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RORSCHACH ERLEBNISTYPUS AND PROBLEM-SOLVING
STYLES IN CHILDREN

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ABSTRACT

This study was designed to determine whether children who, on the basis of their Rorschach Erlebnistypus score, were identified as being introversive or extratensive differed with respect to their approaches to certain novel problem-solving tasks. It was thought that the extratensives would characteristically manipulate the task materials more and make more mistakes than would the introversives, owing to the notion that the introversives internalize more of their manipulations and attempted solutions.

Sixty-nine sixth and seventh graders at a university-run laboratory school were administered the Rorschach. From that number fifteen introversive and fifteen extratensive children were identified who were also given three subtests from the Wechsler Intelligence Scale for Children - Revised (WISC-R). These subtests were the Block Design, Object Assembly, and Mazes. Systems were devised to count the number of manipulations made by the children on the Block Design and Object Assembly subtests and the number of errors committed on the Mazes subtest. These manipulations and errors were recorded and mean manipulation and error scores were tabulated for both the introversive and extratensive groups. T-tests, using these mean scores, tested the hypotheses of this study.

The hypotheses of this study were:

1. Extratensive children make significantly more manipulations than do introversive children on the Block Design subtest of the WISC-R.
2. Extratensive children make significantly more manipulations than do introversive children on the Object Assembly subtest of the

WISC-R.

3. Extratensive children make significantly more errors than do introversive children on the Mazes subtest of the WISC-R.

The results of the analysis of the data revealed that the introversive group performed significantly fewer manipulations than did the extratensive group on the Block Design subtest as expected but not on the Object Assembly subtest. Furthermore, the extratensives did not commit more errors on the Mazes subtest than did the introversives.

It was concluded that introversive and extratensive children do differ with respect to problem-solving styles. It is not known, however, what tasks are required so that these differences are evident.

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Chapter 1

INTRODUCTION

In an effort to clarify the official policy of the American Psychological Association regarding the delivery of services by counseling psychologists, "Specialty Guidelines for the Delivery of Services by Counseling Psychologists" was published in June of 1981 (APA, 1981). They "serve an additional purpose of providing potential users and other interested groups with essential information about particular services available from the several specialties in professional psychology" (p. 652).

These guidelines cover such areas as goals, types of clients served, problem areas, organizational settings for services, and the types of professional services rendered by counseling psychologists. Among the latter are assessment, evaluation, and diagnosis which are defined as follows:

Procedures may include, but are not limited to, behavioral observation, interviewing, and administering and interpreting instruments for the assessment of educational achievement, academic skills, aptitudes, interests, cognitive abilities, attitudes, emotions, motivations, psychoneurological status, personality characteristics, or any other aspect of human experience and behavior that may contribute to understanding and helping the user. (p. 654)

Among the assessment approaches used by counseling psychologists are those referred to as projective tests. These are relatively unstructured tasks in which the underlying hypothesis is that "the way in which the individual perceives and interprets the test material, or 'structures' the situation, will reflect fundamental aspects of her or his

psychological functioning" (Anastasi, 1976, p. 558).

Lindzey (1959) classified projective tests into five categories, the first being "association" tests. With these the subject is presented a stimulus and responds with a word or percept. The Rorschach and word association tests are examples of such approaches. A second type are the "construction" tests, in which the subject develops a response to a given stimulus situation. The Thematic Apperception Test is an example from this group. A third kind of projectives are the "completion" tests, which ask the subject to complete some stimulus or task. The incomplete sentences devices are examples of these instruments. A fourth type are the "choice" or "ordering" tests. In these the subject is asked to choose from among a number of alternatives or stimuli presented, or to place the given stimuli in order. The Szondi is an example from this category. The fifth and final category are the "expressive" tests. These involve a variety of procedures such as drawing, painting, and psychodrama. Finger painting and the Draw-A-Person are examples from this grouping.

The Rorschach Inkblot Test, commonly referred to as the Rorschach, is a widely used association test. It consists of ten cards, each displaying a different stimulus resembling an inkblot. During individual administration, the examiner hands each card in order to the subject with the instructions to look at the card and answer the question, "What might this be?" (Exner, 1974).

Scoring and interpreting the Rorschach is complex and involves an elaborate codifying of the subject's responses, computing mathematical formulae that are based upon the response codes, interpreting the content

of the responses, and interpreting the scores which are derived from the formulae.

Several alternative scoring and interpretive "systems" for the Rorschach have been developed. While these systems differ in terms of some scoring codes and interpretations, there are commonalities among them. All scoring systems involve codifying certain aspects of the responses that the subject gives. Taken into account is the content (what the subject saw), the location (where on the blot the content was seen), and the determinants (what there was about the blot that made it look like that). Systems differ in the way in which they use these basic aspects of a response for the formulation of scores, in their definitions of these basic aspects, and in their interpretations of them.

The interpretation of a protocol always requires consideration of psychometric and personality theory. Interpretations vary, however, dependent in part upon the emphasis that the system and the examiner place upon empirically derived norms with their associated interpretations and upon interpretations based on theories of personality. In other words, the various Rorschach systems place differing degrees of emphasis upon psychometric and personality based interpretations. In addition, it appears that individual examiners often place different degrees of emphasis upon psychometric and personality based interpretations within the system to which they ascribe (Exner & Exner, 1972).

This study concentrates on one form of assessment which comes from projective techniques: the interpretation of one aspect of the Rorschach.

STATEMENT OF THE PROBLEM

Hermann Rorschach's test began as an experiment (Rorschach, 1942). In 1911 he started his study of inkblots, then commonly used as parlor games (Exner, 1969). In 1921 he published the results of numerous studies on the ten blots which now comprise his test. Through his study and intuition he discovered several properties of this test, but due to Rorschach's untimely death, refinement of the instrument was left to others.

