Exposure to Electronic Entertainment Media and Student Outcomes in Two Demographically Diverse Elementary Schools

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Exposure to electronic entertainment media and student outcomes in two demographically diverse elementary schools

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Andrews University
School of Education

EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA AND
STUDENT OUTCOMES IN TWO DEMOGRAPHICALLY
DIVERSE ELEMENTARY SCHOOLS

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

by
Ronald W. Busby
June 1994
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Date approved

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ABSTRACT

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by

Ronald W. Busby

Chair: Paul Brantley
ABSTRACT OF GRADUATE STUDENT RESEARCH

Dissertation

Andrews University
School of Education

Title: EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA AND STUDENT OUTCOMES IN TWO DEMOGRAPHICALLY DIVERSE ELEMENTARY SCHOOLS

Name of researcher: Ronald W. Busby

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Problem

Test-score results have declined sharply and learning difficulties have risen significantly during the decades that electronic entertainment media (EEM) have become a world phenomenon. Research is lacking on how sensory overload impinges upon the brain and mind of developing children with respect to learning and adapting socially. However, exposure to electronic entertainment media has generated much speculation, discussion, and study. Anderson (1988) asserts that research to date has been inconclusive.
Research is needed that addresses sensory overload phenomena and academic performance and social behavior.

Methodology

The Time Tally Checklist, a Likert-type questionnaire that was developed for third-and fourth-grade children, furnished data in six categories of activity. Frequencies, crosstabulations, Pearson product-moment correlation coefficient, Spearman correlation coefficient, and the Chi-square test for Homogeneity were used to test the hypotheses. A correlational research design was used to determine the extent to which time spent exposed to EEM corresponds to academic performance, discretionary academic activities, and social/recreational activity.

Results

With reference to hypothesis 1 (To what extent does exposure to EEM correlate with formal academic performance?), 7 out of 64 pairings were significantly correlated—2 positive and 5 negative. So far as these data indicate, there appears to be little relationship between amount of EEM exposure and formal academic performance.

With reference to hypothesis 2 (To what extent does exposure to EEM correlate with discretionary activity?), only 13 out of 132 pairings were significantly correlated; there appears to be little relationship between amount of EEM exposure and discretionary academic activity.
With reference to hypothesis 3 (To what extent does exposure to EEM correlate with recreational and social behavior?), 122 out of 270 pairings were significantly correlated; there appears to be a fair relationship between amount of EEM exposure and social behavior.

Conclusions

Exposure to EEM may be related to academic achievement of third- and fourth-grade students. However, relatively little evidence for it is found in this study. Limitations of this study considered with other studies and commentary suggest that a more definitive examination of EEM and its relationship with the developing child is warranted.

Exposure to EEM may be related to student-initiated activities such as reading for personal fulfillment, homework, and noise preference. However, the evidence in this study is inconclusive across the two grade levels examined.

Exposure to EEM is related in complex ways to social behavior such as play, talk, hobbies, and discipline. When viewed with the other data in this study, the research indicates a drift away from traditional social attitudes such as talking and hobbies toward more media-oriented culture as students move through the grades.
To Eva Wheeler Busby whose wisdom and dedication demonstrate the mystery of love and whose companionship and support were both necessary and sufficient
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CHAPTER I

INTRODUCTION

Increasingly, parents, educators, the business community, and the public at-large are becoming alarmed at what is perceived to be a failing school system. Young people entering the labor market are unable to perform by several standards (e.g., quality, reliability, and literacy). In an attempt to explain the dysfunction, research has examined possible causative factors within the classroom and the school. Recently, researchers have begun to question technological and environmental factors as they impinge upon the developmental processes of children and even adults (Diamond, 1988; Epstein, 1978; Healy, 1991; Luria, 1982; Postman, 1985).

Citing data from a number of widely respected standardized tests, Bracey (1991, p. 106) challenges the assumption that the schools are bad. "The evidence overwhelmingly shows that American schools have never achieved more than they currently achieve. And some indicators show them performing better than ever." High-school graduation rates are at an all-time high; and if high-school completion rates are high, then dropout rates must be low. Standardized test scores have continued to rise since the early 70s (Bracey, 1991). Kirst (1991) supports Bracey by pointing out that negative test score
reports ignore the value added by the post-secondary education system; that in the international arena, the United States' strongest suit is its post-secondary education system. The high-school dropout statistic is 30%, but when the General Education Development (GED) examination is factored in, the statistic changes to 23%.

Other researchers, however, citing the same sources, declare that despite reform efforts, educational achievement in America is declining (Hodgkinson, 1991; Mikulecky, 1990; Sato & McLaughlin, 1992). Hewlett, in her book When the Bough Breaks (1991), develops an imposing case supporting a crisis in education. She says that the decline in SAT scores between 1963 and 1981 reflects a real decrease in academic performance and is not just some statistical quirk (p. 67). Factors typically considered as contributory causes include drugs, poverty, family disintegration, school ineffectiveness, and even environmental conditions such as lead and mercury poisoning.

One of the most neglected areas of probable cause is sensory overload during infancy and childhood. Children are exposed to sights and sounds that are confusing and unremitting (Mander, 1978). Moody (1980), who collected data in the 1970s, captures the observations of thought leaders who pioneered the concept of "sensory overload." She cites psychiatrist Leopold Bellak from his classic book Overload. There, Bellak (1975) describes the brain as a "complex system of electric circuitry which, when overloaded with stimuli, can short circuit" (p. 13). Such an overload condition is fed not only by the strain of living with the speed of modern technology but also by the impact of crowding, rapid travel, and any general confusion at home or school. "What has us spinning," says Bellack, "is the tremendous overloading of our senses. We are
hit with too much, too fast (and for too long). Our signals are conflicting; what is worse, there are too many of them, and they are constantly changing" (Moody, 1980, p. 13). She voiced a grave concern when she wrote,

> It is worth investigating whether anybody should spend so many hours with TV. But in the case of children who are growing up on continuous television there is special concern. We know the power of the stimulus, and we are especially aware of the vulnerability of the very young nervous system. Nobody yet understands how cumulative television viewing will affect the development of the human species in the long run, but evidence is emerging to show how TV viewing affects individual physical responses such as brain waves, eye movements, the use of the hands, and overall body movements. It is vital for us to know more and to understand how our bodies respond to television and how respective physical responses relate to each other. (pp. 13, 14)

Success in academic achievement is related to attention, organization, and motivation. Healy (1990) theorizes that these vital qualities are compromised by excessive physical and psychological stimuli in the students' environment. Postman (personal communication, 1991), professor at New York University, wrote in part: "There's no question in my mind that sensory overload is a major factor in affecting the learning process. In fact, it does more than that. It affects young and old and comes very close to driving the whole culture mad" (see appendix C). He states elsewhere (Postman, 1985) that television does not merely shape or reflect culture, it has gradually become our culture.

Two aspects of media experience include: (1) the content of programing and (2) the physical experience of the medium itself. In his widely quoted "The Medium Is the Message," Marshall McLuhan (1964) implies the domination of the experiential over the conceptual. Does the preferred medium effect as much change as the much discussed content? To what extent does continuous media/noise distraction affect learning faculties such as attention, memory,
discrimination, concentration, application, and perception; social characteristics such as friendliness, responsibility, language, and community; and developmental processes such as brain/mind organization, identity formation in which is laid the foundation for a world view (zeitgeist), and a sense of self-worth? (Healy, 1987).

Paraphrasing Moody's notion (see p. 3 above) is the question, To what extent does continuous media exposure influence the process of learning both within and without the classroom? A corollary to that question is: To what extent can media management and teaching strategies ameliorate learning impairment? Another question: What inroads do mass media make on the time and interests of youngsters in an information society? Necessary or even prudent parameters of noise and quietude have not been clearly described or understood. A lack of research examining the correlation between learning and media stimulation provides a niche for this study.

According to Anderson (1993) in a personal communication, no definitive research exists supporting the major complaints lodged against television. An exhaustive examination of scientific research by Anderson and Collins (1988) relevant to nine specific commonly held assertions yielded this conclusive statement: "With only a few exceptions, the research literature on any one issue is sparse." Anderson stated later (personal interview, 1993) that essentially nothing had changed in the field of educational research since his 1988 assessment.
Statement of the Problem

In view of the preceding, the purpose of this research was to examine the relationship between exposure to electronic entertainment media and school performance among children in grades 3 and 4. Specifically, the following research questions were proposed:

1. To what extent does exposure to electronic entertainment media correlate with formal academic performance?
2. To what extent does exposure to electronic entertainment media correlate with discretionary academic activity?
3. To what extent does exposure to electronic entertainment media correlate with recreational and social behavior?

Hypotheses

1. There is a relationship between exposure to electronic entertainment media and formal academic performance. Sub-hypotheses to be tested in relation to this main hypothesis were:
   a. There is a relationship between exposure to electronic entertainment media and academic achievement outcomes as measured by the SRA Reading Test.
   b. There is a relationship between exposure to electronic entertainment media and academic achievement outcomes as measured by the SRA Math Achievement Test.
   c. There are relationships between TV program preferences and reading as measured by the SRA Reading Test.
d. There are relationships between TV program preferences and mathematics as measured by the SRA Math Achievement Test.

2. There is a relationship between exposure to electronic entertainment media and discretionary academic activities. Sub-hypotheses to be tested in relation to this main hypothesis were:
   a. There is a relationship between exposure to electronic entertainment media and time spent in student-initiated reading.
   b. There is a relationship between exposure to electronic entertainment media and time spent on homework.
   c. There is a relationship between the number of types of electronic media devices in the home and time spent on homework.
   d. There is a relationship between noise level preference and time spent in student-initiated reading.
   e. There is a relationship between TV program preferences and time spent in student-initiated reading.

3. There is a relationship between exposure to electronic entertainment media and recreational/social behavior. Sub-hypotheses to be tested in relation to this main hypothesis were:
   a. There is a relationship between exposure to electronic entertainment media and time spent in sedentary play.
   b. There is a relationship between exposure to electronic entertainment media and time spent in active play.
   c. There is a relationship between exposure to electronic entertainment media and time spent talking to friends/family.
d. There is a relationship between exposure to electronic entertainment media and time spent on hobbies.

Assumptions

For the purpose of this study, it was assumed that third-and fourth-grade children are sufficiently mature to complete a Likert-type questionnaire.

Definition of Terms

To make understood the exact meaning of certain terms used in this paper, the following definitions are supplied.

**Abuse**: The measurable consequences of exposure to EEM in terms of learning and behavioral deficit.

**Academic Performance**: Restricted to mean behavior inferred by outcomes measured by the SRA Reading Test and the SRA Math Achievement Test.

**CUE (Creative, Useful, Experiential)**: A classroom-based innovation using principles of integrated thematic instruction, as conceptually outlined by Susan Kovalic. CUE was in effect in many classrooms during the tenure of the research study.

**Critical Window**: Optimal developmental periods during which learning is most efficient. Epstein (1974, pp. 207-224) believes that the brain grows in a series of spurts during which it becomes more receptive to teaching and learning. This is due to increasing myelin formation and dendritic connections.
Demographically Diverse Schools: Those in which widespread variation exists among the student body in terms of race, ethnicity, wealth, and other factors.

Discretionary Academic Activities: Include behavior such as student-initiated reading/writing not directly related to formal academic assignments.

Educational Displacement Activities: Activities referred to as educational displacement in type; occupy time and attention normally dedicated to educationally facilitative activities.

Educationally Facilitative Activities: Activities that complement developmental stages as they occur.

Educationally Inhibitive Activities: Activities that frustrate the developmental stages as they occur.

Electronic Entertainment Media: Audio and visual representations and devices of sensory input which preoccupy the attention for purposes of enjoyment and stimulation.

Elementary-school Performance: Data derived from test scores such as the SRA Reading Test and school records such as attendance and referral records yield measurements.

Excessive Exposure: When the relation between the processes of input and the internalization of input is such that internalization is only fragmentary or non-existent.

Exposure to Electronic Entertainment Media: Time spent listening to (1) radio, (2) audio cassette tapes, (3) telephone, and (4) CDs; and time spent watching (1) television, (2) video cassette tapes, (3) MTV, (4) computers, and (5) educational television.
Indoor Play: Games such as monopoly, cards, charades; goofing-off such as doing nothing much, hanging-out, etc.

Neural Plasticity: That tendency of neurons to be site oriented, to be "experience-expectant" (see p. 12 below), and to be capable of structural alteration.

Noise Preference: The level of ambient noise directly manageable and preferred by a student during academic study time.

Outdoor Play: Sports such as baseball, swim, track, and other team activity: play such as tag, hop-scotch, hide-and-seek, tree-house, etc.

Prescriptive Intervention: Strategies that are reactive, traditional, or often coercive respecting solutions to immediate academic dilemmas.

Preventive Intervention: Strategies that are creative, cooperative, and positive respecting solutions to immediate academic dilemmas.

Predictive Intervention: Those strategies based on insightful studies that apply primary principles, and can have a positive effect on future academic dilemmas.

Program Preference: Behavior determined by electronic entertainment media. Its inclusion by category is necessary to this study in order to distinguish the sacred from the profane--in an educational sense. On one end of the program spectrum is educational TV; on the other is situation comedy. On one end of virtual reality is research application and on the other is arcade entertainment.

Reading Preference: Thematic or categorical reading opted by a student when not acting by formal assignment.
Sensory Overload: The condition of (learning\functioning) impairment which results from excessive exposure to sensory input. The capacity to discriminate is diminished either temporarily or permanently, partially or substantially.

Structure and Function: A developmental phenomenon wherein structural features of a maturing brain are influenced by functions demanded of it by environmental factors; which in turn determine further structure and function.

Theoretical Framework

The young of humans are not equipped with "hard-wired" instinctual data bases which provide safe passage to adulthood. Rather, children are born with the potential to think and to reason. During nearly two decades of nurturing by parents, schools, and other social institutions, they are brought to maturity and prepared for self-sufficiency. Four primary theoretical propositions underlie these facts of human development and societal nurturing: environment, language, developmental stages, and intervention strategies.

One: Environment

Although genetic factors are both present and powerful, environmental influences should be given primary attention because of their profound effect on early development. Bridging the categories of genetics and environment is "neural plasticity," a phenomenon in which the stimuli to which children pay attention shapes their brains. Klivington (cited in Healy, 1990, p. 51) asserted "structure and function are inseparable." He told Healy in a personal interview

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that studies currently being done show profound differences in the structure of the brain depending on what is taken in by the senses.

Neurons "migrate" to the areas for which they were designed and which are environmentally stimulated. Prenatal migrations form areas for basic functions such as physical drives, reflex movements, and balance (Pines, 1983). At birth function sites are already largely determined, but the neurons that provide structure for networks within and between parts of the brain are not in place. Pines's study showed that incoming experience is the only thing that will fully "hook up" (connect) the systems of the brains of infants for the performance of complex tasks. Brain development requires all the years of childhood in order to build the pathways that connect the neurons into an intricate and efficient system for thinking (Healy, 1986).

Postnatal migrations provide for relay stations for sensory stimuli and some technical equipment to help with memory and emotion. Then, within the cortex are formed three levels of "association areas" critical for planning, reasoning, and using language. These are the most plastic of all and their development depends on the way the brain is used at different stages of its development. In this sense, three elements are significant: (1) novelty, (2) development of the reticular activation system (RAS), and (3) active effort (Healy, 1987). One of the first structures that is the object of active effort is language.
Two: Language

Language determines both breadth and depth of thought. It is "the verbal bath in which society soaks its children" and in which their synapses and intellects are arranged, providing for reason, reflection, and response (Healy, 1990, p. 86). A child's early experiences with language have powerful long term effects on school achievement (Rinders & Horrobin, 1984). Language physically builds the brain's higher-reasoning centers. It allows for the transcendence of sensory experience permitting the use of symbols, the formulation of generalizations, and categories (Luria, 1982).

Societal changes are overwhelming schools with students who need remedial language training. Most learning disabilities are related to underlying language problems. Children are "linguistically malnourished" (Vail, 1989). So marked is the decline in language skills that experts are asking questions. Could we be witnessing the beginning of a major change in the way the human brain processes information? (Healy, 1990). What circumstances have contributed to the changing brain? These questions lead to the third proposition which has reference to the critical importance of early experience. Some answers become evident in the understanding of brain-readiness.

Three: Developmental Stages or Brain-readiness

"Stage theory" applied to the context of this study defines the observable results of "structure"—when neurons are stimulated to amass at brain sites. In animal studies it was found that variation in environmental stimulation resulted in predictable variation in neuron placement. "Critical windows" applied to the
context of this study define the observable results of "function"—when systems are established through experience (Klivington, personal communication cited in Healy, 1990).

Brain readiness, according to Greenough, Black, and Wallace (1987), requires what is called experience-expectant processes. These are processes that "expect" or depend upon usual experiences to prepare the hardware for their existence. Most human infants, for example, have sufficient visual, auditory, and tactile experiences to activate circuits for seeing, hearing, and touching. These brain cells require both proper experience and the proper time for connections to be formed (Healy, 1990). In fact, the open circuitry that accounts for many human learning abilities develops from connections that Greenough calls experience dependent. This expresses the related notion that not only do these processes expect experience but they cannot proceed without experience, and are thus dependent upon particular experience. The resulting systems, therefore, are unique to each individual's experience.

However, because the organization of the brain is so heavily influenced by the way it is used after birth, youngsters who are extensively exposed to television, for example, may be expected to develop differently from those who pursue the physical, interpersonal, and cognitive challenges of active play (Healy, 1990).

