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A STUDY OF THE DIFFERENCES BETWEEN WRITTEN
MESSAGES ENCODED BY FIELD DEPENDENT AND
FIELD INDEPENDENT SOURCES.

The University of Oklahoma, Ph.D., 1976
Speech

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THE UNIVERSITY OF OKLAHOMA
GRADUATE COLLEGE

A STUDY OF THE DIFFERENCES BETWEEN WRITTEN MESSAGES
ENCODED BY FIELD DEPENDENT AND
FIELD INDEPENDENT SOURCES

A DISSERTATION
SUBMITTED TO THE GRADUATE FACULTY
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degree of
DOCTOR OF PHILOSOPHY

BY
PAULA JANE WRIGHT
Norman, Oklahoma

1976

A STUDY OF THE DIFFERENCES BETWEEN WRITTEN MESSAGES
ENCODED BY FIELD DEPENDENT AND
FIELD INDEPENDENT SOURCES

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A STUDY OF THE DIFFERENCES BETWEEN WRITTEN MESSAGES
ENCODED BY FIELD DEPENDENT AND FIELD
INDEPENDENT SOURCES

By Paula Jane Wright

Major Professor: Wayland Cummings, Ph.D.

This study sought to identify those syntactic differences in messages encoded by field dependent-independent sources which might account for interpersonal attraction and evaluation effects noted in the cognitive style literature. The general questions posed in this study were:

1. What is the relationship between field dependent-independent sources and the messages they encode?
2. What is the relationship between field dependent-independent communication sources and how they perceive themselves in a communication setting?
3. What is the effect of field dependent-independent sources encoded messages on receivers, particularly receivers who are themselves field dependent-independent?

The rationale for the study suggested that the answer to the questions posed would be important to researchers interested in communication issues, cognitive style issues, and educational issues.

To answer these questions, a two-part study was conducted: (1) a syntactic analysis of messages produced by field dependent and field independent sources using SCLA-II; (2) an analysis of variance to determine the effects of these messages on receivers who are field dependent-independent.

The results indicate that:

1. There are differences in the syntactic categories employed in the written messages of field dependent and field independent sources.
2. Written messages encoded by field dependent and field independent sources have different effects on field dependent and field independent receivers:
 - a. Field independent sources are perceived as having a more pleasant disposition than field dependent sources for both field dependent and field independent audiences.
 - b. Receivers perceive sources with whom they are matched for cognitive styles to be more reliable and valuable than sources with whom they are not matched.
 - c. Except in the physical sciences, receivers perceive written messages produced by sources with whom they are matched for cognitive style to be more ordered and precise than messages produced by sources with whom they are not matched.
 - d. Messages about the physical sciences produced by field independent sources are preferred by both field independent and field dependent sources.
3. The choice of message subject content was not a function of field dependence-independence of the encoder.
4. There is a tendency for subjects to rate themselves higher as qualified sources if they write about subjects typically associated with their cognitive style.
5. No sex differences were found on the Hidden Figures Tests scores, a measure of field dependency.

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
LIST OF TABLES	vi
INTRODUCTION	viii
 Chapter	
I. RATIONALE AND REVIEW OF THE LITERATURE	1
Purpose	2
Field Dependence-Independence	3
Field Dependence-Independence and Intellectual Functioning	8
Personality Correlates of Field Dependence- Independence	9
Implications for Communication Research	11
Implications for Education Research	17
Objectives and Expectations of this Study	20
Summary	29
II. METHOD OF ANALYSIS.	30
Procedures	30
Data Analysis.	34
Summary	39
III. RESULTS	41
Empirical Expectation I	41
Empirical Expectation II.	43
Empirical Expectation III	44
Empirical Expectation IV	45
Empirical Expectation V	47
Summary	49
IV. DISCUSSION	50
Reliability of the Findings	50
Empirical Expectations	57
Variable Checks	71
Conclusions	73

	Page
V. IMPLICATIONS FOR FUTURE RESEARCH	75
Future Research in Field Dependence- Independence	76
Future Communication Research.	79
Future Research in Education	81
Conclusion	83
BIBLIOGRAPHY	84
APPENDIX A: INDEPENDENT MEASURES.	91
Hidden Figures Test Cf-1	92
Block Design Subtest of the Wechsler Adult Intelligence Scale	94
APPENDIX B: VARIABLE NAMES USED IN SCLA-II.	95
APPENDIX C: DEPENDENT MEASURES.	100
Instructions to Subjects: Written Messages. .	101
Instructions for Use of the Semantic Differential.	103
Instruments Used in Phase I.	105
Stimulus Messages	106
Instruments Used in Phase III.	112
APPENDIX D: SUPPLEMENTARY DATA.	115
Rotated Factor Loadings for Self-Evaluation Instrument	116
Rotated Factor Loadings for Interest Evaluation Instrument.	117
Rotated Factor Loadings for Source Evaluation Instrument.	118
Rotated Factor Loadings for Message Evaluation Instrument.	119
APPENDIX E: SUPPLEMENTARY DATA.	120
Cell Means for Factor IIIA	121
Cell Means for Factor IIIB	121
Cell Means for Factor IVA.	122
Cell Means for Factor IVB.	122
Descriptive Data for Hidden Figures Test Cf-1 and Block Design	123

LIST OF TABLES

Table	Page
I. T-Tests Between Groups for Hypothesized Syntactic Categories	42
II. Multiple Regression on Four Significant Syntax Variables	43
III. T-Test on Hidden Figures Test Cf-1 Scores by Message Topic	44
IV. Three-Way ANOVA For Source Evaluations, Factor A	45
V. Three-Way ANOVA For Source Evaluations, Factor B	46
VI. Three-Way ANOVA For Message Evaluations, Factor A	47
VII. Three-Way ANOVA For Message Evaluations, Factor B	48
VIII. Intercorrelations Between Independent Measures	72
IX. Rotated Factor Loadings for Self-Evaluation Instrument	116
X. Rotated Factor Loadings for Interest Evaluation Instrument.	117
XI. Rotated Factor Loadings for Source Evaluation Instrument.	118
XII. Rotated Factor Loadings for Message Evaluation Instrument.	119
XIII. Cell Means for Factor IIIA	121
XIV. Cell Means for Factor IIIB	121
XV. Cell Means for Factor IVA.	122
XVI. Cell Means for Factor IVB.	122

Table	Page
XVII. Descriptive Data For Hidden Figures Test Cf-1 and Block Design	123
XVIII. Interjudge Agreement Percentages for Forced-Choice-Sort of Messages	123

INTRODUCTION

During the past twenty years, the interest in the relationship between perception, cognition, and personality has spawned a massive amount of productive investigation and research. This productivity has resulted in an established inquiry into the ways humans perceive, categorize, and react to the external environment. The inquiry currently leads to the notion that humans, in their perceptual and intellectual activities, engage in highly consistent, characteristic modes of functioning. That is, individuals have characteristic cognitive styles which help them assimilate, and sometimes distort, reality.

This study focuses on the effect of one cognitive style (field dependence) on one class of communications (syntax) and their effects, if any, on interpersonal evaluations in an educational setting. Chapter I provides the rationale for such a study, a review of the theoretic origins for the study, and the specific expectations of this study. Chapter II presents a discussion of the design, procedures, and methods of data analysis employed. Chapter III focuses on the results, and Chapter IV includes a discussion and interpretation of results. Chapter V provides suggestions for future study.

A STUDY OF THE DIFFERENCES BETWEEN WRITTEN MESSAGES
ENCODED BY FIELD DEPENDENT AND
FIELD INDEPENDENT SOURCES

CHAPTER I

RATIONALE AND REVIEW OF THE LITERATURE

There is little doubt that cognitive style is a mediating variable in the educational process. On the college level, it functions directly in all areas from choice of major to actual academic success; further, it functions indirectly by apparently confounding the communication process. The extent to which this confounding of the communication process compounds the other effects is unclear. The suspicion is strong, however, that if the communication effects could be controlled, academic success, regardless of cognitive style, would be enhanced. Shows (1967) notes that in addition to liking one another more, individuals matched for cognitive style reported it "easier to understand" (italics mine) each other than unmatched individuals. The question arises whether or not field dependent students wishing to major in the physical sciences would reach a higher level of success if they could

"understand" their field independent instructors better, or if their instructors understood them better.

To test such a notion would require a methodical and well constructed series of investigations focusing on the communication ramifications of cognitive style. So far this has not been done. The study described here provides but one link, though a necessary one, in such an investigation. It focuses on written message variables not yet examined in the cognitive style literature, and it does so in relation to issues significant for the field of education, i.e., variables which might affect the teacher-student relationship which in turn might affect the success of the educational process.

Purpose

More specifically, this study addresses itself to the following questions:

1. What is the relationship between field dependent-independent sources and the messages they encode? What can we predict about written messages produced by these individuals in regard to both syntax and subject matter?
2. What is the relationship between field dependent-independent communication sources and how they perceive themselves in a communication setting? Will they perceive themselves as both knowledgeable and interested in the subject about which they write? Will they write about subjects consistent with our expectations concerning cognitive styles?

3. What is the effect of field dependent-independent source-encoded messages on receivers who are themselves field dependent-independent? How will such receivers perceive the source of these messages? Will the subject matter of the messages affect the receivers' evaluations of the source?

To answer these questions, messages produced by one hundred sixty-four subjects ranging from field dependent to field independent were syntactically analyzed. Representative messages from this sample were then presented to both field dependent and field independent audiences which evaluated the message sources.

The material which follows in this chapter examines the theoretical sources from which this study emerged: the nature of the field dependence as a cognitive style and its implications for education and communication research. The last section of this chapter outlines the specific objectives of this study.

Field Dependence-Independence

One of the more intense research efforts in cognitive styles is that developed and conducted by Herman A. Witkin which began as studies of human perception conducted immediately after World War II. It became evident in his early work on perception of the vertical* that if any

*The techniques employed in the Rod and Frame Test, the Room Adjustment Test, and the Body Adjustment Test (see next page) are direct outgrowths of this early work with Asch at Brooklyn College.

lasting generalizations or predictions about the human capacity for detection of the upright were to be made, subjects would have to be looked at individually. Individual differences would have to be accounted for not only in physiological terms, but in terms of personality as well. His first ten-year endeavor resulted in the conceptualization and identification of field dependence-independence as not only a perceptual style, but as a cognitive style as well (Witkin, et al., 1954). The work of Witkin and his associates since that time has established this cognitive style as a pervasive trend of individual functioning.

Witkin's early work produced a battery of tests which are used in identifying an individual's degree of reliable and consistent perceptual dependence on the background or field of observed stimulation; field dependence is seen as a subject's inability to overcome an embedding context in completion of a perceptual task. On the other hand, field independence is seen as the ability to successfully recognize, identify and/or manipulate an object in a confounding context. Field dependence-independence is said to be a unidimensional continuum of perceptual abilities. Witkin, Goodenough, and Karp (1967) describe the tests used for identifying field dependence as follows:

In the rod-and-frame test (RFT), the subject is seated in a completely darkened room and adjusts a tilted luminous rod, centered within a tilted luminous frame, to a position he perceives as upright, while the frame remains at its initial position of the tilt. The test consists of three series of eight trials each: In Series 1, body and

frame are tilted to opposite sides; in Series 2, body and frame are tilted to the same side; and in Series 3, the body is erect and the frame is tilted. Twenty-eight-degree tilts of the body, frame, and rod are used. The subject's score for each series is the mean degrees absolute deviation of the rod from the true upright.

The tilting-room-tilting-chair test has two parts, the room-adjustment test (RAT) and the body-adjustment test (BAT). In each, the subject sits in a chair, which is initially tilted. In the eight trials of the room-adjustment test, the room is tilted 56 degrees and the chair 22 degrees, and the subject's task is to adjust the room to the upright while his chair remains tilted. In the six trials of the body-adjustment test, the initial settings of the room and chair are 35 degrees and 22 degrees, respectively; here the subject's task is to make himself straight while the room remains tilted. The subject's score for each of the two tests is again the mean degrees absolute deviation of the item to be adjusted (room or chair) from the true upright when he perceives it as straight.

Finally, in the embedded-figures test (EFT) the subject must locate a previously seen simple geometric figure within a complex figure designed to embed it. The test is composed of 24 pairs of simple and complex figures, and the subject's score for the test is the mean amount of time to locate each of the simple figures (pp. 293-294).

It was later determined that the RAT was an inadequate measure of field dependence. On the basis of factor analytic studies it is clear that subjects' performances on this test are not determined primarily by their degree of field dependence (Goodenough and Karp, 1961; Linton, 1952). In a longitudinal study reported by Witkin, Goodenough, and Karp (1967), the intercorrelations of the RFT, BAT, and EFT were reported for both males and females across eight different age groups. The following coefficients are for college age students:

BAT with RFT	$\underline{r}$ (46) = .41, $p < .01$	males
	$\underline{r}$ (45) = .45, $p < .01$	females
EFT with RFT	$\underline{r}$ (46) = .76, $p < .01$	males
	$\underline{r}$ (45) = .26, $p < .05$	females
EFT with BAT	$\underline{r}$ (46) = .54, $p < .01$	males
	$\underline{r}$ (45) = .58, $p < .01$	females

Since the development of these three tests, a portable Rod and Frame Test (Oltman, 1968), a shortened form of the individual Embedded Figures Test (Jackson, 1956), and two group forms of the Embedded Figures Test (Jackson, Messick, and Myers, 1966; Oltman, Raskin, and Witkin, 1971), and a special children's Embedded Figures Test (Karp & Konstadt, 1971) have been developed. The specific nature of the group form of the Embedded Figures Test will be discussed later in the chapter.

Subjects differ greatly in how they perform on these tasks. On the Rod and Frame Test, some will align the rod with the surrounding frame and then say it is perfectly upright. Others are able to bring the rod nearly upright independently of the frame position. During the Body-Adjustment Test, some subjects align their body with the surrounding tilted room, sometimes a tilt of as much as thirty degrees, reporting that they are perfectly upright. Others, regardless of the tilt of the surrounding room are able to bring the body to a more or less upright position. Though the Embedded Figures Test format differs from the Rod and Frame Test and the Body-Adjustment Test, the differences among subjects is still as marked. Some

subjects can locate the embedded figure with relative ease; others cannot find the figure in the three minutes allowed for them to do so. However, subjects tend to be self-consistent across tasks. The individual who finds it easy to bring the rod to an upright position will also find it relatively easy to bring his body to an upright position and to find the embedded figure.

Further, evidence indicates that these tendencies cross sensory modalities; that is, individuals tested for visual field dependence perform in a consistent manner on the same kind of tasks presented in either a tactile or auditory medium. Axelrod and Cohen (1961) report a very high correlation (.78) between scores on their tactile embedded figures test and the visual embedded figures test. White (1953) reports a correlation of .63 between scores on a visual and an auditory embedded figures test.

In contrast to what is known about field dependency, little is known about the origins of an individual's cognitive style. Evidence does suggest, however, that the mother-child relationship in the socialization process is a major influence (Dyk, 1969; Dyk and Witkin, 1965; Witkin, 1972; Witkin, et al., 1962). Studies to determine genetic influences, if any, are being conducted as well (Witkin, 1972).

Developmentally, there is a clear trend from field dependence to field independence from about age five to fifteen, followed by a leveling off period from about fifteen to a mid thirties-early forties, and then a general

increase in field dependence with increasing age (Witkin, Goodenough, and Karp, 1967). Individual differences remain quite stable, however, throughout this developmental process; that is, an individual's position in relation to his age group remains about the same (Witkin, Goodenough, and Karp, 1967). There also appears to be a consistent sex difference in performance; men and boys tend to be more field independent than women and girls.

Field Dependence-Independence and Intellectual Functioning

One's degree of field dependence manifests itself in intellectual endeavors as well. When given a typical "Einstellung" problem which requires that the subject break the set which usually structures his thinking, subjects who are perceptually field dependent tend to have more difficulty than field independent subjects arriving at a solution (Witkin, 1964). This greater ability shown by field independent subjects for solving problems "in which an essential element required for solution must be isolated from the context in which it is presented and used in a different structuring of the problem material" (Witkin and Oltman, 1967, p. 130) does not appear to be a function of intelligence.