In the United States at least five different methods or systems for the administration, scoring, and interpretation of the test have been developed (Exner, 1969). While each system adheres to Rorschach's original formulations they have from that common point deviated from each other. Some systems are more empirically based while others are founded on theoretical notions.

Because there are several Rorschach systems, confusion arises when discussing interpretations and validity of this test. Adding to this confusion, Exner and Exner (1972) made a rather startling discovery. They mailed a 30-item questionnaire to 750 members of the Society for Personality Assessment and Division 12 of the American Psychological Association concerning Rorschach method. Two-thirds of the questionnaires were returned. Twenty-two percent of the respondents admitted that they do not score the Rorschach even though they do administer and interpret it. Additionally, 75% of those who do score stated that they "personalize" their scoring; that is, they "intermix scoring from different systems or add scoring from their experience" (Exner, 1974, p. 13).

Although all Rorschach systems use the same ten inkblots, there is no one Rorschach test. Not only are there five Rorschach systems; there are also innumerable variations in these systems which are imposed by individual test administrators. As Exner said, "How many Rorschachs are there? The possibilities become astronomical" (Exner, 1974, p. 14).

Exner (1974) has made an attempt to incorporate the best of each Rorschach system into a "comprehensive" system. His purpose was to strengthen the use of the test and make it better able to stand the tests of reliability and validity and to do away with some of the confusion which has resulted from so many different systems. By early 1973 he and his associates had completed more than 150 studies and had already begun as many more. Exner's system, the "Comprehensive System," is sometimes considered to be the sixth American Rorschach system.

Interpretations of Rorschach protocols have been based on one or a combination of four approaches (Exner & Weiner, 1982). The first, called the "Ouija-Board" approach, is evident when the examiner bases an interpretation on an intuitive "feeling" about the protocol, not on a scoring of the data. The "Appeal to Authority" approach involves stating an interpretation which includes naming someone of authority who would give a similar interpretation. The third approach is the "Empirical" approach, whereby Rorschach data are found to be empirically related to certain behaviors. Finally, the "Conceptual" approach involves "identifying aspects of personality functioning that link test data with the conclusions drawn from them" (Exner & Weiner, 1982, p. 11).

Exner's approach most closely approximates the "empirical" approach. This, incidentally, is the approach that Rorschach also used. In the

introduction to Psychodiagnostiks (1942), he stated that his "results are largely empirical" and that "conclusions drawn should be regarded more as observations than theoretical deductions" (p. 13).

The study described herein is an attempt to follow Exner's lead as well as that of Hermann Rorschach. The study is designed to strengthen the test through the use of empirical observations. It is hoped that as more is discovered concerning this test, that which is found to be of use will be incorporated into the Rorschach system adopted by psychological examiners. Similarly, what research concludes is not empirically sound Rorschach methodology should be dropped or held in abeyance until it is found to be empirically justified. This study was designed to be of help in determining the usefulness and interpretation of one variable in Rorschach's test, *Erlebnistypus*.

PURPOSE OF THE STUDY

Erlebnistypus (hereafter referred to as EB) was considered by Rorschach to be one of the most important characteristics of his test (Exner, 1974). It is used in all Rorschach systems and has been referred to by various names including Experience Type, Experience Balance, and M to Sum C ratio. Rorschach considered it to represent the "underlying preferential response style of the individual" (Exner, 1974, p. 207). In other words, he believed it represented the cognitive or perceptual framework which precedes and influences a person's behavioral tendencies.

This interpretation has led to some confusion in research and practice. Some have maintained that EB should be evident through overt action, such as impulsiveness or withdrawn behavior (Mindness, 1955), while others believe that one's thinking process is more the issue

(Exner, 1978). Part of this confusion stems from Rorschach's (1942) terms. Persons may be "introversive," "ambitent," or "extratensive" depending upon their EB score. Introversive, ambitent, and extratensive persons are thought to differ in several key ways. Rorschach's (1942, p. 78) summary of these differences are noted in Table 1.

TABLE 1

Differences in Introversives and Extratensives

Introversives	Extratensives
Individualized intelligence	Stereotyped intelligence
Creative ability	Reproductive ability
More inner life	More outward life
Stable affect	Labile affect
Intensive rapport	Extensive rapport
Stable motility	Restless motility
Awkward, clumsiness	Skill and adroitness

Ambitents are those persons who are neither introversive nor extratensive.

These terms, introversive and extratensive, are very similar to Jung's terms introvert and extravert (Jung, 1923) in name and, it seems, in definition. Rorschach (1942), however, quite explicitly states that his terms are related to Jung's only in name. Beyond that, he stated, they are dissimilar. EB indicates, he believed, how the person experiences, not how (s)he behaves. One could, in fact, be introversive on the EB but be an extravert according to Jung's definition. Put simply, EB indicates the manner in which a person perceives, experiences, and organizes his/her environment; that person's subsequent behavior, however, is dependent upon factors which EB does not tap.

One way in which research indicates that introversives seem to be different from extroversives is in novel problem-solving situations which do not involve emotion (Exner, 1978; Rosenthal, 1954). It is reasoned that in such situations the introversives, who are thought to have more "inner life" and "measured, stable motility" (Rorschach, 1942, p. 78), are more planful, thinking through the situation before acting. Again, once a plan of action has been decided, the introversive may behave in an extroverted or introverted manner or some way between the two (Jung's terms). The extroversive, on the other hand, experiences more "outward life" and has "restless, labile motility." In a problem-solving situation such a person would attempt its solution in an active, trial-and-error manner. This individual would not attempt to think through the problem before acting, as would the introversive, but would prefer to act on the situation first and eventually solve the problem through the recognition of errors. The difference between the problem-solving strategies of the two, then, is that the introversives think through the problem and learn from the mistakes made by imagining attempts at resolving it, while the extroversives learn from mistakes made by physically attempting to solve the problem. Neither group, it is hypothesized, solves problems more rapidly than the other. The extroversives, however, make more errors in their attempts.

