Measurement of curiosity in junior high school students

Eloise Olson
Iowa State University

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MEASUREMENT OF CURIOSITY IN JUNIOR HIGH SCHOOL STUDENTS

Iowa State University

PH.D. 1986

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Measurement of curiosity
in junior high school students

by

Eloise Olson

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY

Department: Industrial Education and Technology
Major: Industrial Education and Technology
(Industrial Vocational-Technical Education)

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For the Graduate College

Iowa State University
Ames, Iowa
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CHAPTER I. INTRODUCTION

Advancements in science and technology have been influenced considerably by man's natural curiosity. An analysis of Freud's writings by Aronoff (1962) has indicated that Freud considered curiosity, in part, to be a coping mechanism created to solve the problems of life. Today, nations face phenomenal problems that require a mobilization of both industrial and educational resources in order to solve.

A review of the field by Maw and Maw (1977) has indicated limited utilization of curiosity concepts within the school environment. McClelland (1962) found that truly creative scientists are differentiated from their colleagues not by a greater degree of achievement motivation, but by the simple possession of curiosity. Kreitler, Kreitler, and Zigler (1974) have indicated that curiosity not only facilitates cognitive functioning in general, but, also, facilitates the use of intellectual potential in particular. Schools must face the challenge of awakening a lifelong intellectual curiosity in students so that they can grow into the full creative use of their minds to better meet the demands and challenges of the future.

Beswick and Tallmadge (1971) have provided evidence which indicates that treatment conditions can influence the effects of curiosity on learning according to (1) the congruence of
individual interests and subject matter and (2) the arousal of curiosity by methods of presenting information. Reliable and valid measurement of curiosity is needed in order to facilitate helpful teacher behavior and to provide optimal learning experiences for different students within the school environment.

Investigators such as Kreitler, Kreitler, and Zigler (1975), Langevin (1971, 1976), Maw and Maw (1968, 1977), Naylor (1981), Penney and McCann (1964), Peterson (1975), Vidler (1974), and Vidler and Rawan (1974, 1975) have acknowledged limitations in methods for measuring curiosity in students. Among the major limitations in methods for measuring curiosity in students are: low reliability, the lack of validity or limited validation of assessment techniques, the lack of reliable and valid measures which assess both trait curiosity and state curiosity, and the lack of uniformity in measurement procedures. Thus, development of a reliable and a valid method for measuring curiosity which assesses both trait curiosity and state curiosity could be very helpful to teachers in fostering curiosity in students and could, also, be very helpful to researchers by providing them with a method for measuring curiosity that could lead to more uniform measurement procedures.

Trait curiosity refers to individual differences in the capacity to experience curiosity, while state curiosity refers to individual differences in response to a particular arousing
situation. State curiosity is an index of the arousal of curiosity (Naylor, 1981).

Primarily, the subjects that have been studied in the research concerning the measurement of curiosity have been fourth to sixth graders, high school students, nursing students, college undergraduates, and adults (Vidler & Karan, 1975). In general, research concerning the measurement of curiosity of junior high school students is lacking.

Problem of the Study

The problem of this study was to investigate and develop a reliable and valid instrumentation for measuring both the trait and state curiosity of junior high school students (seventh and eighth graders).

Purpose of the Study

The purpose of this study was twofold:

1. to provide teachers and researchers with a reliable and valid instrumentation for measuring both the trait and state curiosity of junior high school students (seventh and eighth graders), and

2. to differentiate curiosity types within the domain of curiosity which could help teachers to promote learning by stimulating the type of curiosity which is underdeveloped in a particular student or important to a specific subject or discipline.
Research Questions

1. Reliability: Are there acceptable internal consistency indices which estimate the reliability of the trait-state curiosity measure and its subtests?

2. Content validity: Do local experts in the field of measurement agree that the items on the trait-state curiosity measure and its subtests are representative of curiosity?

3. Concurrent validity: Are there correlations between teacher evaluations of student curiosity and student responses on the trait-state curiosity measure and its subtests?

4. Are there correlations between GPA and student responses on the trait-state curiosity measure and its subtests?

5. Are there differences between generally and specifically worded items on the trait-state curiosity measure and its subtests?

6. Are there differences between sexes on the trait-state curiosity measure and its subtests?

7. Are there correlations between the sex of students and student responses on the trait-state curiosity measure and its subtests?
Hypotheses

The following null hypotheses were posed to test the research questions in this study:

Hypothesis 1: There are no acceptable internal consistency indices which estimate the reliability of the total trait-state curiosity measure.

Hypothesis 2: There are no acceptable internal consistency indices which estimate the reliability of the subtests of the trait-state curiosity measure.

Hypothesis 3: There is no consensus among the local experts in the field of measurement that the items on the trait-state curiosity measure and its subtests are representative of manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous.

Hypothesis 4: There are no correlations between teacher evaluations of student curiosity and student responses on the total trait-state curiosity measure.

Hypothesis 5: There are no correlations between teacher evaluations of student curiosity and student responses on the subtests of the trait-state curiosity measure.

Hypothesis 6: There are no correlations between GPA and student responses on the total trait-state curiosity measure.

Hypothesis 7: There is no correlation between GPA and student responses on the manipulatory curiosity subtest of the trait curiosity measure.
Hypothesis 8: There is no correlation between GPA and student responses on the manipulatory curiosity subtest of the state curiosity measure.

Hypothesis 9: There are no correlations between GPA and student responses on the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait-state curiosity measure.

Hypothesis 10: There are no differences in the internal consistency indices of the generally worded and specifically worded items of the total trait-state curiosity measure.

Hypothesis 11: There are no differences in the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded and specifically worded items of the total trait-state curiosity measure.

Hypothesis 12: There are no differences in the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded and specifically worded items of the subtests of the trait curiosity measure.

Hypothesis 13: There are no differences in the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded and specifically worded items of the subtests of the state curiosity measure.

Hypothesis 14: There are no differences in the correlation coefficients between GPA and student responses on the generally
worded and specifically worded items of the total trait-state curiosity measure.

Hypothesis 15: There are no differences in the correlation coefficients between GPA and student responses on the generally worded and specifically worded items of the subtests of the trait curiosity measure.

Hypothesis 16: There are no differences in the correlation coefficients between GPA and student responses on the generally worded and specifically worded items of the subtests of the state curiosity measure.

Hypothesis 17: There are no differences between sexes in the internal consistency indices of the total trait-state curiosity measure.

Hypothesis 18: There are no differences between sexes in the internal consistency indices of the subtests of the trait curiosity measure.

Hypothesis 19: There are no differences between sexes in the internal consistency indices of the subtests of the state curiosity measure.

Hypothesis 20: There are no correlations between the sex of students and student responses on the total trait-state curiosity measure.

Hypothesis 21: There is no correlation between the sex of students and student responses on the manipulatory curiosity subtest of the trait curiosity measure.
Hypothesis 22: There are no correlations between the sex of students and student responses on the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait curiosity measure.

Hypothesis 23: There are no correlations between the sex of students and student responses on the manipulatory curiosity and conceptual curiosity subtests of the state curiosity measure.

Hypothesis 24: There are no correlations between the sex of students and student responses on the perceptual curiosity and curiosity about the complex or ambiguous subtests of the state curiosity measure.

Assumptions of the Study

1. Curiosity cannot only be considered as a trait, that is, some individuals have within themselves certain conditions that contribute to curiosity behavior, but curiosity can, also, be considered as a state, where individuals become curious when confronted by certain kinds of situations.

2. Curiosity as a trait can be expressed across a wide variety of situations with some degree of behavioral consistency.

3. Teachers have an accurate basis for making curiosity trait attributions, attributions which are not confounded by knowledge of the student's performance in the highly structured academic environment.
Limitations of the Study

1. The mechanical learning process that characterizes the traditional classroom does not always sustain a student's curiosity; and consequently, some classroom environments may engender more curiosity than other classroom environments, which may influence student responses on the trait-state curiosity measure and its subtests.

2. The subjects in this study are limited to junior high school students (seventh and eighth graders).

Procedures of the Study

1. A review of the literature was completed to investigate the research which has been conducted to develop and validate instruments which measure the construct of curiosity.

2. Based upon the research findings, a trait-state curiosity inventory for junior high school students which measures four types of curiosity—manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous—was developed.

3. The items on the trait-state curiosity measure were evaluated by professors having expertise in the field of measurement to determine their representativeness of manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous. Numerous revisions were made for content validation.
4. A teacher-rating form was developed to rate student curiosity.

5. A pilot study involving four seventh and four eighth grade students was conducted to determine any initial problems in the instrumentation and administration of the trait-state curiosity measure.

6. Arrangements to conduct the major study were made with the superintendent and principal of Neveln Junior High School in Ankeny, Iowa.

7. In order to protect the rights and welfare of students, approval to complete the major study was obtained from the Iowa State University Committee on the Use of Human Subjects in Research, Ames, Iowa.

8. The trait-state curiosity measure was administered once to each seventh and eighth grade student who was present during the third class period on one of three possible testing days at Neveln Junior High School.

9. Five hundred and nine students in 24 seventh and eighth grade classes completed the trait-state curiosity measure. Each teacher who participated in the major study rated his or her students' curiosity on the teacher-rating form.

10. From the data acquired on the 509 students who participated in the major study, a library for input logon in Wylbur and files in a Wylbur directory were created. The data acquired on the male students who participated in the major study were coded with ones, and the data
acquired on the female students who participated in the major study were coded with twos.

11. Statistical techniques were executed with SPSS-X and SAS. Cronbach alpha reliability coefficients were computed with SPSS-X to determine the internal consistency of the trait-state curiosity measure and its subtests. Pearson product moment correlation coefficients were computed with SAS to determine all correlations, including correlations between teacher evaluations of student curiosity and student responses on the trait-state curiosity measure and its subtests, correlations between GPA and student responses on the trait-state curiosity measure and its subtests, and correlations between the sex of students and student responses on the trait-state curiosity measure and its subtests.

12. The data were tabulated, analyzed, and interpreted to test the research questions of this study. For all tests of hypotheses that the population correlation coefficient, rho, was equal to zero, the statistic, \[ t = \frac{r}{\sqrt{(1-r)/(n-2)}} \]
for \( n-2 \) degrees of freedom, was used. Type I errors were controlled by testing at the .01 and .05 levels of significance.

13. Final preparation of the research results of this study was completed after the initial draft was read and approved.

14. A summary, with conclusions and recommendations, completed this study.
Definitions of Terms

Curiosity does not have a unique definition. However, Maw and Maw's definition of curiosity has been frequently cited in the literature. Maw and Maw (1962) indicated that a child is said to exhibit curiosity to the degree that he:

1. reacts positively to new, incongruous, or mysterious elements in the environment by moving toward them, by exploring them, or by manipulating them,
2. exhibits a need or a desire to know more about himself and/or his environment,
3. scans his surroundings seeking new experiences, and
4. persists in examining and exploring stimuli to know more about them.

Research supports the existence of different types of curiosity, and definitions for many of these types of curiosity follow:

Adjustive-reactive curiosity - curiosity reflecting two qualities, a conventional quality and a reactive quality. The conventional quality refers to tendencies to operate toys according to their customary use, to uncover covered stimuli, and to switch glance or preference. The reactive quality refers to the tendency to respond to the most obvious demand characteristics of objects and the lack of exposure to, and exploration of, new or complex objects and stimuli (Kreitler, Kreitler, & Zigler, 1975).

Conceptual curiosity - curiosity reflecting richly structured meanings which result from extensive conceptual exploration and active information seeking through asking questions and through extensive checking of commonly accepted concepts—concepts about how an object is to be used (Kreitler, Kreitler, & Zigler, 1975).

Curiosity about the complex or ambiguous - curiosity reflecting observation of complex stimuli, preference in observing complex rather than simple stimuli, and the degree to which the complex is viewed longer than the simple (Kreitler, Kreitler, & Zigler, 1975).
Diversive curiosity - a general condition reflecting the need to seek new experiences or to extend one's knowledge into the unknown and which may elicit diversive exploration (Day, 1968).

Epistemic curiosity - responses through which knowledge is acquired (Berlyne, 1960).

Manipulatory curiosity - curiosity elicited mainly by objects which are new in some respect and which enable handling for the purpose of inspection or manipulatory exploration (Kreitler, Kreitler, & Zigler, 1975).

Perceptual curiosity - states of high arousal that can be relieved by specific exploration and in which, therefore, specific exploratory responses are likely to occur (Berlyne, 1960). It is curiosity which leads to increased perception of stimuli. Perceptual curiosity involves increased attention given to objects in a child's immediate environment, such as when a child stares longer at an asymmetrical rather than a symmetrical figure on a screen (Vidler, 1977).