Studies indicate that field independent subjects perform better only on the subtests of the Wechsler Intelligence Scale for Children and the Wechsler Adult Intelligence

Scale which have the same structures and requirements as the tests of field dependence-independence themselves (Karp, 1963; Witkin, et al., 1967). Results of studies such as Karp's factor analytic study (1963) led Witkin (1972) to conclude that since only the Block Design, Picture Completion and Object Assembly subtests and none of the verbal subtests load highly on the field dependence-independence factor, general intelligence could not account for the differences. Differences in level of intellectual functioning appear only when problems requiring analytical solutions are considered; in terms of verbal intelligence, there appears to be no significant difference in the performances of the two groups. Such a finding is significant. It is further evidence that what Witkin first identified as a perceptual style may be more general than that.*

Personality Correlates of Field Dependence-Independence

The developmental trend mentioned earlier from field dependent to field independent is reflected in even

*Because "field dependence-independence" seemed bound to perceptual behavior, the terminology did not seem appropriate in light of the broader intellectual implications. As a result, Witkin (1964) and his associates adopted "the designation 'analytic-global field approach' to represent this broader dimension of cognitive functioning, involving at one extreme a tendency to experience items as discrete from an organized context, and at the other extreme a tendency to experience items as fused with content" (p. 174). These terms, as well as "psychological differentiation" are used frequently and often interchangeably in the cognitive style literature.

broader aspects of personality functioning. This broader aspect Witkin termed "psychological differentiation" (Witkin, 1965). Psychologically, the individual develops from a "global organization to a more structured and articulated organization, and individual personality organizations are viewed as consistent in the degree of differentiation manifested" (Wolitsky & Wachtel, 1973, p. 841). Evidence to confirm this comes from longitudinal studies revealing the relation between this analytic-global cognitive style and an individual's body concept, self concept, controls and defenses.

In general, individuals who show an articulated, field independent, or analytic cognitive style in perceptual tests and intellectual functioning are likely to display a more articulated body concept in figure drawing tests (Epstein, 1957; Silverman, Cohen, Shmavonian and Greenberg, 1961; Witkin, 1962), have a greater sense of separate identity--that is, have a greater awareness of their own needs, feelings and attributes distinct from those of others (Konstadt & Foreman, 1965; Linton, 1955; Messick and Damarin, 1964; Witkin, 1962; Winestine, 1964), and use specialized defenses such as isolation (Bertini, 1961) as opposed to relatively nonspecific defense mechanisms as massive repression and primitive denial used by field dependent individuals (Witkin, 1965).

These differences between a more articulated cognitive style and a more global cognitive style are

manifestations of even greater differences between a more developed and a less developed psychological differentiation. In his 1965 article, Witkin advances the following position:

Thus, we consider it more differentiated if, in his perception of the world, the person perceives parts of the field as discrete and the field as structured. We consider it more differentiated if, in his concept of his body, the person has a definite sense of the boundaries of the body and of the interrelation among its parts. We consider it more differentiated if the person has a feeling of himself as an individual distinct from others, and has internalized, developed standards to guide his view of the world and of himself. We consider it more differentiated if the defenses the person uses are specialized. It is our view that these various characteristics, which we have found to cluster together, are not the end-products of development in separate channels, but are diverse expressions of an underlying process of development toward greater psychological complexity. "Level of differentiation" is a concept which encourages us to look across psychological areas and provides a basis for thinking about self-consistency in individual psychological make-up (p. 323).

Field dependence-independence, as a construct, has evolved from its rather narrow original conception as a visual perceptual style to a construct which "currently refers to a polarity of global versus articulated functioning which provides a basis for conceptualizing self-consistencies in personality structure" (Lefever and Ehri, 1976, p. 100).

Implications for Communication Research

Evidence suggests that, unlike the adage "opposites attract," in the case of field dependent and field independent individuals, opposites repel. Studies from clinical psychology and psychiatry indicate that therapy is most

effective when therapist and client are matched for cognitive style rather than unmatched, since the kind of interactions and best method of analysis for each differs (Greene, 1972; Witkin, et al., 1968). Shows (1967) created an interview situation in which the task for the interviewer was to find out as much as possible about the interviewee. He then analyzed the results of a questionnaire filled out by both interviewer and interviewee. He found that partners matched for cognitive style "found it easier to understand each other, were more interested in each other, and they viewed each other as more sympathetic" (Witkin, 1972, p. 35) than unmatched pairs. This effect occurred after only twenty minutes of interaction. In a study by DiStefano (1969), teachers and students matched for cognitive style rated each other in highly positive terms; the opposite occurred for mismatched subjects. In addition, teachers valued more highly the intellects of students with cognitive styles similar to their own; the same was true for students. In a study by Witkin, Lewis, and Weil (1968), similar effects were found after only twenty-five minutes of interaction. The implications for communication research are clear.

Is there something about the interaction between field dependent and field independent individuals which prompts them to make consistently negative evaluations about each other? Is there something in the interactions between individuals of matched cognitive style that encourages them to make positive evaluations of each other?

Witkin (1972) suggests three reasons why persons matched in cognitive style tend to evaluate each other positively: (1) they have the same interests; (2) they have similar personality traits; (3) they share similar communication modes. This third suggestion is of particular importance for this study. The focus in that third suggestion is not so much on "why" individuals say something or act in a certain way, i.e., send specific messages, but rather on "what" is said (sent) and/or "how" it is said.

Doob (1958), using traditional content analysis categories of grammatical style, found that field independent persons use the personal pronoun and active verbs more often than field dependent individuals. Jennings (1967) found that field dependent persons make fewer self-references in their speech than field independent persons. A recent study by Luborsky (reported by Witkin, 1972) supports this finding. Luborsky found that the ratio of other-people-references to self-references was significantly higher for field dependent individuals. Marcus (1970) found that movement toward congruence of speech rates in an interaction was related to the degree of field dependence. The more field dependent the individual, the greater the attempt at congruence on his part. Green's study (1972) found that the number of interactions between therapist and client was related to cognitive style. Field dependent client-therapist pairings produced significantly more interactions per minute than the closest matching of field

independent client and therapist. Freedman, O'Hanlon, Oltman, and Witkin (1972) found that field dependent and field independent subjects differed in the kind of hand gestures accompanying their speech. To the extent that all these differences cut down on communication effectiveness or satisfaction, we also have an explanation for the findings concerning interpersonal evaluations cited above.

An area yet to be explored in the context of communication modes and cognitive style is the degree of syntactical similarity/dissimilarity in the messages of field dependent and field independent individuals. It may also be important to determine the effects, if any, on interpersonal attraction and evaluation.

In a study dealing not with field-dependence, but with a similar cognitive style, results indicating a relationship between syntax and cognitive styles were found (Hess and Shipman, 1965). The essential details of the study are reported here since the findings bear directly on this investigation, although one must be careful of overstating the findings since no significance data are reported.

The authors argue that "the structure of the social system and the structure of the family shape communication and language and that language shapes thought and cognitive styles of problem solving" (Hess & Shipman, 1965, p. 870). This position evolves from the work of Basil Bernstein (1961) who identifies two major communication styles, restricted and elaborated codes. In their article, Hess and Shipman describe these communication styles:

Restricted codes are stereotyped, limited, and condensed, lacking in specificity and the exactness needed for precise conceptualization and differentiation. Sentences are short, simple, often unfinished; there is little use of subordinate clauses for elaborating the content of the sentence. . . . The basic quality of this mode is to limit the range and detail of concept and information involved.

Elaborated codes, however, are those in which communication is individualized and the message is specific to a particular situation topic, and person. It is more particular, more differentiated, and more precise. It permits expression of a wider and more complex range of thought, tending toward discrimination among cognitive and affective content (Hess & Shipman, 1965, p. 871).

Based on this description, one can easily intuit a relationship between field dependence and restricted codes, field independence and elaborated codes. The foundation for this argument is seen in a detailed analysis of the study.

Hess and Shipman dealt with one hundred sixty Negro mothers from four different social status levels and their four-year-old children, who, among other things, were given the Sigel Sorting Task to determine cognitive style. This test categorizes responses into one of four categories: descriptive part-whole, descriptive-global, relational-contextual, and categorical-inferential. The relational and descriptive global responses on this test are much the same sort of responses a field dependent subject would be expected to make. Descriptive part-whole and categorical responses are more analytic, field independent. Kagan, Moss and Sigel (1963) in discussing their work with the four categories just mentioned note that their work is closely related to Witkin's findings and state:

It is encouraging to note that although Witkin uses spatial orientation techniques, the behaviors associated with an analytic performance on these methods are similar to those we have found with our conceptual tasks. It would appear that there may be some communality in process across these manifestly different task requirements (p. 110).

The Hess and Shipman study (1965) reports a strong relationship between cognitive style of mother and child, between verbal behavior of mother and task performance of child, and between verbal behavior of mother, cognitive style of both mother and child, task performance and social status level. In general, mothers and children of lower social status levels display a global-relational cognitive style, a restricted verbal code, and lower task performance scores. Mothers and children in upper social status levels display an analytical cognitive style, an elaborated verbal code, and higher task performance scores.

In one part of the study dealing with the ability of mothers to give instructions and the child's ability to complete the task, Hess and Shipman conclude:

The effect of restricted speech and of status orientation is to foreclose the need for reflective weighing of alternatives and consequences; the use of an elaborated code, with its orientation to persons and to consequences (including future), tends to produce cognitive styles more easily adapted to problem-solving and reflection (p. 885).

Hess and Shipman more specifically observe that syntax differs between the groups:

The second scale dealt with the mothers' tendency to use complex syntactic structures such as coordinate and subordinate clauses, unusual infinitive phrases. . . infinitive clauses. . . and

participial phrases. The index of structural elaboration derived was a proportion of these complex syntactic structures, weighted in accordance with their complexity and with the degree to which they are strung together to form still more complicated structures (e.g., clauses within clauses), to the total number of sentences.

In the research group, mothers from the middle class had a structure elaboration index of 8.89; the score for ADC mothers was 6.46 (Hess & Shipman, 1965, p. 876).

The authors conclude that:

The use of complex grammatical forms and elaboration of these forms into complex clauses and sentences provides a highly elaborated code with which to manipulate the environment symbolically. This type of code encourages the child to recognize the possibilities and subtleties inherent in language not only for communication but also for carrying on high-level cognitive procedures (p. 876).

The possibility that differences of verbal variables, particularly syntax, are highly correlated with differences in cognitive style needs further exploration in other settings.

Implications for Education Research

It is no accident that current interest in field dependence-independence has spread to the field of education, for it is here, as Witkin (1972) suggests, that the implications for research are strongest and most promising. Consider the following:

1. There is a clear relationship between cognitive style and academic and vocational choices. Field independent students gravitate toward areas requiring analytical skills, i.e., the sciences (biological and physical), mathematics, engineering, technical and mechanical

activities. Field dependent individuals choose areas of concentration in which interpersonal relations and day-to-day involvement with people are required (Chung, 1966; Clar, 1971; DeRussy and Futch, 1971; Glatt, 1969; Krienke, 1969; Linton, 1952; Pierson, 1965; Witkin, 1972; Zytowski, Mills, and Paepe, 1969).

2. There is a clear relationship in the direction expected between cognitive style, achievement, and subject matter (Witkin, 1972).

3. The ease with which students make educational and vocational choices is related to cognitive style. It appears that field independent individuals are "more realistic in their educational choices and more articulated in vocational interests" (Clar, 1971).

4. As a group, individuals favoring teaching as a profession tend to be field dependent (Witkin, 1972). Within specific domains, however, the expected trend is found: teachers in science or mathematics are likely to be field independent (DiStefano, 1969).

5. Teaching strategy appears to be relative to cognitive style. Field dependent teachers prefer discussion or discovery methods rather than lecturing methods which are preferred by more field-independent teachers (Wu, 1967).

6. There is some indication of an interaction between learning, subject matter, and teaching strategy which may override the effects of cognitive style (Rennels, 1970).

7. The amount of knowledge gained by students under varying teaching methods tends to be related to their cognitive style (Grieve and Davis, 1971).

8. Match or mismatch in cognitive style between teacher and student has a striking effect on their interpersonal perception of each other. A match produces mutually high praise; a mismatch produces mutually negative evaluations (DiStefano, 1969).

A myriad of research questions can be generated from the information presented above. But to date, the largest share of research into the relationship between cognitive style and education centers on young children. Much more needs to be done at the college level. Studies of students in higher education designed to explore the interactions between cognitive style, communication, and education variables would have great impact in the field of education. Such studies would help shed more light on the nature of teacher-student interactions which might ultimately help explain academic success or failure with more precision.

Clearly, no one study can encompass all the possible combinations of salient variables. The study described in the remainder of this chapter is designed as a starting point from which the exploration of pertinent communication issues dealing with the educational process and cognitive style could begin.

Objectives and Expectations of This Study

No study of field dependence has specifically studied the effect of cognitive style on syntax, nor the effect of syntax in this regard on interpersonal attraction. Could such a relationship exist? The Hess and Shipman study and the Bernstein material on which it draws at the very least suggest stylistic differences between the language used by individuals of varying cognitive styles. Could such differences affect interpersonal evaluations? If that occurred, could it affect the educational process? Could the way in which an instructor explains the subject matter account in part for the degree to which students understand it? The Show's (1967) study indicates such a notion. This study examined two parts of this issue.

First, it sought to determine whether, in fact, there are syntactic differences in the way in which field dependent and field independent individuals write, and second, to determine whether these differences, if they exist, can account for the differences in interpersonal evaluations cited earlier. In addition, it checked the notion, though indirectly, that the academic subject matter chosen by a student is related to cognitive style. The specific variables treated in this study are examined below.

Independent Variables

Field dependence-independence. Each subject completed Form III of the group Embedded Figures Test (EFT)

developed by Jackson, Messick, and Myers (1964), now distributed as the Hidden Figures Test Cf-1 (HFT) of the Kit of Reference Tests of Cognitive Factors by the Educational Testing Service in Princeton, New Jersey. The administration time for the test is ten minutes and the test provides a reliable indication of the subject's degree of field dependence. The authors report within-group correlations ($p < .01$) between the individual Embedded Figures Test and group Form III of .62 for men ($N=56$) and .56 for women ($N=60$). The reported Kuder Richardson 21 reliability coefficient for Form III was .71.

The test itself is a booklet which contains sixteen complex patterns each containing one of five simple figures which appear at the top of each booklet page. The subject is required to locate the simple figure in the complex design and to trace the figure as it appears in the complex design. The number correct within the ten minute time limit is the subject's score (Instructions and sample items appear in Appendix A).

Analytical reasoning. The Wechsler Adult Intelligence Scale Block Design subtest was administered to randomly selected subjects from the subject population as a measure of their analytical reasoning ability. This particular subtest involves showing the subject a series of reference designs that he must copy by the appropriate arrangement of blocks. Each reference design forms an

organized whole that must be broken up for effective performance (Goodenough & Karp, 1961, p. 241).

Research indicates that field independent individuals perform better on this and two other subtests in the Wechsler Closure subtest group than field dependent subjects. Karp (1963) reported a factor loading of .66 for the Block Design subtest on a field dependence-independence factor. The results of this test provide us with a check on previous findings concerning field dependence-independence and analytical reasoning and a further indication of the degree of field dependence for each subject (see Appendix A).

American College Test scores. As a control for general intelligence of subjects and a comparison point for each subject's self evaluation of knowledge level, the ACT scores for each subject on file at the University were checked.

These three independent measures defined the non-demographic parameters of the subject population. They also provided a check on the intellectual characteristics previously found to correlate highly with the field dependence-independence continuum.

Dependent Variables

Message content. One hundred sixty four subjects were asked to create an essay in which they explained to an unknown reader "how" something was done in one of three specified areas: the fine arts, the social sciences, the physical or applied sciences. It was anticipated on the

basis of results of studies cited earlier that choice of subject matter for this essay would be a function of cognitive style (see Appendix C for Instructions to Subject).

Message syntax. A major criticism of the few content analysis studies dealing with field dependence-independence concerns the inadequacy of both the categories used for analysis and the rationale for selecting them. The Doob study is typical. The categories used were traditional grammatical units and little rationale for their use as units of analysis of field dependence encoding behavior was provided. In addition, such an analysis is less than complete. Perhaps one reason so little has been found in this area is because so little has been examined. The method of analysis utilized in this study avoids these criticisms. Syntactic Language Computer Analysis-II (SLCA-II) provides a more complete set of categories for analysis and a theoretic rationale for its use in the analysis of messages produced by field dependent-independent sources.

It has been suggested (Cummings, 1970; Cummings and Renshaw, 1975) that a fruitful method of analyzing linguistic differences between messages is to examine them syntactically using a category system based on "an operationally adequate but scientifically meaningful classification of signs and sign-to-sign relationships" (Cummings, 1970, p. 24). Such a classification system finds its roots in functional approaches to the study of verbal behavior which recognize that the structural components of messages

as well as specific content words contribute to the pooled meaning of a message (Cummings & Renshaw, 1975).