Exner, Bryant, and Leura (1975) and Rosenthal (1954), in studies to be discussed later, demonstrated that this is, in fact, the case with select groups of college students. Additionally, the Exner et al. study used a problem-solving situation which can be thought to involve logical processes primarily, while the Rosenthal study utilized a problem-solving

situation which can be thought to involve visuospatial processes. These studies have demonstrated that the above thoughts concerning EB style and problem-solving strategies are at least not incorrect for certain problems of a cognitive (not emotional) nature with samples of college students.

JUSTIFICATION OF THE STUDY

Research has not been conducted which looks at EB type and problem-solving with children as subjects. Those studies which have been conducted have used only college students who may be considered to be relatively intelligent. In reading accounts of research on EB in order to determine its interpretation, it is easy to overlook these facts and assume that findings are applicable to average subjects as well. Previous research has not been conducted in an attempt to confirm this apparent assumption. The present study was an effort to determine whether the findings of the Exner et al. (1975) and Rosenthal (1954) studies are applicable to school age children who are considered to be of approximately average intelligence.

GENERAL HYPOTHESES

The study was designed to see whether a group of introversive and extratensive children would perform differently on three problem-solving tasks which may be considered to involve visuospatial functioning (Lezak, 1983). Specifically, sixth- and seventh-grade children were administered the Rorschach and Block Design, Object Assembly, and Mazes subtests of the Wechsler Intelligence Scale for Children - Revised (Wechsler, 1974). It was hypothesized that even though both introversive and extratensive

children would perform these tasks equally successfully, the extratensives would attempt more solutions, thus making more mistakes and manipulations.

DEFINITION OF TERMS

The following definitions which pertain to the Rorschach are Exner's (1974).

Determinant(s) - The features of the blot that contribute to the formation of the percept. Two categories of determinants are important for the purposes of this study. They are defined and their symbols are identified in Table 2 on page 11.

Erlebnistypus (EB) - The sum of the human movement responses to the sum of the weighted color responses. Color responses are weighted as follows: FC=0.5; CF=1.0; C and Cn=1.5. EB may be represented as SUM M: Sum weighted C.

Introversive - Sum M exceeds Sum weighted C by at least two points for a given subject.

Extratensive - Sum weighted C exceeds Sum M by at least two points for a given subject.

Ambitent - The subject is neither introversive nor extratensive.

The following definitions are concerned with certain subtests of the WISC-R. For a description of these subtests see "Method of Procedures" section.

Block Design manipulation - 1) turning a block then placing it next to another block in an apparent attempt to at least partially solve the puzzle; 2) placing a block on the table by itself when it is apparent that the subject is attempting to partially solve the puzzle by placing a block in a corner or outer border position of the design; 3) moving as

TABLE 2

Movement and Color Determinants, Their Symbols,
and Criteria for Their Use

Category	Symbol	Criteria
Movement	M	Human movement response. To be used for responses involving a kinesthetic perception, the content of which involves behavior restricted to humans, or, in animals, is human-like.
Color	C	Pure color response. To be used for responses based exclusively on the chromatic features of the blot. No form is involved.
	CF	Color-form response. To be used for responses which are formulated because of the color features of the blot area and the form involved is of secondary importance.
	FC	Form-color response. To be used for responses which are formulated because of the form of the blot area, and in which color is used secondarily for purposes of clarification and/or elaboration.
	Cn	Color-naming response. To be used when the colors of the blot area are identified by name with no form involved and with the intention of presenting a response.

one unit two blocks which were previously placed next to each other.

Object Assembly manipulation - placement of one part of a figure next to another part of that figure in an attempt to at least partially solve the puzzle.

Mazes error - entry into a "blind alley," an alley in the maze which is a dead end.

DELIMITATIONS

1. This investigation is delimited to examining the relationship between EB and certain problem-solving styles. No attempt was made to address causal factors.

2. The sample for this study was delimited to sixth- and seventh-grade children enrolled in a university laboratory school in Terre Haute, Indiana. These were largely white, lower middle class children. Any generalization of findings to children of different ethnic or cultural backgrounds would be inappropriate.

3. The problem-solving tasks for this study have been already described. They are non-emotional in nature and require visuospatial constructional abilities. This study is delimited to these kinds of problem-solving tasks. Findings may not be generalized to emotional or other kinds of problem-solving tasks.

Chapter 2

REVIEW OF RELATED RESEARCH

Several areas of research pertaining to Erlebnistypus (EB) are briefly reviewed here. Of concern are the component parts of EB, developmental trends, temporal consistency or stability, two studies related to problem solving and EB, and a brief summary of findings concerning EB and their relationship to the present study. It needs to be noted that in preparation for the writing of this chapter a computer search of the literature was conducted. A total of nine studies were located which in any way dealt with EB and were written since 1965. This review is, then, necessarily brief.

COMPONENT PARTS

EB is the ratio of the Sum of the human movement responses to the sum of the weighted color responses ($\text{Sum M}:\text{Sum weighted C}$). Broken into its component parts, EB consists of human movement (M), pure color (C), color-naming (Cn), color-form (CF), and form-color (FC) responses. An evaluation of these separate variables contributes to one's understanding of EB.

Rorschach believed that EB represented the individual's balance between perceptions determined by subjective ideation and those dependent upon the immediate environment (Rorschach, 1942). This makes tacit sense. An M response implies kinesthetic movement. The subject sees movement in a stationary blot. The blot is somehow transformed through the subject's ideation into one which involves movement. Internalization and

ideation, it seems, are involved in movement responses. Color responses, on the other hand, depend upon the actual features of the blot, the color dimension. These responses are a report of what is physically on the blot, unchanged through internalization. Sum M, then, is the component determined by subjective ideation and Sum weighted C is dependent upon the immediate environment.