A sobering caveat is found in Wittlin's study (1984). She says that contrary to computers, human minds cannot be emptied of preceding programs in preparation of a new one.
Four: Intervention Strategies

There are but three points of intervention in any process: a point of prediction, a point of prevention, and a point of prescription. Respecting the ills of education, their treatment and prevention, there is not only a right time to prepare children for maximum learning (prevention), but there is also a right way (prediction). Increasing numbers of normal children seem to be lacking the same necessary experiences in which learning disabled (LD) and attention deficit with hyperactivity disordered (ADHD) children tend to be deficient (Healy, 1990). Absence of necessary experiences is not tantamount to immediate learning disability. However, the potential for mass disability appears to be emerging as is evident from the symptoms known to be related to LD and ADHD children. Society must confront prescriptive procedures immediately for existing conditions. It must institute preventive policies to provide for emerging needs, and predict strategies to accommodate the needs of future generations.

Some appropriate intervention strategies are: (1) adult models of problem-solving under which are subsumed ways of categorizing, internalizing understanding, reflectivity vs. impulsivity, scaffolding for learning to remember, and analytical vs. relational style of thinking; (2) zero-based curriculum which presumes nothing and critically examines everything (Healy, 1990); (3) confronting the reality of the children being taught (Healy, 1990); (4) collaborative learning techniques where more emphasis is placed on the types of learning techniques and communication that will be needed in an information age (Kohn, 1986); and (5) whole language approaches where the learner is viewed as an active constructor of knowledge (Altwerger, 1987; Calkins; 1986, Goodman; 1986, Newman; 1985).
In the present transition from an industrial society to an information society, the four primary theoretical propositions (environment, language, developmental stages, and intervention strategies) are restless bedfellows. Environmental effects impinge the other three. Language structures do not reach their potential. Physiological development through the myelination stages is shorn of vital structures that provide safe passage from infancy to adulthood. These structures are dependent upon timing and experience which in turn are environmentally supplied.

Intervention strategies currently are largely prescriptive of conditions which are poorly understood or not understood at all. Both language and intervention strategies languish, but from discrete causes. The demise of language begins in infancy long before institutional intervention strategies can be brought to bear.

Therefore, neglect of early intervention in environmental factors that contribute to language deficiency lays a foundation for learning disability evident in dysfunctional children.

**Importance of the Study**

Sensory overload has received much indirect attention but has not been linked to developmental structure and function. Among the many negative forces that impact children of the 1990s (disease, genetic disability, neglect, substance abuse, child abuse, isolation, abandonment, poverty), the one force that appears to be both significantly devastating and manageable is noise--audible and visual "noise": incoming sensory signals that are incessant.
attractive, compelling, immaterial, arresting, and devastating to many major processes of growth and development.

Past generations were brought to maturity relatively free of the type of ubiquitous dissonance that is a by-product of technology. Radios that can be worn on the head while running, skiing, or even swimming supply continuous distraction potential. Television and its satellite electronic devices make visual attendance to trivia a primary activity. The disruption or displacement of developmental processes and structures by attention to EEM may affect learning. This study explored such disruption and its impingement on learning, both formal and informal.

It is now imperative that parents, teachers, and care-givers be made aware of process and consequence respecting environmental variables, growth, and development. Awareness of such possibilities could yield the tools to better prepare society and young people to cope with an increasingly electronic environment.

**Limitations of the Study**

The study is not longitudinal. As a consequence, specific factors that may have shaped the children over time are not known. Nor can causes be determined from the relationships observed. The study is not a controlled investigation.
Delimitation of the Study

The study is delimited to grades 3 and 4 in a small demographically diverse mid-western school district. Although generalizability is therefore restricted, the wide array of socioeconomic, racial, and urban/rural sub-populations suggest implications for the larger society which can be explored through subsequent research.

Organization of the Study

This study is organized into five chapters:

Chapter 1 presents the theoretical framework, statement of the problem, the research questions, hypotheses, purpose of the study, importance of the study, delimitation of the study, definition of terms, assumptions, and organization of the study.

Chapter 2 surveys the literature in four areas: (1) Environment--a description of the forces and technologies that collide with the developing child and a discussion of possible effects; (2) Language--a description of the physiological centers and origin of language and a discussion of the effects upon later learning; (3) Developmental studies--a description of the physiological and neurological processes during the developmental years of a child; and (4) Intervention strategies--a discussion of methods and strategies that can ameliorate negative environmental effects on learning and strategies for confronting the "new brain."
Chapter 3 describes the methodology employed in data collection. Included in this chapter is a discussion of the population and the CUE project (see p. 9) that provided the setting for data collection.

Chapter 4 discusses the presentation and the analysis of the results.

Chapter 5 provides the summary, the discussion of the results, the implications of the findings for the field, and recommendations for further research.
CHAPTER II

REVIEW OF THE LITERATURE

An overview of the literature concerning early or prolonged exposure to electronic entertainment media is considered here. The four following areas specifically reviewed are: (1) the environmental presence of various media types and their effects, (2) language and its significance to learning, (3) developmental studies of both physical and mental fields as they are impinged upon by an information society, and (4) intervention strategies that are being considered as remedies for current pedagogical ills.

Environmental Presence

Researchers have probed a number of cause/effect relationships between environmental distracters (e.g., television, video games, radio, telephone) and social responses (e.g., physical fitness, aggression, isolation, and quality of family life). The ubiquity of electronic-information devices impacts all major aspects of life in the developed world. Consider three examples of how pervasive and how socially exacerbating information media can be. "Last month an entrepreneur in New Delhi, India, bought a few miles of cable and a giant dish antenna, aimed it at a satellite and is now providing non-stop music,
For the first time they have an alternative to the state-run-monopoly television network, Doordarshan. Experts believe satellite and cable distributors in major cities now are changing the way Indians see the world (AP Wire Service, February 2, 1992).

Nintendo Company is a multi-billion dollar electronic entertainment corporation that has captivated a cross-generational audience. It is not just boys playing Game Boy and Mario: one-third of players are over 18 and 20% of its market are females of all ages. In 1989, U.S. sales of the home Nintendo Entertainment System (NES) amounted to $2.7 billion. Compare that to the $2.2 billion generated in book sales to U.S. elementary and high schools (Corr. 1990).

Nintendo is the current leader of toy sales in the United States and presently holds 70-80% of the video game market. Two small video manufacturers (Capcom USA and Hi Tech Expressions) are attempting to create their own niche by targeting little girls ages 6 through 11 (Advokat, 1991).

Video games are becoming more personalized and interactive, an element that requires deeper involvement of the participants (Nintendo-video Violence, 1991). NEC technology introduced in 1990 produced the TurboGrafx-16 in which a high-speed graphics chip delivers arcade-game-quality images. The new machine uses a player for optical compact discs that stores 75 to 150 times more information than standard game cartridges. The video screen shows life-like digitized images of human actors and the sound track is hi-fi audio with spoken dialogue. In Japan, Nintendo Corporation is updating its game that converts into a telephone-information terminal called Super Famicom. In addition to playing Nintendo games, these systems can be fitted...
with an optional modem. They then become telecommunications terminals for following the performance of stocks on the Nikkei exchange or for accessing other information (Nelsen, 1981).

What is being called "the third branch of science," computer simulation of reality, has given researchers a source of data so accurate that it can take its place alongside experimental data as an object of scientific study (Pool, 1992). Scientists can now create virtual environments that will give the user the illusion that he/she is handling a real physical model that moves as it is supposed to. The user wears a three-dimensional, head-mounted display that is sensitive to both the user's head position and place in a room. Researchers at IBM and the University of North Carolina are experimenting with "virtual reality" (VR) in which an observer can explore images by turning his/her head and seeing different things by physically moving around them, and can even interact with the images by touching them and manipulating them like real objects (Pool, 1992, p. 47).

Another report, from the University of Washington HIT (Human Interface Technology) lab, describes the phenomenon as "the greatest technological jump forward since the telephone" (Keene, 1992). Virtual reality promises to be a medium for the masses as well. It will not "merely replace TV, it will eat it alive." Techno-ethicists are raising red flags, wondering what is ahead for the latest in a long line of escapist techniques. Will people become even more alienated through VR? Will they stop relating on a personal level and become virtual "vidiots" instead? Will they lose sight of where reality ends and fantasy begins? Thomas Sheridan, a professor of engineering and applied psychiatry at MIT, warns that once VR emerges in the entertainment world and features
virtual violence, it could incite immature young males (and females) to new heights of aggression (Keene, 1992, p. 28).

What effects have video games had on the physical well-being of those who play? In the United States, reports recently linked several cases of epileptic seizures to intense and protracted video game playing. Sometimes a condition develops called "Nintendo-thumb" which takes a week for recovery. Educators have singled out video games as a primary cause of the decline in national SAT achievement scores. These teachers claim that kids have spent so much time engrossed in and interacting with picture-based media, it has arrested their reading development (Keene, 1992). Perhaps the most compelling characteristic of video-game technology is its use of interaction—a highly significant process for learning.

Current discussion of media emphasizes television and its satellite technology. However, radio is still both a presence and an influence among students. Radio technology has adapted the projection of sound to accommodate almost all conceivable circumstances of existence. For example, radio can be worn on the belt, pocket, head, or hand while running, walking, swimming, showering, or commuting by any means of travel. The radio equivalent of television's VCR is the audio tape deck. Some of these devices are barely larger than the tape cartridge itself, yet contain not only the capacity to play the tape but to tune to both AM and FM radio signals as well—in stereo. Studies (Brown, 1990) have shown a decrease in time spent with television offset by an increase in time spent with radio, especially among 14-and 15-year-old adolescents. White female 14-year-olds actually spent more time with radio than with television (p. 78).
Computers, telephones, and fax machines have re-shaped the way society conducts its business. According to Kanter (1989) the "lure of work" has increased significantly. Corporate restructuring as a consequence of greater flexibility derived from these technological innovations has produced a new breed of entrepreneurs who love work. Predictable hours seem to be a thing of the past. These very innovations which were predicted initially to release the employee to have more time for personal fulfillment have often influenced employees to choose longer hours and more intense involvement in the market place. Life on the job, therefore, not only takes huge chunks of time but uses up enormous quantities of psychic and emotional energy which used to be shared with family and children. In the long run, those same innovations to a great extent are responsible for the "latch-key" child problem. Consequently, uses to which these devices are put produce mixed blessings. In an environment so rich with language-related inventions, it is difficult to connect mass communication with intellectual poverty.

Sensory Overload

"Today's children are the first generation exposed to over-stimulation, and we know nothing of its long-term consequences." This comment came from Frankenhaeuser who was speaking of the 1950s and 1960s (cited in Moody, 1980).

As yet no systematic examination of the evidence suggests a link between sensory stimuli and learning difficulty. Only recently has a discussion emerged
concerning the specific relationship that may exist between excessive stimulation of the senses and developmental and learning processes.

White (1956, p. 488) writes that the senses are the "gateways to the soul" and that as such they should be guarded well. Writing nearly 100 years ago, she stated that certain games and theatrical performances can so confuse the senses of the young that they will be unable to discern truth that is present all about them. Healy (1990, pp. 133-4) states that by the time research clarifies exactly what may be happening to today's children, they will have grown up and become teachers and parents of the next generation. She then asks, "Will they be equipped with brains influenced more by sound and sense or by noise and nonsense?" Jane M. Healy, a learning specialist at the Hathaway Brown School in Cleveland and an Adjunct Assistant Professor at Cleveland State University, holds a Ph.D. in educational psychology. Her book *Endangered Minds: Why Our Children Don't Think* (1990) speaks comprehensively on developmental difficulties of children and is a seminal work in the discussion of sensory overload.

Joyce (1990) expresses concern respecting upper-elementary students who read little outside assigned books and for high-school students who read independently less frequently than the elementary students. Reading instruction has not developed a reading habit in the students. For many, reading appears to be a school subject rather than a vital cultural process. Children prefer visual/audible stimulation to reading and writing for fulfillment and pleasure. Why does such a preference exist?

Answers to this question are beginning to emerge, and widely divergent studies reveal commonalities that may supply insight to other such perplexing
questions. In a study released by the American Heart Association, Gold (1991) reveals a correlation between an average of 2 or more hours per day of television and high blood-cholesterol levels (200 mg/dL) for juveniles. Research shows that babies start hearing their mother's heart-beat and growling stomach by the fifth month in utero. By the seventh month, they startle at the clap of a cymbal from the outside world (Goodman, 1991-1992). Another study (Buchanan, 1991) indicates that "fetuses may have their hearing damaged by too much noise even before they are born" (p.12). Perhaps more is being damaged than simple hearing. According to Klapp (1986), "Upon being born, sensation with meaning becomes an immanent experience, differentiating noise and information. By taking in too much noise, a person becomes cluttered, not integrated" (p. 103).

Being discussed behind closed doors of neuropsychological conferences are topics of fundamental significance: (1) the preponderance of musical stimulation on the development of the hemispheres and the connections between them, (2) what heavy doses of "beat" might do to growing brains, and (3) the effects of an overload of sensory input on a nervous system that has not yet developed effective mechanisms to defend itself (Healy, 1990). Studies (Luddington-Hoe, 1989; Smotherman, 1984) indicate that several sensory experiences occur prenatally that affect the learning process. Among the more common are noise and stress.

A study (Anderson & Maguire, 1978) on TV viewing versus educational performance was inconclusive in responding to the popular assumption that the extent of TV viewing has a negative effect on educational performance. Subjects in grades 3 and 4 (N = 102) and 5 and 6 (n = 198) were assessed on 14
variables. However, among TV groups (low, medium, high) word meaning and paragraph comprehension showed testing variance of 10% to 15% between low and high program watchers.

Anderson's work is important because it presents in one document much, if not most, of the major researchers and studies impinging upon children's education and the visual media. Dr. Daniel R. Anderson is a professor in the department of psychology at the University of Massachusetts, Amherst, and has served as a research consultant for the Children's Television Workshop. He has done much independent research as well as in collaboration with other researchers. In view of such interest by the scientific community, a question of priorities is in order respecting governmental activity in education and electronic entertainment media.

A Question of Priorities

President George Bush and the governors of the 50 states announced (February, 1990) six national goals for public education in a plan called "America 2000." These elected officials acting together developed the following goals for America.

Goal 1. By the year 2000, all children in America will start school ready to learn.

Goal 2. By the year 2000, the high school graduation rate will increase to at least 90%.

Goal 3. By the year 2000, American students will leave grades 4, 8, and 12 having demonstrated competency in challenging subject matter, including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so that they may be prepared for
responsible citizenship, further learning, and productive employment in our modern economy.

Goal 4. By the year 2000, U.S. students will be first in the world in mathematics and science achievement.

Goal 5. By the year 2000, every adult American will be literate and will possess the skills necessary to compete in global economy and to exercise the rights and responsibilities of citizenship.

Goal 6. By the year 2000, every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning. (Kagan, 1990)

The stated goals are grand, if not grandiose, and do not address means by which they are to be achieved. Certainly, schools are but one player in a social system that has failed to attend to the needs of its most valuable members--the young (Gough, 1990). Kagan (1990) notes that "what happens to children before they turn 5 dramatically affects school readiness" (p. 277).

What is it that happens before age 5 that produces such a powerful effect? Hodgkinson (September, 1991), the director of the Center for Demographic Policy at the Institute for Educational Leadership in Washington, D.C., cites a gloomy array of statistics in the cover article of Phi Delta Kappan (1991). In part he says that

1. Since 1987, one-fourth of all pre-school children in the U.S. have lived in poverty.
2. Every year, about 350,000 children are born to mothers who were addicted to cocaine during pregnancy.
3. Today, 15 million children are being reared by single mothers whose family income averages $11,400.
4. The traditional family constitutes 6% of U.S. households.
5. One-fourth of pregnant mothers receive no physical care during the first trimester of pregnancy.

6. At least two million school-age children have no adult supervision after school.

7. On any given night, between 50,000 and 200,000 children have no home.

8. In 1987, 2.2 million reports of child abuse/neglect were filed.

These hard data are gleaned from the 1990 census. What about soft data that describe the consequences of societal neglect and abuse which are just as damning but more elusive? Much empirical evidence suggests that education does not proceed the same today as it did in pre-television days. A noted learning-disability educator (Wang, 1988) warns that a "second system" of children with special learning needs is developing within the regular educational system.

Television is an ideal technology for marketing purposes. Commonly applied, television programming supports commercial advertising rather than the other way around. The quick-cut transitions in and out of seemingly unrelated scenes form a mosaic of visual impressions that in the advertising business are called the "McLuhan effect" or perceptual overload (Key, 1976, p. 109). The changing images become affixed in the brain but as it is impossible to do anything about them as they enter, the viewer surrenders to them. Very little cognitive, recallable, analyzable, thought-based learning takes place while watching television (Mander, 1978, p. 204). As Winn (1977, p. 8) states: "The television experience is at best irrelevant and at worst detrimental to children's needs." Miller goes a step further: "Television is violent, not only in its literal

Social Impact

Video games, whether projected on home equipment or in public arcades, go at least two steps further than televised technology: not only can programming be selected but, as has been noted, it is interactive as well. The active element so vital for long-term learning is represented in the most effective of forms. The player identifies with the on-screen image and an array of choices is presented respecting level of difficulty, rate of response, and routing to the goal. Immediate reward and/or the opportunity to progress or try again is always presented. Because of the attraction and the stimulation offered by video games, children spend an inordinate number of hours involved solely with the screen and its electronic activity. They commonly attach a personal regard to the video screen on par with human peers. It is not uncommon for video-game players to regard the computer as a close friend (Winn, 1977).