Reactive curiosity - a tendency to approach and explore relatively new stimulus situations, a tendency to approach and explore incongruous, complex stimuli, and a tendency to vary stimulation in the presence of frequently experienced stimulation (Penney & McCann, 1964).

Specific curiosity - the aroused state of an organism when confronted by an ambiguous or unclear stimulus and which may result in specific exploration (Day, 1968).

State curiosity - individual differences in response to a particular curiosity-arousing situation. It is an index of the arousal of curiosity (Naylor, 1981).

Trait curiosity - individual differences in the capacity to experience curiosity. It reflects the disposition to respond with curiosity (Naylor, 1981).
CHAPTER II. REVIEW OF THE LITERATURE

Research indicates that there exists a growing concern in American education for the development of curiosity in students in order to stimulate their growth into competent individuals. Not only is our society changing very rapidly in this technological era, but the rate of change is accelerating as well.

Toffler (1970) has suggested that changes be made in our present educational system in order to better assist students in developing more flexible and open minds, which would enable them to react more appropriately in a complex and rapidly changing technological environment. Elias and Elias (1976) have indicated that curiosity engenders exploration as well as exposure to diversity, both of which are important in the development of flexibility and open-mindedness. Dorothy W. Gross (1975) wrote: "It is part of conventional wisdom to consider the curious mind superior to the phlegmatic one. Curiosity evokes images of thought, exploration, probing, interest."

The importance of curiosity in the learning process cannot be overemphasized. Available research supports a relationship between curiosity and academic achievement. Hogan and Greenberger (1969) found a moderate, but persistent correlation of curiosity with academic achievement.
Maw and Maw (1961) found that children judged to be higher in curiosity remembered more of the material in a story that was read to them after one week's time than did children of matched verbal intelligence who were judged lower in curiosity. Maw and Maw (1961), also, found that children with a high level of curiosity either learned more from a given period of exposure than did children of low curiosity or that children with a high level of curiosity remembered what they learned longer than did children of low curiosity. Maw and Maw (1962) found in another study that they conducted that children with high curiosity tend to sense the meaning of sentences more accurately than do children with low curiosity of equal intelligence on a reading comprehension test.

Vidler (1980) conducted a study involving undergraduate college students, in which he assessed the correlation between two measures of academic curiosity and academic performance. He found a small positive relationship between academic curiosity and academic performance. Similarly, Demel and Hansen (1969) found a small positive correlation between curiosity and a test of arithmetic concepts.

Research, also, widely supports a relationship between curiosity and creativity. Maw and Maw (1965) identified curious children in the fifth grade on the basis of teacher, peer, and self-ratings. They, then, compared these fifth graders on a series of tests, which included creativity. In terms of creativity, high curious boys and girls scored significantly higher on word association
tests and were found, also, to be more flexible in shifting rapidly from one frame of reference to another and were more organized in their thought processes.

Torrance (1967) asked two teachers of high achieving sixth graders to determine five of the most and five of the least creative youngsters in their classes. Maw and Maw's definition of curiosity was given to these teachers; and almost all of those named among the more curious made higher scores on each of several tests of creative thinking than did their equally intelligent, but less curious classmates.

Penney and McCann (1964) conducted a study involving 433 children, in which they utilized their own curiosity scale. In their study, they, also, utilized originality measures that were derived from a modified version of Guilford's Unusual Uses Test (1956). The Unusual Uses Test requires subjects to give additional uses for common objects after the common use for each object has been given to them. Penney and McCann found that scores on their curiosity scale for sixth grade children were positively related to the originality measures that were derived from a modified version of Guilford's Usual Uses Test.

Research provides some moderate evidence to support a relationship between curiosity and intelligence. Kagan, Sontag, Baker, and Nelson (1958) found that curiosity about nature could motivate the acquisition of intellectual skills and knowledge which facilitate increases in IQ.
Hogan and Greenberger (1969) found moderate, but persistent correlations of curiosity with IQ. Maw and Maw (1975) found a positive and moderate relationship between curiosity and intelligence. Richman, Kahle, and Rutland (1972) found that normal children's level of curiosity was greater than that of mentally retarded children; and similarly, Hoats, Miller, and Spitz (1963) found that high-grade mentally retarded males had less perceptual curiosity than did combined groups of equal mental and chronological age normal males.

In general, Maw and Maw (1964) found that youngsters with high curiosity tend to ask more and better questions, select more adventurous activities, have more information about the world around them, recall more specific facts, and persist longer at problem solving. Thus, curiosity in the learning process is an important quality to measure and promote.

Finally, some theorists have suggested that there exists an inverse relationship between curiosity and anxiety. McReynolds, Acker, and Pietila (1961) found that classroom learning which is dependent upon curiosity is hindered by the anxieties of students. They found negative correlations between curiosity and nervous behavior and curiosity and worry over achievement.

Penney (1965) found that children who are reactively curious show less anxiety than children who are not as reactively curious. He found that children's reactive curiosity was negatively correlated to manifest anxiety. Similarly, Maw and Maw (1970) found that highly
curious fifth grade boys are more secure and freer from nervous symptoms than less curious boys. Levitt (1967) stated simply: "It follows that anxious people will be less motivated by curiosity: will not evince as much interest in exploring new arenas, and in having new experiences."

Berlyne's Theory of Curiosity

The scientific study of curiosity was mainly launched by D. E. Berlyne. In 1960, Berlyne presented a specific theory of curiosity in his book entitled: Conflict, Arousal, and Curiosity. Berlyne's conceptualization of curiosity has been widely accepted. Research indicates considerable support for Berlyne's theory of curiosity as a motivational state, a state of high drive or arousal (Langevin, 1971).

Basically, Berlyne (1960) associated curiosity drive with a state of arousal induced by collative properties of stimuli. "Collative" was the term that Berlyne used to represent novelty, uncertainty, conflict, and complexity—four of the properties of stimuli. The resultant behavior of exploration of such stimuli, then, reduced the curiosity drive. Berlyne emphasized:

the chances of a particular stimulus pattern in the contest for control over behavior depend, among other properties, on how novel the pattern is, to what extent it arouses or relieves uncertainty, to what extent it arouses or relieves conflict, and how complex it is.

Berlyne's theory of curiosity specifically differentiates between perceptual and epistemic curiosity. Perceptual curiosity refers to "states of high arousal that can be relieved by specific
exploration and in which, therefore, specific exploratory responses are likely to occur" (Berlyne, 1960).

Epistemic curiosity refers to "responses through which knowledge is acquired." There are three main classes of epistemic responses, and they are:

1. observation, which includes responses which place the subject in contact with external situations and which nourish the learning process;

2. thinking, which includes productive or creative thinking and which puts the individual in permanent possession of new knowledge; and

3. consultation, which exposes an individual to verbal stimuli from others and includes asking questions, writing letters, and reading (Berlyne, 1960).

Since 1960, much research has demonstrated the veracity of the phenomenon of curiosity (Day, 1982). However, Maw and Maw (1964) have indicated that, if curiosity is to be maintained or developed, adequate measures must be devised.

Measures of Curiosity

Numerous different methods and techniques have been used to measure curiosity. Vidler (1977) has indicated that this wide variety of methods and techniques used to measure curiosity has, in part, been caused by the relative difficulty in studying curiosity and that the measures used have commonly been dictated by the nature of the population sampled, the need to tailor the measures
to the level of functioning of the individual, and the need to take into account the practical restrictions of the situation.

Preschool and elementary school children have formed the populations for most of the studies of curiosity at the human level; and the types of measures of curiosity used with preschool and elementary school children have been mostly observations of children's behavior in the classroom setting and ratings of the children, both by themselves and by their teachers and peers. At the high school level and beyond, an area which has not yet been as extensively explored as that of preschool and elementary school children, true-false scales have been used to measure curiosity. Students rate themselves against a list of statements (Vidler, 1977).

Langevin (1971) has suggested that there has been very little research done relating various curiosity measures and that, in the studies that have been done, measures of curiosity have been only moderately correlated at best, indicating that curiosity is not a unitary construct. Langevin (1971) has, also, suggested that measures of curiosity can be classified into two categories: (1) curiosity as a motivational state and (2) curiosity as a personality trait.

Curiosity as a motivational state can be measured by: free exploration time, selective attention, verbal expressions of preference or interest in complexity, novelty, and incongruity,
number of questions asked, and physiological indicators (Langevin, 1971). Typically, two or more stimuli that vary in novelty or complexity are presented to subjects within a laboratory setting; and the choice of stimuli and the differences in exploration time given to each stimulus are recorded. Then, based upon the obtained data, the level of curiosity is inferred. Much of Berlyne's work was based on this procedure (Maw & Maw, 1977).

Berlyne tried to discover the conditions which arouse curiosity, primarily through the use of perceptual measures involving judgments of a subject's curiosity on the basis of his looking at stimulus figures. Subjects were presented with a series of pictures flashed on a screen that varied in terms of their supposed curiosity-arousing properties. Berlyne was, for the most part, interested in the properties of objects and the conditions that stimulated curiosity rather than in the individual differences in the level of curiosity (Vidler, 1977).

Outside of the laboratory, curiosity is usually measured as a personality trait, reflecting presumably stable individual differences in preferences for novelty and complexity through personality questionnaires or self-reports and teacher-peer ratings (Henderson & Moore, 1979). Self-report measures of curiosity reflect the frequency with which each student participates in certain types of curiosity behavior. The process of obtaining teacher ratings of student curiosity involves, first, providing each teacher with a definition of curiosity and, then,
asking each teacher to rate each student's curiosity. Peer
ratings of curiosity are obtained by having students rate each
other. Students within a class observe each other in play
roles which are specifically designed to reflect curiosity
(Vidler & Levine, 1976).

The simplest method for measuring curiosity has been the
adjective checklist. Hogan and Greenberger (1969) developed a
set of 30 adjectives judged relevant to curiosity. Their check­
list was designed to be used with elementary school children and
was, also, designed for quick and easy use, keyed to minimize
the influence of rater bias.

Twelve graduate students and senior psychology majors at
Johns Hopkins University were asked to describe their conceptions
of a highly curious child using the Gough Adjective Checklist
(Gough, 1960; Gough & Heilbrun, 1965). Their responses were,
then, recorded and tallied; and 30 adjectives characteristic of
the curious child were selected for which there was at least 75
percent agreement. Six of the adjectives that all 12 of the
graduate students and senior psychology majors agreed upon as
describing a curious child were: active, adventurous, energetic,
enthusiastic, imaginative, and interests wide (Hogan & Greenberger,
1969).

A set of 10 adjectives indicative of social desirability,
which included considerate, cooperative, good-natured, helpful,
mannerly, stable, unselfish, affectionate, cheerful, and
wholesome were added to not only disguise the purpose of the checklist, but were, also, added to serve as a check for rater bias. However, in spite of this fact and in spite of the fact that the adjective checklist is easy to administer, it is not highly regarded enough to have justified extensive usage (Vidler, 1977). The evidence suggests that the adjective checklist defines only a unitary dimension of curiosity (Hogan & Greenberger, 1969).

Maw and Maw (1964) have explored numerous techniques for measuring curiosity in elementary students; and through their research, they have laid the foundation for subsequent researchers to build upon. Vidler (1977) has indicated that subsequent researchers have depended very heavily on Maw and Maw's methods, procedures, and definition of curiosity.

In 1964, Maw and Maw attempted to find the dimensions associated with the curious individual. They had 146 sophomores at the college level rate words indicative of curiosity on a zero to four-point scale. The words that were related the most as indicative of the curious individual were: explorer, discoverer, adventurous, and questioning; and the words that were related the next most as indicative of the curious individual were: venturesome, scouting, thinking, and prodding.

Maw and Maw (1961, 1962, 1964) have, also, used teacher ratings as a measure of curiosity in students. They gave their own definition of curiosity to teachers; and, then, teachers were asked to describe their students on this basis. The teachers
ranked their pupils from high to low. They first listed the student who exhibited the most curiosity as defined. Then, they listed the student possessing the least curiosity next to the number corresponding to the number of students in the class. The teachers continued alternating the choices until all children had been ranked.

In a major study conducted by Maw and Maw in 1961, combined teacher, peer, and self-judgments of curiosity were used. The peers judged each other on a "Guess-Who" test. They were given eight paragraphs. Four of these paragraphs described children with high curiosity, and the other four paragraphs described children with low curiosity. The peers were, then, asked to indicate which of their classmates were most nearly like the person described in each of the paragraphs. Also, each child in the study rated himself on a self-rating instrument composed of 41 items which logically should be related to curiosity as defined.