Rorschach (1942) proposed that color responses are related to affect. This general interpretation has been adopted by all of the major Rorschach systematizers (Exner, 1969). It is thought that the greater the number of color responses the more prone an individual is to affective discharge. Conversely, M responses have been linked with motor inhibition, fantasy, and imaginative tendencies (Singer & Brown, 1977). As the proposed study is concerned with EB and not its component parts, suffice it to say that research has generally been supportive of these interpretations (Barrell, 1953; Barron, 1955; Frank, 1979; Frank, 1976; Kuncze & Tamkin, 1981; Meltzoff, Singer, & Korchin, 1953; Piotrowski, 1950; Rapaport, Gill, & Schafer, 1968; Schachtel, 1950; Singer, Meltzoff, & Goldman, 1952; Singer & Spohn, 1954; Singer & Herman, 1954). EB, then, is thought to be the ratio of internalization and ideation to affect and affective discharge.

DEVELOPMENTAL TRENDS

If M is indicative of inhibition of motor impulses and ideation while color responses indicate affective proclivity, it seems reasonable to assume that as children grow older the balance between Sum M: Sum weighted C becomes progressively less pronounced in favor of the right side of the ratio. In other words, as children develop into adults they,

generally speaking, become more restrained and invoke more internal operations. As this occurs, they should produce more M responses to the Rorschach test. Research has shown this to be the case (Ames, 1952; Exner & Weiner, 1982; Thetford, Molish, & Beck, 1951).

Exner and Weiner (1982) have summarized findings concerning developmental trends of EB with children from a sample of 1870 children between the ages of 5 and 16. They state that five-year-olds gave significantly fewer M responses than the older age groups. By age 11 nearly twice as many M responses were given, and after age 11 nearly all children gave at least one M response.

As children grow older there appears to be a change not in the quantity of color responses but in the kind of response. Younger children gave more CF and C responses than FC ones; this trend was reversed in the mid-teens. Additionally, it was found that the frequency of subjects giving at least one C or Cn response declined sharply with age. Seventy percent of all 5-year-olds gave at least one C or Cn response, while 35% of the 8-year-olds, 23% of the 12-year-olds, 17% of the 15-year-olds, and 8% of the 16-year-olds did.

They also noted that the frequency of introversiveness increases with every age group. However, it is important to note that these findings do not indicate fixed or permanent EB styles at young ages, for this does not seem to be the case.

Exner, Leura, Wylie, Armbruster, and Thomas (1980), in a study reported by Exner and Weiner (1982), tested 59 children four times over a six-year period. Each child was tested at age 8, 10, 12, and 14. Briefly, their findings indicate that when introversiveness is indicated

even as early as ages 8 and 10, it is likely that the style will not change with later development. The situation for extratensives is somewhat different. While extratensiveness at age 12 or even 10 seems to indicate a relatively fixed style, such traits at younger ages are much more uncertain. An extratensive 8-year-old may remain extratensive or may become ambitent or introversive with time. However, as Exner (1980) found, even with young children EB is stable over short periods of time, such as over a one-month period.

In summary, young children are largely extratensives. As they grow older an increasing proportion of them become introversive. Children who are introversive are likely to stay that way no matter what their age is, while the extratensive style becomes more rigid only around the ages of 10 and 12.

TEMPORAL CONSISTENCY

EB does not appear to be a stable measure in early childhood. With increasing age, however, it seems to become more sturdy with introversion becoming stabilized at an earlier age than extratension. The question now is whether EB remains consistent in normal adults and in mental health patients.

Exner, Armbruster, and Viglione (1978) tested 100 nonpatients with the Rorschach, then retested them three years later. Seventy-seven of the subjects exhibited a marked EB style in both protocols, but only two changed direction in the EB ratio. For normal adults EB seems to be a very consistent measure.

With mental health patients the situation is somewhat different. Exner (1978) reported a study by Exner, Wylie, and Kline (1977) wherein

279 adult subjects were administered the Rorschach four times during a 28-month period. All subjects were receiving outpatient mental health treatment. Thirty-eight of the subjects changed direction for EB during this time period. Thirty-three of these 38 were at one point or another classified as ambitent. Similarly, of the 51 subjects who were ambitents at the beginning of treatment, 43% became introversive or extratensive by the 28th month. This suggests that, at least among mental health patients, the ambitent may be more pliable or open to suggestion than either of the other two groups.

TWO PROBLEM-SOLVING STUDIES

Exner (1978) discussed a study by Exner, Bryant, and Leura (1975). This study will be described in some detail as it pertains directly to the present research.

Forty-five 19- to 20-year-old college students were divided into three groups of 15 each. One group had members who were clearly introversive. All members of this group had Sum M greater than Sum weighted C by at least two points. The second group had members who were clearly extratensive. All members of this group had Sum weighted C greater than Sum M by at least two points. The final group were ambients. The difference between their Sum M and Sum weighted C scores was plus or minus 0.5 points.

Each subject, additionally, had scored between 575 and 600 on the SAT Verbal test, and the EA on their Rorschach test exceeded the ep by at least two points. Briefly, if $EA > ep$ the interpretation is that the subject has internal resources available and is not being overly affected by things beyond his/her control (Exner, 1978).

The 45 subjects were given four "test" problems of increasing difficulty, with time limits of 10, 15, 20, and 30 minutes, respectively. These "test" problems, involving the Logical Analysis Device (Langmuir, 1958), necessitated that the subjects discover the relationship between nine lights arranged in a circle around a tenth light. On/off switches for three of the nine lights enabled the subjects to discern the relationships among all lights. Turning on one light would cause another light to either turn on or off. The object of the task was to turn on the tenth light, the one in the middle of the circle, using only the three switches. Data collected on each subject's performance included the total number of operations to solution, the total number of extraneous operations, and the total number of repeated operations.

