as "Flexible"			35
Subjects classified as "Not Flexible"			21
Mean of D scores			
	Flexible		23.89
	Not flexible		22.88
Stroop Test score	Observed	Expected	$(O-E)^2 / E$
Above median ≥ 48	35	28	1.75
Below median < 48	21	28	1.75

Chi-square = 3.50; $p < .05$; significant finding

Table 5

Descriptive Data Related to Hypothesis Three

Number of subjects scoring above the third quartile point on P				15
Subjects classified as "Flexible"				11
Subjects classified as "Not Flexible"				4
Mean of P scores				
	Flexible			51.62
	Not flexible			54.74
Stroop Test score	Observed	Expected		$(O-E)^2 / E$
Above median ≥ 48	11	7.5		1.63
Below median < 48	4	7.5		1.63
Chi-square = 3.27; $p < .05$ significant finding				

resulted in a chi-square of 3.27 with one degree of freedom and $p < .05$. This also meets the .05 statistical significance level. Thus the third null hypothesis is rejected. There are more flexible than inflexible individuals above the third quartile point on the P score of the DIT.

Hypothesis Four

Among those subjects with a D score of 28 or higher (above the third quartile point) on the DIT, there will fail to be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median.

Table 6 shows descriptive data and the contingency table information related to this hypothesis. The data in this range produced a chi-square of 0.36 with one degree of freedom and $p > .05$. Thus, null hypothesis four is retained. There are no more flexible than inflexible individuals above the third quartile point on the D score of the DIT.

Summary of Findings

The second and third null hypotheses were rejected at the .05 level, thereby supporting the corresponding experimental hypotheses. However, the data failed to reject the first and fourth null hypotheses at the .05 level.

Table 6

Descriptive Data Related to Hypothesis Four

Number of subjects scoring above the third quartile point on D			25
Subjects classified as "Flexible"			14
Subjects classified as "Not Flexible"			11
Mean of D scores			
	Flexible		33.04
	Not flexible		29.97
Stroop Test score	Observed	Expected	$(O-E)^2 / E$
Above median ≥ 48	14	12.5	0.18
Below median < 48	11	12.5	0.18

Chi-square = 0.36; $p > .05$ non-significant finding

Discussion

A review of the findings thus shows that the results support the second and third research hypotheses, but failed to support the first and fourth research hypotheses. To determine the significance of these results, it is necessary to explore these findings in terms of hypothesis interpretation and integration.

Support of the Second Hypothesis

Statistically significant findings on this hypothesis means that among those with D scores between the second and third quartile points there were significantly more individuals classified as "flexible" than "not flexible." As stated previously, D scores represent a general index of moral reasoning maturity which is developed from a weighted formula of answers from stages one through six. In terms of the hypothesis, the results support the hypothesized necessary but not sufficient relationship between cognitive flexibility and moral reasoning.

Support of the Third Hypothesis

The results show a significantly greater frequency of "flexible" versus "not flexible" individuals scoring above the third quartile point on the P index. In contrast to the D score, the P score consists of a weighted formula using levels 5 and 6 of the DIT. More

simply stated, these findings also support a necessary but not sufficient relationship between moral reasoning and cognitive flexibility.

Failure to support the First and Fourth Hypotheses

Analysis of these hypotheses failed to support the proposed necessary but not sufficient relationship for the scores between the second and third quartile points on the P score and above the third quartile point on the D score. However, the "trends" or "tendencies" in the data (the number of subjects and differences in moral reasoning means between flexible and inflexible groups--see Table 2 and Figures 7, 8, 9, and 10) lend informal support to these research hypotheses. The follow-up tests of the differences of means gave statistically significant support to these same hypotheses.

Figures 7, 8, 9, and 10 show the cognitive flexibility means ("CF") and the DIT P and D means ("P" and "D") for the lower two, third, and top groups determined by the DIT adapted quartile groupings.

In statistical support of the classification, "trend", directional t tests were used to analyze the P and D means of the top two quartile groupings. Each t test compared two means--the flexible versus the not flexible means on the P and D measures.

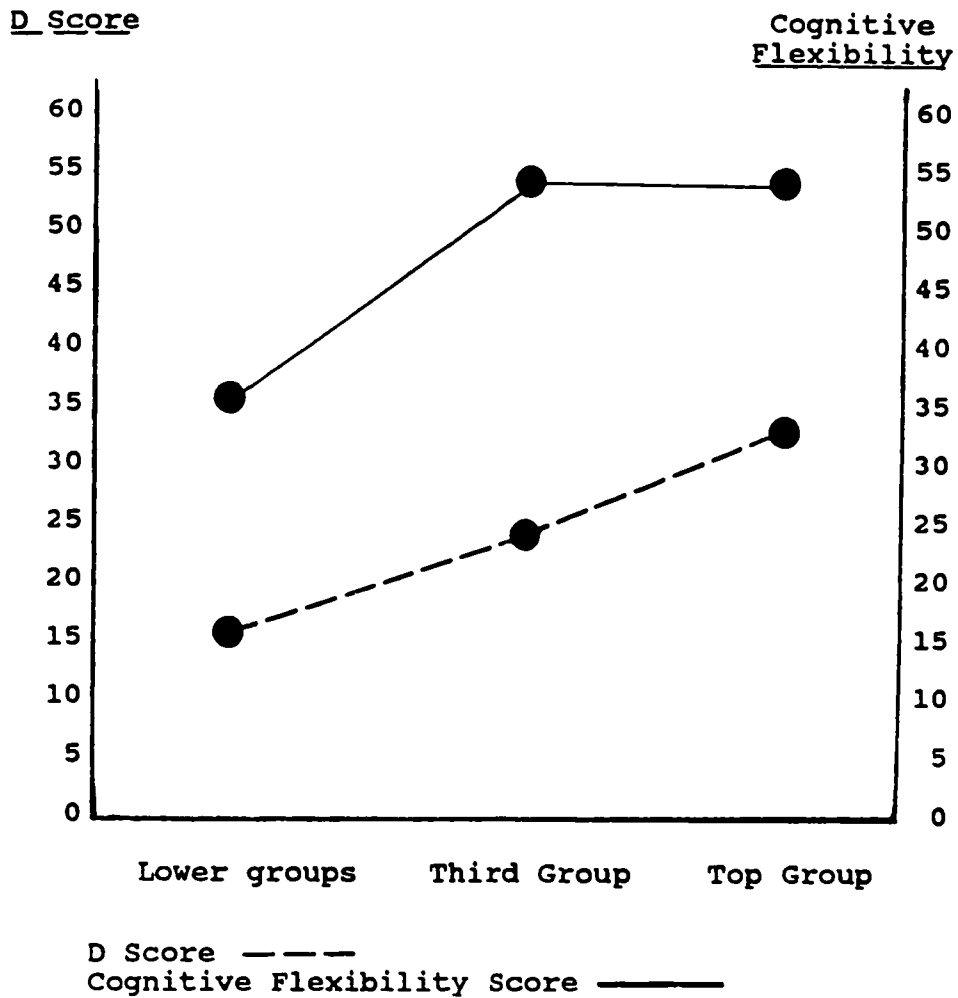


Figure 7. D score and flexibility score means for the lower two (below the second quartile point), third (between the second and third quartile points), and fourth (above the third quartile point) quartile groups for those classified as "flexible".