Language and Its Significance

"Discovering the roots of language is inexorably tied to the still unresolved task of defining what language is" (Allman, 1990, p. 70). The deep connections between languages demonstrate that far from a mere communication device, language is intimately connected to the human experience. Humanity has passed through stages that have been assigned descriptives such as "primitive," "agrarian," and "industrial." The world is now experiencing the
transition into an "information" society wherein goods and services are derived primarily from informational activity. However, at the same time that unprecedented demands are being made upon language, the use of syntax and semantics is in crisis. More and more students are unable to use language with the types of precision that might be reasonably expected at any given age or ability level (Healy, 1990).

The brains of today's children are being structured in language patterns antagonistic to the values and goals of formal education (Healy, 1990). Healy reports that "the notion that television overdevelops the right hemisphere is giving way to the much greater possibility that it underdevelops several areas and/or the connections between them" (p. 216). She says: "Not only left-hemisphere language systems, but also higher-order organizational abilities, including the all-important control, motivation, and planning functions of the prefrontal lobes, may be in jeopardy for children who watch without expending much mental effort" (p. 216). Thus, television viewing becomes an educationally inhibitive activity for the very young and an educational displacement activity for those who are older.

Mander (1978) discusses television viewing as a sensory deprivation experience. "Artificial environments themselves reduce and narrow sensory experience to fit their own new confined reality" (p. 167). This means sitting in darkened rooms, with the natural environment obscured, other humans dimmed out, only two senses operating--both within a very narrow range, the eyes and other body functions stilled, and staring at light for hours. Televiewing overloads the physical aspects of the nervous system while it deprives the cognitive aspects of the mind.
"Spaghetti talk" and "McLanguage" are descriptives for utterances now becoming increasingly common among even the more literate stratum. "It is verbal fast food made up of inflection, gesture, and condensation" (Vail, 1989). These include "um . . . like," "you know . . . ," and "I mean" phrases which substitute for verbal precision. Healy (1987, p. 190) calls a related problem "peanut butter" talk. In these cases the child is not at a loss for words, the words used just do not do a very good job. A typical example cited is a girl, age 7, who retold a story about a boy who went on an imaginary space mission and discovered a new planet.

Well, there were all these . . . ah . . . things and they came at him and he was, he was, well, real scared and then he got back in the--you know--in the space thingey, and he pushed the . . . pushed the button and they went fast and he was scared when the things came but at the end they got back and he went in his . . . um . . . bed and that's the end. (p. 190)

Such speakers are responding at a conversational, not an analytic, level. An increasing number of teachers feel that declining verbal skills are partially responsible for a lack of achievement in class discussions, reading, and writing (Healy, 1990).

Healy states further,

The brain is ravenous for language stimulation in early childhood but becomes increasingly resistant to change when the zero hour of puberty arrives. Severe deprivation of language during early years guarantees lasting neural changes that noticeably affect speech and understanding. (p. 86)

More subtle forms of language deprivation affect abilities to think abstractly, plan ahead, defer gratification, control attention, and perform higher-order analysis and problem-solving (Healy, 1990, p. 86). The notion that language changes brains is reinforced by David Premack (1988) of the Department of
Psychology at the University of Pennsylvania. Premack showed that equipping chimpanzees with language symbols changed their ability to reason. Conversely, language capability so linked to a cognitive function demonstrates vulnerability to abuse or neglect. Healy remarked, "Allowing children to enter (school) with shallow linguistic resources puts them in intellectual jeopardy and creates dangerous tensions within education (1990, p. 107). Priscilla Vail (1989) concludes that "most learning disabilities are related to underlying language problems."

Children read with their brains, so when the brain is undeveloped or maladapted to the task, the quality of performance suffers. School tasks are language laden and cognitively oriented. An epidemic of learning disability in otherwise able children is discussed under various labels. Learning disabled (LD) was coined in the 1970s and became the designation for problems not attributable to intelligence, physical, or emotional status. It now includes some children who might previously have been categorized as mentally deficient or emotionally disturbed as well as a large number who are having trouble in school for reasons that are often unclear (Healy, 1990). Even in neurological examination, LD children may seem to be essentially normal and are able to function well in most settings—but not the classroom.

The basic neuronal wiring diagram that is determined in the womb both by the genetic blueprint and the environment can be adversely influenced by the postnatal environment. A specific learning disability emerges only when the child takes that special brain into a learning situation, "batters his neuron assemblies against a certain kind of demand--and fails" (Healy, 1990, p. 141). A sensory-overloaded environment could produce precisely such disabilities;
however, "no amount of teaching can make up for an impoverished language environment!" (Healy, 1987, p. 288).

**Developmental Studies**

Three stages mark the development of both animal and human brains. First, *dendrites* sprout many new branches and grow heavier as they reach out to receive messages and develop synaptic connections. Second, supporting *glial* cells increase in number. Both of these developments appear to respond directly to the types of stimulation sent in by the environment. Third, *axons* develop a coating of myelin which facilitates rapid and clear transmission of neural impulse. At birth, only the most primitive systems, such as those needed for sucking, have been myelinated. Myelination continues all during childhood and adolescence from lower-to higher-level mental abilities. The myelination in human brains is not completed until well into the 20s and may continue even longer (Healy, 1990, pp. 66, 67).

Before brain regions are myelinated, they do not operate efficiently. Therefore, it is possible that some skills deficits may have resulted from academic demands that were not appropriate either in content or in mode of presentation. Neuromotor development moves gradually from gross motor movements to smaller motor movements farther away from the core of the body. Any inappropriate learning practiced and made automatic in the brain areas that were most available at the time will result in lasting discomfort. Reorganizing synapses is much more difficult than primary learning (Epstein, 1974).
Television viewing is the single most engaged-in activity during childhood, according to Corley (1990). The authors of the Colorado Adoption Project survey noted that children who are adopted often have viewing patterns distinct from those of the other members of the family. Biological parents who give up their children for adoption almost always display similar viewing habits to those of their estranged children, even if they have never met. This suggests that pre-occupation with electronic media is much more complex than a mere acquired behavior.

Such preoccupation is widely discussed as a contributing factor in juvenile obesity. Obesity, which very often has emotional roots, is also on the rise and is now a major disorder among American children. Twenty-seven percent of youngsters age 6 to 11 are now defined as obese, up from 18% just 25 years ago (Fuchs, 1988).

In 1984, only 2% of the 18 million children who took the Presidential Fitness Test received an award. John Anderson (1989, p. 1), Lieutenant Colonel in the United States Army, observed: "It's our opinion that the young people coming into the military now have spent more time in front of the TV than on the tennis court or a softball field." He says he cannot remember recruits in worse condition in his 20-year career (p. 8). Heart disease begins in childhood, reports the National Institutes of Health (Luddington & Diehl, 1991). A recent examination of 360 randomly selected youngsters ages 7-12 revealed that 98% of the children already had three or more risk factors. According to Buchannan (1991), the junior couch potato of today is the fat-farm candidate of tomorrow. There is a definite risk of obesity as children who are not fit grow older beginning with adolescence. Two influences especially noticed are the
pervasive influence of television and a decreased emphasis on physical
education and lifetime fitness in schools. Children between the ages of 6 and
11 watch an average of 26 hours of television a week. The passivity of
televiewing, its substitution for more energy-intensive activities, and its barrage
of commercials for non-nutritious food items contribute to a higher energy intake
and lower energy expenditure. Healy (1990, p. 138) concludes: "For children,
habits of the mind soon become structures of the brain, and they absorb their
habits... from the adult culture that surrounds them."

Addressing societal influences that are generally pressing upon children,
Will (1993) states:

The age that pushes hard against unformed youth is not
something that has just befallen us. We made it; are making it.
Much of it comes from... a trickle-down culture that [promotes]
the idea that the good life consists in satisfying every impulse.

An avenue of speculation being discussed among neuropsychologists is the
effects of an overload of sensory input on a nervous system that has not yet
developed effective mechanisms to defend itself (Healy, 1990, p. 161). The
force most obviously present having the capacity to produce internal and
external distraction is television and its electronic cousins.

**Intervention Strategies for Overload**

Means and Knapp (1991) write that the sources of disadvantage and
school failure lie as much with what schools do as with what the children bring
to the schoolhouse door. By reconceiving what is taught and by rethinking how
it is taught, schools stand a better chance of engaging students in an education
that will be of use to them. Intervention strategies must be tailored to the
developmental reality that brains learn in different ways and on different schedules, and that unorganized "new" brains may require entirely new methods.

Children today may be no less intelligent than those of former years, but the gloss of sophistication they reflect has been applied at the expense of important mental skills and their underlying brain organization (Healy, 1990). Schools where children are enticed into involvement with content along with essential skills, and classrooms where they experience each day the satisfaction of intellectual accomplishment gained by personal effort, are strong antidotes to the anxieties and fragmentation that beset them almost continually. Behind the three R's are the real basics--language and thought.

An excerpt from an interview with an anonymous person appeared in a popular publication in which the question was asked, "What is wrong with college students of today?" Describing the condition of those who are victims of social and technological damage the response was: "It is the fragility of the students." "Fragility" describes what is not primarily a matter of choice. Child abuse, child neglect, drug victims (babies), congenital disease, accident, orphaning, divorce--these are not matters of personal choice for a child. However, choosing to view television, VCR, theater, MTV, video games, and choosing to listen to radio, tapes, concerts, CDs, and walkman-type devices enlist the will of the watcher/listener. Increasingly, elements from both lists are matters of concern for educators. To what extent can schools become involved in the extra-curricular activity of students respecting EEM?

Some interventions being considered include adding early-childhood centers to the public schools, adapting the school calendar and/or length of
school day to the schedules of working parents, and allowing students to stay with the same teacher for more than 1 year. Also being proposed are broader forms of restructuring in which schools work closely with other social agencies. Such teamwork allows the schools to assume a more central role as "locus of advocacy" for all children.

Collaborative learning techniques where more emphasis is placed on the types of cooperation and communication that will be needed in an information society include helping parents parent, helping teachers teach (teaching students to listen, sorting out the sounds, ways of questioning), and whole-language strategies (learners construct knowledge, link reading, writing, listening, and speaking skills, use books and language that model preferred literature and skills, be cognizant of learning styles). David Perkins (1988) of Harvard University advocates "mindware" strategies: abilities to organize and reorganize patterns of thinking, decision-making, and inventive thinking. And finally, visual literacy as well as print literacy is being recommended to turn children from passive into active consumers of all kinds of visual material (Greenfield, 1984).

Members of a National Academy of Sciences committee recently declared current teaching to be an anachronism in an information age. Cramming children full of "factlets" and forgetting to focus on understanding is a problem exacerbated by the use of standardized tests (Healy, 1990). The emphasis here is a hands-on approach--doing rather than simply hearing about it. The infrastructure to support institutional mindware strategies does not exist. The strategies and the knowledge to incorporate them exist but the energy and the will have yet to assert themselves.
Summary

The impact of electronic entertainment media on the qualitative growth of children is too often ignored. Experience and content transmitted during television viewing are generally regarded as innocuous. Yet television viewing is now the number 3 activity of United States adults (in terms of hours per week), eclipsed only by work and sleep. As a social-ethical educator, its influence upon children and adolescents has surpassed both church and school, and in many cases, outweighs the influence of primary relationships within the family. Research has revealed that television's molding power extends beyond viewing time. More and more, television competes as a teacher with traditional social institutions whose job it is to nurture children—teachers, parents, and pastors. Cable TV and the VCR have given television even greater power to teach youth. A study of adolescent conversations discovered that 75% of these discussions center on things seen on television (Schultze, 1992).

For those who are old enough to remember, childhood in the 40s and 50s was altogether different than childhood has been in any decade since. Young people entering the labor market today are ill-equipped to meet even the most basic standards of quality, reliability, or literacy. The dynamics responsible for the decline in academic and social performance over the last 3 decades have not been well defined.

A review of the literature indicates that the majority of research has taken a negative view of EEM (mostly TV) influence. There is evidence, however, that it may not be as adverse as generally presumed with respect to academic work. Anderson and Collins (1988) undertook an exhaustive examination of research
literature that addressed (1) the cognitive nature of children's television viewing, (2) the effects of television viewing, (3) modifiers of these effects, and (4) the relation of these effects to schooling. They concluded that with only a few exceptions the research literature on any issue was sparse. In a more current personal communication (1993) Anderson asserted that there were more recent studies available on the topic of television research but that nothing essential had changed or could be added to the (1988) study.

A link between exposure to EEM and the effects of sensory overload have not been addressed. The purpose of this study was to initiate investigation into the possibility of such a link.
CHAPTER III

METHODOLOGY

Description of the Study

The purpose of this study was to examine the relationship between media variables and academic achievement as well as behavioral performance of third and fourth grade students. Examined also was how exposure to electronic entertainment media related to student-initiated reading, hobbies, playing, listening, talking, and viewing. Described in chapter 3 is the methodology used in data collection and analysis, as well as a discussion of the population and the CUE project that provided the setting for data collection.

Description of the Sample

Data for this study were obtained from two schools in the Berrien County Intermediate School District in the State of Michigan. To obtain a balanced population sampling, one of the schools was selected because it utilized an innovative (CUE) curriculum in which the administration, staff, students, and parents were cooperatively involved. The other school was selected because it was primarily traditional, although one classroom utilized the CUE curriculum. The CUE (Creative, Useful, Experiential) project represents a classroom-based...
curriculum initiative that is being implemented in selected Berrien County schools. It is a well-articulated nexus between curriculum, teaching, and learning as conceptually outlined in Susan Kovalik's Integrated Thematic Model. In addition, the project has drawn liberally from such concepts as cooperative learning, critical thinking, mainstreaming, differentiated staffing, learning styles, and decision-making in teaching. The CUE project was included because it incorporated strategies of intervention to learning difficulties (such as active student involvement and cross-abilities grouping) that may prove effective for helping the media disabled. Although CUE classes were dominant among the population, no effort was made to differentiate CUE from non-CUE.

Fourteen third- and fourth-grade classrooms were involved in the survey--11 CUE classrooms and 3 non-CUE classrooms. In school 1 there were 4 third grades and 4 fourth grades. In school 2 there were 3 third grades and 3 fourth grades. (See table 1 for details.)

The unit under study was a small rural school district with a diverse racial and socioeconomic student sub-population. Inner-city children were bussed from a nearby urban area to achieve a socioeconomic/racial balance. Chapter I (at-risk, LD) children were mainstreamed in all classrooms. School 1 and school 2 student populations were predominantly White, but included Black and Hispanic students as well. The subjects were 349 third and fourth graders comprising all the students in 14 classrooms in the two schools.
TABLE 1
THE DISTRIBUTION OF STUDENTS IN THE STUDY POPULATION

<table>
<thead>
<tr>
<th>School</th>
<th>Classroom #</th>
<th>Grd 3</th>
<th>Grd 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1 &amp; 2</td>
<td>23</td>
<td>21</td>
<td>92</td>
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<td></td>
<td>3 &amp; 4</td>
<td>22</td>
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<td>5 &amp; 6</td>
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<td></td>
<td>7 &amp; 8</td>
<td>24</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Sub-total</td>
<td></td>
<td>92</td>
<td>95</td>
<td>187</td>
</tr>
<tr>
<td>School #2</td>
<td>9 &amp; 10</td>
<td>25</td>
<td>26</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>11 &amp; 12</td>
<td>28</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13 &amp; 14</td>
<td>28</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Sub-total</td>
<td></td>
<td>81</td>
<td>81</td>
<td>162</td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td>173</td>
<td>176</td>
<td>349</td>
</tr>
</tbody>
</table>

Design

This study employed a correlational research design. The purpose was to investigate the extent to which variations in one factor corresponded with variations in one or more other factors based on correlation coefficients (Isaac & Michael, 1985).

A survey (The Time Tally Checklist) was used for collection of data. It was a means of gathering information that described the nature and extent of a specified set of data ranging from physical counts and frequencies to attitudes and opinions. This information, in turn, was used to answer questions that had been raised to describe what existed, in what amount, and in what context.
Letters were sent to the school districts and to each school requesting permission to administer the questionnaire to all students in all third-and fourth-grade classrooms. Permission to access test and referral records were requested. Observation of participating classrooms to be involved in the study provided background information and understanding of the setting in which the data were gathered.

The classroom teachers were given a cover letter, detailed instructions, and a questionnaire for each student. After the questionnaire was administered, teachers forwarded the instruments to the researcher. They were numbered and analyzed for completeness and the data were entered into computer for analysis.

Instrumentation

Three measurement instruments were used in this study: The Science Research Associates Reading Test, The Science Research Associates Math Test, and The Time Tally Checklist. A search of dissertation studies indicated six likely survey instruments. However, after further investigation, it became apparent that revision/adaptation of these instruments would not meet the needs of this study. Nor did a search of current test catalogues indicate any acceptable instruments. Therefore, the Time Tally Checklist was developed to accommodate the needs peculiar to this study.

A first draft questionnaire was prepared by March 1991. These questions evolved through 11 refinements until by May an instrument was ready for field trial (see Appendix A). The first pilot survey was taken April 30, 1991, and was
followed by a second field trial on May 14, 1991. The same instrument was
given to the same subjects. After evaluating the results of the two trials, a final
revision of the Time Tally Checklist (TTC) was prepared (see Appendix B).

The survey instrument used in gathering the data was a Likert-type
response questionnaire. The respondents were asked to check any of six types
of electronic media devices--radio, television, VCR, computer, Walkman, and
video game--present in their homes and to indicate how much time was spent
each day on homework. Six categories of activity--reading, hobbies, playing,
listening, talking, and watching--were listed and space was provided for
indicating how much time was spent in each activity. These data were
compared with test and referral data (SRA levels 22 and 23, Attendance, and
Referral Records) obtained from the district office.