On these tasks the introversives consistently used fewer operations, had a longer average time between operations, and repeated fewer errors. The extratensives used the largest number of operations for the last three problems, and the shortest time between operations on all four problems, repeated slightly fewer errors than the ambitents, and made the greatest number of errors in each of the problems. The ambitents took the longest average time to solution for all four problems and, on the last two problems, repeated significantly more operations and repeated more errors. On the last two problems, the ambitents repeated almost two times as many errors as the extratensives and three times that of the introversives.

Both the introversives and extratensives, then, took approximately the same length of time to solve the problems but the extratensives made significantly more operations. Neither group repeated errors to as large

an extent as the ambitents. The ambitents took the greatest length of time to solve the problems and also repeated operations and errors.

Rosenthal (1954) also studied EB types and problem-solving strategies. His subjects were administered, among other things, the Rorschach and the Katona Match Stick Tasks (Katona, 1940). His study involved two groups of ten college students. One group was composed of extratensives which he defined as having Sum C above two and M at or below three. In the second group were introversives. He defined this group as being composed of individuals whose M score was above three and where Sum C score was at or below two.

The Katona Match Stick Tasks (Katona, 1940) involves placing match sticks before a subject in a pre-determined arrangement. The subject is then instructed to rearrange the match sticks so that they are in the same arrangement as shown on a diagram. Rosenthal used nine match stick tasks, arranged in increasing order of difficulty.

Rosenthal thought that less time would elapse between the last word of instructions to the time of the first move with the extratensive group than with the introversive group. Also, he believed that the extratensives would make significantly more moves in attempting solutions of the problems than the introversive group. Both ideas were confirmed in this study. The extratensive group had shorter reaction times and made more moves than did the introversive group.

SUMMARY

EB seems to be a relatively stable measure which reflects the manner in which an individual experiences and organizes his/her environment. Individuals may be characterized as introversive, ambitent, or

extratensive on the basis of their EB score. Young children are typically extratensive but as they develop, increasing numbers of them become introversive. Around the age of 12 one's EB style is usually set. Prior to that age children may change from one type to another over the course of weeks. Finally, at least among college students, introversives tend to internalize and plan before taking action on certain non-emotional problems of a novel nature, while extratensives prefer to act first and learn from their mistakes. Ambitents appear to be the most inefficient group when it comes to problem-solving situations and are the most easily changed with psychotherapy.

Chapter 3

PROCEDURES

SUBJECTS

Subjects in this study consisted of children in the sixth¹- and seventh-grades at the University School, Terre Haute, Indiana. Only sixth and seventh grade children who had not been retained in or accelerated through a grade level were included. A total of 69 children was tested, fifteen of whom were identified as being introversives and fifteen who were identified as being extratensives. These thirty children made up the sample group for the study.

The population of the Indiana State University Laboratory School is bimodal in terms of academic aptitude and socioeconomic class. One segment of its population comes from faculty and staff families and from area pupils who attend because of a special program for the academically gifted and talented. Because the school serves a regular public school attendance district in the center of the city, many other students come from families which are predominantly white and lower-middle to middle class in nature. Some others attend because it offers special programs for those who have learning or behavioral problems not dealt with successfully in other area schools.

METHOD AND INSTRUMENTATION

The subjects were individually administered the Rorschach using Exner's Comprehensive System (Exner, 1974). There are two parts to the Rorschach administration: free association and inquiry. The free

association and inquiry periods incorporated all of Exner's system. Only human movement (M), form-color (FC), color-form (CF), pure color (C), and color-naming (Cn) responses were scored, because only these determinants were needed in order to derive the Erlebnistypus (EB) score for each subject. Questioning during the inquiry period concentrated only on ascertaining whether the subject used these determinants in forming the percept.

After the Rorschach administration each subject was individually administered the Block Design, Object Assembly, and Mazes subtests of the Wechsler Intelligence Scale for Children - Revised (WISC-R) (Wechsler, 1974), in that order. Both the Rorschach and the WISC-R subtests were administered in the same sitting. A brief description of the WISC-R subtests follows.

The Block Design subtest is a construction test involving red and white blocks which are all alike. Some sides of the blocks are all red, some sides are all white, and some sides are half red and half white. The task is to use the blocks to make replicas of designs printed on cards. Each task is timed and extra credit is given for the rapid completion of some of the designs. A scaled score is given for the subtest. Additionally, manipulations, defined earlier, were also recorded. The total number of these manipulations determined a subject's Block Design manipulations score.

The Object Assembly subtest involves the construction of four cut-up cardboard figures of familiar objects given in order of increasing difficulty. This subtest is timed. Scoring incorporates both the time to completion and the number of parts of an object correctly placed.

Manipulations performed on this test, defined earlier, were recorded. The total number of manipulations performed by a subject on this subtest determined the Object Assembly manipulations score for that subject.

The Mazes subtest is patterned after the Porteus Maze Test (Porteus, 1950). Each subject was presented with a series of mazes drawn on a piece of paper. The task was to draw a path with a pencil from the center of the maze to an opening on the outside of the maze. Each subject was instructed not to lift the pencil from the paper throughout the attempt at each maze. The mazes were presented in order of increasing difficulty. Performance on each maze was timed. A scaled score was given for this subtest. Additionally, errors, defined earlier, were also recorded. The total number of errors committed on this subtest was a subject's Mazes error score.