Penney and McCann (1964) developed a 90-item true-false scale of reactive curiosity to measure the "reactive" curiosity of children in fourth, fifth, and sixth grades. If a statement was true for a student, the student circled the T. If a statement was not true for a student, the student circled the F.

Chiu (1967) chose items from a number of tests and questionnaires considered to be related to motivation in the classroom. He, then, administered the chosen items to a sample of eleventh
graders and factor analyzed the results. Based on the results of his factor analysis, he labeled one of the five identified factors as curiosity. Chiu, then, developed a self-report scale of curiosity which was suited for both high school and college students.

Day (1968) developed a test of specific curiosity, which measured the intent of a student to approach high levels of visual complexity and to withdraw from simple visual stimulation. He had student teachers rank a series of 28 figures generated by Berlyne (1963) along a continuum of complexity. Then, afterward, he had other students rank the same figures along a dimension of interestingness. The results showed that subjects tended to evaluate the figures at the intermediate level of complexity as most interesting. Day (1968), also, developed a more comprehensive measure for adults called the Ontario Test of Intrinsic Motivation. This measure was designed to assess both specific and divergent curiosity.

Leherissey (1971) developed a 20-item measure of state epistemic curiosity. Berlyne's (1960) differentiation between epistemic and perceptual curiosity was used as the basis for the construction of this scale.

Finally, one of the most recent curiosity measures, which has been under development since 1974, is the Melbourne Curiosity Inventory. This inventory is a measure of trait curiosity and state curiosity for subjects in the tenth grade and beyond (Naylor, 1981).
Regrettably, the numerous different methods and techniques that have been used as measures in studies of curiosity have frequently had little in common with each other or, at best, have shown only modest intercorrelations, suggesting that curiosity is a multidimensional construct (Vidler, 1977). Most published curiosity measures tend to be trait measures (Maw & Maw, 1977). Consequently, measurement of the arousal of curiosity in specific situations; that is, measurement of state curiosity, for the most part, has been ad hoc (Peters, undated).

Validation of Curiosity Measures

The establishment of validity has been one of the major problems in the measurement of curiosity. Even though Berlyne's conceptualization of curiosity has been widely accepted, Maw and Maw (1977) have indicated that Berlyne made no attempts at validation in his early studies of curiosity.

The determination of student curiosity through teacher ratings has, also, been sharply criticized because teachers have, too often, confused curiosity with intelligence. Hogan and Greenberger (1969) have pointed out that, even though the technique of using teacher ratings for establishing the curiosity of students may provide face validity, teacher ratings are very susceptible to rater bias. Poor definitions of curiosity have similarly confused raters (Maw & Maw, 1977).

Langevin (1976) has indicated that many self-report measures of curiosity either lack validity or have been subjected to very
limited validation. Oftentimes, test construction focuses on internal consistency and test-retest reliability; while criterion and predictive validity are completely ignored. Langevin (1976) has also indicated that self-report measures of curiosity need further development in order to increase their discriminant validity and, also, to increase the consistency of what is being measured.

Summary

Curiosity is important in the learning process. Available research supports a relationship between curiosity and academic achievement. Research, also, widely supports a relationship between curiosity and creativity and provides some moderate evidence to support a relationship between curiosity and intelligence. In general, youngsters with high curiosity tend to ask more and better questions, select more adventurous activities, have more information about the real world around them, recall more specific facts, and persist longer at problem solving.

Some research suggests the existence of an inverse relationship between curiosity and anxiety. The highly curious tend to be more secure and freer from nervous symptoms than the less curious.

The scientific study of curiosity is only about 25 years old. In 1960, D. E. Berlyne presented a specific theory of curiosity as a motivational state, a state of high drive or arousal. Berlyne's theory of curiosity indicates that, when an individual perceives that a stimulus possesses one or more properties such as novelty,
uncertainty, conflict, and complexity, he will become aroused or curious, orient himself toward the arousing stimulus, and, then, explore the stimulus until he is satisfied.

Since 1960, Berlyne's conceptualization of curiosity has been widely accepted; and the veracity of the phenomenon of curiosity has been demonstrated. Nevertheless, in order to maintain or develop curiosity, adequate measures of curiosity must be devised.

Numerous methods and techniques have been used to measure curiosity. Within the laboratory setting, curiosity has been typically measured by presenting subjects with two or more stimuli that vary in novelty or complexity and, then, recording the choice of stimuli and the differences in exploration time given to each stimulus. Outside of the laboratory, curiosity has been typically measured as a personality trait through the use of personality questionnaires or self-report measures and teacher-peer ratings. The adjective checklist, however, has been the simplest and quickest method devised for measuring curiosity.

Regrettably, the numerous different methods and techniques that have been used to measure curiosity have frequently had little in common with each other or, at best, have shown only modest correlations, reflecting the multidimensionality of curiosity. Also, most published curiosity measures tend to be trait measures only. Consequently, the measurement of state curiosity, for the most part, has been left out, except in the most recent research.
The establishment of validity has been, as well, a major problem in the measurement of curiosity. Many self-report measures of curiosity either lack validity or have been subjected to very limited validation.

Teacher ratings have been sharply criticized because teachers have, too often, confused curiosity with intelligence. Also, teacher ratings are very susceptible to rater bias. Poor definitions of curiosity have similarly confused raters. Measures of curiosity need further development in order to not only increase their discriminant validity, but, also, to increase the consistency of what is being measured. The review of the research literature enabled this researcher to observe the numerous limitations and complexities of creating a reliable and valid instrumentation for measuring the complex, multidimensional construct of curiosity.
CHAPTER III. PROCEDURES

This chapter indicates the procedures, including information on the population and sample, that were used to:

1. develop the Trait-State Curiosity Inventory for Junior High School Students,
2. develop the teacher-rating form for evaluation of student curiosity,
3. collect the necessary data to establish the reliability and validity of the Trait-State Curiosity Inventory for Junior High School Students, and
4. analyze the data by means of specific statistical tests.

Construction of The Trait-State Curiosity Inventory

The research findings of Kreitler, Kreitler, and Zigler (1975) and F. D. Naylor (1981) provided much of the data that were used to develop the Trait-State Curiosity Inventory for Junior High School Students. Kreitler, Kreitler, and Zigler's factor analysis of the intercorrelations between 19 curiosity measures yielded five factors which appeared to reflect manipulatory curiosity, perceptual curiosity, conceptual curiosity, curiosity about the complex or ambiguous, and adjustive-reactive curiosity. Based upon Kreitler, Kreitler, and Zigler's findings, in an attempt to evaluate as many curiosity types as possible, the Trait-State Curiosity Inventory for Junior High
School Students was developed to assess manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous. The Trait-State Curiosity Inventory for Junior High School Students was not developed to evaluate adjustive-reactive curiosity since Kreitler, Kreitler, and Zigler found this factor to be less clearcut in definition.

Four subtests of 10 items each were prepared to evaluate the four curiosity types—manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous. The items for each subtest were prepared in conjunction with Kreitler, Kreitler, and Zigler's (1975) definitions of these four types of curiosity.

F. D. Naylor's research (1981), detailing the development of the Melbourne Curiosity Inventory which is useful in measuring the state-trait curiosity of tenth grade students and beyond, provided a model for the format of the Trait-State Curiosity Inventory for Junior High School Students. However, in the construction of the Trait-State Curiosity Inventory for Junior High School Students, major changes in the format were made—simple and brief directions were used on both the trait and state forms, five response modes, as opposed to only four response modes, were used on both the trait and state forms, and the item pools were changed and doubled on both the trait and state forms so that the four types of curiosity—manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous—would be adequately represented and tested.
To insure that the readability level of both the trait and state curiosity forms was appropriate for junior high school students, the Gunning Readability Formula (Gunning, 1952) was applied to the item pools on the trait and state forms. Four samples of approximately 100 words each were evaluated, and the readability levels ranged from 5.96 to 7.2. The trait form was placed on one side of the paper, and the state form was placed on the opposite side of the paper so that the students would only have to handle one sheet of paper.

The items on the Trait-State Curiosity Inventory for Junior High School Students were written in nonreversed and reversed format. The Trait-State Curiosity Inventory for Junior High School Students is shown in Appendix A.

Wilbur Layton, Professor of Psychology and Chair of the Psychology Department at Iowa State University, Ames, Iowa, William Miller, Professor of Industrial Education and Technology and Professor of Professional Studies in Education at Iowa State University, Donald Schuster, Professor of Psychology at Iowa State University, and Robert Strahan, Professor of Psychology and Professor of Statistics at Iowa State University, individuals having expertise in the field of measurement, evaluated the items on the curiosity inventory and its subtests to determine whether or not they were representative of manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous. Numerous revisions were made after each professor's evaluation until a consensus was obtained to support the content validity of the inventory and its subtests.
Construction of the Teacher-Rating Evaluation Form

The teacher-rating form, created to rate a student's curiosity, was developed in such a manner so as to facilitate quick completion by each teacher who participated in the major study. Maw and Maw's (1962) definition of curiosity was given as the basis upon which each teacher was to evaluate the curiosity of his or her students within the classroom.

A five-point rating scale, as opposed to a ranking scale, was used to indicate the curiosity of each student. The directions were worded so that each teacher would list his or her students in alphabetical order. Then, based upon Maw and Maw's (1962) definition of curiosity, each teacher would rate each of his or her students according to one of the following: not curious at all, somewhat curious, moderately curious, very curious, or extremely curious. The teacher-rating form is shown in Appendix B.

Collection of Data

A pilot study involving four seventh grade and four eighth grade students was conducted to determine any initial problems in the instrumentation and administration of the Trait-State Curiosity Inventory for Junior High School Students. One male and three female seventh grade students and two male and two female eighth grade students participated in the pilot study.

Verbal directions were given to the students who participated in the pilot study prior to the administration of the curiosity inventory. Students were asked to circle all statements on the
curiosity inventory which they did not understand, and they were given as much time as they needed to complete the entire inventory so that the average time length needed to complete the inventory could be determined. The students completed the curiosity inventory in 5 to 15 minutes; and student responses to the directions and statements on the inventory indicated that there were no major problems in the wording of the instrumentation, itself.

Arrangements for conducting the major study at Neveln Junior High School in Ankeny, Iowa, were made through the superintendent of the school district and the school principal. In order to protect the rights and welfare of the students, approval to conduct and complete the major study was obtained from the Iowa State University Committee on the Use of Human Subjects in Research.

The principal of Neveln Junior High School distributed one teacher-rating form and 25 trait-state curiosity inventories to each seventh and eighth grade teacher. The curiosity inventories were arranged so that every other student would complete the side with the trait form on it first, and the remaining students would complete the opposite side with the state form on it first. Classes were scheduled for testing in May of 1985 during the third class period on one of three possible testing days.

Teachers who participated in the major study were given written directions to give verbally to their students prior to the administration of the curiosity inventory to insure that the forms were completed on both sides. The Trait-State Curiosity Inventory for
Junior High School Students was administered once to each seventh and eighth grade student who was present during the third class period on one of the three possible testing days.

Population and Sample

The population for this study consisted of all junior high school students in the Ankeny, Iowa, school district. The sample for this study consisted of 509 seventh and eighth grade students who were enrolled at Neveln Junior High School, Ankeny, Iowa, in May of 1985. Of the 509 students in the sample, 247 were seventh grade students, and 262 were eighth grade students. There were 12 seventh grade classes and 12 eighth grade classes involved in this study. The seventh grade classes included: art, English, history, home economics, industrial arts, math, reading, science, and Spanish. The eighth grade classes included: English, French, math, physical education, science, and social studies. All classes were intact, and no treatments nor control groups were used in this study.

Data Analysis

After all completed teacher-rating forms and trait-state curiosity inventories were collected, an identification number was recorded beside each student's name on both the teacher-rating form and the trait-state curiosity inventory. With administrative approval, grade-point averages were obtained for all seventh and eighth grade students; and each student's grade-point average was, also, recorded beside his or her name on the teacher-rating form.
Then, teacher and student names were blackened out on all the completed forms.