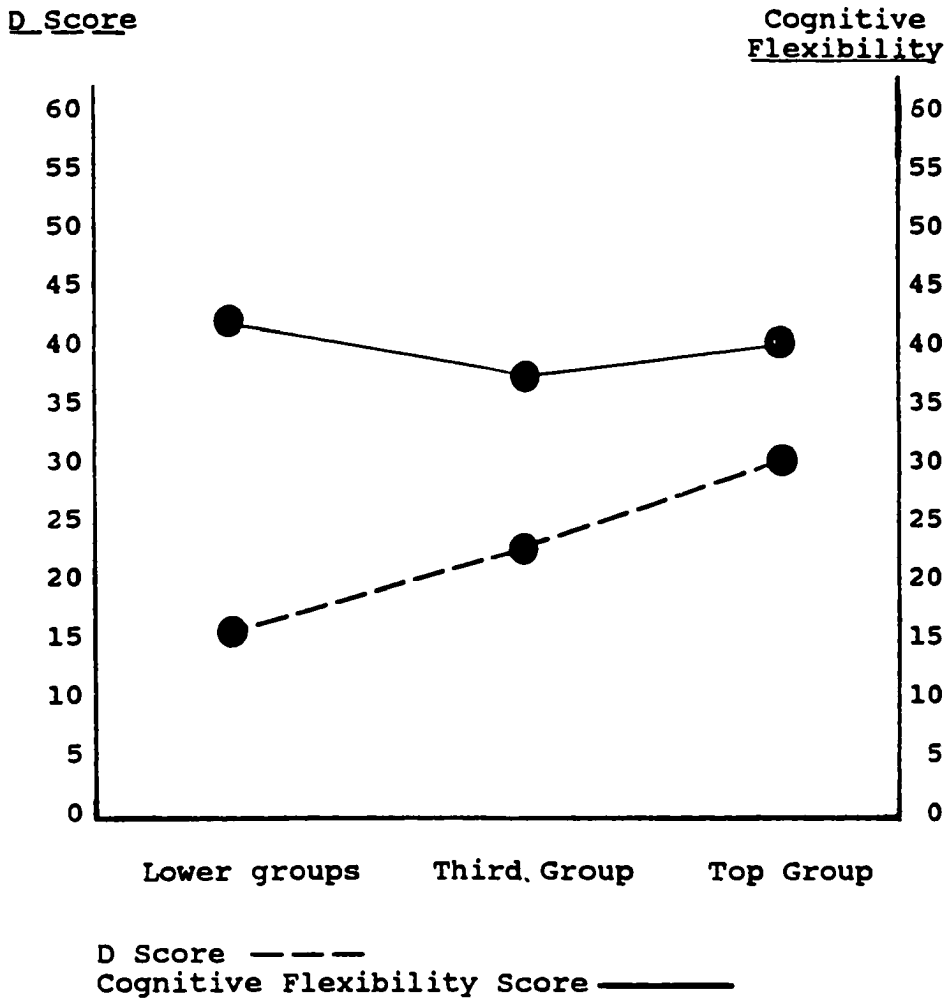


Figure 8. D score and flexibility score means for the lower two (below the second quartile point), third (between second and third quartile points), and fourth (above the third quartile point) quartile groups for those classified as "not flexible".

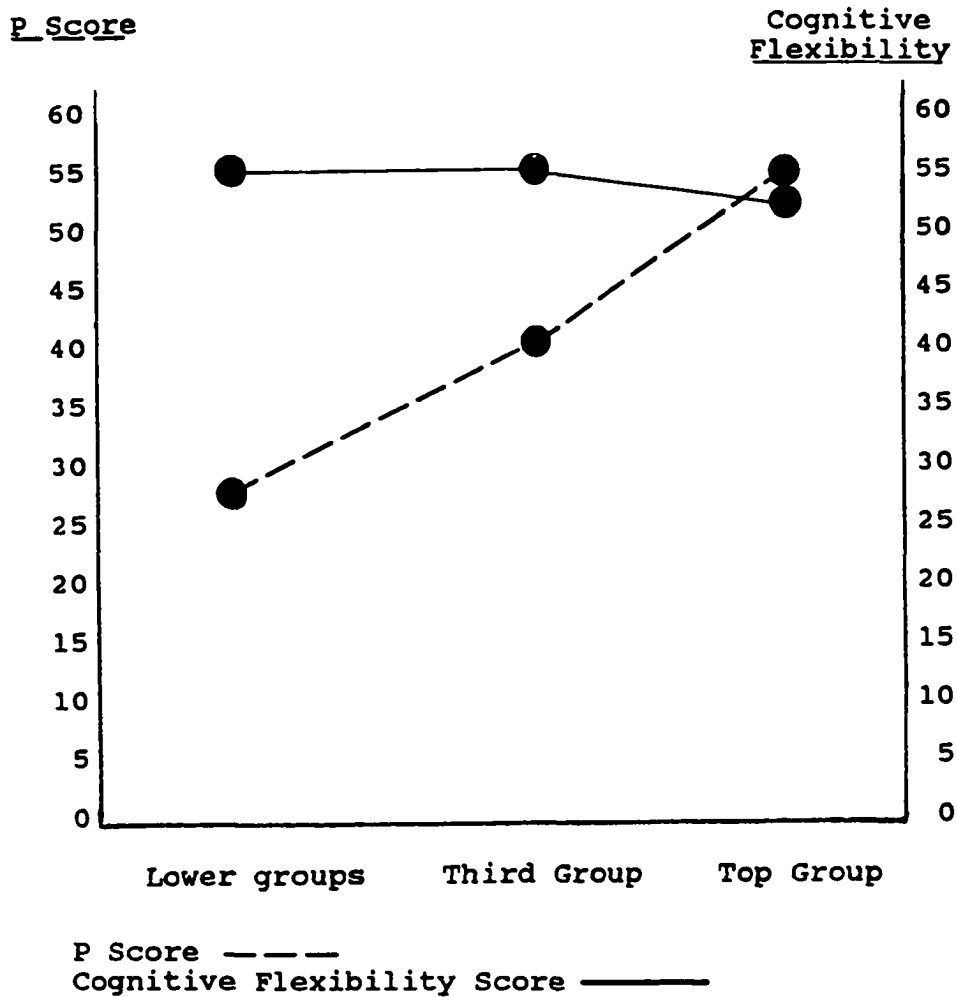


Figure 9. P score and flexibility score means for the lower two (below the second quartile point), third (between the second and third quartile points), and fourth (above the third quartile point) quartile groups for those classified as "flexible".