These WISC-R subtests were designed so that some subjects would complete the tasks more rapidly than others. Subjects who completed the tasks quickly did not have as much time to make manipulations as did the subjects who took more time. It was important, then, to ensure that the groups of introversives and extratensives, on the whole, took approximately the same amount of time attempting to complete the tasks. In order to ensure this it was necessary to keep track of the amount of time that each subject spent completing each task in each subtest. Each subject was timed beginning with the presentation of the task until the completion of the task or until the maximum amount of time allowed for that task was up for each task of each subtest. The total amount of time spent for all tasks within each subtest was summed, producing time to completion scores. Mean total time to completion scores were determined

for both the introversive and extratensive groups. Two-tail t-tests for independent groups performed on these mean scores determined that both groups spent approximately equal lengths of time attempting the solutions of the tasks. This is summarized in Tables 3, 4, and 5 on page 25.

It was also important to determine that both groups were not significantly different in terms of their ability to solve these WISC-R subtests. This was necessary so that differences between the groups could not be credited to ability rather than problem-solving style. It could be reasoned that a group of individuals who were skilled at solving these problems would make fewer manipulations or errors. In order to ensure that the groups were not significantly different in solving the problems each subtest was scored for each subject according to the directions in the WISC-R manual. Average subtest scores for the three subtests used in this study were determined for both experimental groups. Two-tail t-tests were conducted which indicated that the groups were not different with respect to their abilities to solve the problems. This is summarized in Tables 6, 7, and 8 on page 26.

In summary, each subject generated ten scores: EB, Block Design manipulation score, Object Assembly manipulation score, Mazes error score, and total time to completion scores and raw scores for each of the three WISC-R subtests used.

QUESTIONS STUDIED

The following questions and hypotheses were investigated:

Question 1: Do extratensive children make significantly more manipulations than introversive children on the Block Design subtest of the WISC-R?

Table 3

Mean Completion Time for Block Design Subtest, t Value, and
2-Tail Probability for Extratensive and Introversive Groups

Group	Mean Completion Time	t Value	Probability
Extratensive	339 seconds	.82	.42
Introversive	312 seconds		

Table 4

Mean Completion Time for Object Assembly Subtest, t Value,
and 2-Tail Probability for Extratensive
and Introversive Groups

Group	Mean Completion Time	t Value	Probability
Extratensive	191 seconds	.21	.83
Introversive	185 seconds		

Table 5

Mean Completion Time for Mazes Subtest, t Value
and 2-Tail Probability for Extratensive
and Introversive Groups

Group	Mean Completion Time	t Value	Probability
Extratensive	211 seconds	-.44	.66
Introversive	222 seconds		

Table 6

Mean Raw Score for Block Design Subtest, t Value,
and 2-Tail Probability for Extratensive
and Introversive Groups

Group	Mean Score	t Value	Probability
Extratensive	39	.00	1.00
Introversive	39		

Table 7

Mean Raw Score for Object Assembly Subtest, t Value,
and 2-Tail Probability for Extratensive
and Introversive Groups

Group	Mean Score	t Value	Probability
Extratensive	26	-.81	.42
Introversive	27		

Table 8

Mean Raw Score for Mazes Subtest, t Value,
and 2-Tail Probability for Extratensive,
and Introversive Groups

Group	Mean Score	t Value	Probability
Extratensive	23	-.55	.58
Introversive	24		

H01: Extratensive children make significantly more manipulations than do introversive children on the Block Design subtest of the WISC-R.

Question 2: Do extratensive children make significantly more errors than introversive children on the Mazes subtest of the WISC-R?

H02: Extratensive children make significantly more errors than do introversive children on the Mazes subtest of the WISC-R.

Question 3: Do extratensive children make significantly more manipulations than do introversive children on the Object Assembly subtest of the WISC-R?

H03: Extratensive children make significantly more manipulations than do introversive children on the Object Assembly subtest of the WISC-R.

DATA COLLECTION

All subjects were examined by the researcher, who also collected data as the examination took place. A tally was kept of the manipulations made by each subject on the Block Design and Object Assembly subtests and of the errors made on the Mazes subtest. Additionally, the amount of time that each subject took on each task was noted.

In order to validate that the subjects were of the EB types to which they were assigned, an independent evaluation was made by another scorer of ten randomly drawn Rorschach protocols. Agreement between this rater's scorings and those of the researcher were at 80%, indicating that he agreed with the EB type assigned to eight of the ten subjects. It should be noted that a consideration of the independent rater's scores would omit two of the subjects from the sample but only by 0.5 points each. In other words, for inclusion in either the extratensive or

introversive group the difference between a subject's Sum M and Sum weighted C must be plus or minus two. For these two subjects the independent rater scored them at plus or minus 1.5.

Additionally, the reliabilities of the scoring systems devised for counting manipulations on the Block Design and Object Assembly subtests were calculated. Two raters who were trained to score these subtests (see Appendix for specific instructions to raters) viewed videotapes of their administration to nineteen of the subjects, ten introversives and nine extratensives. These persons were blind to the EB type of the subjects. Pearson correlation coefficients, using these scores, demonstrated interrater reliability scores of .99 for the Block Design subtest and .98 for the Object Assembly subtest.

Because the data used in testing the hypotheses were collected by the researcher, it was necessary to determine that his scorings were valid. This was accomplished by performing Pearson correlations using the two rater's average score for each task for each subject on the videotape and the researcher's scores for these same tasks and subjects. Correlations between the rater's scores and the researcher's for the Block Design and Object Assembly subtests were found to be .97 and .96, respectively.

It was determined that an independent scoring of Mazes errors was unnecessary, because counting errors on this subtest is an easy and objective undertaking.

TREATMENT AND ANALYSIS OF DATA

Hypotheses 1-3 were analyzed by way of one-tailed t-tests for independent samples.

ASSUMPTIONS

1. The Block Design, Mazes, and Object Assembly subtests of the WISC-R require behavior indicative of visuospatial functioning.
2. The Block Design, Mazes, and Object Assembly subtests of the WISC-R are reasonable approximations of problem-solving tasks used in related research.
3. Fewer manipulations on problem-solving tasks may be the overt expression of covert conditions.