Research objectives for the TTC were phrased as questions and then
refined. Researchers in the field of education were asked to critique the
questions and format: two professors in the Curriculum/Instruction Department
of Education, Andrews University, a doctoral candidate experienced in research
studies, a secondary instructor of English, an elementary-school teacher, and
an elementary-school principal. By permission of the Andrews University
Human Subjects Review Board and through the cooperation of the principal,
and the classroom teacher, the instrument (Time Tally Checklist) was given to
the fourth grade of the University elementary school. A final revision of the TTC
was then prepared for the study subjects. There are 53 items on the Time Tally
Checklist.

Science Research Associates (SRA) Survey of Basic Skills (SBS) is a
battery of norm-referenced, standardized tests in basic reading and
mathematics curriculum areas for grades K-12, designed to survey students' general academic achievement. The contents of SBS are based on learner objectives most commonly taught in the United States. Validity was established during the development of SRA-SBS by attention to current instructional and curricular materials, reviews by teachers, and continued monitoring by users. SRA-SBS used the KR-20 formula for establishing reliability. Reliability data are presented in Table 2 (SRA, 1972).

Research Questions

The questions around which this investigation was centered are as follows:

1. To what extent does exposure to electronic entertainment media correlate with formal academic performance?

<table>
<thead>
<tr>
<th>TABLE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>RELIABILITY DATA FOR SRA-SBS TESTS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test</th>
<th>Primary II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>.92</td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>.91</td>
</tr>
</tbody>
</table>

Note. From Science Research Associates, 1972
2. To what extent does exposure to electronic entertainment media correlate with discretionary academic activity?

3. To what extent does exposure to electronic entertainment media correlate with recreational and social behavior?

Null Hypotheses

The main null hypotheses to be tested in this study were:

Null hypothesis 1. No relationship exists between exposure to electronic entertainment media and formal academic performance.

Null hypothesis 2. No relationship exists between exposure to electronic entertainment media and discretionary academic activity.

Null hypothesis 3. No relationship exists between exposure to electronic entertainment media and recreational/social behavior.

Null sub-hypotheses to be tested in relation to null hypothesis 1 were:

1a. No relationship exists between exposure to electronic entertainment media and academic achievement outcomes as measured by the SRA Reading Test.

1b. No relationship exists between exposure to electronic entertainment media and academic achievement outcomes as measured by the SRA Math Achievement Test.

1c. No relationships exist between TV program preferences and reading as measured by the SRA Reading Test.
1d. No relationships exist between TV program preferences and mathematics as measured by the SRA Math Achievement Test.

Null sub-hypotheses to be tested in relation to null hypothesis 2 were:

2a. No relationship exists between exposure to electronic entertainment media and time spent in student-initiated reading.

2b. No relationship exists between exposure to electronic entertainment media and time spent on homework.

2c. No relationship exists between the number of types of electronic media devices in the home and time spent on homework.

2d. No relationship exists between noise level preference and student-initiated reading.

2e. No relationship exists between TV program preferences and time spent in student-initiated reading.

Null sub-hypotheses to be tested in relation to null hypothesis 3 were:

3a. No relationship exists between exposure to electronic entertainment media and time spent in sedentary play.

3b. No relationship exists between exposure to electronic entertainment media and time spent in active play.

3c. No relationship exists between exposure to electronic entertainment media and time spent on hobbies.

3d. No relationship exists between exposure to electronic entertainment media and time spent talking to friends/family.
Data Analysis

Data analysis procedures were done by using SPSS/PC. Data input was verified for accuracy. Frequencies, crosstabulations, Pearson product-moment, and the Spearman correlation coefficient were used to test the hypotheses. The Pearson product-moment correlation coefficient (r) was used where the variables were continuous (i.e., interval or ratio). The Spearman rho correlation coefficient (rs) was used where the variables were ordinal or rank-ordered (Ferguson, 1959). The correlation coefficient (r) is a measure of the strength of relationship between two variables. It answers the question, How much of the variance in Y is accounted for, associated with, or determined by the variance in X (Isaac & Michael, 1985). Values obtained were tested for significance at the .01 level.
Chapter 4 presents a description of the intact sample, measurement procedures, testing of the null hypotheses, and a presentation and interpretation of the results. The study centered on whether exposure to electronic entertainment media relates to school performance. Raw data were gathered utilizing school records and the Time Tally Checklist. As a preliminary investigation, a large array of variables was examined for interrelationships. The data is presented first, followed by a discussion of the findings. Chapter 4 concludes with an analysis of those relationships which appear to emerge from the study.

The general population employed for this study was comprised of all the children in the third and fourth grades of two public elementary schools in a demographically diverse school district located in southwestern Michigan. The district was comprised of multi-racial, rural, inner-city, Chapter 1, and handicapped sub-populations. There were 97 female and 76 male respondents in the third grade and 88 female and 88 male respondents in the fourth grade. Altogether there were 185 female respondents and 164 male
respondents. Among these, 16 were learning disabled (LD) and 104 were inter-district transports (IDT).

Sub-hypotheses 1a to 1d considered possible relationships of both time spent exposed to electronic entertainment media and TV program preference with academic performance in reading and mathematics. Sub-hypotheses 2a to 2e considered possible relationships between exposure to electronic entertainment media in terms of time, number of electronic media devices in the homes and TV program preference and academically related activities such as student-initiated reading, and homework. Also considered was the possible relationship between noise level preferences and student-initiated reading. Sub-hypotheses 3a to 3d considered possible relationships between recreational behavior such as passive play, active play, and hobbies as well as informal talk, and time spent exposed to electronic entertainment media. The sub-hypotheses were tested at the .01 level of significance.

Null Hypothesis Involving Formal Academic Performance

Null sub-hypotheses 1a to 1d consider possible relationships between exposure to electronic entertainment media and formal academic performance in reading and mathematics as well as possible relationships between TV program preferences and formal academic performance in reading and mathematics.
Null Hypothesis 1:

Null Hypothesis 1 states: No relationship exists between exposure to electronic entertainment media and formal academic performance.

Null sub-hypothesis 1a

Null sub-hypothesis 1a states: No relationship exists between exposure to electronic entertainment media and academic achievement outcomes as measured by the SRA Reading Test.

Grade 3 respondents were reading at the fourth-grade, eighth-month level and performing in math at the fifth-grade, third-month level as of the fall test administration (see Table 3). Of the grade 3 respondents about 78% indicated that they watched television for about 2 hours every day (see Table 4). Grade 4 respondents were reading at the fifth-grade, seventh-month level and performing in math at the fifth-grade, fifth-month level (see Table 3). Of the grade 4 respondents about 80% indicated that for about 2 hours every day they watched television (see Table 5)--an estimate which may also include such concurrent or overlapping activities as watching video, MTV, and talking on the telephone whereas 85% indicated that they seldom or hardly ever watched educational television.

The N in Table 3 (and in the following tables) vary from the total N (n = 349) in the study because not all respondents had complete reading and mathematics scores.
TABLE 3
MEAN GRADE EQUIVALENT FOR READING AND MATH

<table>
<thead>
<tr>
<th>Grade</th>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Read</td>
<td>133</td>
<td>4.81</td>
<td>1.93</td>
<td>4.90</td>
<td>1.30</td>
<td>10.70</td>
</tr>
<tr>
<td></td>
<td>Math</td>
<td>134</td>
<td>5.26</td>
<td>1.75</td>
<td>5.00</td>
<td>1.60</td>
<td>12.70</td>
</tr>
<tr>
<td>4</td>
<td>Read</td>
<td>129</td>
<td>5.67</td>
<td>1.91</td>
<td>5.40</td>
<td>2.30</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td>Math</td>
<td>128</td>
<td>5.50</td>
<td>1.48</td>
<td>5.30</td>
<td>3.10</td>
<td>11.50</td>
</tr>
</tbody>
</table>

TABLE 4
PERCENTAGE OF STUDENT RESPONSES FOR EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA FOR GRADE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1 Never, hardly ever</th>
<th>2 Once in a while</th>
<th>3 Once or twice a week</th>
<th>4 Every 2 hrs</th>
<th>5 Every 2 hrs +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio</td>
<td>131</td>
<td>8.4</td>
<td>16.0</td>
<td>20.6</td>
<td>24.4</td>
<td>30.5</td>
</tr>
<tr>
<td>Tapes</td>
<td>127</td>
<td>10.2</td>
<td>17.3</td>
<td>19.7</td>
<td>22.1</td>
<td>30.7</td>
</tr>
<tr>
<td>Telephone</td>
<td>120</td>
<td>9.2</td>
<td>17.5</td>
<td>21.7</td>
<td>30.8</td>
<td>20.8</td>
</tr>
<tr>
<td>CDs</td>
<td>114</td>
<td>38.6</td>
<td>15.8</td>
<td>11.4</td>
<td>14.9</td>
<td>19.3</td>
</tr>
<tr>
<td>Television</td>
<td>129</td>
<td>3.9</td>
<td>6.2</td>
<td>11.6</td>
<td>23.3</td>
<td>55.0</td>
</tr>
<tr>
<td>Video</td>
<td>125</td>
<td>11.2</td>
<td>25.6</td>
<td>15.2</td>
<td>15.2</td>
<td>32.8</td>
</tr>
<tr>
<td>MTV</td>
<td>121</td>
<td>24.8</td>
<td>17.4</td>
<td>9.1</td>
<td>16.5</td>
<td>32.2</td>
</tr>
<tr>
<td>Computer</td>
<td>117</td>
<td>19.7</td>
<td>22.2</td>
<td>22.2</td>
<td>14.5</td>
<td>21.4</td>
</tr>
<tr>
<td>Ed TV</td>
<td>112</td>
<td>59.8</td>
<td>18.8</td>
<td>6.3</td>
<td>3.6</td>
<td>11.6</td>
</tr>
</tbody>
</table>


TABLE 5
PERCENTAGE OF STUDENT RESPONSES FOR EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA FOR GRADE 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1 Never, hardly ever</th>
<th>2 Once in a while</th>
<th>3 Once or twice a week</th>
<th>4 Every 2 hrs. -</th>
<th>5 Every 2 hrs. +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio</td>
<td>132</td>
<td>3.8</td>
<td>7.6</td>
<td>15.2</td>
<td>29.6</td>
<td>43.9</td>
</tr>
<tr>
<td>Tapes</td>
<td>132</td>
<td>4.6</td>
<td>9.1</td>
<td>15.2</td>
<td>30.3</td>
<td>40.9</td>
</tr>
<tr>
<td>Telephone</td>
<td>128</td>
<td>6.3</td>
<td>13.3</td>
<td>21.9</td>
<td>26.6</td>
<td>32.0</td>
</tr>
<tr>
<td>CDs</td>
<td>128</td>
<td>31.3</td>
<td>9.4</td>
<td>10.2</td>
<td>20.3</td>
<td>28.9</td>
</tr>
<tr>
<td>Television</td>
<td>137</td>
<td>1.5</td>
<td>8.8</td>
<td>10.2</td>
<td>21.2</td>
<td>58.4</td>
</tr>
<tr>
<td>Video</td>
<td>134</td>
<td>3.7</td>
<td>19.4</td>
<td>21.6</td>
<td>17.9</td>
<td>37.3</td>
</tr>
<tr>
<td>MTV</td>
<td>129</td>
<td>24.8</td>
<td>12.4</td>
<td>16.3</td>
<td>21.2</td>
<td>24.8</td>
</tr>
<tr>
<td>Computer</td>
<td>127</td>
<td>23.6</td>
<td>20.5</td>
<td>10.2</td>
<td>22.1</td>
<td>23.6</td>
</tr>
<tr>
<td>Ed TV</td>
<td>126</td>
<td>69.1</td>
<td>15.9</td>
<td>4.0</td>
<td>4.0</td>
<td>7.1</td>
</tr>
</tbody>
</table>

Grade 3. A significant positive relationship was found (see Table 6) between the amount of time spent listening to audio cassette tapes \((r = .22, \ P < 0.01)\) and reading as measured by scores on the SRA Reading Test. Students who spent more time listening to audio tapes tended to have higher reading scores.

No significant relationship was found (see Table 6) between reading as measured by scores on the SRA Reading Test and the amount of time spent listening to the radio, using the telephone, listening to compact disks, watching...
television, watching videos, watching MTV, using computers, or watching educational television.

Therefore, hypothesis 1a is rejected for grade 3 with respect to listening to audio cassette tapes and is retained for grade 3 with respect to listening to radio, CDs, and telephone, and to watching television, video, MTV, computer and educational television.

TABLE 6
CORRELATION BETWEEN EEM AND READING

<table>
<thead>
<tr>
<th>Variable</th>
<th>3rd Grade</th>
<th>4th Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Rho</td>
</tr>
<tr>
<td>Radio</td>
<td>129</td>
<td>0.09</td>
</tr>
<tr>
<td>Tapes</td>
<td>125</td>
<td>0.22*</td>
</tr>
<tr>
<td>Telephone</td>
<td>118</td>
<td>-0.007</td>
</tr>
<tr>
<td>CDs</td>
<td>113</td>
<td>0.11</td>
</tr>
<tr>
<td>Television</td>
<td>127</td>
<td>0.06</td>
</tr>
<tr>
<td>Video</td>
<td>123</td>
<td>-0.12</td>
</tr>
<tr>
<td>MTV</td>
<td>119</td>
<td>-0.09</td>
</tr>
<tr>
<td>Computer</td>
<td>115</td>
<td>-0.10</td>
</tr>
<tr>
<td>Ed TV</td>
<td>110</td>
<td>-0.02</td>
</tr>
</tbody>
</table>

* P < .01. ** P < .0001.
Grade 4. A significant negative relationship was found (see Table 6) between reading as measured by scores on the SRA Reading Test and the amount of time spent listening to compact disks ($r = -0.21, P < 0.01$), and watching MTV ($r = -0.30, P < 0.001$). Students who spent less time listening to CDs or watching MTV tended to have higher reading scores.

No significant relationship was found (see Table 6) between reading as measured by scores on the SRA Reading Test and the amount of time spent listening to radio, listening to audio cassette tapes, using the telephone, watching television, watching video tapes, using computers, or watching educational television.

Therefore, hypothesis 1a is rejected for grade 4 with respect to listening to CDs and to watching MTV and is retained for grade 4 with respect to listening to radio, audio cassette tapes, and telephone and to watching television, video, computer, and educational television.

Null sub-hypothesis 1b

Null sub-hypothesis 1b states: No relationship exists between exposure to electronic entertainment media and academic achievement outcomes as measured by the SRA Math Achievement Test.

Grade 3. A significant positive relationship was found (see Table 7) between the amount of time spent listening to audio cassette tapes ($r = 0.21, P < 0.01$) and mathematics as measured by scores on the SRA Math
Achievement Test. Students who spent more time listening to tapes tended to have higher mathematics scores.

No significant relationship was found (see Table 7) between the amount of time spent listening to the radio, using the telephone, listening to compact disks, watching television, watching videos, watching MTV, using computers, or watching educational television and mathematics as measured by scores on the SRA Math Achievement Test.

Therefore, hypothesis 1b is rejected for grade 3 with respect to listening to audio cassette tapes and is retained for grade 3 with respect to listening to radio, telephone, and CDs, and watching television, video, MTV, computer, and educational television.

Grade 4. A significant negative relationship was found (see Table 7) between the amount of time spent listening to compact disks ($r = -0.22, P < 0.01$), and watching MTV ($r = -0.24, P < 0.01$) and mathematics as measured by scores on the SRA Math Achievement Test. Students who spent more time listening to CDs or watching MTV tended to have lower mathematics scores.

No significant relationship was found (see Table 7) between the amount of time spent listening to radio, listening to audio cassette tapes, using the telephone, watching television, watching video tapes, using computers, or watching educational television and mathematics as measured by scores on the SRA Math Achievement Test.

Therefore, hypothesis 1b is rejected for grade 4 with respect to listening to CDs and watching MTV and is retained for grade 4 with respect to listening to
### TABLE 7
CORRELATION BETWEEN EEM AND MATH

<table>
<thead>
<tr>
<th>Variable</th>
<th>3rd Grade</th>
<th>4th Grade</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Rho</td>
<td>N</td>
</tr>
<tr>
<td>Radio</td>
<td>129</td>
<td>0.10</td>
<td>121</td>
</tr>
<tr>
<td>Tapes</td>
<td>125</td>
<td>0.21*</td>
<td>122</td>
</tr>
<tr>
<td>Telephone</td>
<td>118</td>
<td>0.06</td>
<td>119</td>
</tr>
<tr>
<td>CDs</td>
<td>113</td>
<td>0.12</td>
<td>119</td>
</tr>
<tr>
<td>Television</td>
<td>127</td>
<td>0.07</td>
<td>126</td>
</tr>
<tr>
<td>Video</td>
<td>123</td>
<td>0.05</td>
<td>124</td>
</tr>
<tr>
<td>MTV</td>
<td>119</td>
<td>-0.07</td>
<td>119</td>
</tr>
<tr>
<td>Computer</td>
<td>115</td>
<td>0.005</td>
<td>118</td>
</tr>
<tr>
<td>Ed TV</td>
<td>110</td>
<td>0.01</td>
<td>117</td>
</tr>
</tbody>
</table>

* P < .01.

radio, audio cassette tapes, and telephone and watching television, video, MTV, computer, and educational television.