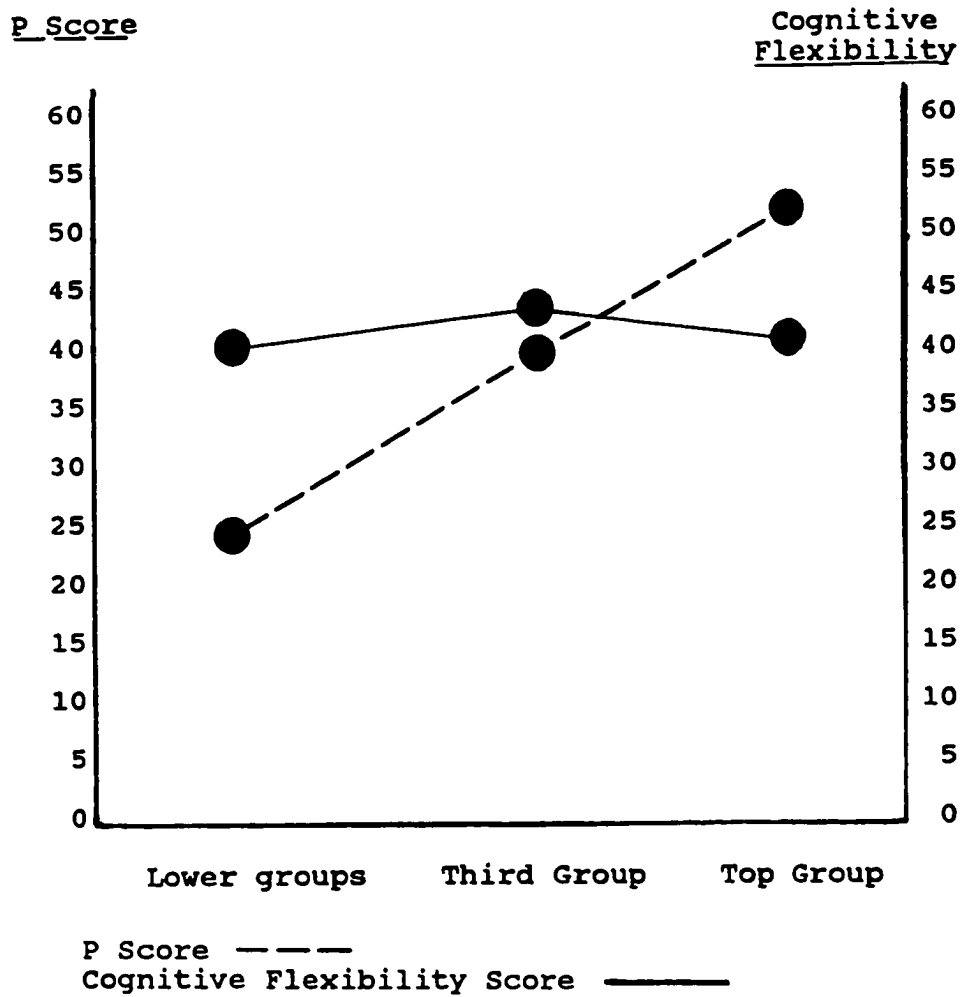


Figure 10. P score and flexibility score means for the lower two (below the second quartile point), third (between the second and third quartile point), and fourth (above the third quartile point) quartile groups for those classified as "not flexible".

Table 7 shows the results of these analyses. The t test results on the data from hypotheses one and four, hypotheses not supported by the chi-square tests, indicate that the means on the moral reasoning measures were significantly higher for the flexible than for the not flexible subjects.

Chi-square analyses, chosen to test the hypotheses, were believed more probably to determine subtle differences between flexible and not flexible subjects. Differences in the means between the flexible/not flexible subjects on the D and P scores within the same quartile groupings, moreover, was not anticipated. The interpretation of a necessary but not sufficient relationship rested on the number of flexible versus not flexible individuals who were in the higher moral reasoning groups. While chi-square tests best suited the hypotheses, it is believed that the t tests provide important additional statistical support for those hypotheses previously not supported.

It is the opinion of this researcher that the information just mentioned is both statistically significant (although not with the test of choice for testing hypotheses) and theoretically significant, especially when viewed in terms of support for all of the hypotheses.

Table 7

Hypotheses-related Comparisons Between Flexible and Not Flexible Groups on P and D Scores

<u>Hypothesis</u>	<u>Subjects</u>	<u>Means Per Group</u>	<u>Variance</u>
First	Flex 24	P = 40.45	$\sigma^2 = 12.66$
	Not Flex 21	P = 38.78	$\sigma^2 = 8.90$
$\underline{t} = 1.692$ with 43 degrees of freedom in directional test. $p < .05$; Sig.			
Second	Flex 35	D = 23.89	$\sigma^2 = 3.70$
	Not Flex 21	D = 22.88	$\sigma^2 = 4.61$
$\underline{t} = 1.812$ with 54 degrees of freedom in directional test. $p < .05$; Sig.			
Third	Flex 11	P = 54.74	$\sigma^2 = 81.25$
	Not Flex 4	P = 51.62	$\sigma^2 = 102.40$
$\underline{t} = 0.580$ with 13 degrees of freedom in directional test. $p < .05$; Sig.			
Fourth	Flex 14	D = 33.04	$\sigma^2 = 12.69$
	Not Flex 11	D = 29.973	$\sigma^2 = 4.70$
$\underline{t} = 2.502$ with 23 degrees of freedom in directional test. $p < .01$; Sig.			