From the data acquired on the 509 students who participated in the major study, a library for input logon in Wylibur and files in a Wylibur directory were created. The data acquired on the male students who participated in the major study were coded with ones, and the data acquired on the female students who participated in the major study were coded with twos. Statistical techniques were executed with SPSS-X and SAS. Cronbach alpha reliability coefficients were computed with SPSS-X to determine the internal consistency of the trait-state curiosity measure and its subtests; and Pearson product moment correlation coefficients were computed with SAS to determine all correlations, including correlations between teacher evaluations of student curiosity and student responses on the trait-state curiosity measure and its subtests, correlations between GPA and student responses on the trait-state curiosity measure and its subtests, and correlations between the sex of students and student responses on the trait-state curiosity measure and its subtests.

For all tests of hypotheses that the population correlation coefficient, rho, was equal to zero, the statistic,

\[ t = \frac{r}{\sqrt{\frac{2}{(1-r) / (n-2)}}} \]

which has a t-distribution for (n-2) degrees of freedom, was used. Type I errors were controlled by testing at the .01 and .05 levels of significance.
CHAPTER IV. ANALYSIS OF DATA

This study was designed to investigate and develop a reliable and valid instrumentation for measuring both the trait and state curiosity of junior high school students (seventh and eighth graders). The analysis of data from this study is presented in seven sections:

1. the reliability of the trait-state curiosity measure and its subtests,
2. the content validity of the trait-state curiosity measure and its subtests,
3. the concurrent validity of the trait-state curiosity measure and its subtests,
4. the correlations between GPA and student responses on the trait-state curiosity measure and its subtests,
5. the differences between generally and specifically worded items on the trait-state curiosity measure and its subtests,
6. the differences between sexes on the trait-state curiosity measure and its subtests, and
7. the correlations between the sex of students and student responses on the trait-state curiosity measure and its subtests.
The Reliability of the Trait-State Curiosity Measure and Its Subtests

Table 1
Reliability Coefficients of the Trait-State Curiosity Measure

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>No. of Items</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trait</td>
<td>422</td>
<td>40</td>
<td>.9180</td>
</tr>
<tr>
<td>State</td>
<td>448</td>
<td>40</td>
<td>.9296</td>
</tr>
</tbody>
</table>

Hypothesis 1: There are no acceptable internal consistency indices which estimate the reliability of the total trait-state curiosity measure.

As indicated in Table 1, the obtained alpha coefficients of the total trait-state curiosity measure were above the .90 level. It was concluded that the alpha coefficients were at acceptable levels for estimating the reliability of the total trait-state curiosity measure and that the trait-state curiosity measure was internally consistent. Hypothesis 1 was rejected.
Table 2
Reliability Coefficients of the Subtests of the Trait-State Curiosity Measure

<table>
<thead>
<tr>
<th>Subtest</th>
<th>n</th>
<th>No. of Items</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trait Measure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>490</td>
<td>10</td>
<td>.7820</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>486</td>
<td>10</td>
<td>.7528</td>
</tr>
<tr>
<td>Conceptual curiosity</td>
<td>485</td>
<td>10</td>
<td>.7904</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>475</td>
<td>10</td>
<td>.7713</td>
</tr>
<tr>
<td><strong>State Measure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>495</td>
<td>10</td>
<td>.8415</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>488</td>
<td>10</td>
<td>.7708</td>
</tr>
<tr>
<td>Conceptual curiosity</td>
<td>491</td>
<td>10</td>
<td>.8245</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>489</td>
<td>10</td>
<td>.7848</td>
</tr>
</tbody>
</table>

Hypothesis 2: There are no acceptable internal consistency indices which estimate the reliability of the subtests of the trait-state curiosity measure.

As indicated in Table 2, the obtained alpha coefficients of the subtests of the trait-state curiosity measure ranged from a low of .7528 to a high of .8415. The alpha coefficients of the subtests were lower than those of the total measure. It was concluded that, since reliability is a function of test length, the alpha coefficients of the subtests of the trait-state curiosity measure were at acceptable levels for estimating the reliabilities of the subtests. Hypothesis 2 was rejected.
The Content Validity of the Trait-State Curiosity Measure and Its Subtests

Hypothesis 3: There is no consensus among the local experts in the field of measurement that the items on the trait-state curiosity measure and its subtests are representative of manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous.

Wilbur Layton, Professor of Psychology and Chair of the Psychology Department at Iowa State University, Ames, Iowa, William Miller, Professor of Industrial Education and Technology and Professor of Professional Studies in Education at Iowa State University, Donald Schuster, Professor of Psychology at Iowa State University, and Robert Strahan, Professor of Psychology and Professor of Statistics at Iowa State University, evaluated the items on the curiosity measure and its subtests to determine their representativeness of manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous. After numerous revisions, it was concluded by a consensus of the aforementioned professors that the items on the curiosity measure and its subtests were representative of manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous. Hypothesis 3 was rejected.
The Concurrent Validity of the Trait-State Curiosity Measure and Its Subtests

Table 3
Correlation Coefficients between Teacher Evaluations and Student Responses on the Trait-State Curiosity Measure

<table>
<thead>
<tr>
<th>Measure</th>
<th>r</th>
<th>Fisher t</th>
<th>n</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trait Evaluation</td>
<td>.26747</td>
<td>5.68877*</td>
<td>422</td>
<td>420</td>
</tr>
<tr>
<td>Z-evaluation</td>
<td>.27638</td>
<td>5.89367*</td>
<td>422</td>
<td>420</td>
</tr>
<tr>
<td>State Evaluation</td>
<td>.27804</td>
<td>6.11288*</td>
<td>448</td>
<td>446</td>
</tr>
<tr>
<td>Z-evaluation</td>
<td>.25553</td>
<td>5.58177*</td>
<td>448</td>
<td>446</td>
</tr>
</tbody>
</table>

*p<.01.

Hypothesis 4: There are no correlations between teacher evaluations of student curiosity and student responses on the total trait-state curiosity measure.

H0: rho=0

HL: rho≠0

Test statistic: \[ t = \sqrt{\frac{r^2}{(1-r)/(n-2)}} \]

Rejection region (.01 level): Reject H0 if \( t < -2.576 \) or \( t > 2.576 \)

Since the obtained values of \( t \) shown in Table 3 were all greater than the critical value of 2.576 at the .01 level, Hypothesis 4 was rejected. It was concluded that the correlation coefficients between teacher evaluations of student curiosity and student responses on the trait-state curiosity measure differed from zero.
Table 4
Correlation Coefficients between Teacher Evaluations and Student Responses on the Subtests of the Trait-State Curiosity Measure

<table>
<thead>
<tr>
<th>Subtest</th>
<th>r</th>
<th>Fisher t</th>
<th>n</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trait Measure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>.12011</td>
<td>2.67267*</td>
<td>490</td>
<td>488</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>.22342</td>
<td>5.04271*</td>
<td>486</td>
<td>484</td>
</tr>
<tr>
<td>Conceptual curiosity</td>
<td>.25632</td>
<td>5.82791*</td>
<td>485</td>
<td>483</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>.27437</td>
<td>6.20529*</td>
<td>475</td>
<td>473</td>
</tr>
<tr>
<td><strong>State Measure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>.15023</td>
<td>3.37394*</td>
<td>495</td>
<td>493</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>.24817</td>
<td>5.64769*</td>
<td>488</td>
<td>486</td>
</tr>
<tr>
<td>Conceptual curiosity</td>
<td>.29228</td>
<td>6.75841*</td>
<td>491</td>
<td>489</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>.29473</td>
<td>6.80646*</td>
<td>489</td>
<td>487</td>
</tr>
</tbody>
</table>

*p<.01.

Hypothesis 5: There are no correlations between teacher evaluations of student curiosity and student responses on the subtests of the trait-state curiosity measure.

H0: \( \rho = 0 \)

H1: \( \rho \neq 0 \)

Test statistic:

\[
    t = \frac{r \sqrt{n-2}}{\sqrt{1-r^2}}
\]

Rejection region (.01 level): Reject H0 if \( t < -2.576 \) or \( t > 2.576 \)

Since the obtained values of \( t \) shown in Table 4 were all greater than the critical value of 2.576 at the .01 level, Hypothesis 5 was rejected. It was concluded that the correlation coefficients between teacher evaluations of student curiosity and student responses on the subtests of the trait-state curiosity measure differed from zero.
The Correlations between GPA and Student Responses on the Trait-State Curiosity Measure and Its Subtests

Table 5
Correlation Coefficients between GPA and Student Responses on the Trait-State Curiosity Measure

<table>
<thead>
<tr>
<th>Measure</th>
<th>r</th>
<th>Fisher t</th>
<th>n</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trait</td>
<td>.28127</td>
<td>5.94212*</td>
<td>413</td>
<td>411</td>
</tr>
<tr>
<td>State</td>
<td>.24282</td>
<td>5.23863*</td>
<td>440</td>
<td>438</td>
</tr>
</tbody>
</table>

*p<.01.

Hypothesis 6: There are no correlations between GPA and student responses on the total trait-state curiosity measure.

H0: rho=0
H1: rho≠0

Test statistic: \( t = \frac{r}{\sqrt{\frac{1-r}{n-2}}} \)

Rejection region (.01 level): Reject H0 if \( t < -2.576 \) or \( t > 2.576 \)

Since the obtained values of \( t \) shown in Table 5 were greater than the critical value of 2.576 at the .01 level, Hypothesis 6 was rejected. It was concluded that the correlation coefficients between GPA and student responses on the trait-state curiosity measure differed from zero.
Table 6
Correlation Coefficients between GPA and Student Responses on the Subtests of the Trait-State Curiosity Measure

<table>
<thead>
<tr>
<th>Subtest</th>
<th>r</th>
<th>Fisher t</th>
<th>n</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trait Measure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>.09460</td>
<td>2.07975*</td>
<td>481</td>
<td>479</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>.32449</td>
<td>7.47666**</td>
<td>477</td>
<td>475</td>
</tr>
<tr>
<td>Conceptual Curiosity</td>
<td>.26399</td>
<td>5.95886**</td>
<td>476</td>
<td>474</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>.23589</td>
<td>5.22878**</td>
<td>466</td>
<td>464</td>
</tr>
<tr>
<td><strong>State Measure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>.08590</td>
<td>1.89681</td>
<td>486</td>
<td>484</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>.31067</td>
<td>7.13836**</td>
<td>479</td>
<td>477</td>
</tr>
<tr>
<td>Conceptual Curiosity</td>
<td>.29593</td>
<td>6.78752**</td>
<td>482</td>
<td>480</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>.21855</td>
<td>4.90170**</td>
<td>481</td>
<td>479</td>
</tr>
</tbody>
</table>

*p<.05.
**p<.01.

Hypothesis 7: There is no correlation between GPA and student responses on the manipulatory curiosity subtest of the trait curiosity measure.

H0: rho=0
H1: rho<0

Test statistic: \( t = \frac{r \sqrt{n-2}}{\sqrt{1-r^2}} \)

Rejection region (.05 level): Reject H0 if t<-1.960 or t>1.960

Since the obtained value of \( t = 2.07975 \) for the manipulatory curiosity subtest of the trait curiosity measure shown in Table 6 was greater than the critical value of 1.960 at the .05 level, Hypothesis 7 was rejected. It was concluded that the correlation coefficient between GPA and student responses on the manipulatory
curiosity subtest of the trait curiosity measure differed from 
zero.

Hypothesis 8: There is no correlation between GPA and student 
responses on the manipulatory curiosity subtest of the state 
curiosity measure.

HO: ρ=0  
HI: ρ≠0

Test statistic: \[ t = \frac{r}{\sqrt{\frac{1-r}{n-2}}} \]

Rejection region (.05 level): Reject HO if t<-1.960 or t>1.960

Since the obtained value of t=1.89681 for the manipulatory 
curiosity subtest of the state curiosity measure shown in Table 6 
was not less than -1.960 nor greater than 1.960 at the .05 level,
Hypothesis 8 was not rejected. It was concluded that the 
correlation coefficient between GPA and student responses on the 
manipulatory curiosity subtest of the state curiosity measure did 
not differ from zero.

Hypothesis 9: There are no correlations between GPA and 
student responses on the perceptual curiosity, conceptual 
curiosity, and curiosity about the complex or ambiguous subtests of 
the trait-state curiosity measure.

HO: ρ=0  
HI: ρ≠0

Test statistic: \[ t = \frac{r}{\sqrt{\frac{1-r}{n-2}}} \]

Rejection region (.01 level): Reject HO if t<-2.576 or t>2.576
Since the obtained values of $t$ for the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait-state curiosity measure shown in Table 6 were all greater than the critical value of 2.576 at the .01 level, Hypothesis 9 was rejected. It was concluded that the correlation coefficients between GPA and student responses on the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait-state curiosity measure differed from zero.