The traditional approach to the content analysis of messages is to examine the message for specific content words. Content analysis studies in psychology or communication using a system of syntactic categories are rare. Cummings (1970) cites only three. A review of the cognitive style literature produced none. This suggests a productive area for exploration.

Combining the need for an "operationally adequate but scientifically meaningful" system of syntactic analysis with the efficient and expedient technique of computer analysis, Cummings and Renshaw have developed a computerized system for the syntactic analysis of language. The program is called the Syntactic Language Computer Analysis II (SLCA-II). The categories used for analysis are drawn from traditional grammatical taxonomies and from the propositional relationships used in formal logic (Cummings, 1970). A complete listing of categories used in SLCA-II can be found in Appendix B.

One aspect of this program does need special attention since it deals directly with expected differences between messages produced by field dependent and field independent sources. SLCA-II discriminates between subject signs (subjects and objects of verbs in the message corpus) and limiter signs (adjectives, adverbs, and objects of prepositions which modify subject signs) which are

afferent (denoting persons, places, qualities or things which can be sensed) and those which are efferent (persons, places, qualities and things which cannot be sensed) (Cummings and Renshaw, 1975). The distinction is drawn between words with external referents (afferent) and words with internal or nonsensory referents (efferent). Such a distinction finds an easy parallel with the following statements by Witkin.

In describing the differences between field dependent and field independent individuals in relation to their views of self, Witkin (1965) notes that field independent individuals have,

. . . a developed sense of separate identity. . . which implies experience of the self as structured; internal frames of reference have been formed and are available as guides for definition of the self. The less developed sense of separate identity of persons with a global cognitive style manifests itself in reliance on external sources for definition of their attitudes, judgments, sentiments, and of their views of themselves (pp. 320-321).

. . . it seems true of persons with a global cognitive style that feelings strongly influence thought and perception; in other words, that feelings are not kept sufficiently discrete from thoughts and percepts Persons with an articulated cognitive style, in their use of isolation, maintain the discreteness of feelings and ideas. . . . (p. 322).

An interesting question is whether these differences manifest themselves in terms of Cummings' afferent-efferent distinction and if so, how?

A second reason for using SLCA-II in this study was found in the original study utilizing SLCA. When Cummings (1970) was developing the categories now used in SLCA-II, he examined the relationship between spatial orientation in

reasoning ability and message syntax. While the flexibility of closure tested in Form III of the group embedded figures test is not the same variable, they share conceptual similarity (Allport, 1955; Thurstone, 1944). It was expected that the syntactic categories in the Cummings study (1970) would predict field dependence-independence at least as well as they discriminated spatial orientation.

Self evaluations. After generating their messages, the subjects were asked to evaluate themselves on both a knowledgeability-expertise and an interest-in-subject matter scale constructed for this study. The knowledgeability-expertise scale is an adaption of the McCroskey "authoritativeness" semantic differential (McCroskey, 1966). The interest-in-topic scale was constructed from the six polar adjective pairs which loaded most highly on the evaluation factor identified in the original Osgood, Suci, and Tannenbaum studies plus four irrelevant pairs (Osgood, et al. 1971). These results were compared with the three independent measures to determine the amount of discrepancy between what was expected of the subject and his own view of himself.

Source evaluations. Subjects, after exposure to a message produced by either a field dependent or a field independent source evaluated the sources on the source evaluation form adapted for this study. The original scale was a teacher-evaluation scale developed by William E. Holdridge from the McCroskey studies (Holdridge, 1972).

Content evaluations. Subjects rated their interest in the content of the message to which they had been exposed by completing the message content evaluation form. This scale was drawn from the semantic differential instrument devised by John B. Carroll for judging prose style (Carroll, 1969).

Empirical Expectations

The following is a list of anticipated findings involving the independent and dependent variables described above:

1. There will be a significant difference between field dependent and field independent subjects in the proportion of occurrences of specified syntactic categories of encoded messages. Specifically, a comparison of the proportion of occurrence of the following syntactic categories in messages produced by field dependent and field independent sources will be significantly different ($p < .05$): TOT-1 (total words encoded), ClP (total connectors which have no modifiers); Sl-A (total subject words which are judged afferent); Sl-E (total subject words which are judged efferent); LSl-A (total modifiers of subject words which are judged afferent); LSl-E (total modifiers of subject words which are judged efferent); LCl-A (total modifiers of connectors which are judged afferent); LCl-E (total modifiers of connectors which are judged efferent); ICE (total comparison-equivalence connectors); IT (total action connectors which are transitive, indicative); IR (total action connectors

which are intransitive, indicative); NSl-A (total negated subject words which are afferent); NSl-E (total negated subject words which are efferent); NLSl-A (total negated subject word limiters which are afferent); NLSl-E (total negated subject word limiters which are efferent); NLC1-A (total negated connector limiters which are afferent); NLC1-E (total negated connector limiters which are efferent); S-S (total subject words which refer to the source, i.e., first person personal pronouns); T-O (total subject words which refer to the receiver, i.e., second person personal pronouns); PREP (total prepositions); OTH (total other); COMP (total frequency of comparison connectors); RC1 (total frequency of intransitive connectors); L (total frequency of limiters); Sl (total frequency of subject words); PRIM (total frequency of primitive subject words and connectors); TOT-2 (total words encoded less the sum of articles, prepositions, and other); TOT-3 (total frequency of subject words, limiters, and connectors).

These stated expectations were not meant to be limiters of the study. All syntactic categories in the SLCA-II program were of interest to this researcher and were examined as possible discriminators of field dependence-independence.

2. When given a choice, subjects will write about topics consistent with their cognitive style. That is, messages dealing with the fine arts and the physical sciences

will discriminate between field dependent and field independent sources ($p < .05$).

3. Subjects will perceive themselves as both knowledgeable and interested in the topic about which they write as measured by the knowledgeability-expertise and interest-in-subject matter scales administered in this study.

4. When the source of a message and a group of receivers of that message are matched according to cognitive style, the source will be rated higher on a source evaluation scale than when the source and receivers are unmatched.

5. The message content will be perceived as more interesting when the source of a message and the receivers are matched for cognitive style than when they are mismatched.

Summary

This chapter presented the theoretic background and rationale for a study dealing with the effects of cognitive style on message production and reception. Chapter II will discuss the method to be employed in conducting and statistically analyzing this study.

CHAPTER II

METHOD OF ANALYSIS

In Chapter I, the rationale for exploring the following possible categories of relationships was presented:

1. The degree to which communication sources are field dependent and the syntactic structure and content of the messages they encode,
 2. The degree to which communication sources are field dependent and their self evaluations in a communication setting, and
 3. The effect of messages produced by either field dependent or field independent sources on receivers who are themselves either field dependent or field independent.
- This chapter provides both a rationale for and a discussion of the procedures and methods of data analysis utilized in testing these issues.

Procedures

Subjects

A total of one hundred sixty-four subjects were selected for this study by randomly selecting classes from the Summer 1975 Speech Communication Department list of offerings, lower division Theatre Department courses, and

a summer mathematics seminar for high school students. Of this total, one hundred fifteen students were enrolled in the speech communication courses, twenty-two were enrolled in the theatre courses, and twenty-five were participating in the mathematics seminar. This combination of speech, theatre, and mathematics classes was utilized in order to systematically obtain a fairly wide cross section of academic majors and a relatively broad range of scores on the Hidden Figures Test Cf-1.

Because field dependence-independence is reported to be developmentally stable for this age group (over fifteen, under forty), age was not considered to be a factor necessary to control. The mean age for this group of subjects was twenty-three; the modal age was twenty-two; the ages ranged from eighteen to forty-six years. Included in this subject group were sixty-six females and fifty-nine males; information on the gender of the other thirty-nine individuals is missing.

Subject Attrition. Of the one-hundred-sixty-four-member subject pool selected for this study, one hundred twenty-seven completed the entire study. Six of the thirty-seven subjects who did not complete the study were the authors of the stimulus messages used in the latter half of the study, and six were eliminated because of identification problems. The six eliminated because of identification problems had either given a false student identification number in the beginning, failed to give a student identification

number, or gave an identification number at a later stage in the experiment which did not correspond to the one originally given. Since this was the only means of identifying subjects' responses, these six were eliminated. An additional twenty-five subjects were absent for the last session of the study.

Data Collection

If, as many suggest, the language one uses and the way in which it is used are reflections of the emotional and mental states of the user, then an examination of messages produced by individuals differing in emotional or mental states should produce linguistic and/or content variables which discriminate between the sources of the messages. This, in fact, is the rationale behind much of the content analysis work done in the social sciences. It is also the rationale for the examination of messages produced in this study. It seems reasonable that one could expect to find significant differences in both the content and structure of messages produced by field dependent and field independent sources. If such differences did in fact appear, then one might reasonably expect different effects to result from different messages.

Because these are essentially two different types of questions, the methods employed for the collection of data to answer each were different and occurred in different stages of this study. A discussion of these stages follows.

Phase I. All subjects (N=164) completed the Hidden Figures Test Cf-1 (instructions and sample items can be

found in Appendix A). Upon completion of the Hidden Figures Test, subjects were given twenty minutes in which to write a set of instructions about how to do something they had learned to do in a course they had taken in high school or college (instructions for this can be found in Appendix C). After completing their messages, the subjects were asked to complete the Self-evaluation Forms I and II. All three measures were administered by the experimenter during a single class period.

Six messages were selected from the total of messages produced according to the following method: (1) a median split of all subjects on the Hidden Figures Test scores was performed; (2) a random sample of thirty-eight messages was drawn from the one hundred sixty-four produced; (3) five independent judges sorted the messages into the three content categories, fine arts, social sciences, physical sciences; (4) an inter-judge agreement index was computed for each message; (5) one message agreed upon by all five judges produced by a field dependent source and one message produced by a field independent source receiving total inter-judge agreement in each subject category were selected for use in Phase III. The subjects who produced these six messages were excluded from Phase III of the study. The five judges were given an opportunity to re-sort the messages into a four category system--fine arts, social sciences, physical sciences and a miscellaneous category for messages which

did not belong in the other three categories. This was done to check the validity of the original three-category sort (see Appendix E).

Phase II. To further test the adequacy of the Hidden Figures Test Cf-1, the sources of the six messages chosen for use in Phase III and a pool of twenty-seven randomly selected subjects from both the upper and lower halves of subjects as determined by the median split mentioned above, were given the Block Design subtest of the Wechsler Adult Intelligence Scale. Each subject in this pool was scheduled for a fifteen minute session with the experimenter.

Phase III. All subjects other than the six eliminated after Phase I were assigned to twelve experimental conditions and were given the appropriate message to read. They were then asked to evaluate the source of the message on the Source Evaluation Form. The subjects next rated the message content on the Message-content Evaluation Form. Phase III was administered by the experimenter during a single class period. Phases I, II, and III were completed over a five-week period.

Data Analysis

The data collected for this study falls essentially into three categories: (1) that which provide information about syntactic categories which discriminate between field dependent subjects and field independent subjects; (2) data that provide a basis for analyzing the sources of the messages analyzed; (3) data that provide a measurement of the effects

of these messages on receivers' evaluations of the message sources and the message content. The following discussion of techniques employed in analyzing these data adheres to this three-part division.

Message Analysis

The messages produced by the one hundred sixty-four subjects employed in this study were analyzed using the SLCA-II technique with the intent of ultimately determining which categories best discriminated between field dependent and field independent message sources. The result of the SLCA-II analysis was a determination of the proportion of usage across all messages for each syntactic category in the SLCA-II program. Any category having a zero usage frequency was eliminated from further analysis.

T-tests were computed between the field dependent and field independent groups for each syntactic category which survived this elimination. Any category which maintained a significant t at the .05 level was noted. These categories were then retained for multiple regression analysis. In addition, post hoc analyses were performed on all the SLCA-II categories.

Source Analysis

Several issues were tested here. The first concerned whether or not the subject matter chosen to write about was consistent with the cognitive style of the source. The expectation was that the two categories, fine arts and physical sciences, would discriminate between

field dependent and field independent individuals. To test this, the 38 randomly selected messages, which were used in Phase I selection of the six stimuli messages, were again examined. The messages originally sorted into the fine arts category by at least three of the five judges and the eleven messages originally sorted into the physical sciences category by at least three of the judges formed the basis of this analysis. A t-test for unequal N s* was computed between the Hidden Figures Test scores of the sources of the fine arts messages and the scores of the sources of the physical science messages.

A second issue examined was the relationship between the source's degree of field dependence and his perceived knowledge in the subject matter about which he wrote. To test this, a Pearson r coefficient between the Hidden Figures Cf-1 test scores of subjects and their self-perceived expertise scores, Self-Evaluation Form, was computed.

The third issue dealt with the relationship between cognitive style of the source and his interest in the subject about which he wrote. To determine this, a Pearson r coefficient was determined for the relationship between the Hidden Figures Cf-1 Test scores of all subjects and their scores on the Interest Evaluation instrument.

The fourth issue concerned the interrelatedness of the three independent variables. The American College Test

*See Nie, et al., Statistical Package for the Social Sciences, 1975, for a discussion of the procedures.

(ACT) scores for each subject were obtained to be used, if necessary, as interpretive information. Previous research suggested (see pp. 8-9) that field dependence operates independently of general verbal intelligence. Since general intelligence data was not available for the subjects used in this study, the ACT scores for each, when obtainable, were substituted. To determine the nature of this relationship in the study, a Pearson r coefficient was computed between all ACT scores and Hidden Figures Test Cf-1 scores, and between Block Design scores and ACT scores. The significance level to be achieved for these tests as for all others outlined in this chapter is .05.

Message Effects Analysis

A 3X2X2 factorial design (messageXsourceXaudience) to assess the effect of messages produced by field dependent and field independent receivers was employed. All subjects retained after Phase I were assigned to the twelve treatment groups in the following manner.

Those subjects identified as field independent as a result of the median split performed in Phase I were randomly assigned to six treatment conditions (three message conditions by two source conditions). The remaining field dependent subjects were randomly assigned to the remaining six complementary treatment conditions.

To determine whether the cognitive style of the source, the content of the message, the cognitive style of the receiver or any combination of these variables had any

effect on the evaluations of message source and message content by the receivers, a three-way analysis of variance was computed for both dependent measures.

Before the analysis of variance was computed, however, the Source Evaluation and Message Content Evaluation instruments were subjected to factor analysis, as were the Self Evaluation Form and the Interest Evaluation Form instruments. This was done for two reasons: (1) because the use of these instruments with a field dependent-independent population had not previously been documented, the applicability of the items and the structure of the instruments were checked; (2) the selection of fewer items for analysis on the basis of the factor structure which resulted was a valid and expedient means of reducing the data.

The procedure utilized for this task was as follows:

1. Each instrument was subjected to principal components factoring and to a varimax rotation solution.
2. Factors with an eigenvalue of 1.5 or greater were selected for further analysis.
3. Variables loading on these factors ± 0.60 or greater, and loading no greater than ± 0.40 on any other factor in the solution were identified.
4. The raw scores for these variables were summed for each subject on each factor, and a Pearson r correlation coefficient between these summated raw scores and the factor score for each subject was computed.

5. When the coefficient was greater than 0.80, the sum of the raw scores for the selected variables was used for analysis rather than factor scores or a summation of all variables on the particular instrument. The final factor structures, selected variables utilized, and all other relevant data are reported in Appendix D.

Data Transformation

Once the data were collected, it became apparent that there was wide disparity in the nature of some of the distributions. Most of the disparity was due to the nature of the instruments employed. To correct for these differences in variance, a z-transformation on scores was utilized, when appropriate, to meet homogeneity of variance assumptions in the statistical techniques employed in the data analysis.

Summary

The procedures and methods of data analysis employed in this study were outlined in this chapter. Essentially, the structure of the study involved two major divisions: one which provided the data for a syntactic analysis of messages produced by field dependent and field independent sources, and one which provided data about the effects of those messages. The data were collected during three distinct time periods, referred to as Phases in this discussion.

Phase I involved the identification of field dependent and field independent individuals, the production of written messages by these individuals, and the administration of two self-evaluation instruments. Phase II entailed the individual testing of a random group of subjects selected from the parent subject pool on the Block Design subtest of the Weschler Adult Intelligence Scale. Phase III, the final stage of the study, assessed the effects of messages produced by field dependent and field independent sources on field dependent and field independent audiences.