It is proposed that the results may be due to a lack of power in either the sensitivity of the chosen instruments or, more probably, in the relatively small number of subjects, both of which could lead to Type II errors. In terms of the fourth hypothesis, one would do well to look first to the usable sample size which was smaller than expected.

Ferguson (1988, pages 201-216) recommends a minimum expected frequency of 5 for each cell for a chi-square test. The sample size of 130 would normally give expected frequencies of close to 32.5 in each quartile grouping--paralleling that of the DIT norming samples. As it turned out, however, the DIT distributions were very different (see Figures 5 and 6).

In the D score distribution 56 were above the second quartile point and 25 between the second and third quartile point. On the P scores, 45 were above the second quartile point and only 15 were between the second and third quartile points.

Therefore, while the overall number of subjects utilized exceeded statistical needs, lower frequencies were found than expected. This is an interesting point to note since the DIT uses adjusted quartile groupings (scores adjusted downward--see Chapter 3) to promote a more reasonable research spread than would be found in a mere quartile division of possible points in moral

development scores. It may be that the testing situation induced stress, which in turn led to regressed scores. However, in view of the procedures and controls used, this possibility must remain highly speculative.

This lowering of scores may also reflect, in part, the findings of Cullman (1989) (see page 61). His report that the P score underestimated a conservative religious group, similar to that used in this study, may be seen in the lower number of subjects above the third quartile point on the P score.

While the first hypothesis did not depend on the lower frequencies to the extent found in the top quartile grouping, it is also suggested that sample size may have limited the power of this analysis. It may be that having higher frequencies for analysis would have increased the chances of finding subtle, yet important differences.

However, these statements do assume sufficiently sensitive testing instruments. While these instruments are believed to be the most sensitive and valid in current usage, this does not necessarily mean that they have sufficient power to detect subtle but nevertheless important differences. Should an improved version of the instruments be available in the future, further investigation of this variable would certainly be warranted.

If Type II errors have indeed occurred, it remains for other researchers to explore further the possibilities of undiscovered, confounding variables.

Integration of findings

The failure of the data to support two of the four hypotheses does not create contradictory interpretations for, as noted above, it appears that integration of the findings are not only possible, but are indeed meaningful.

Integration of the two supported hypotheses with the "tendencies" mentioned previously of the other two hypotheses clearly supports a necessary but not sufficient relationship between cognitive flexibility and moral reasoning. The significance and implications of this relationship follow in Chapter 5.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Personality, a construct representing the dynamic integration of the individual, remains complicated, both in theory and in research. This study, while proposing a paradigm of one aspect of personality, primarily focused on the empirical exploration within that paradigm of the relationship between cognitive flexibility and moral reasoning. To date, researchers had not related the Stroop Color and Word Test and the Defining Issues Test to moral reasoning.

The purpose of this study was to determine if there is a relationship between moral reasoning, as measured by the DIT, and cognitive flexibility, as measured by the Stroop Color and Word Test in order to provide evidence in support of this proposed mosaic paradigm and in particular the construct of cognitive flexibility. It was not intended to generalize the findings to specific populations. The paradigm also provides a theoretical perspective on how, in one respect, an individual interacts with his environment.

Summary of Methodology

The Defining Issues Test and the Stroop Color and Word Test were administered to freshman and sophomore college students. Half of the students took the DIT first, and half took the Stroop Test first. The DIT data were analyzed by computer at the Center for Moral Development in Minneapolis; the Stroop Test was scored by hand, as were the data with chi-square and descriptive analyses.

Summary of Findings

The data did not support the first research hypothesis (chi-square = .20, $p > .05$) which stated that among those subjects with a P score (see page 17 for a description of P and D scores on the DIT) of 35-46 on the DIT, there would be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median.

The data did support the second hypothesis (chi-square = 3.5, $p < .05$) which stated that among those subjects with a D score of 21-27 on the DIT, there would be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median.

The data also supported the third hypothesis (chi-square 3.27, $p < .05$) which stated that among those subjects with a P score of 47 or higher there would be a

significantly higher frequency of Stroop flexibility scores above the sample median than below the median.

The data failed, however, to support the fourth hypothesis (chi-square 0.36, $p > .05$) which stated that among those subjects with a D score of 28 or higher on the DIT, there would be a significantly higher frequency of Stroop flexibility scores above the sample median than below the median (see pages 92 - 99 for more detailed explanation).

In summary, the findings supported the second and third research hypotheses, but they failed to significantly support the first and fourth hypotheses. While findings on the first and fourth hypotheses showed "tendencies" (the means of the flexible group are higher than those of the not flexible group) supporting the research hypotheses, they failed to reach statistical significance with the chosen statistical tests. It remains unknown if increased sample size or further revisions of the instruments would make any difference in the results and the following interpretation.

Conclusions

Full support, or lack of support, of all four hypotheses would naturally make analysis of results simpler. Support of all four would lead directly to a consideration of the importance of the findings. Lack of support might direct the attention to the implications of

such findings and possible modifications of the research design for future use. Thus, either outcome would provide a basis for further research. Hypothesis findings and interpretations, therefore, are related to theory, which, in turn, may be applied to individuals as well as to organizations.

It is believed that the findings of this study are a contribution to knowledge of both a statistically significant and non-statistically significant (trend) nature; and therefore, in this case, both of the above stated possibilities of no support or full support must be explored in the discussion. While more technically complicated, the following discussion suggests the significance of the hypotheses and provides insights into the proposed paradigm.

Discussion of the results

The importance and implications of the hypotheses focus on the relationship between cognitive flexibility and moral reasoning. As stated earlier (see Chapter 4), the combined significant and non-significant findings respectively support, directly and indirectly, the existence of a relationship between these two aspects of the personality.

It may be conjectured that cognitive flexibility is a prerequisite for higher moral development. It is not, however, the only component needed for such

development. In fact, a number of subjects (28 on the DIT D score; 41 on the DIT P score) with a "flexible" classification on the Stroop Test failed to show average or above average moral development. It may be that natural and supernatural factors, when combined with cognitive flexibility, prompt higher moral development.

The importance of this possibility of higher moral reasoning lies in (1) the definitions given of moral reasoning, (2) its application in particular situations, and (3) in the factors which affect the level of moral reasoning attained. For example, varied educational, religious, and other systems (a group of interdependent individuals under the influence of related functions creating a functional unit) claim to promote and utilize higher moral reasoning. Naturally, as these systems vary, so do the forms of moral reasoning within these settings.