Null sub-hypothesis 1c

Null sub-hypothesis 1c states: No relationship exists between TV program preferences and reading as measured by the SRA Reading Test.
Grade 3. On a scale of 1 to 7, their mean preference for EEM programming (see Table 8) ranged from sports as first choice (32.8%) to educational television programming as last choice (0.8%). Following sports, the order of preference was cartoons, music, and movies. These choices together were preferred by 97.8%. The aversion to educational television was striking.

No significant relationship was found (see Table 10) between reading as measured by scores on the SRA Reading Test and a preference for watching sports programs, movies, quiz shows, cartoons, educational programs, music programs, or comedy programs.

Therefore, hypothesis 1c is retained for grade 3 with respect to all EEM variables analyzed in the study.

Grade 4. On a scale of 1 to 7, their preference for EEM programming (see Table 9) ranged from sports as first choice (25.8%) to educational television programming as last choice (0.0%). Following sports, the order of preference was movies, cartoons, and music. These choices together were preferred by 88%. However, the order of preference shifted and was broadened as well--preference for comedy was decreased compared to grade three. The aversion to educational television increased among fourth grade respondents.

No significant relationship was found (see Table 10) between reading as measured by scores on the SRA Reading Test and a preference for watching sports programs, movies, quiz shows, cartoons, educational programs, music programs, or comedy programs.

Therefore, hypothesis 1c is retained for grade 4.
TABLE 8

SIMPLE STATISTICS FOR TV PROGRAM PREFERENCE
FOR GRADE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>*Mean</th>
<th>Std. Dev.</th>
<th>**Preference %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>130</td>
<td>3.43</td>
<td>2.23</td>
<td>32.8</td>
</tr>
<tr>
<td>Movies</td>
<td>129</td>
<td>3.07</td>
<td>1.58</td>
<td>15.0</td>
</tr>
<tr>
<td>Quiz</td>
<td>126</td>
<td>4.60</td>
<td>1.63</td>
<td>3.2</td>
</tr>
<tr>
<td>Cartoons</td>
<td>130</td>
<td>3.22</td>
<td>2.00</td>
<td>27.3</td>
</tr>
<tr>
<td>Educational</td>
<td>124</td>
<td>5.36</td>
<td>1.80</td>
<td>0.8</td>
</tr>
<tr>
<td>Music</td>
<td>130</td>
<td>3.36</td>
<td>2.02</td>
<td>22.7</td>
</tr>
<tr>
<td>Comedy</td>
<td>127</td>
<td>3.80</td>
<td>1.85</td>
<td>13.6</td>
</tr>
</tbody>
</table>

* Mean preference on a scale of 1 to 7 where 1 = most preferred, 7 = least preferred.

** Percent of 1st preference.

Null sub-hypothesis 1d

Null sub-hypothesis 1d states: No relationship exists between TV program preferences and mathematics as measured by the SRA Math Achievement Test.

**Grade 3.** No significant relationship was found between a preference for watching sports programs, movies, quiz shows, cartoons, educational programs, music programs, or comedy programs and math as measured by scores on the SRA Math Achievement Test (see Table 10).

Therefore, hypothesis 1d is retained for grade 3.
Grade 4. No significant relationship was found between a preference for watching sports programs, movies, quiz shows, cartoons, educational programs, music programs or comedy programs and math as measured by scores on the SRA Math Achievement Test (see Table 10).

Therefore, hypothesis 1d is retained for grade 4.

TABLE 9

SIMPLE STATISTICS FOR TV PROGRAM PREFERENCE
FOR GRADE 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>*Mean</th>
<th>Std. Dev.</th>
<th>**Preference %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>135</td>
<td>3.64</td>
<td>2.19</td>
<td>25.8</td>
</tr>
<tr>
<td>Movies</td>
<td>135</td>
<td>2.97</td>
<td>1.60</td>
<td>21.6</td>
</tr>
<tr>
<td>Quiz</td>
<td>134</td>
<td>4.55</td>
<td>1.60</td>
<td>4.0</td>
</tr>
<tr>
<td>Cartoons</td>
<td>136</td>
<td>3.51</td>
<td>1.95</td>
<td>20.6</td>
</tr>
<tr>
<td>Educational</td>
<td>135</td>
<td>5.64</td>
<td>1.80</td>
<td>0.0</td>
</tr>
<tr>
<td>Music</td>
<td>135</td>
<td>3.53</td>
<td>2.01</td>
<td>19.2</td>
</tr>
<tr>
<td>Comedy</td>
<td>134</td>
<td>3.78</td>
<td>1.70</td>
<td>9.7</td>
</tr>
</tbody>
</table>

* Mean preference on a scale of 1 to 7 where 1 = most preferred, 7 = least preferred.

** Percent of 1st preference.

Summary of Hypothesis 1

By a large majority, both grades eschewed educational television and preferred regular television programming. Nineteen percent more fourth-grade respondents reported listening to radio 2 hours or more daily than did third-grade respondents. A pattern became evident in contrasting correlational
values between third- and fourth-grade respondents with respect to reading and mathematics. In both reading and mathematics for grade 3 respondents, video tapes and reading \( r = .22 \) and video tapes and mathematics \( r = .21 \) were positively correlated whereas in both reading and mathematics for grade 4 respondents, CD and reading \( r = -.21 \), MTV and reading \( r = -.30 \), CD and mathematics \( r = -.22 \), and MTV and mathematics \( r = -.24 \) were negatively correlated. No significant correlations were found between television program preference and reading/mathematics for either grade. However, the contrast between a preference for movies (68% of both third- and fourth-grade respondents) and a preference for educational television programming (16% of third-grade, 17% of fourth-grade) illustrates a phenomenon consistent throughout this study.

**Null Hypotheses Involving Academically Related Activities**

Null sub-hypotheses 2a to 2e considered possible relationships between exposure to electronic entertainment media in terms of time, number of electronic media devices in the home, and TV program preference and academically related activities such as student-initiated reading, and homework. The possible relationship between noise level preference and student-initiated reading was also considered.

**Null Hypothesis 2**

Null Hypothesis 2 states: No relationship exists between exposure to electronic entertainment media and discretionary academic activities.
### TABLE 10

CORRELATION BETWEEN READING, MATH, AND TV PROGRAM PREFERENCE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Grade 3 Reading</th>
<th>Grade 3 Math</th>
<th>Grade 4 Reading</th>
<th>Grade 4 Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>0.03</td>
<td>-0.08</td>
<td>0.02</td>
<td>-0.09</td>
</tr>
<tr>
<td></td>
<td>N 128</td>
<td>128</td>
<td>N 126</td>
<td>125</td>
</tr>
<tr>
<td>Movies</td>
<td>0.04</td>
<td>0.01</td>
<td>-0.04</td>
<td>-0.03</td>
</tr>
<tr>
<td></td>
<td>N 127</td>
<td>127</td>
<td>N 127</td>
<td>125</td>
</tr>
<tr>
<td>Quiz</td>
<td>-0.02</td>
<td>-0.05</td>
<td>-0.02</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>N 124</td>
<td>124</td>
<td>N 127</td>
<td>125</td>
</tr>
<tr>
<td>Cartoon</td>
<td>0.08</td>
<td>0.01</td>
<td>-0.03</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td>N 124</td>
<td>128</td>
<td>N 128</td>
<td>125</td>
</tr>
<tr>
<td>Educational</td>
<td>-0.04</td>
<td>-0.04</td>
<td>0.06</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>N 123</td>
<td>123</td>
<td>N 127</td>
<td>125</td>
</tr>
<tr>
<td>Music</td>
<td>0.08</td>
<td>0.21</td>
<td>0.19</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>N 128</td>
<td>128</td>
<td>N 127</td>
<td>125</td>
</tr>
<tr>
<td>Comedy</td>
<td>-0.10</td>
<td>0.005</td>
<td>-0.11</td>
<td>-0.06</td>
</tr>
<tr>
<td></td>
<td>N 125</td>
<td>125</td>
<td>N 126</td>
<td>124</td>
</tr>
</tbody>
</table>

* P < .01.

Null sub-hypothesis 2a

Null sub-hypothesis 2a states: No relationship exists between exposure to electronic entertainment media and time spent in student-initiated reading.

**Grade 3.** Of grade 3 respondents (N=166), 41.6% indicated that they seldom or hardly ever read books, whereas 37.9% indicated that they read
books daily. Nearly 55% indicated that they seldom or hardly ever read newspapers and 17.4% indicated that they read newspapers daily. Nearly 61% indicated that they seldom or hardly ever read letters and 18.5% indicated that they read letters daily (see Table 11).

A significant positive relationship was found between the following three variables (see Table 12):

1. Time spent reading books and watching educational television ($r = .28$, $P < 0.0006$) (Students who spent more time watching educational television also tended to spend more time reading books.)

2. Time spent reading newspapers and listening to radios ($r = .21$, $P < 0.005$), listening to audio cassette tapes ($r = .22$, $P < 0.009$), listening to compact disks ($r = .26$, $P < 0.002$), or watching educational television ($r = .22$, $P < 0.009$) (Students who spent more time listening to radios, audio cassette tapes, CDs, or watching MTV also tended to spend more time reading newspapers.)

3. Time spent reading letters and listening to radios ($r = .30$, $P < 0.0002$), listening to audio cassette tapes ($r = .28$, $P < 0.0006$), using the telephone ($r = .22$, $P < 0.009$), listening to compact disks ($r = .34$, $P < 0.0001$) (Students who spent more time listening to radios, audio cassette tapes, using the telephone, and listening to CDs, also tended to spend more time reading letters.)
TABLE 11

PERCENTAGE OF STUDENT RESPONSES FOR STUDENT-INITIATED READING FOR GRADE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percentage of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Never, hardly ever</td>
</tr>
<tr>
<td>Books</td>
<td>166</td>
<td>14.5</td>
</tr>
<tr>
<td>Newspapers</td>
<td>155</td>
<td>21.3</td>
</tr>
<tr>
<td>Letters</td>
<td>151</td>
<td>24.5</td>
</tr>
</tbody>
</table>

TABLE 12

CORRELATION BETWEEN EEM AND STUDENT-INITIATED READING FOR GRADE 3

<table>
<thead>
<tr>
<th>Reading</th>
<th>Rho with EEM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Radio Tapes</td>
</tr>
<tr>
<td>Books</td>
<td>0.09</td>
</tr>
<tr>
<td>Newspapers</td>
<td>0.21*</td>
</tr>
<tr>
<td>Letters</td>
<td>0.30*</td>
</tr>
</tbody>
</table>

* P < .01.

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No significant relationship was found between:

1. Time spent reading books and time spent listening to the radio, listening to audio cassette tapes, using the telephone, listening to compact disks, watching television, watching video cassette tapes, watching MTV, or using computers

2. Time spent reading newspapers and time spent using the telephone, watching television, watching video cassette tapes, using computers, or watching educational television

3. Time spent reading letters and time spent watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television. (See Table 12.)

Therefore, hypothesis 2a is rejected for grade 3 with respect to reading books and watching educational TV; reading newspapers, and listening to radio, listening to audio cassette tapes, listening to CDs, and watching educational television; and reading letters, and listening to radio, listening to audio cassette tapes, using the telephone, and listening to CDs. Hypothesis 2a is retained for grade 3 with respect to reading books and listening to radio, listening to audio cassette tapes, using the telephone, and listening to CDs and watching television, watching video, watching MTV, and using the computer; reading newspapers, with listening to telephone and watching television, watching video, watching MTV, and using the computer; and reading letters, with watching television, watching video, watching MTV, using the computer, and watching educational television.
Grade 4. About 25% of grade 4 respondents indicated that they seldom or hardly ever read books, whereas 47.1% indicated that they read books daily. About 53% indicated that they seldom or hardly ever read newspapers and 19.7% indicated that they read newspapers daily. About 47% indicated that they seldom or hardly ever read letters, and 29.6% indicated that they read letters daily (see Table 13).

A significant positive relationship was found between time spent reading letters and time spent listening to audio cassette tapes ($r = .22, P < 0.006$), or using the telephone ($r = .33, P < 0.0001$). (See Table 14.) Students who spent more time listening to audio cassette tapes, or using the telephone also spent more time reading letters.

No significant relationship was found between:
1. Time spent reading books and time spent listening to radios, listening to audio cassette tapes, using the telephone, listening to compact disks, watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television disks, watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television
2. Time spent reading newspapers and time spent listening to radios, listening to audio cassette tapes, using the telephone, listening to compact
3. Time spent reading letters and time spent listening to radios, watching compact disks, watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television. (See Table 14.)

Therefore, hypothesis 2a is rejected for grade 4 with respect to reading letters and listening to audio cassette tapes or the telephone and is retained for
### TABLE 13
PERCENTAGE OF STUDENT RESPONSES FOR STUDENT-INITIATED READING FOR GRADE 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Percentage of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td></td>
<td>Never, hardly ever</td>
<td>Once in a while</td>
</tr>
<tr>
<td>Books</td>
<td>170</td>
<td>5.3</td>
</tr>
<tr>
<td>Newspapers</td>
<td>163</td>
<td>25.8</td>
</tr>
<tr>
<td>Letters</td>
<td>152</td>
<td>14.5</td>
</tr>
</tbody>
</table>

### TABLE 14
CORRELATION BETWEEN EEM AND STUDENT-INITIATED READING FOR GRADE 4

<table>
<thead>
<tr>
<th>Rho with EEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
</tr>
<tr>
<td>Books</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>Newspapers</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>Letters</td>
</tr>
<tr>
<td>N</td>
</tr>
</tbody>
</table>

*P < .01.
grade 4 with respect to reading books, newspapers, or letters and all categories of EEM.

Null sub-hypothesis 2b

Null sub-hypothesis 2b states: No relationship exists between exposure to electronic entertainment media and time spent on homework.

Grade 3. Among third-grade respondents, 58.9% spent a few minutes each day on homework (see Table 15).

No significant relationship was found between time spent on homework and time spent listening to radios, listening to audio cassette tapes, using the telephone, listening to compact disks, watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television. (See Table 16.)

Therefore, hypothesis 2b is retained for grade 3.

Grade 4. Among fourth-grade respondents 64.4% spent an hour or more each day on homework (see Table 15).

No significant relationship was found between time spent doing homework and time spent listening to radios, listening to audio cassette tapes, using the telephone, listening to compact disks, watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television. (See Table 16.)
TABLE 15
PERCENTAGE OF STUDENT RESPONSES FOR THE AMOUNT OF TIME SPENT ON HOMEWORK

<table>
<thead>
<tr>
<th>Grade Variable</th>
<th>N</th>
<th>Percentage of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Not any</td>
<td>A few minutes</td>
</tr>
<tr>
<td>3</td>
<td>168</td>
<td>7.1</td>
</tr>
<tr>
<td>4</td>
<td>177</td>
<td>4.0</td>
</tr>
</tbody>
</table>

TABLE 16
CORRELATION BETWEEN EEM AND HOMEWORK

<table>
<thead>
<tr>
<th>Variables</th>
<th>Grade 3</th>
<th>Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Rho</td>
</tr>
<tr>
<td>Radio</td>
<td>161</td>
<td>0.06</td>
</tr>
<tr>
<td>Audio Tapes</td>
<td>158</td>
<td>0.09</td>
</tr>
<tr>
<td>Telephone</td>
<td>151</td>
<td>0.04</td>
</tr>
<tr>
<td>CDs</td>
<td>141</td>
<td>0.09</td>
</tr>
<tr>
<td>Television</td>
<td>161</td>
<td>-0.11</td>
</tr>
<tr>
<td>Video Tapes</td>
<td>157</td>
<td>-0.11</td>
</tr>
<tr>
<td>MTV</td>
<td>153</td>
<td>-0.09</td>
</tr>
<tr>
<td>Computer</td>
<td>149</td>
<td>-0.06</td>
</tr>
<tr>
<td>Ed TV</td>
<td>143</td>
<td>-0.06</td>
</tr>
</tbody>
</table>

* P < .01.
Therefore, hypothesis 2b is retained for grade 4.

Null sub-hypothesis 2c

Null sub-hypothesis 2c states: No relationship exists between the number of types of electronic media devices in the home and time spent on homework.

Grade 3. About 1% of third-grade respondents reported having only one EEM device in the home whereas nearly 61% reported having 6 EEM devices (TV, radio, computer, walkman, video game, VCR) in the home (see Table 18). Nearly 60% of third-grade respondents reported doing homework a few minutes a day (see Table 15).

No significant relationship was found (see Table 17) between time spent on homework and the number of different types of EEM devices in the home: television sets, computers, walkman sets, Nintendo-type games, radios, and video cassette players.

Therefore, hypothesis 2c is retained for grade 3.

Grade 4. Only 2.8% of fourth-grade respondents reported having one EEM device in the home whereas nearly 70% reported having 6 EEM devices in the home (see Table 18). Nearly 55% reported doing homework 1 hour per day (see Table 15).

No significant relationship was found (see Table 17) between time spent on homework and the number of different types of EEM devices in the home.
TABLE 17
CORRELATION BETWEEN THE NUMBER OF DIFFERENT TYPES OF EEM DEVICES IN THE HOME AND TIME SPENT ON HOMEWORK

<table>
<thead>
<tr>
<th></th>
<th>Grade 3 N</th>
<th>Grade 4 N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>-0.07</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>168</td>
<td>177</td>
</tr>
</tbody>
</table>

TABLE 18
PERCENTAGE OF STUDENT RESPONSES FOR THE NUMBER OF DIFFERENT TYPES OF EEM DEVICES IN HOMES

<table>
<thead>
<tr>
<th>Grade Variables</th>
<th>N</th>
<th>1 Device</th>
<th>2 Devices</th>
<th>3 Devices</th>
<th>4 Devices</th>
<th>5 Devices</th>
<th>6 Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>170</td>
<td>1.2</td>
<td>2.4</td>
<td>9.4</td>
<td>24.7</td>
<td>42.9</td>
<td>18.8</td>
</tr>
<tr>
<td>4</td>
<td>177</td>
<td>2.8</td>
<td>2.3</td>
<td>3.4</td>
<td>20.3</td>
<td>49.7</td>
<td>20.9</td>
</tr>
</tbody>
</table>

television sets, computers, Walkman sets, Nintendo-type games, radios, and video cassette players.