The Differences between Generally and Specifically Worded Items on the Trait-State Curiosity Measure and Its Subtests

Table 7
Reliability Coefficients of the Generally and Specifically Worded Items of the Trait-State Curiosity Measure

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>No. of Items</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Items</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trait</td>
<td>454</td>
<td>20</td>
<td>.8719</td>
</tr>
<tr>
<td>State</td>
<td>473</td>
<td>20</td>
<td>.8840</td>
</tr>
<tr>
<td>Specific Items</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trait</td>
<td>470</td>
<td>20</td>
<td>.8323</td>
</tr>
<tr>
<td>State</td>
<td>477</td>
<td>20</td>
<td>.8598</td>
</tr>
</tbody>
</table>

Hypothesis 10: There are no differences in the internal consistency indices of the generally worded and specifically worded items of the total trait-state curiosity measure.

The alpha coefficients for the generally and specifically worded items on the total trait-state curiosity measure are shown in
Table 7. Descriptively, the items that were generally worded on the trait-state curiosity measure had higher alpha coefficients than the items that were specifically worded on the trait-state curiosity measure. At the descriptive level, Hypothesis 10 was rejected.

Table 8
Correlation Coefficients between Teacher Evaluations and Student Responses on the Generally and Specifically Worded Items of the Trait-State Curiosity Measure

| Measure       | Trait Evaluation | Z-evaluation | State Evaluation | Z-evaluation | Prob>|r| under H0: rho=0 | n  |
|---------------|------------------|--------------|------------------|--------------|------------------|----|
| Trait General Items | .32446           | .31551       | .32176           | .29933       | .0001            | 454|
| Trait Specific Items | .17317           | .20272       | .23048           | .22710       | .0001            | 470|
| State General Items | .31551           | .30651       | .29933           | .29777       | .0001            | 473|
| State Specific Items | .20272           | .20272       | .22710           | .22710       | .0001            | 477|

Hypothesis 11: There are no differences in the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded and specifically worded items of the total trait-state curiosity measure.

As indicated in Table 8, descriptively, all correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded items of the trait-state
curiosity measure were greater than the corresponding correlation coefficients between teacher evaluations of student curiosity and student responses on the specifically worded items of the trait-state curiosity measure. All correlation coefficients between teacher evaluations of student curiosity and student responses on the generally and specifically worded items of the trait-state curiosity measure shown in Table 8 differed from zero. Hypothesis 11 was rejected.

| Subtest                  | r       | Prob>|r| | n       |
|--------------------------|---------|-------|---------|
| General Items            |         |       |         |
| Manipulatory curiosity   | .17803  | .0001 | 495     |
| Perceptual curiosity     | .26917  | .0001 | 495     |
| Conceptual curiosity     | .25932  | .0001 | 493     |
| Curiosity about the complex | .28008  | .0001 | 490     |
| Specific Items           |         |       |         |
| Manipulatory curiosity   | .02670  | .5503 | 503     |
| Perceptual curiosity     | .12862  | .0040 | 499     |
| Conceptual curiosity     | .18901  | .0001 | 499     |
| Curiosity about the complex | .20622  | .0001 | 493     |

Hypothesis 12: There are no differences in the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded and specifically worded items of the subtests of the trait curiosity measure.

As indicated in Table 9, descriptively, all correlation coefficients between teacher evaluations of student curiosity and
student responses on the generally worded items of the subtests of the trait curiosity measure were greater than the corresponding correlation coefficients between teacher evaluations of student curiosity and student responses on the specifically worded items of the subtests of the trait curiosity measure. The correlation coefficients between teacher evaluations of student curiosity and student responses on the generally and specifically worded items of the subtests of the trait curiosity measure as shown in Table 9 differed from zero, with one exception. The correlation coefficient between teacher evaluations of student curiosity and student responses on the specifically worded items of the manipulatory curiosity subtest of the trait curiosity measure did not differ from zero. Hypothesis 12 was rejected.

Table 10
Correlation Coefficients between Teacher Evaluations and Student Responses on the Generally and Specifically Worded Items of the Subtests of the State Curiosity Measure

| Subtest                        | r   | Prob>|r| | n       |
|-------------------------------|-----|------|--------|
|                               |     | under HO: rho=0 |
| **General Items**             |     |                  |
| Manipulatory curiosity        | .18708 | .0001      | 500    |
| Perceptual curiosity          | .25579 | .0001      | 497    |
| Conceptual curiosity          | .24902 | .0001      | 498    |
| Curiosity about the complex   | .33082 | .0001      | 498    |
| **Specific Items**            |     |                  |
| Manipulatory curiosity        | .07028 | .1158      | 502    |
| Perceptual curiosity          | .17994 | .0001      | 498    |
| Conceptual curiosity          | .29109 | .0001      | 500    |
| Curiosity about the complex   | .19991 | .0001      | 498    |
Hypothesis 13: There are no differences in the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded and specifically worded items of the subtests of the state curiosity measure.

As indicated in Table 10, descriptively, the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded items of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure were greater than the corresponding correlation coefficients between teacher evaluations of student curiosity and student responses on the specifically worded items of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure. The reverse was true for the conceptual curiosity subtest of the state curiosity measure, however. Descriptively, the correlation coefficient between teacher evaluations of student curiosity and student responses on the specifically worded items of the conceptual curiosity subtest of the state curiosity measure shown in Table 10 was greater than the correlation coefficient between teacher evaluations of student curiosity and student responses on the generally worded items of the conceptual curiosity subtest of the state curiosity measure. The correlation coefficients between teacher evaluations of student curiosity and student responses on the generally and specifically worded items of the subtests of the state curiosity measure as shown in Table 10 differed from zero, with one exception. The correlation coefficient between teacher evaluations of student curiosity and student responses on the specifically worded
items of the manipulatory curiosity subtest of the state curiosity measure did not differ from zero. Hypothesis 13 was rejected.

Table 11
Correlation Coefficients between GPA and Student Responses on the Generally and Specifically Worded Items of the Trait-State Curiosity Measure

| Measure  | r    | Prob>|r| under H0: rho=0 |
|----------|------|---------------------------------|
|          |      |                                 |
| General Items |      |                                 |
| Trait    | .33537 | .0001                           |
| State    | .28387 | .0001                           |
| Specific Items |      |                                 |
| Trait    | .18564 | .0001                           |
| State    | .21221 | .0001                           |

Hypothesis 14: There are no differences in the correlation coefficients between GPA and student responses on the generally worded and specifically worded items of the total trait-state curiosity measure.

As indicated in Table 11, descriptively, the correlation coefficients between GPA and student responses on the generally worded items of the trait-state curiosity measure were greater than the correlation coefficients between GPA and student responses on the specifically worded items of the trait-state curiosity measure. All correlation coefficients between GPA and student responses on the generally and specifically worded items of the trait-state curiosity measure as shown in Table 11 differed from zero. Hypothesis 14 was rejected.
Table 12
Correlation Coefficients between GPA and Student Responses on the Generally and Specifically Worded Items of the Subtests of the Trait Curiosity Measure

| Subtest                      | $r$     | Prob>|r| | n    |
|------------------------------|---------|-----|-----|
|                              | under HO: rho=0 |
| General Items                |         |     |     |
| Manipulatory curiosity       | .10606  | .0194| 486 |
| Perceptual curiosity         | .33003  | .0001| 486 |
| Conceptual curiosity         | .31183  | .0001| 484 |
| Curiosity about the complex  | .30983  | .0001| 481 |
| Specific Items               |         |     |     |
| Manipulatory curiosity       | .04533  | .3147| 494 |
| Perceptual curiosity         | .23721  | .0001| 490 |
| Conceptual curiosity         | .16164  | .0003| 490 |
| Curiosity about the complex  | .11251  | .0133| 484 |

Hypothesis 15: There are no differences in the correlation coefficients between GPA and student responses on the generally worded and specifically worded items of the subtests of the trait curiosity measure.

As indicated in Table 12, descriptively, all correlation coefficients between GPA and student responses on the generally worded items of the subtests of the trait curiosity measure were greater than the corresponding correlation coefficients between GPA and student responses on the specifically worded items of the subtests of the trait curiosity measure. The correlation coefficients between GPA and student responses on the generally and specifically worded items of the subtests of the trait curiosity measure as shown in Table 12 differed from zero, with one exception. The correlation coefficient between GPA and student responses on the specifically worded items...
of the manipulatory curiosity subtest of the trait curiosity measure did not differ from zero. Hypothesis 15 was rejected.

Table 13
Correlation Coefficients between GPA and Student Responses on the Generally and Specifically Worded Items of the Subtests of the State Curiosity Measure

| Subtest                              | r    | Prob>|r| under H0: rho=0 | n  |
|--------------------------------------|------|-------------------------------|----|
|                                      |      |                               |    |
| General Items                        |      |                               |    |
| Manipulatory curiosity               | .08084 | .0735                         | 491|
| Perceptual curiosity                 | .29394 | .0001                         | 488|
| Conceptual curiosity                 | .23790 | .0001                         | 489|
| Curiosity about the complex          | .31555 | .0001                         | 490|
| Specific Items                       |      |                               |    |
| Manipulatory curiosity               | .08011 | .0756                         | 493|
| Perceptual curiosity                 | .24574 | .0001                         | 489|
| Conceptual curiosity                 | .30379 | .0001                         | 491|
| Curiosity about the complex          | .08255 | .0682                         | 489|

Hypothesis 16: There are no differences in the correlation coefficients between GPA and student responses on the generally worded and specifically worded items of the subtests of the state curiosity measure.

As indicated in Table 13, descriptively, the correlation coefficients between GPA and student responses on the generally worded items of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure were greater than the corresponding correlation coefficients between GPA and student responses on the specifically worded items of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state.
curiosity measure. The reverse was true for the conceptual curiosity subtest of the state curiosity measure, however. Descriptively, the correlation coefficient between GPA and student responses on the specifically worded items of the conceptual curiosity subtest of the state curiosity measure shown in Table 13 was greater than the correlation coefficient between GPA and student responses on the generally worded items of the conceptual curiosity subtest of the state curiosity measure. As indicated in Table 13, the correlation coefficients between GPA and student responses on the generally worded items of the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure and the correlation coefficients between GPA and student responses on the specifically worded items of the perceptual curiosity and conceptual curiosity subtests of the state curiosity measure differed from zero. The correlation coefficients between GPA and student responses on both the generally and specifically worded items of the manipulatory curiosity subtest of the state curiosity measure and the correlation coefficient between GPA and student responses on the specifically worded items of the curiosity about the complex or ambiguous subtest of the state curiosity measure did not differ from zero. Hypothesis 16 was rejected.
The Differences between Sexes on the Trait-State Curiosity Measure and Its Subtests

Table 14
Reliability Coefficients of the Trait-State Curiosity Measure by Sex

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>No. of Items</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trait</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>205</td>
<td>40</td>
<td>.9207</td>
</tr>
<tr>
<td>Female</td>
<td>217</td>
<td>40</td>
<td>.9213</td>
</tr>
<tr>
<td>State</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>214</td>
<td>40</td>
<td>.9325</td>
</tr>
<tr>
<td>Female</td>
<td>234</td>
<td>40</td>
<td>.9330</td>
</tr>
</tbody>
</table>

Hypothesis 17: There are no differences between sexes in the internal consistency indices of the total trait-state curiosity measure.

As indicated in Table 14, descriptively, the obtained alpha coefficients of the total trait-state curiosity measure were about the same for the male and female junior high school students who participated in this study. Hypothesis 17 was not rejected.
Table 15
Reliability Coefficients of the Subtests of the Trait Curiosity Measure by Sex

<table>
<thead>
<tr>
<th>Subtest</th>
<th>n</th>
<th>No. of Items</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Males</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>240</td>
<td>10</td>
<td>.7601</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>235</td>
<td>10</td>
<td>.7422</td>
</tr>
<tr>
<td>Conceptual curiosity</td>
<td>240</td>
<td>10</td>
<td>.8049</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>233</td>
<td>10</td>
<td>.7682</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>250</td>
<td>10</td>
<td>.8240</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>251</td>
<td>10</td>
<td>.7578</td>
</tr>
<tr>
<td>Conceptual curiosity</td>
<td>245</td>
<td>10</td>
<td>.7702</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>242</td>
<td>10</td>
<td>.7716</td>
</tr>
</tbody>
</table>

Hypothesis 18: There are no differences between sexes in the internal consistency indices of the subtests of the trait curiosity measure.