CHAPTER III

RESULTS

This chapter reports the findings of the study outlined in the preceeding two chapters. The information which follows is the result of direct tests of the empirical expectations stated in Chapter I. As an aid to clarity, the presentation order of the results follows that of the empirical expectations. The information is uninterpreted and unevaluated; these two tasks are reserved for Chapter IV.

Empirical Expectation I

There will be a significant difference between field dependent and field independent subjects in the proportion of occurrences of specified syntactic categories of encoded messages ($p < .05$).

T-tests were computed between the field dependent and field independent groups for each syntactic category noted in the first expectation. Only four of the twenty-eight categories tested were found to significantly discriminate between the two groups. These four categories were then subjected to stepwise multiple regression analysis. The results of this analysis and a complete table of the hypothesized variables and their respective t values is found below.

TABLE I

T-Tests Between Groups for Hypothesized Syntactic Categories

	<u>t</u>	<u>sig.</u>		<u>t</u>	<u>sig.</u>
ClP	-1.04	.300	NLC1-A	0.06	.951
S1-A	-0.77	.440	NCL1-E	-0.61	.545
S1-E	0.61	.541	S-S	0.44	.659
LS1-A	0.39	.695	**T-O	-2.19	.030
LS1-E	1.10	.273	PREP	-0.59	.558
LC1-A	-0.07	.941	OTH	-0.37	.712
LC1-E	-0.91	.366	COMP	0.59	.554
RCL	-0.42	.679	ICE	-1.53	.127
IT	-0.53	.594	L	0.77	.440
IR	-0.68	.495	SL	-0.18	.855
NS1-A	-0.67	.505	PRIM	-0.98	.329
NS1-E	1.89	.063	*TOT-1	3.90	.000
NLS1-A	-0.21	.832	*TOT-2	3.66	.000
NLS1-E	1.33	.186	*TOT-3	3.88	.000

*p<.01
 **p<.05
 df=154

TABLE II

Multiple Regression on Four Significant
Syntax Variables

TOT-1:	R(156) = .229
T-O:	R(156) = .255
TOT-2	R(156) = .269
TOT-3:	R(156) = .271

Empirical Expectation II

Messages dealing with the fine arts and the physical sciences will discriminate between field dependent and field independent sources ($p < .05$).

A t-test for unequal N s* was computed between the Hidden Figures Cf-1 Test scores for subjects writing about the fine arts and subjects writing about the physical sciences. As can be found from the following data, no significant difference was found. The null hypothesis was not rejected.

*See Nie et al. for discussion of weighting procedure used in making such contrasts.

TABLE III

T-Test on Hidden Figures Test Cf-1 Scores
By Message Topic

<u>Message Topic</u>	<u>Mean</u>	<u>N</u>	<u>t</u>	<u>sig.</u>	<u>df</u>
Fine Arts	4.81	16	-1.423	.182	11.4
Physical Sciences	6.70	10			

Empirical Expectation III

Subjects will perceive themselves as both knowledgeable and interested in the topic about which they write as measured by the knowledge Self-evaluation and Interest Evaluation forms administered in this study.

The data reported here support this expectation. The mean score for the summated selected variables on the self-evaluation form was 17.064 (N=156). The theoretic mean for these variables is 12.00. The observed mean score for the summated selected variables on the Interest Evaluation form was 5.463 (N=156); the theoretic mean for these variables was 4.00. The factor structures and selected variables used for this analysis can be found in Appendix D.

Empirical Expectation IV

When the source of a message and a group of receivers of that message are matched according to cognitive style, the source will be rated higher on a source evaluation scale than when the source and receivers are unmatched ($p < .05$).

A three-way analysis of variance was computed for both factors of the source evaluation scale obtained from the factor analysis procedure explained in Chapter II. The factor structures and selected variables used for this analysis can be found in Appendix D. The expected source-by-audience interaction did not occur for the first factor. The results are tabled below.

TABLE IV
Three-Way ANOVA for Source Evaluations, Factor A

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Sig.</u>
TOTAL	3766.692	125	30.134		
Main Effects	289.651	4	72.413	2.543	.043
Message	17.105	2	8.552	0.300	.999
Source	189.137	1	189.137	6.742	.011*
Audience	89.877	1	89.877	3.156	.075
2-Way Interactions	169.448	5	33.889	1.190	.318
MessageXSource	132.975	2	66.488	2.335	.099
MessageXAudience	15.742	2	7.871	0.276	.999
SourceXAudience	11.339	1	11.339	0.398	.999
3-Way Interactions	61.208	2	30.604	1.075	.346
MessageXSourceX Audience	61.208	2	30.604	1.075	.346
RESIDUAL	3246.386	114	28.477		

NOTE: Cell Means can be found in Appendix E.

*Indicates significant effects.

The expected source-by-audience interaction occurred on the second factor of the source evaluation instrument which appears to be a measure of the worth. When source and audience were matched for cognitive style, the evaluations on this factor tended to be higher than when they were not.

TABLE V
Three-Way AVOVA for Source Evaluations, Factor B

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Sig.</u>
TOTAL	1125.290	125	9.002		
Main Effects	91.600	4	22.900	2.707	.033
Message	6.747	2	3.374	0.399	.999
Source	83.976	1	83.976	9.928	.002*
Audience	2.455	1	2.455	0.290	.999
2-Way Interactions	48.374	5	9.675	1.144	.341
MessageXSource	4.019	2	2.010	0.238	.999
MessageXAudience	1.471	2	0.735	0.087	.999
SourceXAudience	42.015	1	42.015	4.967	.026*
3-Way Interactions	21.076	2	10.538	1.246	.291
MessageXSourceX Audience	21.076	2	10.538	1.246	.291
RESIDUAL	964.239	114	8.458		

NOTE: Cell Means can be found in Appendix E.

*Indicates significant effects.

The null hypothesis cannot be rejected for the first factor; it is for the second.

Empirical Expectation Five

Message content will be perceived as more interesting when the source of the message and the receivers are matched for cognitive style than when they are mismatched.

The same procedure utilized in testing the fourth empirical expectation was employed here. The two factors and the selected variables used as the dependent measures in this analysis can be found in Appendix D.

No significant effects were found for the first factor of the Message Evaluation instrument, and, for this factor, the null hypothesis could not be rejected.

TABLE VI
Three-Way ANOVA for Message Evaluations, Factor A

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Sig.</u>
Total	277.498	125	2.220		
Main Effects	14.122	4	3.530	1.589	.181
Message	6.808	2	3.404	1.532	.219
Source	2.117	1	2.117	.953	.999
Audience	4.817	1	4.817	2.168	.140
2-Way Interactions	8.833	5	1.767	.795	.999
MessageXSource	.141	2	.071	.032	.999
MessageXAudience	8.757	2	4.378	1.970	.142
SourceXAudience	.001	1	.001	.001	.999
3-Way Interactions	1.196	2	.598	.269	.999
MessageXSourceX Audience	1.196	2	.598	.269	.999
RESIDUAL	253.347	114	2.222		

NOTE: Cell Means can be found in Appendix E.

The second factor, however, produced significant effects though not those precisely stated in the expectation. Rather than a two-way interaction between source and audience, a three-way interaction between source, audience, and message emerged. The results indicate that the expected interaction holds true except for messages about the physical sciences where messages produced by field independent sources were preferred by both field independent and field dependent audiences.

TABLE VII

Three-Way ANOVA for Message Evaluations, Factor B

<u>Source</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Sig.</u>
Total	1501.861	125	12.015		
Main Effects	132.147	4	33.037	2.231	.015
Message	17.023	2	8.512	0.833	.999
Source	95.856	1	95.856	9.375	.003*
Audience	19.513	1	19.513	1.908	.166
2-Way Interactions	126.016	5	25.203	2.465	.036
MessageXSource	42.336	2	21.168	2.070	.129
MessageXAudience	48.932	2	24.466	2.393	.094
SourceXAudience	28.913	1	28.913	2.828	.091
2-Way Interactions	78.136	2	39.068	3.821	.024*
MessageXSourceX Audience	78.136	2	39.068	3.821	.024
RESIDUAL	1165.562	114	10.224		

NOTE: Cell Means can be found in Appendix E.

*Indicates significant effects.

Summary

Four of the expected syntax categories were found to discriminate between field dependent subjects and field independent subjects. The second empirical expectation was not supported; the third was. The fourth and fifth empirical expectations were each partially supported; the second factor of each instrument produced the anticipated interaction between source and audience.

Much of what was not found led to valuable post hoc examination of the data. That and the interpretation of what occurred in this study will be discussed in the next chapter.

CHAPTER IV

DISCUSSION

It is the objective of this chapter to discuss and interpret the results reported in the previous chapter. In doing so, the following organization will be observed:

1) A discussion of reliability of the findings, 2) a discussion of the findings for the empirical expectations, 3) a discussion of variable checks, and 4) a discussion of the conclusions to be drawn from this study.

Reliability of the Findings

Interpretation of research results cannot be adequately done without first assessing the types of error which might have occurred and which might then account for the results. That error occurs in most research is probable; the task is to determine the degree to which it was probable. The likelihood that the errors occurring in this study favored the research expectations, i.e., Type I error, seems relatively low. On the contrary, the skewed distribution of the Hidden Figures Test scores probably contributed to Type II error by deflating correlations in which it was involved

and generally violating the assumptions of the various test statistics used in the study (see Appendix E for the descriptive statistics for the Hidden Figures Test distribution). Type I error was minimized also by the relatively large sample size used ($N=164$).

In general, four major considerations which could have contributed to Type II error are worthy of note. First, there is some question about the intervality of the Hidden Figures Test scale. Very little normative data are available for the test, though the Educational Testing Service distributes it as an alternate form of the Group Embedded Figures Test. This in turn makes it difficult to attribute cause for the non-normal distribution of scores in this study. Is it because the subject population was atypical of the population in general, or is it because the test itself does not provide interval level data? If the scale does not provide interval level data, then the median split used to determine field dependent and field independent groups only compounded the problem. This in turn would naturally adversely affect the results of the test statistics used.

One study reported in an unpublished paper from the Educational Testing Service files (1975) conducted by Witkin using the Hidden Figures Test Cf-1 does report relatively high split-half reliability coefficients for the test (males, $r = <.80$, females, $r = <.79$). The split-half reliability coefficient for the test in this study was .87. Though these

figures seem adequate, it is unfortunate that more normative data are not available.

Another problem is concerned with the five independent judges who were asked to sort the messages into the three subject categories. They also were given a second opportunity to sort the messages with an added "miscellaneous" category into which any message which was not judged to be about the fine arts, social sciences, or physical sciences could be placed. When given this opportunity, 30% of the messages judged were put into the fourth category (see Appendix E for additional data). Perhaps, then, the content categories used were not realistic ones for the messages produced in this study, and analyses involving these three groups may have been affected.

A third and rather interesting aspect of the study which leads to an interesting philosophical position deals with the significance level specified in this study. Employing the conventional significance-test decision procedure, the .05 alpha level for significance was set to determine whether a null hypothesis would or would not be rejected. Rozeboom (1970) and others have suggested that such a procedure, while used extensively in the behavioral sciences, is inappropriate. He outlines five arguments against its use, parts of which are quoted below:

1. The null-hypothesis significance test treats "acceptance" or "rejection" of a hypothesis as though these were decisions one makes. . . . Acceptance or rejection of a hypothesis is a cognitive process, a degree of believing or disbelieving which, if rational, is not a matter of choice but determined solely by how

likely it is, given the evidence, that the hypothesis is true. . . .

2. Decision theory shows the NHD to be woefully inadequate as a decision procedure. . . . NHD procedure pays no attention to utilities at all, and considers the probability of the hypothesis, given the data--i.e., the inverse probability--only in the most rudimentary way (by taking the rejection region at the extremes of the distribution rather than in its middle). Failure of the traditional significance test to deal with inverse probabilities invalidates it not only as a method of rational inference but also as a useful decision procedure.

3. The traditional NHD test unrealistically limits the significance of an experimental outcome to a mere two alternatives, confirmation or disconfirmation of the null hypothesis. Moreover, the transition from confirmation to disconfirmation as a function of the data is discontinuous--an arbitrarily small difference in the value of the test statistic can change its significance from confirmatory to disconfirmatory. Finally, the point at which this transition occurs is entirely gratuitous. There is absolutely no reason (at least provided by the method) why the point of statistical "significance" should be set at the 95% level, rather than, say the 94% or 96% level one is as arbitrary as the other.

4. The null-hypothesis significance test introduces a strong bias in favor of one out of what may be a large number of reasonable alternatives.

5. Finally, if anything can reveal the practical irrelevance of the conventional significance test, it should be its failure to see genuine application to the inferential behavior of the research scientist. Who has ever given up a hypothesis just because one experiment yielded a test statistic in the rejection region? And what scientist in his right mind would ever feel there to be an appreciable difference between the interpretive significance of data, say, for which one-tailed $p < .04$ and that of data for which $p < .06$, even though the point of "significance" has been set at $p < .05$? In fact, the reader may well feel undisturbed by the charges raised here against traditional NHD procedure precisely because, without perhaps realizing it, he has never taken the method seriously anyway. . . . What has given the traditional method its spurious feel of usefulness is that the first, and by far most laborious, step in the procedure, namely estimating the probability of the experimental outcome under the assumption that a certain hypothesis is correct, is also a crucial first step toward what one is genuinely concerned with, namely an idea of the likelihood of that hypothesis, given this experimental outcome (Rozeboom, 1970, pp. 206-207).

To adopt this position is to adopt a more open approach when interpreting the results of a study. One does not simply "accept" or "reject" hypotheses; one examines the "probabilities" of occurrence associated with each hypothesis with an eye toward future research and realizes that a decision to "not reject" or "to accept" a null hypothesis on the basis of an .05 level of significance may be a contribution to Type II error.

The last, and rather important measurement limitation of this study which might have contributed to Type II error and which bears directly on the issue just considered, concerns the SLCA-II categories and procedure.

This study was extremely informative concerning the SLCA-II technique. In fact, the largest part of the completion time for this study was spent working with SLCA-II. As a method for categorizing meaningful syntactic units in a message, it is very useful. As a practical instrument for reliably discriminating between such units in this study, it was only partially successful.

At present, there is a lack of purity in some of the major categories. The afferent-efferent distinction, a particularly important one for this study, is hazy. Afferent words are seen as those words which have real world referents, i.e., dog, black, smelly, rough, loud. They are words which can be sensed--seen, tasted, smelled, heard, felt--no matter what their function in the sentence.

Efferent words have no real world referents; they frequently refer to internal states or abstract concepts or qualities, i.e., fear, angry, faith, soon. There are, however, a great many words which seem to fall into neither category; they frequently refer to social institutions, social definitions, or abstractions of afferent categories, i.e., corporation, work, play, equipment. Where should such words be placed? To cope with this, the dictionaries for SLCA-II are now set-up so that any word not judged afferent is included in the efferent dictionaries. The afferent category has been widened to include words which may not only be sensed directly, but also to those words whose referents are direct abstractions of afferent words, words whose referents are directly measurable (inch, ounce, year), even if only by social convention, and certain kinds of verb forms (mainly present or past participles of action and/or transitive verbs). Such a set of rules pretty clearly defines the afferent category, but it leaves the efferent category impure in terms of its original definition. It also renders the category rather inconsistent with Witkin's use of the word "internal" (see p. 25) and a rather inadequate test of the first empirical expectation.

Two computer programming faults were discovered in SLCA-II which, though they are now being corrected, affected the results of this study. The sorting and identification techniques employed in the program before the faults were discovered make it difficult to reliably interpret the final

word indexes when a large number of messages are being analyzed. Most verbs can be used both transitively and intransitively. Only a select few cannot be. Yet, if a verb was entered into the intransitive dictionary of SLCA-II, it became permanently intransitive--used without an object. Every time the computer encountered a verb listed as intransitive, it was automatically included in the intransitive frequency count. This in turn created an inflated intransitive verb frequency and a deflated transitive verb frequency. The following cases serve as an example:

I didn't want to drive. But the robber told me to get in and drive the car or he would drive his six inch switch blade through my back. I decided I'd better do as I was told and drive.

The computer would count three intransitive "drive" verbs in this message; only the last "drive" is intransitive.

Another problem of a similar nature was the double-entry of words in the limiter dictionaries. Some words may be used to modify both subject words and connectors. If they are entered in both subject limiter and connector limiter dictionaries, the first dictionary containing the word was used by the computer as the tag for that word, and that category received the frequency count. This frequently occurred in grammatically incorrect sentences. For example:

He fired quick, without thinking.--connector limiter
It was a quick movement, hardly noticeable.--subject limiter

One last observation about SLCA-II is that many of the variables may ultimately prove to be unnecessary for

analysis. In this study alone, seventeen of the one hundred and two categories had zero frequencies. Only further use of the technique can determine the usefulness of all one hundred and two categories.