Therefore, hypothesis 2c is retained for grade 4.

Null sub-hypothesis 2d

Null sub-hypothesis 2d states: No relationship exists between noise-level preference and time spent in student-initiated reading.
Grade 3. Less than one-fifth (18.8%) of third-grade respondents preferred no noise while doing homework (see Table 19). Reinforcing a perception present in much of the literature is the finding that nearly 75% of them found noise at some level a preferred ambient element. No significant relationship was found between noise preference and reading books, newspapers, or letters (see Table 20).

Therefore, hypothesis 2d is retained for grade 3.

Grade 4. Only 13.6% of fourth-grade respondents preferred no noise while doing homework. Nearly 80% preferred some noise. More (10.4%) fourth-grade respondents than third-grade respondents preferred a lot of noise.

No significant relationship was found between noise-level preference and reading books, newspapers or letters (see Table 20).

Therefore, hypothesis 2d is retained for grade 4.

TABLE 19

PERCENTAGE OF STUDENT RESPONSES FOR NOISE-LEVEL PREFERENCE

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>1 No Noise</th>
<th>2 A Little Noise</th>
<th>3 A Lot of Noise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 3</td>
<td>170</td>
<td>18.8</td>
<td>38.8</td>
<td>35.9</td>
</tr>
<tr>
<td>Grade 4</td>
<td>177</td>
<td>13.6</td>
<td>32.8</td>
<td>46.3</td>
</tr>
</tbody>
</table>
TABLE 20
CORRELATION BETWEEN NOISE PREFERENCE
AND STUDENT-INITIATED READING

<table>
<thead>
<tr>
<th>Variables</th>
<th>Grade 3</th>
<th>Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Rho</td>
</tr>
<tr>
<td>Books</td>
<td>166</td>
<td>0.14</td>
</tr>
<tr>
<td>Newspapers</td>
<td>155</td>
<td>-0.04</td>
</tr>
<tr>
<td>Letters</td>
<td>151</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Null sub-hypothesis 2e

Null sub-hypothesis 2e states: No relationship exists between TV program preferences and time spent on student initiated-reading.

Grade 3 respondents preferred watching sports, cartoons, music, and movies, in that order (see Table 21). Grade 4 respondents preferred watching sports, movies, cartoons, and music, in that order (see Table 22). Sports ranked first by both grades more consistently, with cartoons and music second. Both groups least preferred quiz and educational programs.

On a scale from 1 (most preferred) to 7, the mean for movies, the most preferred programming of third-grade respondents, was 3.06 (see Table 23). The mean for educational programming, their least preferred programming, was 5.26. The mean for movies, the most preferred programming of fourth-grade respondents as well, was 2.88 (see Table 24). The mean for educational programming, their least preferred programming, was 5.57. Fourth-grade
### TABLE 21
**PERCENTAGE OF STUDENT RESPONSES FOR PREFERRED PROGRAMMING FOR GRADE 3**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Least</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>161</td>
<td>29.8</td>
<td>14.3</td>
<td>8.1</td>
<td>11.2</td>
<td>10.6</td>
<td>11.8</td>
<td>14.3</td>
</tr>
<tr>
<td>Movies</td>
<td>161</td>
<td>16.8</td>
<td>25.5</td>
<td>26.1</td>
<td>11.8</td>
<td>10.6</td>
<td>5.6</td>
<td>3.7</td>
</tr>
<tr>
<td>Quiz</td>
<td>154</td>
<td>4.5</td>
<td>7.8</td>
<td>15.6</td>
<td>18.8</td>
<td>22.1</td>
<td>16.9</td>
<td>14.3</td>
</tr>
<tr>
<td>Cartoons</td>
<td>160</td>
<td>25.6</td>
<td>18.8</td>
<td>12.5</td>
<td>16.3</td>
<td>9.4</td>
<td>10.0</td>
<td>7.5</td>
</tr>
<tr>
<td>Educational</td>
<td>155</td>
<td>7.7</td>
<td>4.5</td>
<td>5.8</td>
<td>8.4</td>
<td>16.1</td>
<td>23.9</td>
<td>33.5</td>
</tr>
<tr>
<td>Music</td>
<td>163</td>
<td>23.9</td>
<td>18.4</td>
<td>14.7</td>
<td>12.3</td>
<td>12.3</td>
<td>8.6</td>
<td>9.8</td>
</tr>
<tr>
<td>Comedy</td>
<td>157</td>
<td>12.7</td>
<td>17.8</td>
<td>17.2</td>
<td>15.9</td>
<td>14.0</td>
<td>13.4</td>
<td>8.9</td>
</tr>
</tbody>
</table>

### TABLE 22
**PERCENTAGE OF STUDENT RESPONSES FOR PREFERRED PROGRAMMING FOR GRADE 4**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Least</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>168</td>
<td>25.6</td>
<td>13.7</td>
<td>11.9</td>
<td>8.9</td>
<td>9.5</td>
<td>17.3</td>
<td>13.1</td>
</tr>
<tr>
<td>Movies</td>
<td>170</td>
<td>21.8</td>
<td>25.3</td>
<td>23.5</td>
<td>14.1</td>
<td>6.5</td>
<td>5.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Quiz</td>
<td>167</td>
<td>4.8</td>
<td>7.8</td>
<td>13.8</td>
<td>15.6</td>
<td>25.1</td>
<td>21.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Cartoons</td>
<td>172</td>
<td>21.5</td>
<td>16.9</td>
<td>15.1</td>
<td>14.0</td>
<td>12.8</td>
<td>11.6</td>
<td>8.1</td>
</tr>
<tr>
<td>Educational</td>
<td>167</td>
<td>5.4</td>
<td>2.4</td>
<td>7.8</td>
<td>7.8</td>
<td>12.6</td>
<td>18.6</td>
<td>45.5</td>
</tr>
<tr>
<td>Music</td>
<td>169</td>
<td>18.9</td>
<td>19.5</td>
<td>14.8</td>
<td>16.6</td>
<td>10.7</td>
<td>9.5</td>
<td>10.1</td>
</tr>
<tr>
<td>Comedy</td>
<td>167</td>
<td>9.0</td>
<td>18.0</td>
<td>15.6</td>
<td>21.0</td>
<td>18.6</td>
<td>12.6</td>
<td>5.4</td>
</tr>
</tbody>
</table>

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### TABLE 23
SIMPLE STATISTICS FOR TV PROGRAM PREFERENCE FOR GRADE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean *</th>
<th>Std. Dev.</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>161</td>
<td>3.51</td>
<td>2.23</td>
<td>3.00</td>
</tr>
<tr>
<td>Movies</td>
<td>161</td>
<td>3.06</td>
<td>1.61</td>
<td>3.00</td>
</tr>
<tr>
<td>Quiz</td>
<td>154</td>
<td>4.54</td>
<td>1.67</td>
<td>5.00</td>
</tr>
<tr>
<td>Cartoons</td>
<td>160</td>
<td>3.25</td>
<td>1.95</td>
<td>3.00</td>
</tr>
<tr>
<td>Educational</td>
<td>155</td>
<td>5.26</td>
<td>1.87</td>
<td>6.00</td>
</tr>
<tr>
<td>Music</td>
<td>163</td>
<td>3.36</td>
<td>2.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Comedy</td>
<td>157</td>
<td>3.76</td>
<td>1.86</td>
<td>4.00</td>
</tr>
</tbody>
</table>

* Mean Preference 1 = Most, 7 = Least.

### TABLE 24
SIMPLE STATISTICS FOR TV PROGRAM PREFERENCE FOR GRADE 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean *</th>
<th>Std. Dev.</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>168</td>
<td>3.67</td>
<td>2.20</td>
<td>3.00</td>
</tr>
<tr>
<td>Movies</td>
<td>170</td>
<td>2.88</td>
<td>1.60</td>
<td>3.00</td>
</tr>
<tr>
<td>Quiz</td>
<td>167</td>
<td>4.59</td>
<td>1.60</td>
<td>5.00</td>
</tr>
<tr>
<td>Cartoons</td>
<td>172</td>
<td>3.47</td>
<td>1.96</td>
<td>3.00</td>
</tr>
<tr>
<td>Educational</td>
<td>167</td>
<td>5.57</td>
<td>1.78</td>
<td>6.00</td>
</tr>
<tr>
<td>Music</td>
<td>169</td>
<td>3.49</td>
<td>1.95</td>
<td>3.00</td>
</tr>
<tr>
<td>Comedy</td>
<td>167</td>
<td>3.81</td>
<td>1.68</td>
<td>4.00</td>
</tr>
</tbody>
</table>

* Mean Preference 1 = Most, 7 = Least.
TABLE 25
CORRELATION BETWEEN TV PREFERENCE AND READING
FOR GRADE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Book</th>
<th>Newspaper</th>
<th>Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>-0.005</td>
<td>0.05</td>
<td>0.13</td>
</tr>
<tr>
<td>N</td>
<td>159</td>
<td>149</td>
<td>145</td>
</tr>
<tr>
<td>Movies</td>
<td>0.03</td>
<td>-0.04</td>
<td>-0.009</td>
</tr>
<tr>
<td>N</td>
<td>158</td>
<td>148</td>
<td>144</td>
</tr>
<tr>
<td>Quiz</td>
<td>-0.09</td>
<td>-0.24*</td>
<td>-0.04</td>
</tr>
<tr>
<td>N</td>
<td>152</td>
<td>142</td>
<td>138</td>
</tr>
<tr>
<td>Cartoons</td>
<td>0.18</td>
<td>0.08</td>
<td>0.16</td>
</tr>
<tr>
<td>N</td>
<td>158</td>
<td>147</td>
<td>141</td>
</tr>
<tr>
<td>Educational</td>
<td>-0.01</td>
<td>0.03</td>
<td>0.08</td>
</tr>
<tr>
<td>N</td>
<td>153</td>
<td>143</td>
<td>139</td>
</tr>
<tr>
<td>Music</td>
<td>0.02</td>
<td>0.009</td>
<td>-0.17</td>
</tr>
<tr>
<td>N</td>
<td>161</td>
<td>151</td>
<td>145</td>
</tr>
<tr>
<td>Comedy</td>
<td>0.07</td>
<td>0.001</td>
<td>-0.03</td>
</tr>
<tr>
<td>N</td>
<td>155</td>
<td>145</td>
<td>140</td>
</tr>
</tbody>
</table>

* P < .01.

preference were less strongly reflected than were those of the third-grade respondents. Six of the seven ratings were only slightly less preferred than were those of third-grade; there was no consistent difference in percentage of preference for any one rating.

**Grade 3.** A significant negative relationship was found between student-initiated reading (newspapers) and quiz shows \( r = -.24, P < 0.004 \) (see Table
Students who spent more time watching quiz shows tended to spend less time reading newspapers.

No significant relationship was found between time spent in student initiated reading (see Table 25) and (1) books or letters and time spent watching sports programs, movies, quiz shows, cartoons, educational programs, music programs, or comedy programs; and (2) newspapers and time spent watching sports programs, movies, cartoons, educational programs, music or comedy.

Therefore, hypothesis 2e is rejected for grade 3 with respect to reading newspapers and watching quiz shows, and retained for grade 3 with respect to reading books and letters and to all other EEM variables analyzed by the study.

Grade 4. No significant relationship was found between time spent in student-initiated reading (see Table 26) of books, newspapers, or letters, and time spent watching sports programs, movies, quiz shows, cartoons, educational programs, music programs, or comedy programs.

Therefore, hypothesis 2e is retained for grade 4.

Summary of Hypothesis 2

The only significant correlational activity between EEM and reading books emerged in watching educational television (third-grade). Also, for grade 3, considerably more significant correlations emerged between EEM and reading newspapers or letters. Just why this profile emerged is not readily explainable without further treatment. Fourth-grade respondents showed no correlational activity between EEM and reading except for listening to audio tapes and the
TABLE 26
CORRELATION BETWEEN TV PREFERENCE AND READING
FOR GRADE 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>Book</th>
<th>Newspaper</th>
<th>Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports</td>
<td>-0.006</td>
<td>-0.01</td>
<td>0.16</td>
</tr>
<tr>
<td>N</td>
<td>163</td>
<td>157</td>
<td>147</td>
</tr>
<tr>
<td>Movies</td>
<td>0.09</td>
<td>0.01</td>
<td>-0.09</td>
</tr>
<tr>
<td>N</td>
<td>164</td>
<td>158</td>
<td>147</td>
</tr>
<tr>
<td>Quiz</td>
<td>-0.07</td>
<td>-0.17</td>
<td>-0.19</td>
</tr>
<tr>
<td>N</td>
<td>162</td>
<td>157</td>
<td>146</td>
</tr>
<tr>
<td>Cartoons</td>
<td>-0.005</td>
<td>-0.02</td>
<td>0.10</td>
</tr>
<tr>
<td>N</td>
<td>166</td>
<td>159</td>
<td>148</td>
</tr>
<tr>
<td>Educational</td>
<td>-0.21</td>
<td>-0.11</td>
<td>-0.07</td>
</tr>
<tr>
<td>N</td>
<td>162</td>
<td>156</td>
<td>145</td>
</tr>
<tr>
<td>Music</td>
<td>0.08</td>
<td>0.09</td>
<td>-0.12</td>
</tr>
<tr>
<td>N</td>
<td>164</td>
<td>158</td>
<td>147</td>
</tr>
<tr>
<td>Comedy</td>
<td>0.007</td>
<td>0.07</td>
<td>0.03</td>
</tr>
<tr>
<td>N</td>
<td>162</td>
<td>156</td>
<td>145</td>
</tr>
</tbody>
</table>

* P < .01.

telephone with respect to reading letters. Perhaps because books are more widely read, EEM could be expected to be more related to the reading of books than the reading of newspapers or letters. However, reading volume may not account for significant relationships as much as the nature of the content. The content of newspapers and letters may correspond to the content of EEM more closely than the content of books to EEM.

For both grades, time spent doing homework appeared to be unaffected by exposure to EEM. That is, no significant difference in relationships emerged
between high and low exposure to EEM and the amount of time spent doing homework.

Three-fourths of all respondents preferred some noise while doing homework. Yet, no significant correlation between the two emerged for either grade. Five percent more fourth-grade respondents preferred noise than did third-grade respondents.

Whereas for third grade, EEM noise is significantly correlated with reading newspapers and watching quiz shows, by fourth-grade this has disappeared.

**Null Hypotheses Involving Recreational/Social Behavior**

Null sub-hypotheses 3a to 3d considered possible relationships between time spent exposed to electronic entertainment media and recreational behavior such as sedentary play, active play, and hobbies, and time spent exposed to electronic entertainment media and the social behavior of informal talk.

**TABLE 27**

**PERCENTAGE OF STUDENT RESPONSES PREFERING SEDENTARY PLAY FOR GRADE 3**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1 Never, hardly ever</th>
<th>2 Once in a while</th>
<th>3 Once or twice a week</th>
<th>4 Every day 2 hrs. -</th>
<th>5 Every day 2 hrs. +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor play</td>
<td>156</td>
<td>10.9</td>
<td>32.1</td>
<td>21.8</td>
<td>15.4</td>
<td>19.9</td>
</tr>
<tr>
<td>Goof off</td>
<td>150</td>
<td>26.0</td>
<td>15.3</td>
<td>6.0</td>
<td>16.7</td>
<td>36.0</td>
</tr>
<tr>
<td>Video games</td>
<td>149</td>
<td>22.1</td>
<td>14.8</td>
<td>6.7</td>
<td>18.8</td>
<td>37.6</td>
</tr>
</tbody>
</table>
TABLE 28
PERCENTAGE OF STUDENT RESPONSES PREFERING SEDENTARY PLAY FOR GRADE 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1 Never, hardly ever</th>
<th>2 Once in a while</th>
<th>3 Once or twice a week</th>
<th>4 Every 2 hrs. -</th>
<th>5 Every day 2 hrs. +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor play</td>
<td>165</td>
<td>9.7</td>
<td>32.1</td>
<td>29.1</td>
<td>16.4</td>
<td>12.7</td>
</tr>
<tr>
<td>Goof off</td>
<td>162</td>
<td>17.9</td>
<td>14.2</td>
<td>13.0</td>
<td>23.5</td>
<td>31.5</td>
</tr>
<tr>
<td>Video games</td>
<td>166</td>
<td>12.0</td>
<td>20.5</td>
<td>17.5</td>
<td>16.3</td>
<td>33.7</td>
</tr>
</tbody>
</table>

Note. Video games as a category of sedentary play is not to be confused with video cassette tapes as EEM.

Null Hypothesis 3

Null hypothesis 3 states: No relationship exists between exposure to electronic entertainment media and social/recreational behavior.

