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PREVIEW

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**Characteristics of intelligent behavior and critical thinking  
ability among elementary students**

**Grandy, Victoria Vella, Ed.D.**

**The University of Nebraska - Lincoln, 1993**

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Ann Arbor, MI 48106**

PREVIEW

**CHARACTERISTICS OF INTELLIGENT BEHAVIOR AND CRITICAL  
THINKING ABILITY AMONG ELEMENTARY STUDENTS**

by

**Victoria Vella Grandy**

**A DISSERTATION**

**Presented to the Faculty of**

**The Graduate College in the University of Nebraska**

**In Partial Fulfillment of Requirements**

**For the Degree of Doctor of Education**

**Major: Interdepartmental Area of Administration,  
Curriculum and Instruction**

**Under the Supervision of Professor F. William Sesow**

**Lincoln, Nebraska**

**May, 1993**

DISSERTATION TITLE

Characteristics of Intelligent Behavior And Critical Thinking

Ability Among Elementary Students

BY

Victoria Vella Grandy

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GRADUATE COLLEGE  
UNIVERSITY OF NEBRASKA

# CHARACTERISTICS OF INTELLIGENT BEHAVIOR AND CRITICAL THINKING ABILITY AMONG ELEMENTARY STUDENTS

Victoria Vella Grandy, Ed.D.

University of Nebraska, 1993

Advisor: F. William Sesow

The purpose of the study was to predict critical thinking abilities by way of teacher assessment of intelligent behavior. Forty-nine, grade 5, Catholic, elementary school students, from a midwestern urban area, served as subjects. The Cornell Test of Critical Thinking--Level X, Third Edition (Ennis, Millman, & Tomko, 1985) was administered during the sixth week of the 1992-1993 school year to obtain a measure of critical thinking ability. Teacher assessment of each student, using a 14-item Intelligent Behavior Rating Scale based upon Costa's (1991) 14 Characteristics of Intelligent Behavior, was obtained following administration of the Cornell test.

To determine the relationship between the assessment of intelligent behavior and critical thinking ability in this pre-experimental research design, multiple linear regression statistical analysis was used.

Based upon the findings of this study the null hypothesis, the Intelligent Behavior Rating Scale does not predict student performance on the Cornell Test of Critical Thinking--Level X, Third Edition, was rejected at the .05 level of significance. Neither teacher, gender, nor method of scoring the Cornell was significant in the predictive value of the Intelligent Behavior Rating Scale upon student performance on the Cornell test.

Analysis of the data appeared to support the following conclusions:

1. The Intelligent Behavior Rating Scale is a potential reliable alternative to multiple-choice testing when attempting to authentically assess critical thinking skills or intelligent behavior of intermediate level, elementary school students.

2. Teacher bias is not a significant factor when rating students on the Intelligent Behavior Rating Scale.

3. Gender of students does not affect how teachers rate individual students using the Intelligent Behavior Rating Scale or performance on the Cornell test.

PREVIEW



***Dedication:***

***The author dedicates this dissertation to her parents, Charles and Mary Vella. They have always given their love and support unconditionally and have served as my first and foremost teachers in life. Their respect for and appreciation of learning and the ability to think became my inspiration to enter the world of teaching to serve others.***

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Special recognition is given to the author's husband, Tom, and son, David. Their lives were most impacted during the course of study and this investigation. The author is indebted to them for their patience, sacrifices, and willingness to help.

V. V. G.

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PREVIEW

## CHAPTER I

### INTRODUCTION AND STATEMENT OF THE PROBLEM

Intelligent behavior sets people apart from all other living creatures to the extent that interest in this unique ability has resulted in years of scientific observation and study. Recently attention has been directed toward expansion of an original focus upon critical thinking to the investigation of the critical attributes of the more complex notion of intelligent behavior. Intelligent behavior was defined by Costa (1991) as action which is "demonstrated when we are confronted with questions and problems for which we don't know the immediate answer" (p. 100). As a result of this attention, programs are being infused into schools to develop and measure intelligent behaviors as means of ultimately improving the human condition.

John Dewey was credited by McTighe and Schollenberger (1991) as having identified the "development of an individual capable of reflective thinking as a prominent educational objective" (p. 2). Although the development of critical thinking abilities has become a fundamental goal of education, a problem clearly emerges. The complexity of the concept of intelligent behavior, lack of commonly agreed upon definitions of terms, diversity of theories and models, and the limited number and types of valid and reliable assessment tools create a sense of frustration when attempting to achieve development and assessment of critical thinking abilities and intelligent behavior. Quellmalz (1984) stated this problem succinctly when she observed, "There is little consensus on what critical thinking is, on how to teach it or on how to measure its outcomes" (p. 189).