The findings of this study speak to the necessity of individual and collective cognitive flexibility within these forms. Cognitive rigidity (relative lack of cognitive flexibility--also called cognitive constriction) used to either maintain a system (religious, educational, political, corporate, and other), or to teach those in the system, may preclude development of the flexibility assumed here to be necessary for higher moral and other reasoning.

Fear of heresy, or even fear of change itself, may lead to stunted individual/system growth, regression of moral and other types of reasoning, loss of system membership, and even demise of the system. As mentioned in Chapter 2, stress can cause reasoning regression at various levels. The intra- and inter-individual conflict and fears experienced can prompt regression and even greater rigidity. A church or educational system, for example, presumed to be bastions of reasoning, can quite possibly become vehicles for individual and collective regression.

It might be wise at this point to explore a possible question of the reader. Can cognitive flexibility lessen the "protection" against "genuine error"? While recognizing the subjective and objective qualities of "truth" and "error", the question must still be answered.

Based on the proposed paradigm and its definition of cognitive flexibility, the answer is that it does not increase already existing dangers of accepting errors. The characteristics of cognitive flexibility include tendencies to process contrasting ideas or viewpoints and to deal with ambiguous information. Prior research (see page 41) found that those classified as flexible also show a higher ability to deal with the accompanying emotions of any given analysis or decision than those less flexible.

This does not, however, equate with a greater acceptance of "error" or rejection of "truth". Quite to the contrary, it is believed that it is the flexibility itself which "protects" the "truth". This may or may not include rejection of any given belief or behavior; this may or may not include acceptance of any given belief or behavior. It does, however, allow presumed (by an individual and/or system) "truth" and "error" to be similarly analyzed. It is this analysis that moves the beliefs beyond presumption. While it does not prevent acceptance of "error" or rejection of "truth", it does allow room for the exploration of "truth".

If the reader gleans nothing from this research save one idea, it is hoped that it is an understanding of the necessity to risk the inherent dangers involved in seeking out the truth--its beliefs, behaviors, and moral implications.

It is believed that people rob the "truth", moral reasoning, and moral behavior of their most precious assets (depth of understanding, ability to change, etc.) by "protecting" them out of fear of rejecting or losing them. People themselves may rob themselves of "truth" because of this same fear.

To move beyond this fear, individuals allow the capability of cognitive flexibility to guide cognitive processing through appropriately selected or newly developed mosaics. This type of cognitive processing leads to

the growth of the individual. Moreover, it is believed that this growth embodies higher moral reasoning, higher moral behavior, and a relatively greater understanding of "truth".

Fortunately, the risks taken by an individual or system in viewing alternatives, exploring what is ambiguous, communicating with others with the same and opposing views, recognizing their own and others' emotions, and, in general, maintaining cognitive flexibility can become the basis for cognitive growth, adaptation, and survival. An individual must incorporate the characteristics of cognitive flexibility, such as those just mentioned, into his personality. Similarly an organization must incorporate cognitive flexibility into the training of its members in order to grow. Unfortunately, some individuals perceive this as a risk to be avoided at all costs.

A lack of understanding regarding the relationship between cognitive flexibility and moral reasoning in individuals and organizations can lead to a standstill or even to regression in moral development and other cognitive functions. Conversely, a clear understanding of this relationship by individuals and organizations can lead to more meaningful applications.

Incorporation requires, however, that an individual or an organization have cognitive flexibility as a goal or, at least, regard cognitive flexibility as

important. Usage of metacognition (thinking about thinking), understanding the dynamics of the interaction of reason and emotion, tolerance in dealing with ambiguity, and general practices of independent and open-minded thinking represent possible ways in which cognitive flexibility may be developed. Awareness and acceptance of flexibility itself may very well be the cornerstone of such development.

The following delineates the importance and implications of the findings as applied to the proposed paradigm.

Personality paradigm

Important in beginning this paradigm exploration are findings on cognitive flexibility. Again, it is not proposed that this study "proves" the paradigm, but rather that it begins the investigation of support for the paradigm. As such, the importance of this research lies in the initial information involving flexibility and in the viability of the paradigm itself.

Paradigm reviewed. A pattern or mosaic is a unique combination of cognitive processes within the mind. The first mosaic may be genetically derived, prompting early development. It is this first pattern that allows for the first interaction with the environment.

Once this first processing pattern is firmly established, the person is able to interpret and utilize data from the environment. This mosaic, therefore, exists as just one of many eventual mosaics. Varied experiences, maturation, and learning naturally prompt new patterns.

The proposed paradigm consists of a hierarchy of many such mosaics involving the cognitive subsystem. It is believed that this set of mosaics has two dimensions: (1) adaptability (ranging from low to high adaptability) and (2) mosaic recency (ranging from earliest formed to most recently formed). The capacity to select for use in a situation an appropriate mosaic from among the mosaic repertoire augments psychological and biological adaptation and survival.

If this cognitive flexibility is compromised, by stress for example, individuals may show inappropriate hierarchical regression (inappropriate usage of mosaic --a less adaptive mosaic). Regression patterns may vary in inappropriateness for any given situation, and the level of inappropriateness is relative to the individual's biological and psychological maturity.

The duration and dominating quality of such regression depends on stress-related circumstances, the cognitive flexibility of the personality, and the health and coping mechanisms of the individuals. It is

believed that cognitive flexibility is necessary for the growth and adaptation of an individual.

Cognitive flexibility. Cognitive flexibility is the capacity to select one mosaic from a pattern repertoire and to create other patterns as needed. It forms the core of the paradigm and describes the individual interacting with the environment.

While it is not proposed to fully define or subdivide the components or processes of any given mosaic (an impossible task due to the complex, individualized, conceptual nature of mosaics), an example is offered in hopes of further clarifying the idea of cognitive flexibility.

A prominent example comes from events occurring during the writing of this dissertation--that of the "Chinese revolution" (the Tianamen Square, Beijing incident in 1989). Utilizing different mosaics, an individual may "understand" this world event in correspondingly different ways. Here "understanding" includes cognition of the causes, dynamics of the situation, and the consequences and implications of the event within the context of cultural, social, political, and economic characteristics of any given situation.

For instance, an individual may experience fear concerning a possible World War III. In the proposed

paradigm, this fear may cause regression and thus use of a less adaptive mosaic.

One such mosaic (see page 13, mosaic C) might involve allowing for little ambiguous information, viewing the event within the context of past United States history, concern for how it affects that individual, the expressing of moderate emotion, and focus on what a particular significant other person considers important about the event.