Null sub-hypothesis 3a

Null sub-hypothesis 3a states: No relationship exists between exposure to electronic entertainment media and time spent in sedentary play.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Grade 3</th>
<th></th>
<th></th>
<th>Grade 4</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indoor play</td>
<td>Goof off</td>
<td>Video game</td>
<td>Indoor play</td>
<td>Goof off</td>
<td>Video game</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td>0.33**</td>
<td>0.39**</td>
<td>0.31**</td>
<td>0.10</td>
<td>0.23*</td>
<td>0.10</td>
</tr>
<tr>
<td>N</td>
<td>153</td>
<td>146</td>
<td>145</td>
<td>162</td>
<td>159</td>
<td>162</td>
</tr>
<tr>
<td>Audio tapes</td>
<td>0.38**</td>
<td>0.28*</td>
<td>0.30*</td>
<td>0.19*</td>
<td>0.28*</td>
<td>0.27*</td>
</tr>
<tr>
<td>N</td>
<td>152</td>
<td>148</td>
<td>147</td>
<td>164</td>
<td>160</td>
<td>164</td>
</tr>
<tr>
<td>Telephone</td>
<td>0.22*</td>
<td>0.40**</td>
<td>0.36**</td>
<td>0.09</td>
<td>0.25*</td>
<td>0.21*</td>
</tr>
<tr>
<td>N</td>
<td>148</td>
<td>144</td>
<td>144</td>
<td>160</td>
<td>158</td>
<td>159</td>
</tr>
<tr>
<td>CDs</td>
<td>0.30*</td>
<td>0.23*</td>
<td>0.27*</td>
<td>0.10</td>
<td>0.14</td>
<td>0.27*</td>
</tr>
<tr>
<td>N</td>
<td>139</td>
<td>139</td>
<td>139</td>
<td>160</td>
<td>156</td>
<td>162</td>
</tr>
<tr>
<td>TV</td>
<td>0.17</td>
<td>0.20</td>
<td>0.35**</td>
<td>0.03</td>
<td>0.30**</td>
<td>0.28*</td>
</tr>
<tr>
<td>N</td>
<td>153</td>
<td>147</td>
<td>147</td>
<td>165</td>
<td>162</td>
<td>165</td>
</tr>
<tr>
<td>Video tapes</td>
<td>0.29*</td>
<td>0.36**</td>
<td>0.42**</td>
<td>0.17</td>
<td>0.28*</td>
<td>0.47**</td>
</tr>
<tr>
<td>N</td>
<td>150</td>
<td>146</td>
<td>145</td>
<td>164</td>
<td>160</td>
<td>164</td>
</tr>
<tr>
<td>MTV</td>
<td>0.27*</td>
<td>0.32**</td>
<td>0.27*</td>
<td>0.13</td>
<td>0.21*</td>
<td>0.37**</td>
</tr>
<tr>
<td>N</td>
<td>149</td>
<td>148</td>
<td>147</td>
<td>160</td>
<td>156</td>
<td>160</td>
</tr>
<tr>
<td>Computer</td>
<td>0.24*</td>
<td>0.15</td>
<td>0.28*</td>
<td>0.05</td>
<td>0.07</td>
<td>0.31**</td>
</tr>
<tr>
<td>N</td>
<td>146</td>
<td>143</td>
<td>143</td>
<td>158</td>
<td>156</td>
<td>159</td>
</tr>
<tr>
<td>Ed TV</td>
<td>0.05</td>
<td>-0.04</td>
<td>0.06</td>
<td>0.02</td>
<td>-0.02</td>
<td>0.07</td>
</tr>
<tr>
<td>N</td>
<td>142</td>
<td>139</td>
<td>140</td>
<td>155</td>
<td>153</td>
<td>157</td>
</tr>
</tbody>
</table>

* P < .01. ** P < .0001.
Over 30% of third-and fourth-grade respondents favored sedentary play every day. Indoor play, which requires more individual structuring, was not preferred as much as goofing off and video games, each of which was a preferred daily activity by over 50% of respondents (see Tables 27 and 28). Sheff (1993) cites a study by Nielsen Media Research, the company that monitors television viewing, which showed that within a particular age group more kids were playing Nintendo than were watching the major children's TV network, Nickelodeon. Kids spent more time in electronic environments (TV, radio, records) than they did in school or talking with friends or parents. "Some of them were spending an additional two hours a day on Nintendo" (p. 8).

**Grade 3.** A significant positive relationship was found between time spent on (see Table 29):

1. Indoor play and time spent listening to radios ($r = .33, P < 0.0001$), listening to audio cassette tapes ($r = .38, P < 0.0001$), using the telephone ($r = .22, P < 0.008$), listening to compact disks ($r = .30, P < 0.0003$), watching video cassette tapes ($r = .29, P < 0.0004$), watching MTV ($r = .27, P < 0.001$), or using computers ($r = .24, P < 0.004$) (Students who spent more time exposed to these media also tended to spend more time in indoor play.)

2. Goofing off and time spent listening to radios ($r = .39, P < 0.0001$), listening to audio cassette tapes ($r = .28, P < 0.0006$), using the telephone ($r = .40, P < 0.0001$), listening to compact disks ($r = .23, P < 0.006$), watching video cassette tapes ($r = .36, P < 0.0001$), or watching MTV ($r = .32, P < 0.0001$)
(Students who spent more time exposed to these media also tended to spend more time goofing off.)

3. Playing video games and time spent listening to radios ($r = .31$, $P < 0.0001$), listening to audio cassette tapes ($r = .30$, $P < 0.0003$), using the telephone ($r = .36$, $P < 0.0001$), listening to compact disks ($r = .27$, $P < 0.001$), watching television ($r = .35$, $P < 0.0001$), watching video cassette tapes ($r = .42$, $P < 0.0001$), watching MTV ($r = .27$, $P < 0.001$), or using computer ($r = .28$, $P < 0.0006$) (Students who spent more time exposed to these media also tended to spend more time playing video games.)

No significant relationship was found between time spent:
1. On indoor play and time spent watching television or educational television
2. Goofing off and time spent watching television, using computers or watching educational television
3. Playing video games and watching educational television. (See Table 29.)

Therefore, hypothesis 3a is rejected for grade 3 for indoor play, with respect to listening to radio, audio cassette tapes, telephone, and CDs and for watching video, MTV, and computer; for goofing off, with respect to listening to radio, audio cassette tapes, and telephone and for watching video and MTV; and for video games, with respect to listening to radio, audio cassette tapes, telephone, compact disks, and for watching television, and MTV and using computers. Hypothesis 3a is retained for grade 3 for indoor play, with respect to TV and educational television; for goofing off, with respect to listening to CDs
and watching TV, computer, and educational television; and for video games, with respect to watching educational television.

**Grade 4.** A significant positive relationship was found between time spent on:

1. Indoor play and time spent listening to audio cassette tapes ($r = .19$, $P < 0.01$) (Students who spent more time listening to audio cassette tapes also tended to spend more time in indoor play.)

2. Goofing off and time spent listening to radios ($r = .23$, $P < 0.004$), listening to audio cassette tapes ($r = .28$, $P < 0.0004$), using the telephone ($r = .25$, $P < 0.001$), watching television ($r = .30$, $P < 0.0001$), watching video cassette tapes ($r = .28$, $P < 0.0003$), or watching MTV ($r = .21$, $P < 0.01$) (Students who spent more time exposed to these media also tended to spend more time goofing off.)

3. Playing video games and time spent listening to audio cassette tapes ($r = .27$, $P < 0.0005$), using the telephone ($r = .21$, $P < 0.009$), listening to compact disks ($r = .27$, $P < 0.0004$), watching television ($r = .28$, $P < 0.0002$), watching video cassette tapes ($r = .47$, $P < 0.0001$), watching MTV ($r = .37$, $P < 0.0001$), or using computers ($r = .31$, $P < 0.0001$) (Students who spent more time exposed to these media also tended to spend more time playing video games. See Table 29.)
No significant relationship was found between time spent on:

1. Indoor play and time spent listening to radio, audio cassette tapes, compact disks, using the telephone, watching television, video cassette tapes, MTV, using computers, or watching educational television

2. Goofing off and time spent listening to compact disks, watching educational television or using computers

3. Playing video games and time spent listening to radio or watching educational television. (See Table 29.)

Therefore, hypothesis 3a is rejected for grade 4 for indoor play, with respect to listening to audio cassette tapes; goofing off, with respect to listening to radio, listening to audio cassette tapes, using the telephone and watching television, watching MTV, and watching video; and video games, with respect to listening to audio cassette tapes, using the telephone, listening to CDs, watching television, watching video, watching MTV, and using computers. Hypothesis 3a is retained for grade 4 for indoor play, with respect to all EEM listed by the study except for listening to audio cassette tapes; goofing off, with respect to listening to compact disks, using computers, and watching educational television; and video games, with respect to listening to radio or watching educational television.

Null sub-hypothesis 3b

Null sub-hypothesis 3b states: No relationship exists between exposure to electronic entertainment media and time spent in active play.
TABLE 30
PERCENTAGE OF STUDENT RESPONSES PREFERING
ACTIVE PLAY FOR GRADE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Never, hardly ever</td>
<td>Once in a while</td>
<td>Once or twice a week</td>
<td>Every day 2 hrs -</td>
<td>Every day 2 hrs +</td>
</tr>
<tr>
<td>Sports</td>
<td>165</td>
<td>7.3</td>
<td>11.5</td>
<td>19.4</td>
<td>23.0</td>
<td>38.8</td>
</tr>
<tr>
<td>Outdoor play</td>
<td>160</td>
<td>15.6</td>
<td>21.9</td>
<td>18.8</td>
<td>24.4</td>
<td>19.4</td>
</tr>
</tbody>
</table>

TABLE 31
PERCENTAGE OF STUDENT RESPONSES PREFERING
ACTIVE PLAY FOR GRADE 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Never, hardly ever</td>
<td>Once in a while</td>
<td>Once or twice a week</td>
<td>Every day 2 hrs -</td>
<td>Every day 2 hrs +</td>
</tr>
<tr>
<td>Sports</td>
<td>172</td>
<td>5.8</td>
<td>10.5</td>
<td>18.6</td>
<td>25.0</td>
<td>40.1</td>
</tr>
<tr>
<td>Outdoor play</td>
<td>165</td>
<td>16.4</td>
<td>27.3</td>
<td>20.0</td>
<td>21.2</td>
<td>15.2</td>
</tr>
</tbody>
</table>

Third-grade respondents engaged in active play every day—61.8% sports (to what extent school supervised sports was included in this statistic is not clear)—and 43.8% outdoor play (see Table 30). Fourth-grade respondents varied only slightly—65.1% sports and 36.4% outdoor play (see Table 31). However, nearly 20% of the third-grade respondents seldom engaged in sports and nearly 40% seldom engaged in outdoor play. The percentages are fairly consistent with fourth-grade respondents as well, except for outdoor play which was avoided by 43.7% or nearly half the respondents (see Table 31).
Grade 3. A significant positive relationship was found between time spent:

1. In sports and time spent listening to radios ($r = .38, P < 0.0001$), listening to audio cassette tapes ($r = .34, P < 0.0001$), using the telephone ($r = .22, P < 0.007$), watching television ($r = .24, P < 0.003$), watching video cassette tapes ($r = .37, P < 0.0001$), watching MTV ($r = .29, P < 0.0003$), or using computers ($r = .27, P < 0.0008$) (Students who spent more time exposed to these media also tended to spend more time with sports. See Table 32.)

2. In outdoor play and time spent listening to radio ($r = .20, P < 0.01$), listening to audio cassette tapes ($r = .25, P < 0.002$), using the telephone ($r = .24, P < 0.003$), or watching video cassette tapes ($r = .22, P < 0.005$) (Students who spent more time exposed to these media also tended to spend more time in outdoor play.)

No significant relationship was found between time spent:

1. In sports and time spent listening to compact disks, or watching educational television

2. In outdoor play and time spent listening to compact disks, watching television, or watching educational television. (See Table 32.)

Therefore, hypothesis 3b is rejected for grade 3, sports, with respect to listening to radio, listening to audio cassette tapes, using the telephone, watching television, watching video, watching MTV, or using computers; outdoor play, with respect to listening to radio, listening to audio cassette tapes, using the telephone, watching video, or watching MTV. Hypothesis 3b is retained for grade 3, sports, with respect to listening to compact disks and watching educational television; outdoor play with respect to listening to compact disks and watching educational television.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Grade 3</th>
<th>Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sports</td>
<td>Outdoor play</td>
</tr>
<tr>
<td>Radio</td>
<td>0.38**</td>
<td>0.20*</td>
</tr>
<tr>
<td>N</td>
<td>160</td>
<td>158</td>
</tr>
<tr>
<td>Audio tapes</td>
<td>0.34**</td>
<td>0.25*</td>
</tr>
<tr>
<td>N</td>
<td>158</td>
<td>156</td>
</tr>
<tr>
<td>Telephone</td>
<td>0.22*</td>
<td>0.24*</td>
</tr>
<tr>
<td>N</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td>CDs</td>
<td>0.17</td>
<td>0.20</td>
</tr>
<tr>
<td>N</td>
<td>140</td>
<td>140</td>
</tr>
<tr>
<td>TV</td>
<td>0.24*</td>
<td>0.06</td>
</tr>
<tr>
<td>N</td>
<td>160</td>
<td>158</td>
</tr>
<tr>
<td>Video tapes</td>
<td>0.37**</td>
<td>0.22*</td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td>156</td>
</tr>
<tr>
<td>MTV</td>
<td>0.29*</td>
<td>0.21*</td>
</tr>
<tr>
<td>N</td>
<td>153</td>
<td>151</td>
</tr>
<tr>
<td>Computer</td>
<td>0.27*</td>
<td>0.20</td>
</tr>
<tr>
<td>N</td>
<td>148</td>
<td>147</td>
</tr>
<tr>
<td>Ed TV</td>
<td>0.12</td>
<td>0.18</td>
</tr>
<tr>
<td>N</td>
<td>142</td>
<td>144</td>
</tr>
</tbody>
</table>

* P < .01.  ** P < .0001.
compact disks, watching television, using computers, or watching educational television.

**Grade 4.** A significant positive relationship was found between time spent:

1. In sports and time spent listening to radios (r = .27, P < 0.0005), listening to audio cassette tapes (r = .23, P < 0.003), listening to compact disks (r = .23, P < 0.003), watching video cassette tapes (r = .22, P < 0.005), or watching MTV (r = .21, P < 0.006) (Students who spent more time exposed to these media also spent more time in sports. However, a negative correlation was found between time spent in sports and time spent watching educational television (r = -.23, P < 0.004). Students who spent more time watching educational television also tended to spend less time in sports.)

2. In outdoor play and time spent watching educational television (r = .23, P < 0.004). (See Table 32.)

No significant relationship was found between time spent:

1. In sports and time spent using the telephone, watching television, or using computers

2. In outdoor play and time spent listening to radios, listening to audio cassette tapes, using the telephone, listening to compact disks, watching television, watching video cassette tapes, watching MTV, or using computers. (See Table 32.)

Therefore, hypothesis 3b is rejected for grade 4, sports, with respect to listening to radio, audio cassette tapes, or CDs and watching video, MTV, or
educational television; outdoor play, with respect to listening to audio cassette tapes and watching educational television. Hypothesis 3b is retained for grade 4, sports, with respect to listening to telephone and watching television or computer; outdoor play, with respect to listening to radio, listening to audio cassette tapes, using the telephone, listening to compact disks, watching television, watching video, watching MTV, or using computers.

Null sub-hypothesis 3c

Null sub-hypothesis 3c states: No relationship exists between exposure to electronic entertainment media and time spent talking to friends/family.

The TTC (Time Tally Checklist) defined telephoning as student participation calls with friends and relatives. Chatting was defined as conversations with the immediate family. Talking was defined as conversations with friends and neighbors.

Third-grade respondents (46% to 60%) every day spent 2 hours in some form of student-initiated conversation (see Table 33, last two columns). Fourth-grade respondents (56% to 70%) every day spent 2 hours in some form of student-initiated conversation (see Table 34, last two columns). However, important to note are those who did not participate in these forms of social conversation or rarely did so. Among third-grade respondents, 34.1% rarely telephoned, 30.3% rarely chatted, and 22% rarely held conversation with friends and neighbors. Among fourth-grade respondents, 21.3% rarely telephoned, 25.4% rarely chatted, and 13.2% rarely held conversation with friends and neighbors.
TABLE 33
PERCENTAGE OF STUDENT RESPONSES
PREFERRING TALKING FOR GRADE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1 Never, hardly ever</th>
<th>2 Once in a while</th>
<th>3 Once or twice a week</th>
<th>4 Every day 2 hrs -</th>
<th>5 Every day 2 hrs +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephoning</td>
<td>164</td>
<td>14.0</td>
<td>20.1</td>
<td>20.1</td>
<td>21.3</td>
<td>24.4</td>
</tr>
<tr>
<td>Chatting</td>
<td>155</td>
<td>7.7</td>
<td>22.6</td>
<td>11.0</td>
<td>26.5</td>
<td>32.3</td>
</tr>
<tr>
<td>Talking</td>
<td>150</td>
<td>8.7</td>
<td>13.3</td>
<td>18.0</td>
<td>29.3</td>
<td>30.7</td>
</tr>
</tbody>
</table>

**Grade 3.** A significant positive relationship was found between time spent on:

1. Telephoning as a device and time spent listening to radios (r = .44, P < 0.0001), listening to audio cassette tapes (r = .45, P < 0.0001), listening on the telephone as an activity (r = .75, P < 0.0001), listening to compact disks (r = .43, P < 0.0001), watching television (r = .25, P < 0.002), watching video cassette tapes (r = .39, P < 0.0001), watching MTV (r = .42, P < 0.0001), or using computers (r = .30, P < 0.0002) (Students who spent more time exposed to these media also tended to spend more time telephoning.) (See Table 35.)