As indicated in Table 15, descriptively, the obtained alpha coefficients of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait curiosity measure were slightly higher for the female junior high school students than for the male junior high school students who participated in this study. Descriptively, the obtained alpha coefficient of the conceptual curiosity subtest of the trait curiosity measure was slightly higher for the male junior high school students than for the female junior high school students who participated in this study, however. At the descriptive level, Hypothesis 18 was rejected.
Table 16
Reliability Coefficients of the Subtests of the State Curiosity Measure by Sex

<table>
<thead>
<tr>
<th>Subtest</th>
<th>n</th>
<th>No. of Items</th>
<th>Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Males</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>243</td>
<td>10</td>
<td>.8390</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>241</td>
<td>10</td>
<td>.7669</td>
</tr>
<tr>
<td>Conceptual curiosity</td>
<td>239</td>
<td>10</td>
<td>.8342</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>236</td>
<td>10</td>
<td>.7628</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manipulatory curiosity</td>
<td>252</td>
<td>10</td>
<td>.8625</td>
</tr>
<tr>
<td>Perceptual curiosity</td>
<td>247</td>
<td>10</td>
<td>.7581</td>
</tr>
<tr>
<td>Conceptual curiosity</td>
<td>252</td>
<td>10</td>
<td>.8179</td>
</tr>
<tr>
<td>Curiosity about the complex</td>
<td>253</td>
<td>10</td>
<td>.8025</td>
</tr>
</tbody>
</table>

Hypothesis 19: There are no differences between sexes in the internal consistency indices of the subtests of the state curiosity measure.

As indicated in Table 16, descriptively, the obtained alpha coefficients of the perceptual curiosity and conceptual curiosity subtests of the state curiosity measure were slightly higher for the male junior high school students than for the female junior high school students who participated in this study. The reverse was true for the obtained alpha coefficients of the manipulatory curiosity and curiosity about the complex or ambiguous subtests of the state curiosity measure, however. Descriptively, the alpha coefficients of the manipulatory curiosity and curiosity about the complex or ambiguous subtests of the state curiosity measure as shown in Table 16 were slightly higher for the female junior high school students than
for the male junior high school students who participated in this study. At the descriptive level, Hypothesis 19 was rejected.

The Correlations between the Sex of Students and Student Responses on the Trait-State Curiosity Measure and Its Subtests

Table 17
Correlation Coefficients between the Sex of Students and Student Responses on the Trait-State Curiosity Measure

| Measure | r     | Prob>|r| | n  |
|---------|-------|-------|-----|
| Trait   | -.07049 | .1483 | 422 |
| State   | -.01608 | .7342 | 448 |

Note: Males were coded with ones and females were coded with twos.

Hypothesis 20: There are no correlations between the sex of students and student responses on the total trait-state curiosity measure.

As indicated in Table 17, the correlation coefficients between the sex of students and student responses on the total trait-state curiosity measure did not differ from zero. Hypothesis 20 was not rejected.
Table 18
Correlation Coefficients between the Sex of Students and Student Responses on the Subtests of the Trait-State Curiosity Measure

| Subtest                          | r       | Prob>|r| under H0: rho=0 | n  |
|----------------------------------|---------|---------------------------------|----|
|                                  |         |                                  |    |
| **Trait Measure**                |         |                                  |    |
| Manipulatory curiosity           | -.05654 | .2115                            | 490|
| Perceptual curiosity             | .16631  | .0002                            | 486|
| Conceptual curiosity             | -.11313 | .0127                            | 485|
| Curiosity about the complex      | -.23896 | .0001                            | 475|
| **State Measure**                |         |                                  |    |
| Manipulatory curiosity           | -.05489 | .2229                            | 495|
| Perceptual curiosity             | .21457  | .0001                            | 488|
| Conceptual curiosity             | -.00231 | .9594                            | 491|
| Curiosity about the complex      | -.24156 | .0001                            | 489|

Note: Males were coded with ones and females were coded with twos.

Hypothesis 21: There is no correlation between the sex of students and student responses on the manipulatory curiosity subtest of the trait curiosity measure.

As indicated in Table 18, the correlation coefficient between the sex of students and student responses on the manipulatory curiosity subtest of the trait curiosity measure did not differ from zero. Hypothesis 21 was not rejected.

Hypothesis 22: There are no correlations between the sex of students and student responses on the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait curiosity measure.

As indicated in Table 18, the correlation coefficients between the sex of students and student responses on the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait curiosity measure differed from zero. Hypothesis 22 was rejected.
Hypothesis 23: There are no correlations between the sex of students and student responses on the manipulatory curiosity and conceptual curiosity subtests of the state curiosity measure.

As indicated in Table 18, the correlation coefficients between the sex of students and student responses on the manipulatory curiosity and conceptual curiosity subtests of the state curiosity measure did not differ from zero. Hypothesis 23 was not rejected.

Hypothesis 24: There are no correlations between the sex of students and student responses on the perceptual curiosity and curiosity about the complex or ambiguous subtests of the state curiosity measure.

As indicated in Table 18, the correlation coefficients between the sex of students and student responses on the perceptual curiosity and curiosity about the complex or ambiguous subtests of the state curiosity measure differed from zero. Hypothesis 24 was rejected.
CHAPTER V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Numerous methods and techniques have been developed to measure the curiosity of fourth to sixth grade students, high school students, nursing students, college undergraduates, and adults (Vidler & Karan, 1975). Most of these methods and techniques that have been used to measure curiosity have frequently had little in common with each other or, at best, have shown only modest intercorrelations, reflecting the multidimensionality of curiosity (Vidler, 1977). Most published curiosity measures have been trait measures only (Maw & Maw, 1977).

The problem of this study was to investigate and develop a reliable and valid instrumentation for measuring both the trait and state curiosity of junior high school students (seventh and eighth graders). In an effort to evaluate as many curiosity types as possible, the Trait-State Curiosity Inventory for Junior High School Students was developed to measure four types of curiosity—manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous.
The specific research questions to be answered in this study were as follows:

1. Reliability: Are there acceptable internal consistency indices which estimate the reliability of the trait-state curiosity measure and its subtests?

2. Content validity: Do local experts in the field of measurement agree that the items on the trait-state curiosity measure are representative of curiosity?

3. Concurrent validity: Are there correlations between teacher evaluations of student curiosity and student responses on the trait-state curiosity measure and its subtests?

4. Are there correlations between GPA and student responses on the trait-state curiosity measure and its subtests?

5. Are there differences between generally and specifically worded items on the trait-state curiosity measure and its subtests?

6. Are there differences between sexes on the trait-state curiosity measure and its subtests?

7. Are there correlations between the sex of students and student responses on the trait-state curiosity measure and its subtests?
Hypotheses

In order to answer Question 1 posed in this study, the following two null hypotheses were tested:

Hypothesis 1: There are no acceptable internal consistency indices which estimate the reliability of the total trait-state curiosity measure.

Hypothesis 2: There are no acceptable internal consistency indices which estimate the reliability of the subtests of the trait-state curiosity measure.

Question 2 posed in this study required the testing of the following null hypothesis:

Hypothesis 3: There is no consensus among the local experts in the field of measurement that the items on the trait-state curiosity measure and its subtests are representative of manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous.

Question 3 posed in this study required the testing of the following two null hypotheses:

Hypothesis 4: There are no correlations between teacher evaluations of student curiosity and student responses on the total trait-state curiosity measure.

Hypothesis 5: There are no correlations between teacher evaluations of student curiosity and student responses on the subtests of the trait-state curiosity measure.
Question 4 posed in this study required the testing of the following four null hypotheses:

Hypothesis 6: There are no correlations between GPA and student responses on the total trait-state curiosity measure.

Hypothesis 7: There is no correlation between GPA and student responses on the manipulatory curiosity subtest of the trait curiosity measure.

Hypothesis 8: There is no correlation between GPA and student responses on the manipulatory curiosity subtest of the state curiosity measure.

Hypothesis 9: There are no correlations between GPA and student responses on the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait-state curiosity measure.

Question 5 posed in this study required the testing of the following seven null hypotheses:

Hypothesis 10: There are no differences in the internal consistency indices of the generally worded and specifically worded items of the total trait-state curiosity measure.

Hypothesis 11: There are no differences in the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded and specifically worded items of the total trait-state curiosity measure.
Hypothesis 12: There are no differences in the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded and specifically worded items of the subtests of the trait curiosity measure.

Hypothesis 13: There are no differences in the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded and specifically worded items of the subtests of the state curiosity measure.

Hypothesis 14: There are no differences in the correlation coefficients between GPA and student responses on the generally worded and specifically worded items of the total trait-state curiosity measure.

Hypothesis 15: There are no differences in the correlation coefficients between GPA and student responses on the generally worded and specifically worded items of the subtests of the trait curiosity measure.

Hypothesis 16: There are no differences in the correlation coefficients between GPA and student responses on the generally worded and specifically worded items of the subtests of the state curiosity measure.

Question 6 posed in this study required the testing of the following three null hypotheses:

Hypothesis 17: There are no differences between sexes in the internal consistency indices of the total trait-state curiosity measure.
Hypothesis 18: There are no differences between sexes in the internal consistency indices of the subtests of the trait curiosity measure.

Hypothesis 19: There are no differences between sexes in the internal consistency indices of the subtests of the state curiosity measure.

Lastly, Question 7 posed in this study required the testing of the following five null hypotheses:

Hypothesis 20: There are no correlations between the sex of students and student responses on the total trait-state curiosity measure.

Hypothesis 21: There is no correlation between the sex of students and student responses on the manipulatory curiosity subtest of the trait curiosity measure.

Hypothesis 22: There are no correlations between the sex of students and student responses on the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait curiosity measure.

Hypothesis 23: There are no correlations between the sex of students and student responses on the manipulatory curiosity and conceptual curiosity subtests of the state curiosity measure.

Hypothesis 24: There are no correlations between the sex of students and student responses on the perceptual curiosity and curiosity about the complex or ambiguous subtests of the state curiosity measure.
To test the hypotheses, the sample for this study consisted of 509 seventh and eighth grade students who were enrolled at Neveln Junior High School, Ankeny, Iowa, in May of 1985. Of the 509 students in the sample, 247 were seventh grade students; and 262 were eighth grade students. The Trait-State Curiosity Inventory for Junior High School Students was administered once to each student during the third class period on one of three possible testing days. There were 12 seventh grade classes and 12 eighth grade classes involved in this study. The seventh grade classes included: art, English, history, home economics, industrial arts, math, reading, science, and Spanish. The eighth grade classes included: English, French, math, physical education, science, and social studies. All classes were intact, and no treatments nor control groups were used in this study.

After collection of the data, the tenability of each of the null hypotheses of this study was tested by the following statistical techniques:

1. Hypotheses 1, 2, 10, 17, 18, and 19 were tested by the utilization of Cronbach alpha reliability coefficients. SPSS-X was used to compute the Cronbach alpha reliability coefficients.

2. Hypothesis 3 was tested by the utilization of a panel of four professors from Iowa State University, Ames, Iowa, who have expertise in the field of measurement. The panel of four professors evaluated the items on the curiosity inventory and its subtests to determine whether or not they were representative of manipulatory curiosity,
perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous.

3. Pearson product moment correlation coefficients were computed with SAS to determine all sample correlations.

4. For all tests of Hypotheses 4, 5, 6, 7, 8, 9, 20, 21, 22, 23, and 24, that the population correlation coefficient, \( \rho \), was equal to zero, the statistic, \( t = \frac{r}{\sqrt{(1-r)/{(n-2)}}} \), which has a t-distribution for \( (n-2) \) degrees of freedom, was used. Type I errors were controlled by testing at the .01 and .05 levels of significance.

Conclusions

Research question 1

Reliability: Are there acceptable internal consistency indices which estimate the reliability of the trait-state curiosity measure and its subtests?

1. Based upon the data provided in Table 1 of Chapter IV, it was concluded that there are acceptable internal consistency indices which estimate the reliability of the total trait-state curiosity measure.

2. Based upon the data provided in Table 2 of Chapter IV, it was concluded that there are acceptable internal consistency indices which estimate the reliability of the subtests of the trait-state curiosity measure.
Research question 2

Content validity: Do local experts in the field of measurement agree that the items on the trait-state curiosity measure and its subtests are representative of curiosity?

3. By consensus of a panel of four professors, Wilbur Layton, Professor of Psychology and Chair of the Psychology Department at Iowa State University, Ames, Iowa, William Miller, Professor of Industrial Education and Technology and Professor of Professional Studies in Education at Iowa State University, Donald Schuster, Professor of Psychology at Iowa State University, and Robert Strahan, Professor of Psychology and Professor of Statistics at Iowa State University, it was concluded that the items on the trait-state curiosity measure and its subtests are representative of manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous.