In more specific terms, the individual using this mosaic may look to one particular news source, show preference for a particular type of sensory input such as audio or visual information concerning the event, view the Chinese Revolution as merely a transplanted American Revolution, and focus only on information of how the event will economically affect the United States and himself.

Further interaction of the cognitive subsystem with the values, affective, sensory, and motor subsystems might lead to particular feelings, attitudes, and behavior. Feelings of patriotism with a positive attitude of "rightness" of the event may lead to demonstrating with Chinese students in his city. Moreover, it is believed that this mosaic's processing of this information will affect future processing with this topic, with similar events, and even appropriately/inappropriately with dissimilar events. In other words, what

we are is a sum total of our past experiences and choices of processing.

While the reader may not find fault with the general results of this mosaic's effect, this mosaic could prove inferior to other, more adaptive mosaics. Another limitation of this mosaic may be the individual's looking to a source outside of himself to shape, not merely to add to, his perceptions of the event.

Beyond the type, form, and amount of input processed, the individual simply did not deal with data which might be conflicting. It is believed that a particular mosaic defines the parameters of conflict/ambiguity. Here, if new information conflicted with information from the chosen source, the individual more than likely just ignored the new data.

In not dealing with conflicting information and perspectives, stress may have been reduced. Processing conflicting information involves the problem of determining what is to be believed--a situation which draws energy. It is proposed that this drain increases the level of stress, or may even equate with stress. Yet, while this mosaic may have reduced the stress of the situation for the individual, it remains doubtful that the exchange for a more adaptable mosaic was equitable.

This reduction in the amount of information utilized, the limited cultural, political, and economic viewpoints, and the particular basis for feelings,

attitudes, and behavior describe a less adaptive mosaic. The individual did process the information; however, another mosaic might have proven more adaptive.

For example, an individual with cognitive flexibility would be aware of his own cognitive processes and would process any information with insights into his own thinking (see page 11, mosaic A).

This more adaptive mosaic might have included a relatively higher tolerance of ambiguity/conflict in the information, the viewpoint of Chinese culture and politics, concern for possible consequences for the individuals in China, and an ability to express the feelings evoked--a mosaic tailored (drawn from repertoire or created) for this event.

This individual may incorporate as many forms and sources of information--dealing with ambiguous or conflicting reports--to arrive at what he believes best represents the situation, with a realization and acceptance of what he will be unable to ascertain. He may view the Chinese Revolution as both similar and not similar to other revolutions, but would maintain an understanding within the context of the Chinese culture.

The cognitive subsystem interacting with values, affect, sensory, and motor subsystems produces feelings, attitudes, and a behavior repertoire. His feelings may involve a wide range of acceptable and expressed affect, while he may not have established a set attitude beyond

that of a positive attitude towards the event. He may exhibit no behavior related to the revolution save that of discussing the event with others.

This mosaic incorporates those components more suited to the event than the prior mosaic. The amount of information, the ability to perceive an event from another cultural viewpoint, and the gleaning of "truth" from a wide variety of sources and forms exhibits a broadly based foundation of adaptability.

While the attitudes or behaviors resulting from the chosen appropriate and inappropriate mosaics may not differ, the reasoning and potential behaviors of the appropriate mosaic are more adaptive to the situation--an analysis that proves more valuable in understanding current events in China.

This does not mean, however, that this inappropriate mosaic would be inappropriate in all situations. It may be helpful, for instance in learning a simple, highly motor-focused task. Non-conflicting information from a competent source processed by a "fill-in-the-blank" mentality (mosaic stereotype which leaves much of the shaping of the input to someone else) might prove best for this situation.

It is not believed that a new mosaic exists for every new situation, but rather that a flexible individual is more likely to use the most appropriate mosaic. The appropriateness depends on what is available

from the environment and from prior experience or insight, the individual's cognitive abilities, and the complexity of the situation. In some cases this may involve a new mosaic, but in many cases this would be unnecessary, even inappropriate. It is cognitive flexibility that makes the choice possible.

The training of cognitive flexibility and an awareness of thinking are believed to be primarily conscious processes (see page 13, Figure 3). However, choice of any new mosaic may not be a conscious choice. Awareness and self-development of cognitive flexibility, however, prompt the likelihood of choosing (unconsciously/consciously) more adaptive mosaics.

Each mosaic reflects the unique preferences and experiences of the individual. Here uniqueness results from a myriad of genetic predispositions interacting with a possibly infinite combination of experiences which forms a personalized mosaic repertoire. The two mosaics mentioned above were chosen for their extreme differences in processing. It is proposed that many mosaics exist with any number of cognitive components. It is an individual's cognitive flexibility which determines the number, nature, and creation of mosaics best suited for adaptation, survival, and growth within the many situations encountered daily.

The following section integrates this explanation of cognitive flexibility and mosaics and reviews the proposed paradigm with the research findings.

Integration of proposed paradigm with findings

The research results and interpretations show a necessary but not sufficient relationship between cognitive flexibility and moral reasoning (see pages 91 - 101 where a more complete assessment of the findings is addressed). This means that flexibility within the cognitive subsystem is a necessary element of higher moral reasoning which is assumed to involve the value and cognitive subsystems. It also means that such flexibility is not the only element necessary for higher moral reasoning. This impacts on the proposed paradigm in terms of indicating a relationship among the constructs of cognitive flexibility, cognitive mosaics, and the cognitive and other subsystems.

This study suggests and supports a relationship between flexibility and general reasoning abilities. It is believed that these abilities, in turn, affect other subsystems within the proposed paradigm.

As mentioned previously according to the Wardell and Royce model, personality exists as an integrative function. Moral reasoning in this study, for instance, exists in the interaction between the cognitive and value subsystems within the personality. Such interactions

exist between other subsystems, creating a dynamic whole called the personality.

In fact, addition of one of these subsystems--affect--is required in the description of "flexible" individuals (see Chapter 2). This researcher prefers the term cognitive-affective flexibility to cognitive flexibility, as the former more accurately reflects the dynamic characteristic of a mosaic.

Within this paradigm, it is believed that higher moral reasoning represents the choice of an appropriate mosaic. This more highly developed reasoning involves analyzing a problem from multiple perspectives; inclusion of ambiguous and/or conflicting information; acceptance of emotional input; and often, processing from a perspective unique to the analysis of a particular situation--a process descriptive of cognitive flexibility.