The professional staff working with SLCA II at the University of Oklahoma is currently dealing with these problems in SLCA-II; they are certainly not formidable ones, but they did contribute to the difficulty in explaining the findings of this study.

Empirical Expectations

There were four categories stated in the first expectation which did achieve significance at .05 or better. Three of these are also variables identified in the original Cummings study (1970) as having discriminated between individuals with high versus low spatial relationship abilities. The relationship, however, was opposite to the relationship found in this study. Cummings (1971) notes that ". . . subjects who were low in spatial abilities encoded more TOT-1. . . more TOT-2. . . and more TOT-3. . ." (p. 83). In this study, field independent subjects encoded more TOT-1, TOT-2, and TOT-3. The fourth significant expected difference was in the Target-Other category. Here field dependent subjects encoded more words. This supports Luborsky's (reported in Witkin, 1972) findings that the ratio of other people-references to self-references was significantly higher for field dependent individuals.

Though only four of the expected syntactic categories proved to be discriminators between field dependent and field independent subjects, there were other categories which also discriminated at .05. Two of these emerged as a result of t -tests on all the variables (one hundred and two) which entailed a weighting process for cells with unequal N s after the homogeneity of variance assumption had been tested for each pair of groups (see Nie, et al., 1975, for a detailed description of the procedure). From this procedure the SCE (subjunctive, comparison equivalence verbs) and NIT (negative indicative, transitive--active--verbs) categories appeared. Field dependent subjects encoded more subjunctive, comparison equivalence verbs ($t(153) = -2.57$, $p < .01$) than field independent subjects, and field independent subjects encoded more negative indicative, transitive verbs ($t(153) = 2.00$, $p < .048$).

By themselves, these findings are not spectacular nor particularly interpretable, though Doob (1958) reported finding that field independent individuals encoded significantly more total action verbs than did field dependent individuals. NIT (negative indicative, transitive verbs) is certainly a subset of the larger category of action verbs, so at least a partial explanation does exist.

The Rozeboom (1970) arguments discussed earlier provide a prelude to the consideration of other syntactic

categories which also proved to be rather good discriminators of field dependence-independence beyond the .05 level of significance. Consideration of these categories is important from a practical view as well. Most of the expectations tested were two-tailed questions. Consequently twenty-four of the language variables examined were rejected as discriminators of field dependence-independence when, in fact, had this not been an exploratory-descriptive study for the first hypothesis, they would have met the .05 level of directional expectations. And, directional expectations will no doubt be posited in future research. It seems important, then, that they be considered.

William Hays in Statistics for the Social Sciences (1973) provides a rationale for examining such categories from a different direction. He suggests the researcher "suspend judgement" when interpreting nonsignificant results.

Obtaining a nonsignificant result (one not leading to a rejection of H_0 in favor of H_1) often puts the experimenter in a quandary. He cannot make the decision to reject H_0 and still stay within the bounds of α set by his decision-rule. Does this mean, however, that he must decide that H_0 is true? Most emphatically not! In the first place the experimenter does not have to decide anything. . . . In the case of nonsignificant results a wise decision may be to suspend judgment and wait for more evidence (pp. 365-366).

There seems to be sound justification, then, for reporting and examining those syntactic categories which discriminate at least at the .10 level or better whether stated in the expectation or not. What follows is a discussion of some post hoc analysis of the syntactic categories data.

To control for gender, a variable that traditionally is reported as confounding tests of field dependence-independence, the syntactic categories were again analyzed using a 2X2 analysis of variance design. This time three groups of variables emerged: 1) those discriminating between field dependence and field independence, 2) those discriminating between gender, and 3) variables creating an interaction effect between sex and field dependence-independence. Those which discriminate only between genders will not be reported here.

Variables encoded most frequently by field independent subjects

1. SCP (total connectors which are subjunctive, comparison spatial)
 $F(1,125) = 3.055, p < .079.$
2. NSI-E (total negated subject words which are efferent)
 $F(1,125) = 2.923, p < .086.$

Variables encoded most frequently by field dependent subjects

1. ICE (total comparison equivalence connectors)
 $F(1,125) = 5.247, p < .022.$
2. NICE (total negated comparison connectors which are indicative, equating)
 $F(1,125) = 3.119, p < .076.$

Variables encoded most frequently by field independent male subjects

1. NICS (total negated comparison connectors which are indicative, subset)

$$F(1,125) = 5.562, p < .019.$$

2. ISC (total comparison subset connectors)

$$F(1,125) = 4.112, p < .042.$$

3. SS (total subject words which refer to the source,
i.e., first person pronouns)

$$F(1,125) = 3.569, p < .058.$$

4. COMP (total frequency of comparison connectors)

$$F(1,125) = 4.798, p < .029.$$

5. IFU (total connectors which are indicative, future tense)

$$F(1,125) = 3.476, p < .061.$$

6. ICM (total comparison-more/than connectors)

$$F(1,125) = 4.851, p < .028.$$

7. ICT (total comparison time connectors)

$$F(1,125) = 2.846, p < .090.$$

Variables encoded most frequently by field independent
female subjects

1. ACTC1 (total frequency of action connectors)

$$F(1,125) = 2.744, p < .096.$$

Variables encoded most frequently by field dependent
male subjects

1. ACTC1 (total frequency of action connectors)

$$F(1,125) = 2.744, p < .096.$$

Variables encoded most frequently by field dependent
female subjects

1. NC1D (total negated connectors which are defined)

$$F(1,125) = 3.159, p < .074.$$

Three points stand out when looking at these data:

- 1) most of the categories involved are connector (verb)
categories,

- 2) the second most frequently occurring categories are negatives, and
- 3) the external-internal distinctions Witkin speaks of do not manifest themselves in the afferent-efferent syntactic categories Cummings proposes.

There is at least intuitive explanation for the first item. Connectors are words which function in a special manner; they help us express relationships or actions. They therefore ought to reflect differences in the way individuals perceive and process relationships or actions. And, since a mature language user is taught to speak and write in complete thought units, it is highly infrequent that we produce linguistic descriptions without using verb forms.

The verb forms available in English for our use are many and varied. SLCA-II alone can analyze over sixty verb categories. The likelihood that all individuals use all categories with the same frequency is low. Each individual probably has a unique selection pattern of verbs which somehow correspond to his uniqueness as a human being, more specifically, the way he perceives and processes events in the world.

Subject signs and limiters in English by comparison are not so variable in form, and since the choices are so limited, the likelihood that we all select similar patterns for use is much greater than it is for our selection of verbs. Consequently, it does not seem surprising that subject signs and limiter signs are not particularly good

discriminators in this study. There is one special exception to this pattern, the total subject words which refer to the receiver and the total subject words which refer to the source categories. These do reflect the cognitive and personality structures of the user. Field independent individuals are more inner directed in decision making than are field dependent individuals, and field dependent individuals are more sensitive to others, and more dependent on others when forming opinions.

Of the connector categories which discriminate between field dependent and field independent encoders, eight of them are comparison connector categories. This perhaps is a function of the task presented the encoders, giving instructions. Instructions such as the following were not uncommon:

" . . . move it closer to the right. . . ."
 " . . . hydrogen is part of"
 " . . . until the distillate is darker than before"

Two of the comparison connector categories are particularly interesting, total connectors which are subjunctive, comparison spatial (SCP) and total connectors which are subjunctive, comparison equivalence (SCE), because they truly reflect the differences between field dependent and field independent individuals. The SCP category is encoded more frequently by field independent sources. This seems highly consistent with what is known about field independent people. SCE is a comparison equivalence category, one used when making statements

of similarity about entities. This category, ICE (total comparison equivalence connectors), and NICE (total negated comparison connectors which are indicative, equating), are all encoded more frequently by field dependent people. Field dependent encoders tend to see "sameness" or similarities more frequently than field independent individuals--at least they make statements about and give directions concerning the similarities in entities.

By contrast, one might argue that the field independent individual, particularly the field independent male, encodes more analytical comparisons, i.e., encodes statements about differences. Six different connector categories reflect this difference.

Why negative categories appear so frequently is uncertain. They seem to be evenly divided between field dependent and field independent encoders which hampers interpretation.

Only one category of the afferent-efferent variety emerged from the analysis, the NSI-E (total negated subject words which are efferent) for field independent sources. This category is difficult to interpret for two reasons: it is a negative category, and the lack of "purity" in the efferent categories of SLCA. Whether this reflects the use of words like "love, hate, God, anger, fear, joy" or "science, religion, democracy, decency, fairness," etc., is unclear. What is clear is that if either group were to use more

efferent words, the field dependent sources should be the ones to do so. This was not the case.

Had the subject population been sufficiently large, these nineteen categories would have been subjected to a step-wise multiple regression along with the four significant hypothesized categories. Unfortunately the recommended minimum ratio of ten subjects per variable used in the regression equation could not be met.* However, the subject population was sufficiently large to legitimately run a multiple regression using the seven syntactic categories which discriminated between field dependent and field independent sources at .05 or better and the four significant hypothesized categories. The results indicate a low moderate correlation, $R(156) = .352$. The results reflect the grossness of the t statistic and the relative precision of R as tests for relationships between variables.

Empirical Expectation II

The results indicate a clear lack of relationship between Hidden Figures Test scores and subject matter written about. This is also the clearest instance where Type II error might have occurred. The forced-sort of messages

*The theoretical basis upon which the argument for the ten-subjects-per-variable minimum is based, is presented in an article by Richard B. Darlington (1970). Additional support for the position is derivable from cross-validation formulas originally presented in a document by the same author entitled "Proofs of Some Theorems on Multiple Regression" (Document No. 9810, ADI Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington, D.C. 20540).

into the three categories by the judges when approximately a third of the messages were later judged to belong to none of the three categories probably accounts for the results. But the problem was compounded by the median split performed on the hidden figures test scores which did not fall into a normal distribution to begin with.

It may also be that the task given the field dependent-independent encoders may not have tapped their differences. If anyone were told to write a set of directions for "doing something," the decision about content would no doubt be made on two factors, recency of exposure and expedience, i.e., what have I recently learned how to do that is easy to talk about? Since the subjects did not yet know they were to rate their own interest in the topic about which they wrote, they may not have used "interest" as a criteria for selecting a topic. Perhaps a field independent person had just recently watched the "Galloping Gourmet" on PBS while waiting for "Nova" to begin. He therefore wrote directions for baking a cake. When the judges were asked to sort this message, three out of five sorted it into the fine arts category and there it stayed for analysis.

Consequently, for this result Hayes may be right again. The best conclusion to draw is to "suspend judgment" until future research either confirms or contradicts this finding.

Empirical Expectation III

The findings for this expectation lead one to conclude that the subjects as a whole felt themselves to be competent sources and interested in the subjects about which they wrote. The next question asked was whether there was any relationship between the subjects' Hidden Figures Test scores and their evaluations of self and interest. To answer this question and to compensate for the small N size being analyzed in each group (Fine Arts = 16, Social Science = 7, Physical Science = 10), the data were treated as ordinal data and a Spearman rho was computed between the Hidden Figures Test scores and each set of evaluation scores within each message content category.

A moderate negative correlation (rho = $-.36$; $p < .085$) occurred in the fine arts category between the Hidden Figures Test scores and the self evaluations. A moderate positive correlation (rho = $.49$, $p < .073$) occurred in the physical sciences category. These results are perfectly consistent with our knowledge of field dependent and field independent individuals. Field independent people would not be expected to consider themselves better sources about the fine arts than field dependent individuals. Field dependent individuals would not be expected to consider themselves better sources about the physical sciences than field independent individuals. Perhaps the reason the correlation coefficients were not larger is due again to the lack of purity within the message categories.

No significant correlation was found between Hidden Figures Test scores and the interest evaluations. The explanation for this may be the same as the one offered for Expectation II. When the subjects chose their topics they were not particularly interested in finding one of great interest to them. An alternative explanation is that the instrument itself is faulty. It is the weakest of the four. The items were taken from the evaluative dimension of the original Osgood studies (see p.25) and only one of the items was finally selected for analysis (happy-sad) by the procedure outlined in Chapter II.

To further check on these relationships, Pearson r coefficients were computed between the Hidden Figures Test scores of all subjects, regardless of message content, and their evaluation scores. No relationships were found.

Empirical Expectation IV

The expected interaction occurred for the second factor of the source evaluation instrument. That is, when source and audience were matched (field independent audience with field independent source, field dependent audience with field dependent source), the sources were judged to be more valuable and reliable. This was predicted. What is still not known is what about the message caused these evaluations. It most certainly was something in the message since the correlation between the source evaluation instrument and the message evaluation instrument scores indicates a lack of independence. The r's between the two

factors on each instrument range from .69 to .85. The course was not judged independently of the message. Could the syntactic categories be the cue for the receivers? The results of the multiple regression of the eleven syntactic variables on the two variables of this instrument suggest this was not the case.

Regression on disposition of source summated items: $R(156) = .204$. Regression on worth of the source summated items: $R(156) = .203$.

Perhaps stylistic or organizational preferences in messages differ significantly from field dependent to field independent receivers. There is the possibility that the chaotic-ordered and precise-vague scale items used to judge messages were also used to judge the reliability of the message source. In that case, a source which ordered a message in the same manner as the receiver would, should be judged more reliable than one who differed.

The main effect for source on the disposition item is rather puzzling and contrary to expected results. That field dependent audiences should find field independent sources to have better dispositions than field dependent sources is inconsistent with the literature. This may just be a statistical problem which occurred because field independent audiences rated field independent sources higher than field dependent audiences rated field dependent sources when they liked them, and that field independent audiences rated field dependent audiences lower than field

dependent audiences rated field independent sources when they didn't like them. This is speculation. An examination of the cell means found in Table 1, Appendix E, supports such speculation, however. Exactly what was used by the receivers to make judgments about the disposition of the sources is unknown.

Empirical Expectation V

No effects were found for the originality scale item of the message evaluation instrument. Either it was not salient for these messages or the notion of originality-triteness differed randomly from person to person rather than uniformly from group to group.

The second set of items, however, produced an unexpected, though easily explained, three-way interaction between source, audience, and message. Matching of a field dependent source with a field dependent audience and a field independent source with a field independent audience produces higher message evaluation except in the physical sciences category where messages produced by field independent sources are preferred regardless of the cognitive style characteristics of the audience. This tends to suggest that field dependent receivers change their minds as to what constitutes ordered and precise messages when the content deals with the physical sciences. Previous research has suggested that this sort of an interaction in academic areas may well exist (see Chapter I). Perhaps there are some subjects which need to be taught in specific ways regardless

of the cognitive style of the student and/or teacher. Even field dependent students may prefer field independent teaching methods in traditionally field independent courses. The methods typically employed by field dependent instructors and preferred by field dependent students may be inadequate for handling analytic subjects.

Variable Checks

In Chapter II the inter-relationship of three independent variables was presented. Hidden Figures Test scores were expected to correlate highly with Block Design scores but not to correlate at all with the ACT scores. Table VIII is an intercorrelation matrix for these two variables. The expectations held with two exceptions. The correlation between Hidden Figures Test scores and Block Design scores is lower than reported in previous literature (Karp, 1963). This is no doubt due to the skewed distribution of the Hidden Figures Test scores. The correlation between Hidden Figures Test scores and the American College Test math subtest is explainable, but was not expected. If ACT can be treated as an intelligence measure, then the math subtest might be conceptually equivalent to those same kinds of tasks which appear in the Wechsler Adult Intelligence Scale. Embedded Figures Test scores are reported to correlate with the math subtest on the Wechsler Adult Intelligence Scale. The Hidden Figures Test might be expected to do the same. That Block Design scores correlate so well with the ACT scores should be

TABLE VIII. Intercorrelations Between Independent Measures

	HFT	BD	English ACT	Mathematics ACT	Social Sciences ACT	Natural Sciences ACT	Total ACT
HFT	1.000	$\underline{r}(33) = .506,$ $p < .003$	$\underline{r}(69) = .075,$ $p < .541$	$\underline{r}(69) = .213,$ $p < .079$	$\underline{r}(69) = .105,$ $p < .389$	$\underline{r}(69) = .050,$ $p < .685$	$\underline{r}(69) = .098,$ $p < .423$
BD		1.000	$\underline{r}(11) = .551,$ $p < .079$	$\underline{r}(11) = .712$ $p < .014$	$\underline{r}(11) = .702$ $p < .016$	$\underline{r}(11) = .753,$ $p < .007$	$\underline{r}(11) = .737,$ $p < .010$
ACT			1.000	$\underline{r}(69) = .551$ $p < .001$	$\underline{r}(69) = .803$ $p < .001$	$\underline{r}(69) = .7610,$ $p < .001$	$\underline{r}(69) = .858,$ $p < .001$
ACT				1.000	$\underline{r}(69) = .488$ $p < .001$	$\underline{r}(69) = .549,$ $p < .001$	$\underline{r}(69) = .687,$ $p < .001$
ACT					1.000	$\underline{r}(69) = .77$ $p < .001$	$\underline{r}(69) = .876$ $p < .001$
ACT						1.000	$\underline{r}(69) = .88$ $p < .001$
ACT							1.000

expected if both are intelligence measures, a position supported by the following statement: "Scholastic aptitude tests are really specialized intelligence tests made up of the kinds of items that correlate most closely with school success" (Psychology Today, 1972, p. 392).