Within the body of available literature, it is noteworthy that since the writings of John Dewey researchers have proposed myriad theories and models related to critical thinking and, most recently, intelligent behavior (Beyer, 1991; Bloom, 1956; Costa, 1991; Ennis, 1962; Glatthorn & Baron, 1991; Norris, 1989a; Sternberg, 1986). The dilemma which emerges was noted by McTighe and Clemson (1991) who reported that while this "rich marketplace of instructional theories, models, and techniques is cause for celebration . . . . it is not uncommon for educational planners to feel . . . . the problems of overload and fragmentation . . . . [This] result[s] in frustration and cynicism on the part of practitioners at all levels" (p. 310), as they attempt to design and implement curriculum to develop and assess the growth of critical thinking abilities and intelligent behavior. In literature related to the assessment of thinking abilities, an additional problematic issue has been revealed, i.e., reliance upon a limited number of standardized tests to the apparent exclusion of any other format. During a conference on assessing thinking skills, panelists Rankin, Norris, Quellmalz, and Bumgarner each presented concerns regarding the lack of assessment procedures related to thinking abilities other than multiple-choice formats, i.e., assessment "within some meaningful context" (Arter & Salmon, 1987, p. 6). Recently, Costa (1991) summarized this still-unresolved concern, stating that thinking is a dynamic process which is most accurately assessed through "direct observation, recording critical incidents, [and] keeping checklists" (pp. 312-313).

Given the importance of the development and assessment of critical thinking abilities and intelligent behavior and the apparent lack of a

standardized assessment approach in which the focus is upon observation of student behavior, it is of merit to explore the development of a reliable, brief rating scale within which the intelligent actions of elementary students can be measured by teachers through the observation and recording of specific intelligent behaviors. In addition, there appeared to be little evidence of research comparing the results of such a rating scale to a reliable, valid, standardized measurement tool of critical thinking abilities such as the Cornell Test of Critical Thinking--Level X, Third Edition (Ennis, Millman, & Tomko, 1985).

Elementary school administrators, teachers, and curriculum planners, faced with the challenge of implementing strategies to enhance critical thinking abilities and intelligent behavior, will be well-served to have at their disposal a reliable, efficient measurement tool based upon observation of specific intelligent behaviors. Such a tool will enable them to more frequently and systematically assess the presence and growth of intelligent behavior based upon observation of how students attempt to resolve real-life problem situations.

### Purpose of the Study

The purpose of this study was to compare the degree to which teachers assess the intelligent behavior of students, using a four-point rating scale consisting of Costa's (1991) 14 Characteristics of Intelligent Behavior and the critical thinking abilities of elementary students as measured by the Cornell Test of Critical Thinking--Level X, Third Edition (Ennis, Millman, & Tomko, 1985).

### Hypothesis and Research Questions

This study was designed to determine if teachers can predict performance on the Cornell Test of Critical Thinking--Level X, Third Edition, using an Intelligent Behavior Rating Scale consisting of 14 Characteristics of Intelligent Behavior. Within this design, three research questions were posed at the .05 level of significance to investigate the primary null hypothesis in more detail.

#### Primary Null Hypothesis

The Intelligent Behavior Rating Scale is not a reliable predictor of student performance on the Cornell Test of Critical Thinking--Level X, Third Edition. The null hypothesis was tested at the .05 level of significance.

#### Research Questions

1. With respect to predicting student performance on the Cornell Test of Critical Thinking--Level X, Third Edition, are teachers a significant variable?
2. Is there a significant difference in the predictive value of the Intelligent Behavior Rating Scale if rights only (instead of rights minus one-half wrongs) is used in scoring the Cornell Test of Critical Thinking--Level X, Third Edition?

3. Does gender of the student play a significant role in how teachers rate students on the Intelligent Behavior Rating Scale or how students perform on the Cornell Test of Critical Thinking--Level X, Third Edition?

### Assumptions

The following assumptions were made for this study.

1. By the sixth week of the school year, teachers are able to assess specific intelligent behaviors demonstrated by their students.
2. The Cornell Test of Critical Thinking--Level X, Third Edition is an appropriate measure of critical thinking ability.
3. The 14 characteristics identified by Costa (1991) are elements of intelligent behavior.

### Theoretical Framework

Within the body of research related to critical thinking, Ennis (1962) provided a concept of critical thinking which has withstood the test of three decades. His theory ultimately led to the construction of the Cornell Test of Critical Thinking (Ennis, Millman, & Tomko, 1985), a widely used standardized test for measuring critical thinking abilities from grade four through adulthood. Ennis' research began with the basic notion of B. Othanel Smith: "Now if we set about to find out what . . . [a] statement means and to determine whether to accept or reject it, we would be engaged in thinking which, for lack of a better term, we shall call critical thinking" (Ennis, 1962, p. 83). Ennis (1962) cited Dewey's writing as basic research in

the realm of thinking skills. Ennis also noted that while the teaching of critical thinking is a primary function of education, educators' efforts fall short of desirable goals because there has not been "a comprehensive and detailed examination of what is involved in making judgments about the worth of statements or answers to problems" (p. 82). Ennis established as his purpose, the collation of philosophical insights, the goals of schools, literature on the criteria of good thinking, definitions of critical thinking, and the simplification of this information by reducing it to "basic factors or dimensions of critical thinking" (p. 83). The result was a theoretical framework of 12 aspects of critical thinking.