This perspective involves a combination of cognitive processes which in this study is called a mosaic or pattern. The choice of an appropriate cognitive mosaic is a function of cognitive flexibility.

Again, the interpretation of the results of this study show that cognitive flexibility appears to be a necessary basis for higher moral reasoning. Yet students classified as "flexible" on the Stroop Test did not all show higher moral reasoning on the DIT. It is suggested, therefore, that cognitive flexibility is not the only factor involved in higher moral reasoning. Instead

cognitive flexibility is a necessary but not sufficient basis for higher moral reasoning.

This study, therefore, indicates the proposed relationship between cognitive flexibility, cognitive mosaics, and the cognitive and other subsystems within the context of the proposed paradigm. In other words, the research findings of a relationship between cognitive flexibility (Stroop Test scores) and moral reasoning (DIT scores) can be taken as evidence for the paradigm subsystems of which they are considered a part.

The relationship between cognitive flexibility and moral reasoning can be taken also as evidence for an interaction between the subsystems. Furthermore, with cognitive flexibility so closely related to cognitive mosaics in the paradigm, evidence for cognitive flexibility can be considered as evidence for the existence of cognitive mosaics.

While cognitive mosaics remain a construct reflecting processes within the personality, support of this construct provides a framework for analysis of both cognitive processes and the personality.

In light of these associations, the proposed personality paradigm appears viable. The significance of this possibility is that of the heuristic potential of any newly proposed personality paradigm. That, in turn, has further ramifications for theory and practice.

In addition to the associations and implications just previously noted, there are other, more extended implications.

For instance, an individual or society may knowingly affect the number, type, and sophistication of mosaics utilized by an individual. It is believed that these mosaics develop from a genetic and environmental relationship, although the specific genetic limitations and the actual amount of possible environmental control cannot be determined.

While the proposed paradigm remains a conceptualization for explaining cognitive processes in general, the implications and potential applications can be explored in terms of relation to early development, continuing development, and links with behavior.

Early development. As mentioned earlier (see Chapter 1, Description of the Proposed Paradigm), the paradigm proposes a developmental task of a first-learned mosaic. [(The development of subsequent mosaics is in part explainable through the use of developmental task theory (e.g., Havighurst, 1972)].

Can parents, teachers, friends, and others knowingly influence these developmental tasks? If so, how might this be accomplished? While developing flexibility and more advanced mosaics is envisioned as a continuing task, is there a "critical" period for cognitive

flexibility or the formation of any particular mosaic? As this research represents only beginning paradigm exploration, the answers to these questions remain tentative.

It is believed, however, that beginning answers include (1) the possibility of nurturing cognitive flexibility (and additional mosaics), (2) teaching techniques for self-growth, and (3) modeling cognitive flexibility. This "nurturing" may begin (it is not implied that full self-awareness and understanding occurs within the first few years) with teaching and modeling a tenet of metacognition--awareness of one's own thinking. Upon this foundation, skills in recognizing and dealing with conflicting and ambiguous information and emotions can be demonstrated, taught, prompted, and encouraged.

These objectives can be accomplished through guiding individuals through "novel" and challenging situations and the making of decisions. This guidance includes asking those questions which make a person aware of different perspectives for any situation, modeling relative comfort in the presence of ambiguous information, and teaching them to deal with conflicting ideas within the limits of their cognitive reasoning abilities. Most importantly, this sharing includes showing the developing person how to deal with difficult situations without paralyzing or regression-prompting fear.

In contrast, this does not emphasize the encouragement of individuals to focus on changing "grey" situations (situations involving conflicting, ambiguous information or perspectives with no "right" answer) into black and white problems for which there is a relatively easily recognized answer. Instead it involves training and honing abilities to utilize cognitive flexibility and associated mosaics in accepting or tolerating many life situations of an ambiguous nature.

Moral dilemmas often involve situations where one set of values and morals comes into conflict with alternative sets of values and morals. Cognitive flexibility, the ability to develop or choose a mosaic to deal with a specific situation, allows the individual to incorporate possibly competing values and morals into a unique solution. This relatively more inclusive and developed approach permits a potentially higher form of moral (or other) reasoning. In this approach, the moral decision does not become one of choosing between the morality of stealing versus the value of life. Both aspects are incorporated within a higher moral reasoning utilizing cognitive flexibility.

As many behaviors resulting in growth may become self-reinforced, it is believed that such guidance in cognitive flexibility can promote self-reinforced growth toward increased flexibility and reasoning abilities. Such guidance, however, comes best from cognitively

flexible individuals--these individuals can both teach and model behavior based on personal past experiences.

The ability to discuss openly those ideas and perspectives which differ from one's own belief system requires a great deal of cognitive flexibility. The danger of fear-prompted regression becomes even greater when this conflict involves beliefs of a church, corporation, governmental, educational, or other system. While religious systems may traditionally represent closely held, fought-for beliefs, any system may hold written/unwritten beliefs.

It is recognized that the degree of possible fear from having a belief or resulting code of behavior challenged is definitely related to the importance given such beliefs and/or behaviors, and that some systems naturally involve different levels of importance to an individual. Nonetheless, it is believed that fear and fear-prompted plateaus or regressions may occur in any system where the individual accords undue importance to that system's written/unwritten beliefs.

For example, a political organization may have an unwritten code of behavior that discourages direct confrontation of an advisor's proposal. If one individual challenged this code and did question an idea or even a master plan, for instance, fear may be prompted in those individuals nearing the top of the political ladder. If

this fear results in several of these individuals selecting an inappropriate mosaic, such as one of ignoring all ideas or differing perspectives proposed by the challenging individual, group think may result. This group think, in turn, may result in stagnation or even dissolution of the political party or organization.

Another current example, this one from the corporate world, involves the common belief that spouses cannot or should not work within the same level (usually a high, executive level) of a corporate structure. This experience, new to corporate systems, often results in the firing of one or both executives.

Whatever the fear behind the inability to not even consider all the alternatives to this new dynamic within the system (noted inflexibility in not considering new options sometimes having conflicting and/or ambiguous information about the results of such a situation), the usage of such a fear-prompted mosaic costs corporations valuable human resources. The solution for integrating this relationship into higher levels of many corporations remains unanswered. It is not proposed that the answer itself will be simple or uncomplicated. It is proposed, however, that this is just another example of the relationship between cognitive flexibility, fear, and growth. It shows, moreover, possible results of this interaction within any system.

Can the "average" adult foster cognitive flexibility in youth when this process courts a chance for them to believe and behave in conflict with a societal or religious belief system important to him? Fear of this outcome could lead to cognitive regression and constriction of the adult--which he may unwittingly model and teach them.