Conclusions

Within the constraints imposed by this study on the generalizability of the results, the following statements may be made:

1. There are differences in the syntactic categories employed in the written messages of field dependent and field independent sources.

2. The meaning and significance of these differences needs further study.

3. Written messages encoded by field dependent and field independent sources have different effects on field dependent and field independent receivers:

- A. Field independent sources are perceived as having a more pleasant disposition than field dependent sources for both field dependent and field independent audiences.
- B. Receivers perceive sources with whom they are matched for cognitive styles to be more reliable and valuable than sources with whom they are not matched.
- C. Except in the physical sciences, receivers perceive written messages produced by sources with whom they are matched for cognitive style to be more ordered and precise than messages produced by sources with whom they are not matched.

- D. Messages about the physical sciences produced by field independent sources are preferred by both field independent and field dependent receivers.

4. Message subject content is not a function of field dependence - independence.

5. There is a tendency for subjects to rate themselves higher as qualified sources if they write about subjects typically associated with their cognitive style.

What this means for future cognitive style research in both education and communication will be discussed in Chapter V.

CHAPTER V

IMPLICATIONS FOR FUTURE RESEARCH

The lines of inquiry in cognitive style research have been many and varied. The outcome of this research has been the opening of even newer and more varied avenues of inquiry into the nature and implications of the cognitive style construct. Each time researchers pose a question and begin to answer it, a battery of questions replaces it; that is the point this study has reached. It poses more questions than it answers. The irony of the situation is that depending on the reader's position on the issues at hand, this can be either regrettable or commendable.

The discussion which follows treats the implications for future research created by this study by examining three major areas: 1) those questions of interest to the cognitive style scholar, 2) those of interest to the communication scholar, and 3) those of interest to the researcher of educational issues. The categories are not meant to be mutually exclusive and, in fact, are not.

Future Research in Field Dependence-Independence

If future research is to utilize the Hidden Figures Test Cf-1 as a measure of field dependence-independence, the measure will need to be tested and normative data compiled and collected for it. At present, such information is scanty at best, an unfortunate occurrence since there is so much construct validity associated with it. The ease with which the test is obtained, administered, and scored are strong arguments for seeking validation of the instrument. There are, however, other forms of group-administered, paper-and-pencil tests of field dependence-independence available for research use. But, the questions raised about field dependence-independence as a construct by this study may be deeper than the form of test used.

The field dependence-independence literature consistently reports a small but significant and persistent sex difference on all field dependence-independence measures. What small amount of normative data are available for the Hidden Figures Test indicate the same thing (Educational Testing Service files, 1975). Women score consistently lower than men. This did not occur in the present study. There was no significant difference in the Hidden Figures Test Cf-1 scores of male and female subjects, $t(104.91) = -.44$, $p=.66$.

The finding might be the effect of an atypical subject population, the result of the Hidden Figures Test itself, or the confirmation of the notion that previously

found sex differences on measures of field dependence-independence were artificial differences. That is, women traditionally scored lower than men because they had less exposure to experiences and training which might enable them to score better on field dependence-independence measures (Vaught, 1971). With the advent of women's rights, this difference, so the argument goes, should diminish.

There is some evidence to support the argument. Pre-adolescent boys and girls do not display significant differences on measures of field dependence-independence, young women of higher intelligence score about the same as men on measures of field dependence-independence (Jackson, et al., 1964), and geriatric subjects do not show sex differences on measures of field dependence-independence (Witkin and Oltman, 1967). Witkin himself does not see the sex differences in field dependence-independence as immutable ones. "In documenting the existence of sex differences, whether in cognitive style, or in educational and occupational interests, preferences and choices, we are simply describing the situation as we now find it. There is no assumption, of course, that this is the way it must be (Witkin, 1972, p. 21).

The results of the present study can now be added to those which support the lack of sex differences in field dependence-independence testing, if errors in measurement, i.e., the Hidden Figures Test Cf-1, can be ruled out. The call for additional research is clear.

There is also the clear implication from previous field dependence-independence research, that matching of subjects for cognitive style produces more positive interpersonal evaluations than mismatching (see Chapter I). That was not always the case in this study. As noted before (see Chapter IV) two distinct criteria emerged with which the subjects judged the sources of the messages they read. The first was a sort of personality yardstick, the second a measure of reliability and value. The interesting and contradictory finding was that everyone thought field independent encoders were more personable, i.e., have a better disposition, but only field independent receivers considered them more reliable and valuable than field dependent encoders. There is nothing in the review of the literature conducted for this study that would explain this finding. In fact, the preponderance of information available indicates the exact opposite effect. Field dependent individuals are thought to be more socially tuned than field independent individuals; one would expect them to be more personable; they even prefer professions and occupations where being personable is a necessity.

Consequently, more research is necessary to ferret out the cause of this finding. It may be a function of written interchanges rather than face to face dialogue. Whatever the causes, they need to be explored. The implication for educational research may be great since the evaluation instrument used was a scale used for teacher evaluations.

Such research would be important for a second reason. It appears that what field dependent subjects like and what they value in message sources is different, but that what field independent subjects like and what they value in sources is the same. At what point field dependent and field independent subjects differ in the evaluation process of others needs exploring; the cognitive processes appear to be different. Perhaps only the field dependent subjects actually use both factors when judging others. Perhaps the field independent subjects employ the maxim, "If I like you, you must be reliable," or "I like you because you're reliable."

Future Communication Research

The outcome of the research just suggested will be significant for the field of communication as well. If it should be the case that the interpersonal evaluation effects found in this study hold only for written messages, then the communication scholar will be interested in finding out how field dependent and field independent subjects differ in both their written and oral communication endeavors. The interest in the differences between oral and written modes of communication will again surface but will be confounded this time with a cognitive style variable.

In addition, from a communication perspective, the messages used in this study need a closer and more thorough analysis. There are other issues here besides syntax. Subjects were judging the messages, it seems, by their

orderliness and precision. Further, they preferred the order and precision, with one exception, produced by encoders with whom they were matched according to cognitive style. Is it fact, then, that field dependent and field independent subjects organize messages differently? Only a closer analysis of the messages and some future research can answer the question completely. More detailed analysis of the messages might also uncover stylistic differences in the messages which might be interacting with the results.

The entire battery of connector categories in SLCA-II appears to be a fertile ground for future communication research. They certainly seem to capture the intuitive difference in cognitive style of field dependent and field independent encoders. Perhaps an even more sophisticated research design could tap this sensitivity more directly and produce a set of valuable predictor variables. Even ignoring the cognitive style construct altogether, the connector categories should be examined in greater detail as sensitive predictors of human behavior.

This study provides the impetus for future research for communication scholars in another interesting area--sex differences in syntax usage. The two-factor analysis of variance described in Chapter IV also produced the following twelve syntactic categories as discriminators of sex in syntax usage:

<u>Females</u>		<u>Males</u>	
CLD	$F(1,155) = 3.752, p = .052$	Sl-E	$F(1,155) = 4.460, p = .035$
IPA	$F(1,155) = 4.283, p = .038$	LSlE	$F(1,155) = 5.372, p = .021$
ClPA	$F(1,155) = 4.283, p = .038$	ICM	$F(1,155) = 4.851, p = .028$
LCIA	$F(1,155) = 2.752, p = .096$	NICM	$F(1,155) = 5.271, p = .022$
NIT	$F(1,155) = 3.273, p = .069$	EFF	$F(1,155) = 5.545, p = .019$
		DEM	$F(1,155) = 4.023, p = .044$
		SID	$F(1,155) = 2.834, p = .091$

These twelve categories need to be validated for written messages and then tested for oral messages as well. It may well be that sex can be predicted by the proportion of usage of the major efferent categories in SLCA-II or the proportion of usage of more/than comparison connectors.

Future Research in Education

The results of this study should be of interest to educators for two reasons. First, the interpersonal evaluation instrument used was a teacher evaluation scale. The results indicate that field independent sources were judged to be more personable but not always more valuable or reliable. If these results are generalizable to the classroom and to the oral communication situation, field independent teachers ought to win personality contests but not necessarily the Excellence of Teaching Award. This should be of comfort to those individuals who are concerned with the impact of student evaluations of instructors. The results should also point up the need for examining the impact of cognitive styles of both students and instructors in the classroom.

The research reported earlier in Chapter I indicated that an interaction between cognitive style of instructor and cognitive style of student was involved in classroom exchanges. This study suggests the same, to the extent that liking and valuing one's instructor can make a difference in the quantity and/or quality of student-instructor-exchanges.

A second area of interest in this study for educators concerns the effects of written messages. Subjects preferred messages written by sources with whom they were matched according to cognitive style except when the messages were about the physical sciences. In that case, all subjects preferred messages written by field independent sources. This information may prove valuable when making textbook selections. If the results of this study are generalizable, field independent authors write better organized material about the physical sciences. If the results are generalized, field dependent students would prefer having their English themes evaluated and commented upon by field dependent instructors. If the results are generalizable, field independent students should prefer having their art appreciation courses taught by field independent individuals, and prefer having their textbook for the course written by a field independent individual. If the results are generalizable. . . .

The point, of course, is that all of this needs to be explored with further research, very pointed research. Precisely what is it that field dependent and/or field

independent individuals find to be organized and precise in written material? Do they find the same things to be precise and ordered in oral discourse? Does reading material which field dependent individuals find to be ordered and precise help field dependent individuals in the learning process? These are not meant to be rhetorical questions. They are substantive in nature and are meant to be explored. A research endeavor of some importance that needs to be done in this regard would examine first the way field dependent and field independent individuals organize their thoughts, second how they organize the messages they encode for other individuals, and third, what is perceived as organized by field dependent and field independent individuals. Discovering the links in such a chain would be of great value to educators.

Conclusion

The practical significance of this study has yet to be determined. The most direct route to determining its significance is to replicate, in part, extend to other research endeavors, and recast the same questions in alternative, innovative designs which may more parsimoniously address the issues of the relationships between cognitive style, language behavior, and education. Until this is done, the conclusions drawn from the results of this study must be considered provocative, but tentative.

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APPENDIX A

INDEPENDENT MEASURES

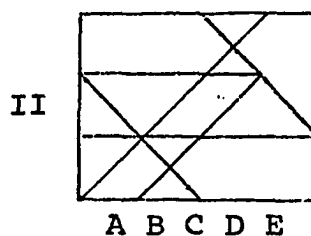
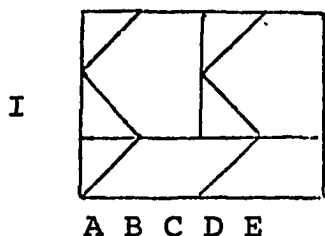
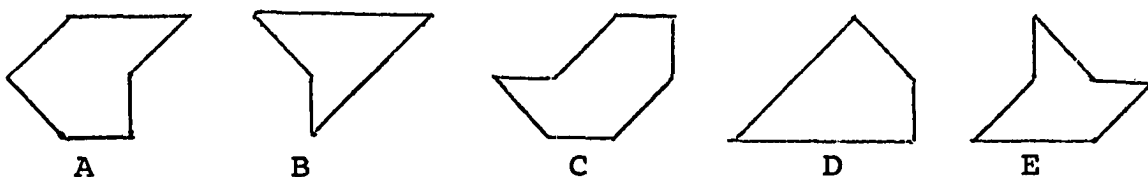
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HIDDEN FIGURES TEST -- Cf-1

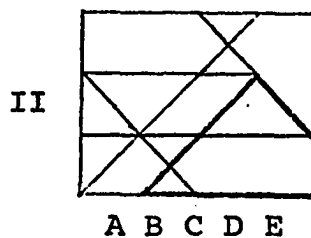
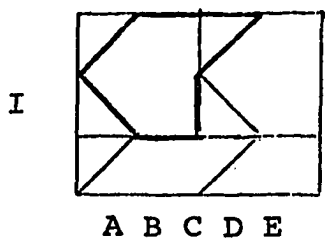
This is a test of your ability to tell which one of five simple figures can be found in a more complex pattern. At the top of each page in this test are five simple figures lettered A, B, C, D, and E. Beneath each row of figures is a page of patterns. Each pattern has a row of letters beneath it. Indicate your answer by putting an X through the letter of the figure which you find in the pattern.

NOTE: There is only one of these figures in each pattern, and this figure will always be right side up and exactly the same size as one of the five lettered figures.

Now try these 2 examples.



The figures below show how the figures are included in the problems. Figure A is in the first problem and figure D in the second.



Your score on this test will be the number marked correctly minus a fraction of the number marked incorrectly. Therefore, it will not be to your advantage to guess unless you are able to eliminate one or more of the answer choices as wrong.

HIDDEN FIGURES TEST -- Cf-1
(Continued)

You will have 10 minutes for each of the two parts of this test. Each part has 2 pages. When you have finished Part 1, STOP. Please do not go to Part 2 until you are asked to do so.

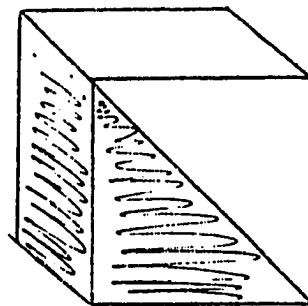
DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.

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Developed under NIMH Contract M-4186

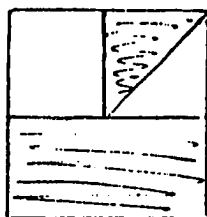
BLOCK DESIGN SUBTEST OF THE WECHSLER ADULT INTELLIGENCE SCALE

The one-inch wooden cube:



The reference designs to be duplicated with the wooden cubes:

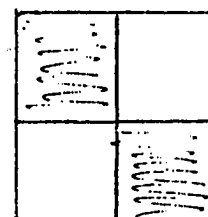
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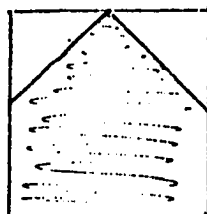
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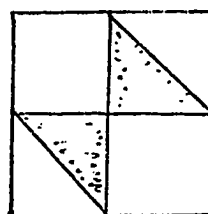
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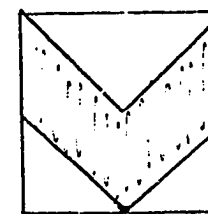
4