LIMITATIONS

1. It is recognized that the order of presentation of tests influences subject performance. The results of this study may be, to an extent, a product of this finding. Generalization of this study's findings must take into account the fact that a different order of presentation may produce somewhat different results.
2. Because the researcher was aware of the EB type of most subjects prior to his administration of the WISC-R subtests, it is possible that examiner bias could have inadvertently influenced the scoring of these subtests.
3. It is recognized that some of the subjects included in this study barely met the criterion of an EB score of at least plus or minus two. These subjects could have had a diminishing effect on the differences between the two experimental groups.

Chapter 4

RESULTS

The results of the statistical analysis of the data for the three hypotheses are presented in this chapter. These hypotheses, generally speaking, were that extratensives and introversives perform differently on certain problem-solving tasks. It was reasoned that the extratensives would make more manipulations or commit more errors in their attempts. A level of significance of .05 was set in order to reject the hypotheses.

Hypothesis One. Extratensive children make significantly more manipulations than introversive children on the Block Design subtest of the Wechsler Intelligence Test for Children - Revised (WISC-R).

In order to address this hypothesis, extratensive and introversive children were given the Block Design subtest of the WISC-R and their manipulations were recorded. A t-test was performed using the mean number of manipulations for the two research groups. The results of this analysis are presented in Table 9 on page 31.

As can be seen in Table 9, a one-tail t-test between the two research groups concerning the variable, Block Design manipulations, resulted in significance at the .03 level. The two groups did differ with regard to the mean number of manipulations performed in attempting the Block Design subtest of the WISC-R. Specifically, the introversives made significantly fewer manipulations than did the extratensives.

Hypothesis Two. Extratensive children make significantly more manipulations than do introversive children on the Object Assembly subtest of the WISC-R.

Table 9

Mean Number of Block Design Manipulations, t Value,
and 1-Tail Probability for Extratensive
and Introversive Groups

Group	Mean Manipulations	t Value	Probability
Extratensive	100.13	1.92	.03
Introversive	87.27		

Table 10

Mean Number of Object Assembly Manipulations, t Value,
and 1-Tail Probability for Extratensive
and Introversive Groups

Group	Mean Manipulations	t Value	Probability
Extratensive	42.87	-0.11	.45
Introversive	43.27		

Table 11

Mean Number of Mazes Errors, t Value, and
1-Tail Probability for Extratensive
and Introversive Groups

Group	Mean Errors	t Value	Probability
Extratensive	8.47	0.99	.16
Introversive	6.33		

In order to test this hypothesis, extratensive and introversive children were given the Object Assembly subtest of the WISC-R and their manipulations were recorded. A one-tail t-test was performed using the mean number of manipulations for both research groups. The results of this analysis are presented in Table 10 on page 31.

As can be seen in Table 10, a one-tail t-test between the two research groups concerning the variable, Object Assembly manipulations, resulted in significance at the .45 level. The two groups did not differ with regard to the mean number of manipulations performed in attempting the Object Assembly subtest of the WISC-R.

Hypothesis Three. Extratensive children make significantly more errors than introversive children on the Mazes subtest of the WISC-R.

In order to test this hypothesis, extratensive and introversive children were given the Mazes subtest of the WISC-R and their errors were recorded. A one-tail t-test was performed using the mean number of errors for the two research groups. The results of this analysis are presented in Table 11 on page 31.

As can be seen in Table 11, a one-tail t-test between the two research groups concerning the variable, Mazes errors, results in significance at the .16 level. The two groups did not differ with regard to the mean number of errors performed in attempting the Mazes subtest of the WISC-R.

Chapter 5

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

SUMMARY

This study was designed to determine whether extratensive and introversive children differ with respect to their approach to certain novel problem-solving tasks which are non-emotional in nature. It was thought that the extratensives would characteristically manipulate the task materials more and make more mistakes than the introversives, owing to the notion that the introversives internalize more of their manipulations and attempted solutions. In other words, the introversives were thought to imagine manipulations of the task materials and to learn the consequences of such moves in this manner. The extratensives, on the other hand, would not internalize their actions to as great an extent, resulting in more overt manipulations and errors.

Problem-solving tasks for this study were the Block Design, Object Assembly, and Mazes subtests of the Wechsler Intelligence Scale for Children - Revised (WISC-R). These were selected as they may be thought of as reasonable approximations of tasks used in related research, they are homogeneous in that they are thought to be reflective of visuospatial abilities, and it is relatively easy to count manipulations or errors committed while attempting to solve these problems.

The hypotheses tested in this study were:

1. Extratensive children make significantly more manipulations than do introversive children on the Block Design subtest of the WISC-R.

2. Extratensive children make significantly more manipulations than do introversive children on the Object Assembly subtest of the WISC-R.

3. Extratensive children make significantly more errors than do introversive children on the Mazes subtest of the WISC-R.

Sixty-nine sixth- and seventh-grade children who were enrolled in the Laboratory School at Indiana State University were tested, fifteen of whom were identified as being extratensive and fifteen who were introversive. These thirty students served as subjects for this study. They were individually administered the Rorschach, and then the Block Design, Object Assembly, and Mazes subtests of the WISC-R, in that order.

For each subject, the number of manipulations made while attempting to solve the Block Design and Object Assembly tasks and the number of errors made on the Mazes subtest were recorded. For both the extratensive and introversive groups mean manipulation scores were calculated for the Block Design and Object Assembly subtests and mean error scores were computed for the Mazes subtest. T-tests, using these mean scores, were employed in order to test the hypotheses of the study. The results of this statistical analysis were as follows:

1. The extratensive children made significantly more manipulations than did the introversive children on the Block Design subtest of the WISC-R.

2. The extratensive children did not make significantly more manipulations than did the introversive children on the Object Assembly subtest of the WISC-R.