If the more mature individual elects the "safer" avenue, those younger than he may or may not finally embrace his belief system. He has, however, taken away opportunities for them to understand their own thinking processes, and he has reduced opportunities for learning the art of cognitive flexibility from his influence.

This absence, in turn, may lead potentially to a new generation of "constricted" individuals who have difficulty in understanding, let alone encouraging, cognitive flexibility in others. Under these circumstances, self-perpetuating "constriction" may lead to stunted individual and organizational growth. It may even lead to the eventual death of a religious, political, societal, or other belief system.

Hope may be found in the proposed belief that cognitive flexibility is a continuing growth task which should be encouraged in adulthood--an occurrence which, in part, may break a vicious cycle of inflexibility.

Continuing development. It is believed that cognitive flexibility and the development of mosaics, while perhaps more easily learned in certain situations, is not restricted to a "critical" growth period. This task potentially continues throughout life. Applications of the proposed paradigm, therefore, go beyond early development to continuing development.

With current knowledge and available testing instruments, means for adult development of cognitive flexibility include, for one, the identification of "flexible" versus "less flexible" individuals. Training programs, inservice seminars, support groups, and counseling can additionally develop their techniques, pacing, and goals to accommodate to the developmental needs of their trainees or clients.

In the graduate preparation of those in the helping profession (see Chapter 1, page 3) adaptive intervention and counseling sessions may prove important in the process of facilitating professional and personal growth. It is not suggested that extended therapy would change this situation, but rather that a variety of services could promote cognitive flexibility and adaptation within and beyond the typical graduate program.

These interventions and services might start with stress-related tactics. For instance, training in conflict-oriented communication, stress reduction, and

coping techniques may, in part, eliminate the fears and anxiety that can evoke more primal, less adaptive mosaics.

Future teaching and counseling practices dealing with hierarchical regression may actually increase cognitive flexibility in those so instructed. It is postulated that working through issues of trust with "less flexible" individuals at regressed levels may produce a more solid foundation within the mosaic hierarchy. It is in moving towards cognitive flexibility, however, that potentials for adaptation, survival, and growth are realized. With further exploration of cognitive flexibility and more advanced techniques of classification, individuals may indeed develop greater capacity for cognitive flexibility.

Cognitive flexibility and behavior. Possible behavioral evidences of cognitive "constriction" and regression have been mentioned previously. In contrast, how will increasing cognitive flexibility translate into behavior? This question involves consideration of the process beginning with information processed through cognitive mosaics and other subsystems as they contribute to the decisions and behavior within the strictures of realized circumstances.

As seen in the context of moral reasoning, cognition is not always consistent with, nor does it predict,

behavior. This is because reasoning exists as only one factor in organizing and acting out options within any behavior repertoire. Since many theories explain the relationship between cognition and behavior (e.g., Bandura, 1977; Piaget, 1951; Tolman, 1948), that synthesis is not attempted in this discussion.

It is proposed, however, that any potential behavior based on a decision involving relatively all-inclusive and synthesized information and insight can be more adaptive and "moral" than behavior based on a "constricted" decision. In other words, it is believed that cognitive flexibility not only increases behavior options, but also increases the potential for more developed and adaptive behaviors within an individual's repertoire. The link between cognitive mosaics and behavior exists, therefore, in a form such as to facilitate the creating of potentially improved behavior.

While this link may never be fully understood, it is believed that the applications mentioned above reflect a potential for individually and societally-based increased cognitive flexibility.

One can hardly speculate on the limits of such potentials. With the immense capabilities and unused potential that exists within the two brain hemispheres, it is suggested that the potential exists for an infinite number of patterns to be developed. The fact that the

mind is composed of two hemispheres instead of a simple mass of neurons suggests a myriad of interactional factors. The importance and further implications of the proposed paradigm lies in (1) heuristically forwarding attention to an understanding of the requirements for facilitating the wholistic integration of the two hemispheres, (2) noting correlation with observations, and (3) developing applications of the theory.

Personality theories, by nature, remain conceptual. It remains for collective observations and empirical explorations of aspects of the theory to support or fail to support the proposed paradigm. This study combined both theory and research in this beginning investigation of the paradigm.

Summary

In combination with findings from the hypotheses, the suggested paradigm advances knowledge and provides encouragement for possible applications. Further analysis of other relationships and aspects of the paradigm lie with future studies.

Recommendations

The following suggestions are made:

Recommendations for practice

1. Recommendations for practice lie in an understanding and employment of cognitive

flexibility within training situations. This involves prompting and using open-mindedness, communication with others with dissimilar viewpoints, appropriate usage of affect, personal comfort with ambiguity, and an insight into "thinking about thinking."

2. Parallel to the preceding suggestion, it is highly recommended that systems of all types (church, education, business-oriented organizations, etc.) incorporate the characteristics of cognitive flexibility into all aspects of their structure and encourage such traits on an individual level.

For further research

1. Relationships between cognitive flexibility and other aspects of personality certainly warrant further investigation.
2. More refined instruments measuring cognitive flexibility need to be developed. It is hoped that such tests will then become available to professionals.
3. It is recommended that other studies empirically explore varying aspects of the

proposed paradigm or framework (e.g., cognitive flexibility and self-concept, cognitive flexibility over time). While the preliminary theoretical nature of the paradigm is recognized, possibilities for empirical support invites investigation.

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PROFILE: 32 year old working towards post-doctorate employment and licensure as a psychologist in the State of Maryland.

EDUCATION:

- Completing a Ph.D. in Counseling Psychology from Andrews University June, 1991.
- B.S. in Psychology from Pacific Union College June, 1982.

**EMPLOYMENT
EXPERIENCE:**

- 9/89-9/90 ● Clinical Psychology Intern
Crownsville Hospital Center
Annapolis, Maryland:
Responsibilities included a wide range of assessment, therapy, and administrative opportunities with diverse populations at this American Psychological Association-approved mental health care facility.
- 9/84-8/87 ● Research/Teaching Assistantship
Andrews University
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Responsibilities included work with the designing, data gathering/analysis, and write-up of several research projects. Teaching/supervising masters/doctoral students in therapy and assessment.

PRESENTATIONS:

- A COMPARISON OF LEFT AND RIGHT HEMISPHERIC PROCESSING OF LETTER SETS VERSUS NONVERBAL SYMBOL SETS Masters Thesis (April, 1987).

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