5

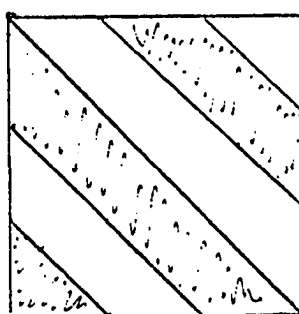


6

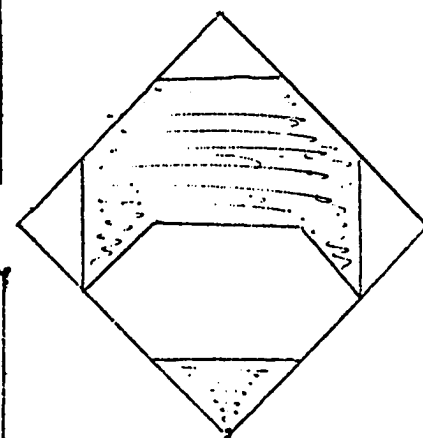


4 cubes
used

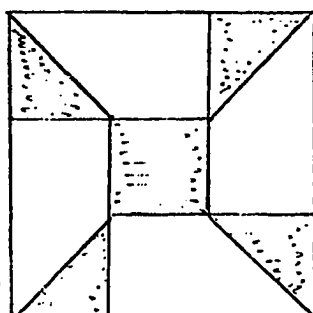
8



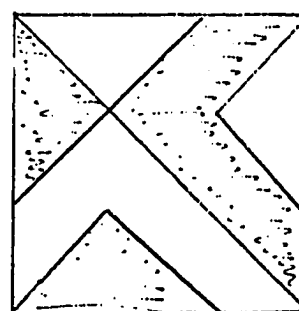
10



7



9



9 cubes
used

APPENDIX B

VARIABLE NAMES USED IN SLCA-II

KEY TO VARIABLE NAMES USED IN SLCA-II

SLP	TOTAL SUBJECT WORDS WHICH HAVE NO MODIFIER
SLD	TOTAL SUBJECT WORDS WHICH ONE OR MORE MODIFIERS
CLP	TOTAL CONNECTORS WHICH HAVE NO MODIFIERS
CLD	TOTAL CONNECTORS WHICH HAVE ONE OR MORE MODIFIERS
SL-A	TOTAL SUBJECT WORDS WHICH ARE JUDGED AFFERENT
SL-E	TOTAL SUBJECT WORDS WHICH ARE JUDGED EFFERENT
LS1-A	TOTAL MODIFIERS OF SUBJECT WORDS WHICH ARE JUDGED AFFERENT
LS1-E	TOTAL MODIFIERS OF SUBJECT WORDS WHICH ARE JUDGED EFFERENT
LC1-A	TOTAL MODIFIERS OF CONNECTORS WHICH ARE JUDGED AFFERENT
LC1-E	TOTAL MODIFIERS OF CONNECTORS WHICH ARE JUDGED EFFERENT
IPA	TOTAL CONNECTORS WHICH ARE INDICATIVE, PAST TENSE
IPR	TOTAL CONNECTORS WHICH ARE INDICATIVE, PRESENT TENSE
IFU	TOTAL CONNECTORS WHICH ARE INDICATIVE, FUTURE TENSE
ICE	TOTAL COMPARISON-EQUIVALENCE CONNECTORS
ICM	TOTAL COMPARISON-MORE/THAN CONNECTORS
ICS	TOTAL COMPARISON SUBSET CONNECTORS
ICP	TOTAL COMPARISON SPATIAL CONNECTORS
ICT	TOTAL COMPARISON TIME CONNECTORS
IADJ	TOTAL CONNECTORS ASSOCIATING SUBJECT SIGN WITH ADJECTIVE
IEXT	TOTAL CONNECTORS ASSOCIATION SUBJECT SIGN WITH DEMONSTRATIVES
IT	TOTAL ACTION CONNECTORS WHICH ARE TRANSITIVE, INDICATIVE
IR	TOTAL ACTION CONNECTORS WHICH ARE INTRANSITIVE, INDICATIVE
SPA	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, PAST TENSE
SPR	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, PRESENT TENSE
SFU	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, FUTURE TENSE
SCE	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, COMPARISON EQUIVALENCE
SCM	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, COMPARISON MORE/THAN
SC3	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, COMPARISON SUBSET
SCP	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, COMPARISON SPATIAL
SCT	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, COMPARISON TIME

SADJ	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, ASSOCIATING A SUBJECT SIGN WITH AN ADJECTIVE
SEXT	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, ASSOCIATING A SUBJECT SIGN WITH A DEMONSTRATIVE
ST	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, TRANSITIVE
SR	TOTAL CONNECTORS WHICH ARE SUBJUNCTIVE, INTRANSITIVE
NS1P	TOTAL PRIMITIVE SUBJECT WORDS NEGATED
NS1D	TOTAL DEFINED SUBJECT WORDS NEGATED
NIPA	TOTAL NEGATED CONNECTORS WHICH ARE INDICATIVE, PAST TENSE
NIPR	TOTAL NEGATED CONNECTORS WHICH ARE INDICATIVE, PRESENT TENSE
NIFU	TOTAL NEGATED CONNECTORS WHICH ARE INDICATIVE, FUTURE TENSE
NICE	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE INDICATIVE, EQUATING
NICM	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE INDICATIVE, MORE/THAN
NICS	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE INDICATIVE, SUBSET
NICP	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE INDICATIVE, SPATIAL
NICT	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE INDICATIVE, TIME
NIADJ	TOTAL NEGATED INDICATIVE CONNECTORS WHICH ASSOCIATE A UNIT SIGN WITH AN ADJECTIVE
NISXT	TOTAL NEGATED INDICATIVE CONNECTORS WHICH ASSOCIATE A UNIT SIGN WITH A DEMONSTRATIVE PRONOUN
NIT	TOTAL NEGATED ACTION CONNECTORS WHICH ARE TRANSITIVE
NIR	TOTAL NEGATED ACTION CONNECTORS WHICH ARE INTRANSITIVE
NSPA	TOTAL NEGATED PAST TENSE CONNECTORS WHICH ARE SUBJUNCTIVE
NSPR	TOTAL NEGATED PRESENT TENSE CONNECTORS WHICH ARE SUBJUNCTIVE
NSFU	TOTAL NEGATED FUTURE TENSE CONNECTORS WHICH ARE SUBJUNCTIVE
NSCE	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE SUBJUNCTIVE, EQUATING
NSCM	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE SUBJUNCTIVE, MORE/THAN
NSCS	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE SUBJUNCTIVE, SUBSET
NSCP	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE SUBJUNCTIVE, SPATIAL
NSCT	TOTAL NEGATED COMPARISON CONNECTORS WHICH ARE SUBJUNCTIVE, TIME
NSADJ	TOTAL NEGATED SUBJUNCTIVE CONNECTORS WHICH ASSOCIATE A UNIT SIGN WITH AN ADJECTIVE
NSEXT	TOTAL NEGATED SUBJUNCTIVE CONNECTORS WHICH ASSOCIATE A UNIT SIGN WITH A DEMONSTRATIVE PRONOUN
NST	TOTAL NEGATED CONNECTORS WHICH ARE SUBJUNCTIVE, TRANSITIVE
NSR	TOTAL NEGATED CONNECTORS WHICH ARE SUBJUNCTIVE, INTRANSITIVE
NS1-A	TOTAL NEGATED SUBJECT WORDS WHICH ARE AFFERENT
NS1-E	TOTAL NEGATED SUBJECT WORDS WHICH ARE EFFERENT
NC1P	TOTAL NEGATED CONNECTORS WHICH ARE PRIMITIVE

NC1D	TOTAL NEGATED CONNECTORS WHICH ARE DEFINED
NLS1-A	TOTAL NEGATED SUBJECT WORD LIMITERS WHICH ARE AFFERENT
NLS1-E	TOTAL NEGATED SUBJECT WORD LIMITERS WHICH ARE EFFERENT
NLC1-A	TOTAL NEGATED CONNECTOR LIMITERS WHICH ARE AFFERENT
NLC1-E	TOTAL NEGATED CONNECTOR LIMITERS WHICH ARE EFFERENT
AO	TOTAL SUBJECT WORDS WHICH REFER TO A SPECIFIC PERSON OR GROUP
GO	TOTAL SUBJECT WORDS WHICH REFER TO UNSPECIFIC PERSONS OR GROUPS, I.E., THIRD PERSON PERSONAL PRONOUNS
S-S	TOTAL SUBJECT WORDS WHICH REFER TO THE SOURCE, I.E., FIRST PERSON PERSONAL PRONOUNS
T-O	TOTAL SUBJECT WORDS WHICH REFER TO THE RECEIVER, I.E., SECOND PERSON PERSONAL PRONOUNS
NAO	TOTAL NEGATED SUBJECT WORDS WHICH REFER TO A SPECIFIC PERSON OR GROUP
NGO	TOTAL NEGATED SUBJECT WORDS WHICH REFER TO UNSPECIFIC PERSON, GROUPS, I.E., THIRD PERSON PERSONAL PRONOUNS
NS-S	TOTAL NEGATED SUBJECT WORDS WHICH REFER TO THE SOURCE, I.E., FIRST PERSON PERSONAL PRONOUNS
NT-O	TOTAL NEGATED SUBJECT WORDS WHICH REFER TO THE RECEIVER, I.E., SECOND PERSON PERSONAL PRONOUNS
ART	TOTAL ARTICLES
PREP	TOTAL PREPOSITIONS
OTH	TOTAL OTHER
COMP	TOTAL FREQUENCY OF COMPARISON CONNECTORS
ACTC1	TOTAL FREQUENCY OF ACTION CONNECTORS
IC1	TOTAL FREQUENCY OF INDICATIVE CONNECTORS
SC1	TOTAL FREQUENCY OF SUBJUNCTIVE CONNECTORS
TC1	TOTAL FREQUENCY OF TRANSITIVE CONNECTORS
RC1	TOTAL FREQUENCY OF INTRANSITIVE CONNECTORS
NC1	TOTAL FREQUENCY OF NEGATIVE CONNECTORS
AFF	TOTAL FREQUENCY OF AFFERENT SUBJECT WORDS AND LIMITERS
EFF	TOTAL FREQUENCY OF EFFERENT SUBJECT WORDS AND LIMITERS
L	TOTAL FREQUENCY OF LIMITERS
S1	TOTAL FREQUENCY OF SUBJECT WORDS
C1PA	TOTAL FREQUENCY OF PAST TENSE CONNECTORS
C1PR	TOTAL FREQUENCY OF PRESENT TENSE CONNECTORS
C1FU	TOTAL FREQUENCY OF FUTURE TENSE CONNECTORS

PRIM	TOTAL FREQUENCY OF PRIMITIVE SUBJECT WORDS AND CONNECTORS
DEFD	TOTAL FREQUENCY OF DEFINED SUBJECT WORDS AND CONNECTORS
PC1	TOTAL FREQUENCY OF POSITIVE (NON-NEGATIVE) CONNECTORS
C1	TOTAL FREQUENCY OF POSITIVE AND NEGATIVE CONNECTORS
DEM	DEMONSTRATIVES
COLL	COLLECTIVES
TOT-1	TOTAL WORDS ENCODED
TOT-2	TOTAL WORDS ENCODED LESS THE SUM OF ARTICLES, PREPOSITIONS, AND OTHER
TOT-3	TOTAL FREQUENCY OF SUBJECT WORDS, LIMITERS, AND CONNECTORS

APPENDIX C

DEPENDENT MEASURES

INSTRUCTIONS TO SUBJECTS: WRITTEN MESSAGES

During the course of your formal education you have studied and been exposed to a number of different academic subjects. Some you have probably found to be very interesting, others dull; some easy, others difficult. Please select one of these subjects and write a set of instructions in which you describe how to do something. For example, you might choose chemistry as the subject and then describe how one might produce water in a laboratory; or, you might choose drama as the subject and describe how an actor prepares for a role in a show; you might choose home economics and tell how to make a souffle, or English and tell how to write a superior essay. Your choice makes no difference. Just be sure you write your instructions so that someone unfamiliar with the topic can understand them.

The form on which you are to write these instructions is attached to this instruction sheet. Please provide all the information asked for. Thank You.

Student Identification Number: _____

Academic Subject Area From Which Topic
of Instructions is Drawn: _____

These Instructions Tell How _____

Please write your instructions below:

INSTRUCTIONS FOR USE OF THE SEMANTIC DIFFERENTIAL

Instructions: You are about to complete two forms which ask you to evaluate two different concept by judging them against a series of descriptive scales. In completing these forms, please make your judgments on the basis of how you feel. At the top of each form you will find the concept to be judged and beneath it a set of scales. You are to rate the concept on each of these scales in order.

Here is how you are to use these scales:

If you feel that the concept at the top of the form is very closely related to one end of the scale, you should place your check-mark as follows:

fair X : ____ : ____ : ____ : ____ : ____ : ____ unfair

OR

fair ____ : ____ : ____ : ____ : ____ : ____ : X unfair

If you feel that the concept is quite closely related to one or the other end of the scale (but not extremely), you should place your check-mark as follows:

nice ____ : X : ____ : ____ : ____ : ____ : ____ awful

OR

nice ____ : ____ : ____ : ____ : ____ : X : ____ awful

If the concept seems only slightly related to one side as opposed to the other side (but is not really neutral), then you should check as follows:

active ____ : ____ : X : ____ : ____ : ____ : ____ passive

OR

active ____ : ____ : ____ : ____ : X : ____ : ____ passive

The direction toward which you check, of course, depends upon which of the two ends of the scale seem most characteristic of the thing you're judging.

If you consider the concept to be neutral on the scale, both sides of the scale equally associated with the concept, or if the scale is completely irrelevant, unrelated to the concept, then you should place your check-mark in the middle space:

safe ____ : ____ : ____ : X : ____ : ____ . ____ dangerous

IMPORTANT: (1) Place your check-marks in the middle of spaces, not between them:

____:____: X :____: X :____
 THIS NOT THIS

- (2) Be sure you check every scale for every concept--do not omit any.
- (3) Never put more than one check-mark on a single scale.

Sometimes you may feel as though you've had the same item before on the test. This will not be the case, so do not look back and forth through the items. Do not try to remember how you checked similar items earlier. Make each item a separate and independent judgment. Work at fairly high speed through this test. Do not worry or puzzle over individual items. It is your first impressions, the immediate "feelings" about the items, that is wanted. On the other hand, please do not be careless, because your true impressions are wanted.

INSTRUMENTS USED IN PHASE I

As the author of the message I just completed writing,

I AM

unreliable	_____:	_____:	_____:	_____:	_____:	_____:	_____:	reliable
informed	_____:	_____:	_____:	_____:	_____:	_____:	_____:	uninformed
hot	_____:	_____:	_____:	_____:	_____:	_____:	_____:	cold
strong	_____:	_____:	_____:	_____:	_____:	_____:	_____:	weak
qualified	_____:	_____:	_____:	_____:	_____:	_____:	_____:	unqualified
unintelligent	_____:	_____:	_____:	_____:	_____:	_____:	_____:	intelligent
sober	_____:	_____:	_____:	_____:	_____:	_____:	_____:	drunk
worthless	_____:	_____:	_____:	_____:	_____:	_____:	_____:	valuable
angular	_____:	_____:	_____:	_____:	_____:	_____:	_____:	rounded
expert	:	:	:	:	:	:	:	inexpert

As the author of the message you just completed writing, evaluate your

INTEREST IN THE TOPIC

[illegible]

STIMULUS MESSAGES

Fine Arts Message, Field Independent Source

INSTRUCTIONS: Please read the following message silently to yourself. When you have finished doing so, turn to page two for further instructions.

How to Apply Make-up for a Character: Female, Age: 40-50

1. Always begin with a thoroughly cleansed face, free of all make up and oil.
2. Select a "pancake" (type of makeup base in round flat container).
 - A. The pancake bases are numbered according to colors--.
 - B. You will probably select one from #'s 20-30 depending on your skin color.
 - C. the base is applied to skin with a wet sponge.
3. Select liners (either grease or pancake) for shades and highlights.
 - A. The liner colors range from light to dark in every color. (usually a #7 Brown liner is used for shadows).
 - B. Select a grease liner for eye shadow. (usually a color complimentary to your costume)
4. Select lip color and gloss.
5. Begin makeup by applying base to entire face and neck area (make sure there is no distinct line connoting face and make up).
6. The make up should cover all facial pigment color including eyelids. It should be even on all areas and no thicker on one spot than another.
7. Find natural shadows in face by sinking in cheeks for receding areas that you don't want to stand out.
8. Conversely look for highlites of face that you do want unconsapiciously noticable. (This gives your face a deminsion on stage.)
9. With a triangle area apply brown (or lavender) liner (either use brush or finger--finger works better--but brush is more professional) insunker part of cheek and blend where there is no noticable color change--but effect of shadow. (Do this on all shaded areas.)
10. To highlite simply work a white streak over necessary highlited areas and blend so that the shadow receds and highlite (ex. over eyelids before adding color--above eye-brows, etc.).
11. Apply eye shadow larger than life. Add little rouge on cheeks.
12. Apply false eyelashes & eye liner--for a little age effect draw lite crow's feet on corners of eyes and add Bags to eyes through highlite.
13. Powder lightly and lightly brush off with brush.
14. Draw on mouth and fill in with color.
15. Go to make up crew head and ask for approval.
16. HAVE A GOOD SHOW.

Fine Arts Message, Field Dependent Source

INSTRUCTIONS: Please read the following message silently to yourself. When you have finished doing so, turn to page two for further instructions.

How to Construct Basic Lighting

A minimum of five baby spots, preferably six to eight feet from front stage and placed in such a manner that the end spots cross in mid stage, lighting each side of the stage with the two spots next to outside crossing also at mid stage to light center left and center right stage, leaving the remaining spot for center stage. Strip lights, but preferably spots will hang from a baton downstage. These will be placed in a similar pattern as the aforementioned lighting down stage, primarily where most of the action will be.