3. The extratensive children did not make significantly more errors than did the introversive children on the Mazes subtest of the

WISC-R.

CONCLUSIONS

Based upon the analysis of data which was presented in Chapter 4 and consistent with the limitations of this study, several conclusions may be made.

1. Extratensive children appear to make more manipulations than do introversive children on the Block Design subtest of the WISC-R.

2. Extratensive children do not appear to make more manipulations than do introversive children on the Object Assembly subtest of the WISC-R.

3. Extratensive children do not appear to make more errors than do introversive children on the Mazes subtest of the WISC-R.

4. Because the extratensive children in this study did make more manipulations than did the introversive children on only one subtest, it may be concluded that extratensive children do make more manipulations on some problem-solving tasks than do introversive children but not on others.

5. All three hypotheses were concerned with the difference in problem-solving styles between extratensive and introversive children. The hypotheses differed with respect to problem-solving situations. Because only one hypothesis resulted in statistical significance, it may be concluded that the problem-solving situation which was associated with that hypothesis required different behaviors than was required by the other two. Specifically, the Block Design subtest of the WISC-R requires behaviors that are different than those required for the Object Assembly and Mazes subtests of the WISC-R.

DISCUSSION

It is not known why only one of the three hypotheses reached significance. Three possible explanations are offered:

1. EB does seem to predict different problem-solving approaches for extratensive and introversive children but only when the problem-solving situation requires certain, as yet unidentified, behaviors. It is known that, although all three WISC-R subtests used in this study are similar in that they require perceptual organization, spatial abilities, cognition, and visual-motor coordination, there are distinct differences as well (Kaufman, 1979). For example, the Block Design subtest is uniquely thought to require the analysis of a whole into component parts, tap nonverbal concept formation, and utilize spatial visualization. Also, Block Design is thought to be a good measure of general intelligence, while Object Assembly and Mazes fare less well in this regard. Object Assembly is thought to utilize the right-brain almost exclusively, while Block Design and Mazes depend upon both the left and right hemispheres. It is apparent that "problem-solving" is not one defined behavior but is composed of many different behaviors dependent upon the type of problem to be solved. Perhaps EB is a reliable predictor of the problem-solving strategy used by children only when certain specific problem-solving behaviors are required.

2. EB has been determined not to be a stable measure in children until around the age of 12, approximately the age of the subjects in this study. The unstable nature of EB could have had an effect on the outcome of this study. It could be possible that problem-solving behaviors which are ascribed to the different EB types become evident only after an

individual has remained a particular EB type for a period of time. It is likely that many of the children in this study had not developed a firm, rather permanent EB type and had only relatively recently acquired the type which they were during the testing. It is also likely that some of the children tested are no longer the type they were at that time. Perhaps, then, the problem-solving behaviors do not immediately accompany the formation of the EB type but follow after the type has remained for a period of time.

3. Finally, it is possible that the problem-solving styles that have been ascribed to the different EB types become evident only once an individual has reached a certain age. In order to imagine attempts to solve problems, as introversives are thought to do, a child has to be able to perform what Piaget calls "operations" (Lefrancois, 1977). Children are able to do this, he believed, beginning around ages seven through twelve. It is possible that some of the subjects had not reached the Piagetian stage of development wherein they would possess this ability.

IMPLICATIONS FOR PRACTICE

1. Extratensive children do seem to make more manipulations than do introversive children on certain problem-solving tasks. However, it has not been determined on what kind of tasks this is likely to occur. As a result, interpretation of EB in this manner needs to be held somewhat suspect, at least with sixth- and seventh-grade children.

2. This study was not concerned with the interpretation of EB with adults but rather with whether findings from studies concerning EB and adults may be applied to children. As a result, this study does not

negate nor deter from findings previously found for adults.

RECOMMENDATIONS FOR FUTURE RESEARCH

1. It is recommended that research be conducted which seeks to define problem-solving situations in which previous findings are and are not applicable. What is needed is a determination of the types of problem situations when it is true that extroverted children make more manipulations than do introverted children.

2. The developmental relationship between EB and the behaviors that are thought to accompany it is unknown. Specifically, it has not been determined whether the behaviors appear at the same time as does the EB type, or whether it only appears after EB has become stable. It is recommended that research be undertaken which studies the onset of both the appearance of EB styles in children and the behaviors that are thought to accompany them in order to determine if they appear consecutively or at the same time.

3. Furthermore, because a child's EB type may change many times during that child's developmental years, it is recommended that longitudinal studies be undertaken in order to determine whether a concomitant change in problem-solving styles also occurs.

4. If, as was suggested earlier, children cannot be expected to adopt the problem-solving strategies of introverts because of their undeveloped cognitive structures, then it is unknown what meaning there is for EB with children. It is recommended that research be conducted to discover if EB may be indicative of behaviors other than those already indicated.

5. It is recommended that this study be repeated with children

whose differences in Sum M and Sum weighted C are greater than that which was required for inclusion in this study. It could be expected with subjects who have more pronounced EB types that the differences between the groups would be more evident.

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APPENDIX

INSTRUCTIONS TO RATERS

Block Design manipulation - A manipulation is to be scored on the Block Design subtest when a subject places a block which that subject has just turned next to another block in an attempt to partially solve the puzzle. A manipulation is also scored when a subject places a block on the table in an apparent attempt to correctly place the block even though it may not be placed next to another block. This occurs when a subject is placing blocks in positions which appear to be the outline or corner of the design. Finally, if a subject has two or more blocks placed next to one another and moves all of the blocks together as one unit it is scored only as one manipulation.

Object Assembly manipulation - A manipulation is to be scored on the Object Assembly subtest when a subject places one part of a figure next to another part of that figure in an attempt to partially solve the puzzle. In order to be counted as a manipulation it is necessary when one part of the figure is placed next to another that both pieces are still for a moment.