Research question 3

Concurrent validity: Are there correlations between teacher evaluations of student curiosity and student responses on the trait-state curiosity measure and its subtests?

4. As evidenced by the data presented in Table 3 of Chapter IV, it was concluded that there are positive correlations between teacher evaluations of student curiosity and student responses on the total trait-state curiosity measure.
5. As evidenced by the data presented in Table 4 of Chapter IV, it was concluded that there are positive correlations between teacher evaluations of student curiosity and student responses on the manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait-state curiosity measure.

Research question 4

Are there correlations between GPA and student responses on the trait-state curiosity measure and its subtests?

6. As evidenced by the data presented in Table 5 of Chapter IV, it was concluded that there are positive correlations between GPA and student responses on the total trait-state curiosity measure.

7. As evidenced by the data presented in Table 6 of Chapter IV, it was concluded that there are positive correlations between GPA and student responses on the manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait curiosity measure.

8. As evidenced by the data presented in Table 6 of Chapter IV, it was concluded that there is no correlation between GPA and student responses on the manipulatory curiosity subtest of the state curiosity measure.

9. As evidenced by the data presented in Table 6 of Chapter IV, it was concluded that there are positive correlations between GPA and student responses on the perceptual curiosity, conceptual curiosity,
and curiosity about the complex or ambiguous subtests of the state curiosity measure.

Research question 5

Are there differences between generally and specifically worded items on the trait-state curiosity measure and its subtests?

10. Based upon the data provided in Table 7 of Chapter IV, it was concluded that, descriptively, the generally worded items on the trait-state curiosity measure have higher internal consistency indices than the specifically worded items on the total trait-state curiosity measure.

11. As evidenced by the data presented in Table 8 of Chapter IV, it was concluded that, descriptively, all correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded items of the trait-state curiosity measure are greater than the corresponding correlation coefficients between teacher evaluations of student curiosity and student responses on the specifically worded items of the total trait-state curiosity measure.

12. As evidenced by the data presented in Table 9 of Chapter IV, it was concluded that, descriptively, all correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded items of the subtests of the trait curiosity measure are greater than the corresponding correlation coefficients between teacher evaluations of student curiosity and student responses on the specifically worded items of the subtests of the trait curiosity measure.
13. As evidenced by the data presented in Table 10 of Chapter IV, it was concluded that, descriptively, the correlation coefficients between teacher evaluations of student curiosity and student responses on the generally worded items of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure are greater than the corresponding correlation coefficients between teacher evaluations of student curiosity and student responses on the specifically worded items of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure.

14. As evidenced by the data presented in Table 10 of Chapter IV, it was concluded that, descriptively, the correlation coefficient between teacher evaluations of student curiosity and student responses on the specifically worded items of the conceptual curiosity subtest of the state curiosity measure is greater than the correlation coefficient between teacher evaluations of student curiosity and student responses on the generally worded items of the conceptual curiosity subtest of the state curiosity measure.

15. As evidenced by the data presented in Table 11 of Chapter IV, it was concluded that, descriptively, the correlation coefficients between GPA and student responses on the generally worded items of the trait-state curiosity measure are greater than the correlation coefficients between GPA and student responses on
the specifically worded items of the total trait-state curiosity measure.

16. As evidenced by the data presented in Table 12 of Chapter IV, it was concluded that, descriptively, all correlation coefficients between GPA and student responses on the generally worded items of the subtests of the trait curiosity measure are greater than the corresponding correlation coefficients between GPA and student responses on the specifically worded items of the subtests of the trait curiosity measure.

17. As evidenced by the data presented in Table 13 of Chapter IV, it was concluded that, descriptively, the correlation coefficients between GPA and student responses on the generally worded items of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure are greater than the corresponding correlation coefficients between GPA and student responses on the specifically worded items of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure.

18. As evidenced by the data presented in Table 13 of Chapter IV, it was concluded that, descriptively, the correlation coefficient between GPA and student responses on the specifically worded items of the conceptual curiosity subtest of the state curiosity measure is greater than the correlation coefficient
between GPA and student responses on the generally worded items of the conceptual curiosity subtest of the state curiosity measure.

Research question 6

Are there differences between sexes on the trait-state curiosity measure and its subtests?

19. Based upon the data provided in Table 14 of Chapter IV, it was concluded that, descriptively, there are no differences between sexes in the internal consistency indices of the total trait-state curiosity measure.

20. Based upon the data provided in Table 15 of Chapter IV, it was concluded that, descriptively, the internal consistency indices of the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the trait curiosity measure are slightly higher for the female students than for the male students who participated in this study.

21. Based upon the data provided in Table 15 of Chapter IV, it was concluded that, descriptively, the internal consistency index of the conceptual curiosity subtest of the trait curiosity measure is slightly higher for the male students than for the female students who participated in this study.

22. Based upon the data provided in Table 16 of Chapter IV, it was concluded that, descriptively, the internal consistency indices of the manipulatory curiosity and curiosity about the complex or ambiguous subtests of the state curiosity measure are
slightly higher for the female students than for the male students who participated in this study.

23. Based upon the data provided in Table 16 of Chapter IV, it was concluded that, descriptively, the internal consistency indices of the perceptual curiosity and conceptual curiosity subtests of the state curiosity measure are slightly higher for the male students than for the female students who participated in this study.

Research question 7

Are there correlations between the sex of students and student responses on the trait-state curiosity measure and its subtests?

24. As evidenced by the data presented in Table 17 of Chapter IV, it was concluded that there are no correlations between the sex of the students who participated in this study and their responses on the total trait-state curiosity measure.

25. As evidenced by the data presented in Table 18 of Chapter IV, it was concluded that there is no correlation between the sex of the students who participated in this study and their responses on the manipulatory curiosity subtest of the trait curiosity measure.

26. As evidenced by the data presented in Table 18 of Chapter IV, it was concluded that there is a positive correlation between the sex of the students who participated in this study and their responses on the perceptual curiosity subtest of the trait curiosity measure.
27. As evidenced by the data presented in Table 18 of Chapter IV, it was concluded that there are negative correlations between the sex of the students who participated in this study and their responses on the conceptual curiosity and curiosity about the complex or ambiguous subtests of the trait curiosity measure.

28. As evidenced by the data presented in Table 18 of Chapter IV, it was concluded that there are no correlations between the sex of the students who participated in this study and their responses on the manipulatory curiosity and conceptual curiosity subtests of the state curiosity measure.

29. As evidenced by the data presented in Table 18 of Chapter IV, it was concluded that there is a positive correlation between the sex of the students who participated in this study and their responses on the perceptual curiosity subtest of the state curiosity measure.

30. As evidenced by the data presented in Table 18 of Chapter IV, it was concluded that there is a negative correlation between the sex of the students who participated in this study and their responses on the curiosity about the complex or ambiguous subtest of the state curiosity measure.

As a general conclusion of this study, it may be stated that the Trait-State Curiosity Inventory for Junior High School Students displayed high internal consistency and displayed significant correlations between teacher judgments and student curiosity for the total measure and its subtests. Specifically, on the basis of the


30 conclusions of this study, it should be noted that two of the 30 conclusions of this study showed that there are acceptable internal consistency indices which estimate the reliability of the trait-state curiosity measure and its subtests. One of the 30 conclusions of this study showed that the items on the trait-state curiosity measure and its subtests are representative of manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous.

Seven of the 30 conclusions of this study showed positive correlations between the following:

1. teacher evaluations of student curiosity and student responses on the trait-state curiosity measure and its subtests;
2. GPA and student responses on the total trait-state curiosity measure;
3. GPA and student responses on the subtests of the trait curiosity measure;
4. GPA and student responses on the perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure; and
5. the sex of the students who participated in this study and their responses on the perceptual curiosity subtests of the trait-state curiosity measure.

Four of the 30 conclusions of this study showed no correlations between the following:
1. GPA and student responses on the manipulatory curiosity subtest of the state curiosity measure;
2. the sex of the students who participated in this study and their responses on the total trait-state curiosity measure;
3. the sex of the students who participated in this study and their responses on the manipulatory curiosity subtest of the trait curiosity measure; and
4. the sex of the students who participated in this study and their responses on the manipulatory curiosity and conceptual curiosity subtests of the state curiosity measure.

Two of the 30 conclusions of this study showed negative correlations between the following:
1. the sex of the students who participated in this study and their responses on the conceptual curiosity and curiosity about the complex or ambiguous subtests of the trait curiosity measure, and
2. the sex of the students who participated in this study and their responses on the curiosity about the complex or ambiguous subtest of the state curiosity measure.

One of the 30 conclusions of this study showed that, descriptively, the internal consistency indices of the total trait-state curiosity measure did not differ between the sexes of the students who participated in this study.

Four of the 30 conclusions of this study showed that, descriptively, the internal consistency indices of the subtests of the
trait-state curiosity measure differed between the sexes of the students who participated in this study.

One of the 30 conclusions of this study showed that, descriptively, the generally worded items have higher internal consistency indices than the specifically worded items on the total trait-state curiosity measure.

Six of the 30 conclusions of this study showed that, descriptively, the generally worded items have greater correlation coefficients than the specifically worded items between the following:

1. teacher evaluations of student curiosity and student responses on the total trait-state curiosity measure;

2. teacher evaluations of student curiosity and student responses on the subtests of the trait curiosity measure;

3. teacher evaluations of student curiosity and student responses on the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure;

4. GPA and student responses on the total trait-state curiosity measure;

5. GPA and student responses on the subtests of the trait curiosity measure; and

6. GPA and student responses on the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure.
Finally, two of the 30 conclusions of this study showed that, descriptively, the specifically worded items have greater correlation coefficients than the generally worded items between the following:

1. teacher evaluations of student curiosity and student responses on the conceptual curiosity subtest of the state curiosity measure, and

2. GPA and student responses on the conceptual curiosity subtest of the state curiosity measure.

Recommendations

The reliability and validity data collected in this study are encouraging in that the Trait-State Curiosity Inventory for Junior High School Students was found to have high internal consistency and supportive content and concurrent validity. Nevertheless, there is need for validation of the theoretical distinction between curiosity as a trait and curiosity as a state. The measurement consequences of the theoretical distinction between curiosity as a trait and curiosity as a state are clearly in need of extensive supporting research.

Past attempts to differentiate between curiosity types have been based upon classifications which have been supported by, more or less, theoretical arguments. However, most of these classifications have remained untested (Kreitler, Kreitler, & Zigler, 1975). A factor analysis of the intercorrelations between the subtests of the Trait-State Curiosity Inventory for Junior High School Students is needed to (1) determine whether the intercorrelations between the subtests reflect four different dimensions or types of curiosity and (2)
determine the nature of the different dimensions or types of curiosity.

Analysis of the generally worded and specifically worded items on the Trait-State Curiosity Inventory for Junior High School Students led to some interesting conclusions in this study. Examination of the conclusions of this study shows that, descriptively, the generally worded items of the trait-state curiosity measure have higher internal consistency indices than the specifically worded items of trait-state curiosity measure. Also, descriptively, the generally worded items have greater correlation coefficients than the specifically worded items between the following:

1. teacher evaluations of student curiosity and student responses on the total trait-state curiosity measure;

2. teacher evaluations of student curiosity and student responses on the subtests of the trait curiosity measure;

3. teacher evaluations of student curiosity and student responses on the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure;

4. GPA and student responses on the total trait-state curiosity measure;

5. GPA and student responses on the subtests of the trait curiosity measure; and
6. GPA and student responses on the manipulatory curiosity, perceptual curiosity, and curiosity about the complex or ambiguous subtests of the state curiosity measure.

A comprehensive item analysis of the Trait-State Curiosity Inventory for Junior High School Students is needed to identify the items which best discriminate between the four types of curiosity—manipulatory curiosity, perceptual curiosity, conceptual curiosity, and curiosity about the complex or ambiguous. Analyses of variance need to be computed to determine the significance of such variables as sex and wording of the items on the trait-state curiosity measure and its subtests.

Replications of this study are, also, needed to firmly establish the stability of Trait-State Curiosity Inventory for Junior High School Students; and further validity studies need to be performed with the Trait-State Curiosity Inventory for Junior High School Students in order to gain knowledge about its discriminating power and to better determine its usefulness.
REFERENCES


Acknowledgments

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Lastly, the author wishes to thank God, her righteous Father, and her Lord and Saviour Jesus Christ, in Whom are hid all the treasures of wisdom and knowledge (Colossians 2:2-3).
APPENDIX A
THE TRAIT-STATE CURIOUSITY INVENTORY
FOR JUNIOR HIGH SCHOOL STUDENTS
### Trait Curiosity Inventory

**Name:**

**Male**

**Female**

**Grade:**

**Date:**

**DIRECTIONS:** Read each statement below. Then, circle the number to the right of each statement to indicate how you generally feel.