This is simplified lighting for a basic lighting plan. It eliminates for the most part, dark spots and shadows.

Social Sciences Message, Field Independent Source

INSTRUCTIONS: Please read the following message silently to yourself. When you have finished doing so, turn to page two for further instructions.

The Effects of Losing A Child on the Parent

Through current research, I have been able to identify four stages or levels of reaction that a parent usually goes through when a child is diagnosed as being fatally ill.

At first the parents go through a stage of denial. Saying its just not true or taking the child from Dr. to Dr. because of credibility.

Then the parents enter a state of anger. They are mad at themselves, doctors sometimes even the children.

From there the parents usually progress into a state of despair. This is usually evidence by a great lack of motivation and/or depression.

Finally, the parent should attain a state of acceptance. This stage is where the parents realize there is little they can do for the child and a much more relaxed atmosphere results. This stage is also characterized by an increase in psychological and/or physical distance. Although to outsiders, this increase in psychological distance seems somewhat callous, current research points that this is indeed the best thing for both child and parent.

Now, in working with parents of diagnosed fatally ill children the job or task of the social worker is to help the parents progress through the denoted stages (or cycles).

This is done best by establishing a cathartic group. The group should be composed of other parents in the same situation. It has been shown that these groups allow the parents to ventilate their feelings and emotions and attain a state of homeostatic acceptance. Often, due to the effects of society and friends the parents will repeat the cycle of mourning. The group helps prevent that by consciously examining each parent's reactions and showing through program materials, and role playing that acceptance is indeed the most healthy position, and stressing the fact that there is a natural cycle of mourning.

Through the group, parents of fatally ill children have been able to help each other; through role models, reinforcement, and ventilation, to attain this homeostatic acceptance of the situation and carry on at a more functional level.

Social Science Message, Field Dependent Source

INSTRUCTIONS: Please read the following message silently to yourself. When you have finished doing so, turn to page two for further instructions.

How to Tell if a Child is Learning or Ready to Learn

First of all you have to show a job something that is new and that he has never seen before and then after giving the child the opportunity to manipulate the object and work with it in as many ways as possible you can then observe him to see if these very simple steps are followed over a period of time.

1. Show interest--most children will show interest in something that is new they've never seen before.
2. Show a sustained interest--this has to be in every-time they are confronted with the new thing or area. They will do this no matter how many times they fail with the situation.
3. Show improvement--this would be that each time the child has the opportunity he will do new and more varied things in the situation. This will vary according to the situation and the age of the child.

If only one of the above or even two should happen the child is not ready for the situation or toy and it would be best not to push it on the child too soon. All three steps must occur in order for the child to be truly ready.

Physical Sciences Message, Field Independent Source

INSTRUCTIONS: Please read the following message silently to yourself. When you have finished doing so, turn to page two for further instructions.

How to Prove Identities

The first step in proving trigonometric identities is to put the problem into simplest terms by setting the whole problem into terms of sine and cosine, such as tangent is equal to sine over cosine ($\tan = \frac{\sin}{\cos}$). It is not possible to work on both sides of the problem together, so pick the side that looks more complicated and begin putting it into simplest terms. Using identities one already knows such as $\sin^2\theta + \cos^2\theta = 1$, one can keep cutting the problem down. When it is fairly well cut down, begin on the other side and work towards the final answer received on the first side of the equals sign. Dividing and multiplying both sides of the equation by the same number is not permitted because one cannot really know if both sides of the equation are equal in the first place.

It does not matter if the equation gets totally put in simplest terms as long as one gets the same answer on both sides. When the sides of the equation are worked out to be equal, the identity has been proved and one knows that equation is true. Therefore, the identity has been proved and one can go on to more interesting things.

Physical Sciences Message, Field Dependent Source

INSTRUCTIONS: Please read the following message silently to yourself. When you have finished doing so, turn to page two for further instructions.

How to Login, Get into Basic, and What to Do on a PDP-10 Computer Terminal

1. Turn machine on by turning dial to the left which will put it on line.
2. Pick up receiver or phone and dial 294-0308. (You should hear a beeping noise)
3. Place phone in cupler (turn but on it to on).
4. Depress your finger on the control key and the C key at the same time.
5. If the machine is working properly you should get a dot (.). If not, start over at step #2, only this time dial 294-0711 or 294-0715.
6. If you do get the dot then type in:

.EN 440,5

En = Enter the system
440,5 = account # (may differ
depending on school you go to)

7. The computer will then give you the day, date, year, a job# and a teletype#. It will also ask you for a password you shall then enter your password which is a one to six letter word which changes every month or two. (The password is used so other people won't charge things to your account).
8. If the password you entered was correct the computer will type out on your terminal the opening message which usually tells you about the computer system. If not you will get a: (#) then put in the account # and password again.
9. You will then get another dot. This time type in:

.BAS

which means Basic or Beginners all
purpose symbolic instructional code

10. You will then receive another message that says:

READY FOR HELP TYPE HELP

(If you need help type (↑C)
control C and get back into
the monitor and then type
.Help)

11. If you don't want help you're ready to make or use a program.
12. To use a program Type: OLD name of program
To make a program Type: NEW new file name

INSTRUMENTS USED IN PHASE III

In terms of the message you just finished reading, please judge . . .

THE SOURCE

[illegible]

Please judge THE MESSAGE you've just read:

profound	_____:	_____:	_____:	_____:	_____:	_____:	superficial
subtle	_____:	_____:	_____:	_____:	_____:	_____:	obvious
abstract	_____:	_____:	_____:	_____:	_____:	_____:	concrete
meaningful	_____:	_____:	_____:	_____:	_____:	_____:	meaningless
succinct	_____:	_____:	_____:	_____:	_____:	_____:	wordy
graceful	_____:	_____:	_____:	_____:	_____:	_____:	awkward
austere	_____:	_____:	_____:	_____:	_____:	_____:	lush
earnest	_____:	_____:	_____:	_____:	_____:	_____:	flippant
intimate	_____:	_____:	_____:	_____:	_____:	_____:	remote
elegant	_____:	_____:	_____:	_____:	_____:	_____:	uncouth
natural	_____:	_____:	_____:	_____:	_____:	_____:	affected
clear	_____:	_____:	_____:	_____:	_____:	_____:	hazy
interesting	_____:	_____:	_____:	_____:	_____:	_____:	boring
strong	_____:	_____:	_____:	_____:	_____:	_____:	weak
opinionated	_____:	_____:	_____:	_____:	_____:	_____:	impartial
original	_____:	_____:	_____:	_____:	_____:	_____:	trite
chaotic	_____:	_____:	_____:	_____:	_____:	_____:	ordered
pale	_____:	_____:	_____:	_____:	_____:	_____:	vivid
impersonal	_____:	_____:	_____:	_____:	_____:	_____:	personal
precise	_____:	_____:	_____:	_____:	_____:	_____:	vague
masculine	_____:	_____:	_____:	_____:	_____:	_____:	feminine
varied	_____:	_____:	_____:	_____:	_____:	_____:	monotonous
emotional	_____:	_____:	_____:	_____:	_____:	_____:	rational
complex	_____:	_____:	_____:	_____:	_____:	_____:	simple
pleasant	:	:	:	:	:	:	unpleasant

serious ____:____:____:____:____:____:____ humorous
florid ____:____:____:____:____:____:____ plain
good ____:____:____:____:____:____:____ bad
vigorous ____:____:____:____:____:____:____ placid

APPENDIX D

SUPPLEMENTARY DATA

TABLE IX
ROTATED FACTOR LOADINGS FOR SELF-EVALUATION INSTRUMENT

	A ^a	B	C
Unreliable-Reliable	.445	.040	-.007
Informed-Uninformed*	.624	-.044	.120
Hot-Cold	.074	.048	.656
Strong-Weak	.430	.222	.501
Qualified-Unqualified*	.736	.173	.162
Unintelligent-Intelligent	.538	.323	.173
Sober-Drunk	-.041	.495	.144
Worthless-Valuable	.294	.799	-.004
Angular-Rounded	-.090	-.330	-.350
Expert-Inexpert*	.669	.080	.127
Eigenvalue	2.827	.843	.584
% of Total Variance	66.5	19.8	13.7
Cum. % of Variance	66.5	86.3	100.00

^aCorrelation between factor score for this factor and summated raw scores for selected variables:
 $r(164) = .964, p < .001$.

*—Selected items for factor Ia.

TABLE X

Rotated Factor Loadings for Interest Evaluation Instrument

Items	A ^a	B
Fair-Unfair	.564	.180
Happy-Sad*	.802	.234
Dirty-Clear	.526	.438
Small-Large	.443	.153
Soft-Hard	.198	.157
Tasty-Distasteful	.222	.723
Slow-Fast	.485	.525
Good-Bad	.433	.450
Unpleasant-Pleasant	.601	.472
Beautiful-Ugly	.238	.817
Eigenvalue	4.001	.583
& of Total Variance	87.3	12.7
Cum. % of Variance	87.3	100.00

^aCorrelation between factor score for this factor and summated raw scores for selected variables:
 $r(164) = .922, p < .001$.

*Selected items for factor IIa.

TABLE XI
Rotated Factor Loadings for Source Evaluation Instrument

Items	Factors				
	A ^a	B ^b	C	D	E
Sociable-Unsociable	.515	.301	.077	.266	-.081
Nervous-Poised	.190	.155	.767	.058	.163
Cheerful-Gloomy*	.639	.083	-.000	.349	.107
Tense-Relaxed	.302	.103	.656	.269	.147
Good-natured-Irritable*	.602	.393	.229	.087	-.278
Cooperative-Negativistic	.438	.527	.277	.060	-.035
Meek-Aggressive	.066	.114	.031	.215	.706
Valuable-Worthless**	.193	.752	.145	.131	.135
Calm-Anxious	.097	.280	.675	.175	-.082
Verbal-Quiet	.117	.176	.196	.633	.175
Friendly-Unfriendly*	.608	.298	.146	.197	-.117
Unsympathetic-Sympathetic	.278	.433	.073	.055	-.037
Admirable-Contemptible	.473	.568	.181	.123	.202
Awful-Nice*	.662	.381	.248	-.085	.219
Just-Unjust	.467	.417	.253	.033	.039
Unpleasant-Pleasant*	.677	.235	.316	-.101	.321
Timid-Bold	-.060	.117	.272	.271	.547
Talkative-Silent	.178	-.066	.115	.762	.255
Expert-Inexpert	.075	.453	.454	.075	.234
Crude-Refined	.247	.472	.403	-.100	.202
Reliable-Unreliable**	.275	.709	.192	.005	.136
Eigenvalue	7.503	1.702	1.199	.879	.627
% of Total Variance	63.00	14.30	10.1	7.4	5.3
Cum. % of Variance	63.00	77.3	87.3	94.7	100.00

*Selected Items for factor IIIa.

**Selected Items for factor IIIb.

^aCorrelation between factor score for this factor and summated raw scores for selected variables: $r(131) = .922, p < .001$.

^bCorrelation between factor score for this factor and summated raw scores for selected variables: $r(131) = .912, p < .001$.

TABLE XII

Rotated Factor Loadings for Message Evaluation Instrument

	A ^a	B ^b	C	D	E	F	G	H
Profound-Superficial	.055	.401	.151	.020	.142	.282	.216	.367
Subtle-Obvious	-.036	.075	.188	.610	-.019	-.196	-.058	-.002
Abstract-Concrete	-.026	.231	.206	.745	.134	.149	-.027	.064
Meaningful-Meaningless	.378	.282	.256	.430	.322	.257	.210	.026
Succinct-Wordy	.226	.251	.498	.114	.244	-.066	.221	.018
Graceful-Awkward	.007	.287	.169	.059	.491	.195	.224	-.163
Austere-Lush	.051	-.026	-.345	-.183	-.026	.253	.064	-.196
Earnest-Flippant	.236	.277	.152	.531	.323	.164	.091	.197
Intimate-Remote	.094	.053	-.027	-.045	.229	.239	.753	-.101
Elegant-Uncouth	-.035	.196	-.152	.150	.689	.070	.145	-.085
Natural-Affected	.350	.130	.141	.109	.412	.006	.125	.211
Clear-Hazy	.203	.472	.376	.276	.375	.163	.129	.202
Interesting-Boring	.476	.179	.299	.074	.402	.364	.234	-.016
Strong-Weak	.222	.240	.298	.183	.369	.476	-.053	-.090
Opinionated-Impartial	.071	.363	-.030	.065	-.013	-.039	-.018	-.001
*Original-Trite	.757	.118	-.014	-.010	.074	.149	.098	-.009
**Chaotic-Ordered	.043	.638	.167	.238	.371	.038	-.015	.013
Pale-Vivid	.160	.404	.056	-.002	.365	.382	.127	-.235
Impersonal-Personal	.225	-.043	.161	.044	.335	.216	.570	-.171
**Precise-Vague	.141	.694	.153	.217	.320	.145	.141	-.138
Masculine-Feminine	.005	-.170	.159	.092	-.093	-.086	-.232	.700
Varied-Monotonous	.360	.105	.073	-.030	.423	.526	.078	-.139
Emotional-Rational	-.113	.442	.256	.216	.034	-.069	-.191	.332
Complex-Simple	.022	.047	.646	.197	.036	.041	-.000	.087
Pleasant-Unpleasant	.098	.024	.152	-.027	.708	.205	.139	.055
Serious-Humorous	.126	.332	-.085	.480	.004	-.187	.089	.426
Florid-Plain	.017	-.024	-.092	-.061	.142	.755	.162	-.154
Good-Bad	.350	.125	.138	.132	.650	.348	.145	.038
Vigorous-Placid	.125	-.026	-.066	.002	.147	.412	.217	.097
Eigenvalue	8.282	2.090	1.186	.844	.758	.735	.709	.575
% of Total Variance	51.2	19.1	7.3	5.2	4.7	4.5	4.4	3.6
Cum. % of Variance	51.2	70.3	77.6	82.8	87.5	92.1	96.4	100.00

^aCorrelation between factor score for this factor and summated raw scores for selected variables: $r(131) = .898$, $p < .001$.

^bCorrelation between factor score for this factor and summated raw scores for selected variables: $r(131) = .943$, $p < .001$.

*Selected items for factor IVa.

**Selected items for factor IVb.

APPENDIX E

SUPPLEMENTARY DATA

TABLE XIII
Cell Means for Factor IIIA

	Field Independent Source		Field Dependent Source	
Message	FI Audience	FD Audience	FI Audience	FD Audience
Fine Arts	26.500	23.333	19.286	20.700
Social Sciences	23.778	20.900	22.750	20.818
Physical Sciences	24.000	23.200	23.900	20.800

TABLE XIV
Cell Means for Factor IIIB

	Field Independent Source		Field Dependent Source	
Message	FI Audience	FD Audience	FI Audience	FD Audience
Fine Arts	11.833	9.444	8.071	10.200
Social Sciences	11.333	10.500	9.000	8.909
Physical Sciences	10.556	9.300	8.700	9.000

TABLE XV

Cell Means for Factor IVA

	Field Independent Source		Field Dependent Source	
	FI Audience	FD Audience	FI Audience	FD Audience
Message				
Fine Arts	3.917	4.444	3.429	4.500
Social Sciences	4.778	4.600	4.583	4.091
Physical Sciences	3.667	4.500	3.600	4.200

TABLE XVI

Cell Means for Factor IVB

	Field Independent Source		Field Dependent Source	
	FI Audience	FD Audience	FI Audience	FD Audience
Message				
Fine Arts	11.750	9.111	7.214	10.200
Social Sciences	11.111	9.800	7.250	7.818
Physical Sciences	9.333	7.800	10.400	6.700

TABLE XVII

Descriptive Data for Hidden Figures Test Cf-1 and Block Design

<u>Hidden Figures Test Scores</u>				
Mean	5.096	Standard Error	.244	Standard Deviation 3.052
Variance	9.313	Kurtosis	.387	Skewness .635
Range	16.000	Minimum	0.0	Maximum 16.00
<u>Block Design Scores</u>				
Mean	41.636	Standard Error	1.116	Standard Deviation 6.412
Variance	41.114	Kurtosis	-.969	Skewness -.665
Range	19.000	Minimum	29.000	Maximum 48.000

TABLE XVIII

INTER-JUDGE AGREEMENT PERCENTAGES FOR FORCED-CHOICE-SORT OF MESSAGES

Sorting Method	Message Category		
	Fine Arts	Social Sciences	Physical Sciences
Three Category Sort	81.2%	74.3%	92.7%
Four Category Sort	51.7%	48.6%	67.3%