Three dimensions were identified within Ennis' (1962) model:

1. The logical dimension. The ability to know "what follows from a statement or a group of statements, by virtue of their meaning" (p. 84).
2. The criterial dimension. The "knowledge of the criteria for judging statements . . . which are covered by the logical dimension" (p. 85).
3. The pragmatic dimension. The "impression of the background purpose on the judgment, and . . . the decision as to whether the statement is good enough for the purpose" (p. 85).

As recently as 1991, Costa, in an essay entitled "the Search for Intelligent Life," cited the work of Ennis as a source which has led to the development of 14 characteristics of intelligent behavior. Costa (1991) stated that "these characteristics have been identified in . . . people from all walks of life" (p. 100). His purpose in identifying these characteristics stemmed from his belief:

Gathering evidence of the performance and growth of intelligent behavior is difficult through standardized testing. It . . .

requires . . . observing students as they try to solve the day-to-day academic and real-life problems they encounter in school, at home, on the playground, alone, and with friends. (p. 100)

Given that Costa's (1991) model of intelligent behavior is an extension of the research of Ennis (1962), if students demonstrate characteristics of intelligent behavior then they should also exhibit a similar level of proficiency in critical thinking.

### Definition of Terms

Critical thinking, as defined by Ennis (1985), is the ability to reasonably decide what to believe and do using the specific skills of induction, deduction, observation, credibility, and assumptions.

Intelligent behavior as defined by Costa (1991) is behavior which is demonstrated when one is confronted with questions and problems for which one does not know the immediate answer.

The 14 Characteristics of Intelligent Behavior were individually defined by Costa (1991) as follows:

1. Persistence. "Stick to a task until it is completed" (p. 101).
2. Decreasing Impulsivity. "Think before [you] act" (p. 101).
3. Listening to Others--With Understanding and Empathy.  
"The ability to listen to other people, to empathize with and understand their point of view" (p. 101).
4. Cooperative Thinking--Social Intelligence. "Heightened ability to think in concert with others" (p. 101).

5. Flexibility in Thinking. "Approach[ing] a problem from a new angle using a novel approach; willing to change one's mind if presented with a convincing argument" (p. 102).
6. Metacognition--Awareness of One's Own Thinking. "Becoming more aware of [one's] thinking" (p. 102).
7. Striving for Accuracy and Precision. "Communicat[ing] accurately in both written and oral form" (p. 102).
8. A Sense of Humor. "The ability to perceive a situation from an original and often humorous vantage point" (p. 103).
9. Questioning and Problem Posing. "Asking questions and finding problems [to solve] (p. 103).
10. Drawing on Past Knowledge and Applying it to New Situations. "Apply school-learned knowledge to real-life situations and to content areas beyond those in which it was learned" (p. 104).
11. Risk Taking. "Accepting confusion, uncertainty, and the higher risks of failure as part of the process and learn[ing] to view failure as normal, even interesting and challenging" (p. 104).
12. Using All the Senses. "Sensory pathways are open and alert, absorb[ing] more information from the environment" (p. 105).
13. Ingenuity, Originality, Insightfulness: Creativity. "Know[ing] how to be creative when the situation

demands it . . . project[ing] [oneself] into different roles, starting with a vision and working backward to [a] solution" (p. 105).

14. Wonderment, Inquisitiveness, Curiosity, and the Enjoyment of Problem Solving--A Sense of Efficacy as a Thinker. "Seek problems to solve . . . and to give to others to solve" (p. 106).

### Delimitations of the Study

The scope of this pre-experimental study was limited to all students in grade 5 enrolled in a Catholic Archdiocesan elementary school located mid-city in Omaha, Nebraska. This study involved the use of the Cornell Test of Critical Thinking--Level X, Third Edition (Ennis, Millman, & Tomko, 1985) and the use of an informal rating scale, which was based upon Costa's 14 Characteristics of Intelligent Behavior.

### Limitations of the Study

1. The narrow scope of the population assessed limited the ability to generalize findings beyond the setting in which the study was conducted.
2. Although the Cornell Test of Critical Thinking--Level X, Third Edition is widely used, there is some question as to whether there is a need to improve the level of reliability and validity (Modjeski & Michael, 1983; Norris, 1989a).