*Your answers will not affect your grades in any way.*

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>1. I would rather handle things than just look at them.</td>
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<td>2. I ignore objects around me.</td>
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<td>3. I question a lot of things.</td>
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<td>4. I wonder what makes electricity work.</td>
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<td>5. I avoid picking up objects to inspect them.</td>
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<td>6. New events capture my attention.</td>
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<td>7. I want to find out things.</td>
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<td>8. I don't care how television works—I prefer just to watch it.</td>
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<td>9. I enjoy handling new objects to explore them.</td>
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<td>10. I like to observe things that are going on in my environment.</td>
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<td>11. I like to seek out things to find out their meanings.</td>
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<td>12. Computers interest me because they seem so complex.</td>
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<td>13. When I see knobs or dials on things, I want to turn them.</td>
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<td>14. When I hear strange sounds, I like to find out what is making them.</td>
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<td>15. I like to create puzzles and games in my own mind.</td>
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<td>16. The complex is more exciting than the simple.</td>
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<tr>
<td>17. I like to touch paintings and works of art.</td>
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<td>18. Bright colors capture my attention.</td>
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<td>19. I dislike looking up words in the dictionary.</td>
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<td>20. I like to study things that are easy.</td>
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<tr>
<td>21. I enjoy playing with silly putty, clay, and other things that can be shaped with my hands.</td>
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<td>22. I like to discover patterns in designs.</td>
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<td>23. I like to think about problems and try to solve them in my head.</td>
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<td>24. I like to study objects that are puzzling and unusual.</td>
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<td>25. I like to take objects apart to find out more about them.</td>
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<td>26. School is boring.</td>
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<td>27. I like to ask about things that I do not fully understand.</td>
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<td>28. It's fun to look at unusual art.</td>
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<td>29. If I see a new machine in the room, I am likely to touch it.</td>
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<td>30. When I hear sudden claps of thunder, I like to look at the sky.</td>
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<td>31. I would rather solve a problem myself than be told how to do it by someone else.</td>
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<td>32. I avoid complex situations.</td>
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<td>33. I learn about new objects by touching them.</td>
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<tr>
<td>34. I like to notice everything that goes on around me.</td>
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<td>35. I like to explore things to find out information about them.</td>
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<tr>
<td>36. When I see a complex machine, I want to know how it works.</td>
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<td>37. It's interesting to handle seashells of different shapes and sizes.</td>
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<td>38. I like to sit quietly and listen to the birds sing and the cars pass by.</td>
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<td>39. I wish I knew everything in books.</td>
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<td>40. I look at complex objects longer than I do simple objects.</td>
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</tbody>
</table>

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THE STATE CURIOSITY INVENTORY

NAME ___________________________  Male ______  7th Grade ______
Date _____________________________  Female ______  8th Grade ______

DIRECTIONS: Read each statement below. Then, circle the number to the right of each statement to indicate how you feel about each of the given situations right now, at this moment.

Your answers will not affect your grades in any way.

1. I want to know everything in books. ________________________________ 1 2 3 4 5
2. It's fun to look at unusual art. ________________________________ 1 2 3 4 5
3. Bright colors capture my attention. ________________________________ 1 2 3 4 5
4. I am interested in computers because they seem so complex. ________________________________ 1 2 3 4 5
5. I want to study things that are easy. ________________________________ 1 2 3 4 5
6. I question a lot of things. ________________________________ 1 2 3 4 5
7. It's interesting to turn knobs and dials on things. ________________________________ 1 2 3 4 5
8. It's fun to create puzzles and games in my own mind. ________________________________ 1 2 3 4 5
9. I want to find out things. ________________________________ 1 2 3 4 5
10. I want to study about objects that are unusual and puzzling. ________________________________ 1 2 3 4 5
11. I want to avoid complex situations. ________________________________ 1 2 3 4 5
12. I want to ask about things that I do not fully understand. ________________________________ 1 2 3 4 5
13. I want to learn about new objects by touching them. ________________________________ 1 2 3 4 5
14. I don't care how television works—I want to just watch it. ________________________________ 1 2 3 4 5
15. My attention has been captured. ________________________________ 1 2 3 4 5
16. I am more interested in complex things than in simple things. ________________________________ 1 2 3 4 5
17. It's more interesting to handle things than to just look at them. ________________________________ 1 2 3 4 5
18. I want to explore things to find out more information. ________________________________ 1 2 3 4 5
19. I want to know how complex machines work. ________________________________ 1 2 3 4 5
20. I want to ignore objects around me. ________________________________ 1 2 3 4 5
21. I want to seek things out to find out their meanings. ________________________________ 1 2 3 4 5
22. It's interesting to take objects apart to find out more about them. ________________________________ 1 2 3 4 5
23. It's interesting to handle different rocks and seashells. ________________________________ 1 2 3 4 5
24. I want to look at complex objects longer than simple objects. ________________________________ 1 2 3 4 5
25. It's interesting to know what makes a light work. ________________________________ 1 2 3 4 5
26. It's fun to paint pictures and works of art. ________________________________ 1 2 3 4 5
27. It's interesting to look up new words in the dictionary. ________________________________ 1 2 3 4 5
28. It's fun to play with clay and other things that I can shape with my hands. ________________________________ 1 2 3 4 5
29. It's interesting to discover patterns in designs. ________________________________ 1 2 3 4 5
30. I feel curious about this Curiosity Inventory. ________________________________ 1 2 3 4 5
31. It's interesting to think about problems and try to solve them in my head. ________________________________ 1 2 3 4 5
32. It's interesting to handle new objects to explore them. ________________________________ 1 2 3 4 5
33. It's interesting to observe things that are going on in my environment. ________________________________ 1 2 3 4 5
34. I feel bulletin boards are interesting. ________________________________ 1 2 3 4 5
35. It's interesting to look at the sky when it thunders. ________________________________ 1 2 3 4 5
36. It's interesting to notice what goes on around me. ________________________________ 1 2 3 4 5
37. Strange noises capture my attention. ________________________________ 1 2 3 4 5
38. It's interesting to pick up objects to inspect them. ________________________________ 1 2 3 4 5
39. I am likely to touch a new machine in the room. ________________________________ 1 2 3 4 5
40. I feel school is boring. ________________________________ 1 2 3 4 5

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APPENDIX B
THE TEACHER RATING EVALUATION FORM
Clow and Clow (1962) have indicated that a child is said to exhibit curiosity to the degree that he:

1. reacts positively to new, incongruous, or mysterious elements in the environment by moving toward them, by exploring them, or by manipulating them,
2. exhibits a need or a desire to know more about himself and/or his environment,
3. scans his surroundings seeking new experiences, and
4. persists in examining and exploring stimuli to know more about them.

**DIRECTIONS:**

Please list your students in alphabetical order. Then, based upon the above definition of curiosity, circle the number to the right of each student's name which best represents how curious each student is within the classroom. Thank you!

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APPENDIX C
THE USE OF HUMAN SUBJECTS IN RESEARCH APPROVAL FORM
INFORMATION ON THE USE OF HUMAN SUBJECTS IN RESEARCH

IOWA STATE UNIVERSITY

(Please follow the accompanying instructions for completing this form.)

1. Title of project (please type):
   Measurement of Curiosity in Junior High School Students (Seventh and eighth graders)

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are properly protected. Additions or changes in procedures affecting the subjects after the project has been approved will be submitted to the committee for review.
   Elmer Olson
   4/13/85
   Typed Name of Principal Investigator & Math Department
   400 Carver Hall
   204-1792
   Campus Address
   Campus Telephone

3. Signatures of others (if any), Date Relationship to Principal Investigator

   [Signature]
   [Date]

4. ATTACH an additional page(s) (A) describing your proposed research and (B) the subjects to be used, (C) indicating any risks or discomforts to the subjects, and (D) covering any topics checked below. CHECK all boxes applicable.
   □ Medical clearance necessary before subjects can participate
   □ Samples (blood, tissue, etc.) from subjects
   □ Administration of substances (foods, drugs, etc.) to subjects
   □ Physical exercise or conditioning for subjects
   □ Deception of subjects
   □ Subjects 13 years or younger
   □ Subjects 14-17 years of age
   □ Subjects in institutions
   □ Research must be approved by another institution or agency

5. ATTACH an example of the material to be used to obtain informed consent and CHECK which type will be used.
   □ Signed informed consent will be obtained.
   □ Modified informed consent will be obtained.

6. Anticipated date on which subjects will be first contacted:
   Month Day Year
   Anticipated date for last contact with subjects:
   Month Day Year
   If Applicable: Anticipated date on which audio or visual tapes will be erased and/or identifiers will be removed from completed survey instruments:
   Month Day Year

7. Signature of Head or Chairperson of Department or Administrative Unit
   [Signature]
   [Date]

8. Name of Committee Chairperson
   [Name]
   [Date]
   [Signature]

9. Decision of the University Committee on the Use of Human Subjects in Research:
   [Project Approved] [Project not approved] [No action required]
   Name of Committee Chairperson
   [Name]
   [Date]
   [Signature]
Dear Superintendent Hopkins:

As per our telephone conversation this morning, I have enclosed a copy of my first chapter of my dissertation which indicates, among other things, my research questions and procedure for my study. When I piloted my trait-state curiosity inventory, after giving verbal directions, it took students from 5 to 15 minutes to complete both sides of the curiosity inventory. So, overall, it took from 20 to 30 minutes to give verbal directions, distribute the curiosity inventory, have students complete both sides of the inventory, and, finally, collect the completed forms.

I developed the teacher-rating form, which is needed to establish the concurrent validity of my measure, in such a manner so as to facilitate quick completion by teachers. (Copies of my trait-state curiosity inventory and teacher-rating form are enclosed.)

I appreciate your consideration, and I truly believe that my research will add considerably to the advancement in the measurement of curiosity at the junior high school level.

Thank you.

Sincerely,

[Signature]

Miss Eloise Olson

Enc.
APPENDIX E
CORRESPONDENCE - ANKENY COMMUNITY SCHOOLS
May 6, 1985

Dr. Karas
Graduate Office
201 Beardshear Hall
Iowa State University
Ames, Iowa 50011

Dear Dr. Karas:

Ankeny's Neveln Junior High School will administer the Student Curiosity Inventory and Teacher Evaluation Form for Eloise Olson in her pursuit towards an advanced degree.

Sincerely,

Keith D. Hopkins
Superintendent of Schools
Superintendent Keith Dean Hopkins
Ankeny Community School District
420 SW School Street
Ankeny, Iowa 50021

Dear Superintendent Hopkins:

Thank you very, very much for assisting me with my research. I sincerely appreciate what you have done for me.

Please extend my personal thank you to your secretary, Bonnie, for her kindness and assistance, as well. Once again, my sincerest thank you.

Miss Eloise Olson
APPENDIX G
CORRESPONDENCE - NEVEIN JUNIOR HIGH SCHOOL
Principal Bill Wilson  
Novelin Junior High School  
306 SW School Street  
Ankeny, Iowa  50021  

Dear Principal Wilson:

A heartfelt thank you for all the effort and time that you gave to help me with my research. I sincerely appreciated your kindness; and I, also, appreciated the kindness of your secretaries and vice-principal.

I extend a written thank you, as well, to all the teachers and students who took part in my research. Once again, my sincerest thank you.

Sincerely,

[Signature]

Miss Eloise Olson
The Human Subjects Committee  
201 Beardshear Hall  
Iowa State University  
Ames, Iowa  50011

Gentlemen:

RE: Measurement of Curiosity in Junior High School Students

Information on all student and teacher evaluation forms used in my study has been coded, and names have been blackened out on these forms.

Thank you.

Sincerely,

Miss Eloise Olson
APPENDIX I
CORRESPONDENCE - THE HUMAN SUBJECTS COMMITTEE
Gentlemen:

Consent to administer my student and teacher evaluation forms was given by both the superintendent of the Ankeny Community Schools and the principal of the Novolin Junior High School at Ankeny, Iowa. Final consent rested with the teachers, themselves, as to whether or not they wanted to administer my curiosity inventory to their own students. No student was forced to complete my curiosity inventory.

I sincerely hope that you will give final approval to my research project. Thank you.

Sincerely,

[Signature]

Miss Eloise Olson