2. Chatting and time spent listening to radio (r = .27, P < 0.0009), audio cassette tapes (r = .34, P < 0.0001), telephone (r = .31, P < 0.0001), compact disks (r = .28, P < 0.0008), watching video cassette tapes (r = .29, P < 0.0003), MTV (r = .28, P < 0.0007), computer (r = .24, P < 0.004), or educational television (r = .25, P < 0.003) (Students who spent more time exposed to these media also tended to spend more time chatting.)
3. Visiting and time spent listening to radio \( (r = .46, P < 0.0001) \), audio cassette tapes \( (r = .41, P < 0.0001) \), telephone \( (r = .48, P < 0.0001) \), compact disks \( (r = .47, P < 0.0001) \), watching television \( (r = .31, P < 0.0001) \), video cassette tapes \( (r = .47, P < 0.0001) \), MTV \( (r = .43, P < 0.0001) \), computer \( (r = .32, P < 0.0001) \), or educational television \( (r = .26, P < 0.002) \) (Students who spent more time exposed to these media also tended to spend more time talking.)

No significant relationship was found between time spent on:

1. Telephoning and time spent watching educational television
2. Chatting and time spent watching television or watching educational television. (See Table 35.)

Therefore, hypothesis 3c is rejected for grade 3, telephone (device), with respect to listening to radio, audio cassette tapes, telephone (activity), or CDs and watching TV, video, MTV or computer; chatting, with respect to listening to radio, audio cassette tapes, telephone or CDs and watching video, MTV, using computers, or watching educational television; and visiting, with respect to

---

**TABLE 34**

PERCENTAGE OF STUDENT RESPONSES PREFERING TALKING FOR GRADE 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1 Never, hardly ever</th>
<th>2 Once in a while</th>
<th>3 Once or twice a week</th>
<th>4 Every 2 hrs</th>
<th>5 Every 2 hrs +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephoning</td>
<td>174</td>
<td>5.2</td>
<td>16.1</td>
<td>21.8</td>
<td>33.3</td>
<td>23.5</td>
</tr>
<tr>
<td>Chatting</td>
<td>169</td>
<td>4.7</td>
<td>20.7</td>
<td>18.3</td>
<td>34.9</td>
<td>21.3</td>
</tr>
<tr>
<td>Talking</td>
<td>167</td>
<td>4.8</td>
<td>8.4</td>
<td>17.4</td>
<td>31.7</td>
<td>37.7</td>
</tr>
</tbody>
</table>
TABLE 35
CORRELATION BETWEEN EEM AND TALKING
FOR EACH VARIABLE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Grade 3</th>
<th>Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phone***</td>
<td>Chatting</td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.44**</td>
<td>0.27*</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>160</td>
</tr>
<tr>
<td>Audio tapes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.45**</td>
<td>0.34**</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>158</td>
</tr>
<tr>
<td>Telephone</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.75**</td>
<td>0.31**</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>152</td>
</tr>
<tr>
<td>CDs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.43**</td>
<td>0.28*</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>142</td>
</tr>
<tr>
<td>TV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.25*</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>161</td>
</tr>
<tr>
<td>Video tapes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.39**</td>
<td>0.29*</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>158</td>
</tr>
<tr>
<td>MTV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.42**</td>
<td>0.27*</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>154</td>
</tr>
<tr>
<td>Computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.30*</td>
<td>0.24*</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>149</td>
</tr>
<tr>
<td>Ed TV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.03</td>
<td>0.25*</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>144</td>
</tr>
</tbody>
</table>

* P < .01. ** P < .0001. *** Student telephone conversations.
listening to radio, audio cassette tapes, telephone or CDs and watching TV, video, MTV, using computers or watching educational television. Hypothesis 3c is retained for grade 3, telephone, with respect to watching educational television; and chatting, with respect to watching TV or educational television.

Grade 4. A significant positive relationship was found between time spent on:

1. Telephoning and time spent listening to radio (r = .29, P < 0.0001), audio cassette tapes (r = .34, P < 0.0001), telephone (r = .72, P < 0.0001), or compact disks (r = .30, 0.0001), watching television (r = .23, P < 0.002), MTV (r = .25, P < 0.0002), or using computers (r = .21, P < 0.008) (Students who spent more time exposed to these media also tended to spend more time telephoning.)

2. Visiting and time spent listening to radio (r = .33, P < 0.0001), audio cassette tapes (r = .36, P < 0.0001), telephone (r = .33, P < 0.0001), watching television (r = .32, P < 0.0001), or watching MTV (r = .21, P < 0.008) (Students who spent more time exposed to these media also tended to spend more time visiting. See Table 35.)

No significant relationship was found between time spent on:

1. Telephoning and time spent watching educational television

2. Chatting and time spent listening to radios, listening to audio cassette tapes, using the telephone, listening to compact disks, watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television
3. Visiting and time spent listening to compact disks, watching video cassette tapes, using computers, or watching educational television. (See Table 35.)

Therefore, hypothesis 3c is rejected for grade 4, with respect to telephone (device), listening to radio, listening to audio cassette tapes, using the telephone (activity), watching compact disks, watching television, watching video cassettes, watching MTV, or using computers; and for visiting, with respect to listening to radio, listening to audio cassette tapes, using the telephone, watching television, or using computers. Hypothesis 3c is retained for grade 4 for telephone, with respect to watching educational television; for chatting, with respect to all EEM listed by the study; and for visiting, with respect to listening to compact disks and watching video, using computers or watching educational television.

Null sub-hypothesis 3d

Null sub-hypothesis 3d states: No relationship exists between exposure to electronic entertainment media and time spent on hobbies.

Grade 3. Third-grade respondents expressed much diversity regarding time spent on hobbies. Fifty-five respondents wrote in hobbies other than those categories listed on the TTC. A majority of the write-in hobbies were variations of the categories listed, however. Twenty percent were involved every day, 2 hours or more with writing (see Table 36). Nearly half of the respondents (44.5%) were involved with music as a hobby every day, 2 hours or more.
Nearly 41% cited art as a preference every day, 2 hours or more. On the other side, 61.4% were involved with writing, almost never, 28.5% with art, almost never, and 48.9% with collections, almost never.

A significant positive relationship was found between time spent on:

1. Writing and time spent listening to radio ($r = .30, P < 0.0001$) or listening to audio cassette tapes ($r = .24, P < 0.003$), using the telephone ($r = .22, P < 0.001$), listening to compact disks ($r = .26, P < 0.002$), or watching MTV ($r = .20, P < 0.01$) (Students who spent more time listening to radio, listening to audio cassette tapes, using the telephone, listening to compact disks, or watching MTV also spent more time writing. See Table 37.)

### TABLE 36

**PERCENTAGE OF STUDENT RESPONSES PREFERING HOBBIES FOR GRADE 3**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>1 Never, hardly ever</th>
<th>2 Once in a while</th>
<th>3 Once or twice a week</th>
<th>4 Every day 2 hrs -</th>
<th>5 Every day 2 hrs +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing</td>
<td>163</td>
<td>31.3</td>
<td>30.1</td>
<td>17.8</td>
<td>14.1</td>
<td>6.7</td>
</tr>
<tr>
<td>Art</td>
<td>158</td>
<td>8.9</td>
<td>19.6</td>
<td>31.0</td>
<td>20.3</td>
<td>20.3</td>
</tr>
<tr>
<td>Music</td>
<td>155</td>
<td>14.2</td>
<td>16.1</td>
<td>25.2</td>
<td>14.8</td>
<td>29.7</td>
</tr>
<tr>
<td>Collections</td>
<td>145</td>
<td>24.8</td>
<td>24.1</td>
<td>14.5</td>
<td>13.1</td>
<td>23.4</td>
</tr>
<tr>
<td>Other</td>
<td>76</td>
<td>14.5</td>
<td>7.9</td>
<td>9.2</td>
<td>25.0</td>
<td>43.4</td>
</tr>
</tbody>
</table>
2. Art and time spent listening to radio ($r = .26, P < 0.001$), listening to audio cassette tapes ($r = .25, P < 0.002$), listening to compact disks ($r = .22, P < 0.009$), or watching MTV ($r = .24, P < 0.003$) (Students who spent more time listening to radio, listening to audio cassette tapes, listening to compact disks, or watching MTV also tended to spend more time on art.)

3. Music and time spent using the telephone ($r = .26, P < 0.002$) (Students who spent more time talking on the telephone also tended to spend more time on music.)

4. Collections and time spent listening to radio ($r = .33, P < 0.0001$), listening to audio cassette tapes ($r = .39, P < 0.0001$), using the telephone ($r = .39, P < 0.0001$), listening to compact disks ($r = .33, P < 0.0001$), watching television ($r = .32, P < 0.0001$), watching video cassette tapes ($r = .35, P < 0.0001$), watching MTV ($r = .31, P < 0.0002$), or using computers ($r = .21, P < 0.01$) (Students who spent more time exposed to these media also tended to spend more time on collections.)

No significant relationship was found between time spent on:

1. Writing and time spent listening on the telephone, listening to CDs, watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television (See Table 37.)

2. Art and time spent listening on the telephone, watching television, watching video cassette tapes, using computers, or watching educational television

3. Music and time spent listening to radio, listening to audio cassette tapes, listening to compact disks, watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television

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TABLE 37
CORRELATION BETWEEN EEM AND HOBBIES FOR EACH VARIABLE FOR GRADE 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>Writing</th>
<th>Art</th>
<th>Music</th>
<th>Collection</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio</td>
<td>0.30**</td>
<td>0.26*</td>
<td>0.15</td>
<td>0.33**</td>
<td>0.03</td>
</tr>
<tr>
<td>N</td>
<td>160</td>
<td>155</td>
<td>151</td>
<td>143</td>
<td>73</td>
</tr>
<tr>
<td>Audio tapes</td>
<td>0.24*</td>
<td>0.25*</td>
<td>0.19</td>
<td>0.39**</td>
<td>0.24</td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td>153</td>
<td>151</td>
<td>141</td>
<td>74</td>
</tr>
<tr>
<td>Telephone</td>
<td>0.22*</td>
<td>0.11</td>
<td>0.26*</td>
<td>0.39**</td>
<td>0.25</td>
</tr>
<tr>
<td>N</td>
<td>151</td>
<td>150</td>
<td>145</td>
<td>137</td>
<td>71</td>
</tr>
<tr>
<td>CDs</td>
<td>0.26*</td>
<td>0.22*</td>
<td>0.19</td>
<td>0.33**</td>
<td>0.25</td>
</tr>
<tr>
<td>N</td>
<td>141</td>
<td>140</td>
<td>138</td>
<td>131</td>
<td>70</td>
</tr>
<tr>
<td>TV</td>
<td>0.06</td>
<td>0.16</td>
<td>0.10</td>
<td>0.32*</td>
<td>0.23</td>
</tr>
<tr>
<td>N</td>
<td>160</td>
<td>157</td>
<td>152</td>
<td>142</td>
<td>74</td>
</tr>
<tr>
<td>Video tapes</td>
<td>0.15</td>
<td>0.07</td>
<td>0.19</td>
<td>0.35*</td>
<td>0.22</td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td>155</td>
<td>150</td>
<td>141</td>
<td>74</td>
</tr>
<tr>
<td>MTV</td>
<td>0.20*</td>
<td>0.24*</td>
<td>0.15</td>
<td>0.31*</td>
<td>0.23</td>
</tr>
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<td>N</td>
<td>153</td>
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<td>140</td>
<td>74</td>
</tr>
<tr>
<td>Computer</td>
<td>0.14</td>
<td>0.03</td>
<td>0.14</td>
<td>0.21*</td>
<td>0.34*</td>
</tr>
<tr>
<td>N</td>
<td>148</td>
<td>147</td>
<td>144</td>
<td>136</td>
<td>73</td>
</tr>
<tr>
<td>Ed TV</td>
<td>0.17</td>
<td>0.11</td>
<td>0.05</td>
<td>0.20</td>
<td>-0.03</td>
</tr>
<tr>
<td>N</td>
<td>144</td>
<td>142</td>
<td>139</td>
<td>135</td>
<td>71</td>
</tr>
</tbody>
</table>

*P < .01. **P < .0001.
4. Collections and time spent using computers or watching educational television

5. Other hobbies and time spent on any of the listed EEM except using computers.

Therefore, hypothesis 3d is rejected for grade 3 for writing, with respect to listening to radio, listening to audio cassette tapes, using the telephone, listening to compact disks, or watching MTV; for art with respect to listening to radio, listening to audio cassette tapes, listening to compact disks, and watching MTV; for music with respect to using the telephone; for collections with respect to listening to radio, listening to audio cassette tapes, using the telephone, listening to compact disks, watching television, watching video, watching MTV and using computers; and for other with respect to using computers. Hypothesis 3d is retained for grade 3 for writing, with respect to watching television, watching video, using computer, and watching educational television; for art with respect to using the telephone, watching television, watching video, using computers, and watching educational television; for music with respect to all EEM listed except for (1) using the telephone; (2) for collections with respect to watching educational television; and (3) for other with respect to all EEM listed except for using computer.

Grade 4. Fourth-grade respondents were also quite diverse regarding time spent on hobbies. Seventy-seven respondents wrote in hobbies other than those categories listed on the TTC. As with the third-grade respondents, a majority of the write-in hobbies were variations of the categories listed. Writing
as a hobby involved almost identical percentages for fourth-grade respondents as for third grade respondents (compare Tables 36 and 38). Thirty-eight percent were involved in music every day, 2 hours. Nearly 45% cited art as a preference every day, 2 hours. On the negative side, 59.8% were involved with writing almost never, 24.1% with art almost never, and 48.5% with collections almost never. These statistics are almost identical for the two groups.

A significant positive relationship was found between time spent on:

1. Writing and time spent listening to CDs ($r = .21, P < .009$) (This suggests that as students spent more time listening to CDs, they also tended to spend more time writing.)

2. Art and time spent listening to CDs ($r = .22, P < .004$) or watching video cassette tapes ($r = .22, P < .005$) (This suggests that as students spent more

<table>
<thead>
<tr>
<th>TABLE 38</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERCENTAGE OF STUDENT RESPONSES PREFERING HOBBIES</td>
</tr>
<tr>
<td>FOR GRADE 4</td>
</tr>
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<table>
<thead>
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<th>Variable</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never, hardly ever</td>
<td>Once in a while</td>
<td>Once or twice a week</td>
<td>Every day 2 hrs -</td>
<td>Every day 2 hrs +</td>
<td></td>
</tr>
<tr>
<td>Writing</td>
<td>164</td>
<td>31.1</td>
<td>28.7</td>
<td>20.1</td>
<td>11.6</td>
<td>8.5</td>
</tr>
<tr>
<td>Art</td>
<td>170</td>
<td>8.2</td>
<td>15.9</td>
<td>31.2</td>
<td>20.6</td>
<td>24.1</td>
</tr>
<tr>
<td>Music</td>
<td>163</td>
<td>30.1</td>
<td>12.3</td>
<td>19.6</td>
<td>19.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Collections</td>
<td>157</td>
<td>21.7</td>
<td>26.8</td>
<td>20.4</td>
<td>17.8</td>
<td>13.4</td>
</tr>
<tr>
<td>Other</td>
<td>93</td>
<td>9.7</td>
<td>6.5</td>
<td>11.8</td>
<td>17.2</td>
<td>54.8</td>
</tr>
</tbody>
</table>
time listening to CDs or watching video cassette tapes, they also tended to spend more time on art.)

3. Music and time spent using the telephone ($r = .27$, $P < 0.0006$) (This suggests that as students spent more time using the telephone, they also tended to spend more time on music. See Table 39.)

No significant relationship was found between time spent on:

1. Writing and time spent listening to radio, listening to audio cassette tapes, listening on the telephone, watching television, watching video cassette tapes, watching MTV, using computers, or watching educational television

2. Art and time spent listening to radio, listening to audio cassette tapes, listening on the telephone, watching television, watching MTV, using computers, or watching educational television

3. Music and time spent listening to radio, listening to audio cassette tapes, listening to CDs, watching television, watching MTV, using computers, or watching educational television

4. Collections and time spent on any of the listed EEM

5. Other hobbies and time spent on any of the listed EEM. (See Table 39.)

Therefore, hypothesis 3d is rejected for grade 4 for writing, with respect to listening to compact disks; for art, with respect to listening to compact disks and watching video; and for music, with respect to using the telephone. Hypothesis 3d is retained for grade 4 for writing, with respect to all EEM listed except for listening to compact disks; for art, with respect to all EEM listed except for listening to compact disks and watching video; for music, with respect to all EEM
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<th>Variable</th>
<th>Writing</th>
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<th>Music</th>
<th>Collection</th>
<th>Other</th>
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<td>Radio</td>
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<td>-0.04</td>
<td>0.15</td>
</tr>
<tr>
<td>N</td>
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<td>166</td>
<td>159</td>
<td>153</td>
<td>91</td>
</tr>
<tr>
<td>Audio tapes</td>
<td>0.13</td>
<td>0.18</td>
<td>0.16</td>
<td>0.06</td>
<td>0.12</td>
</tr>
<tr>
<td>N</td>
<td>162</td>
<td>166</td>
<td>160</td>
<td>156</td>
<td>91</td>
</tr>
<tr>
<td>Telephone</td>
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<td>0.12</td>
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<tr>
<td>N</td>
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<td>162</td>
<td>158</td>
<td>152</td>
<td>90</td>
</tr>
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<td>CDs</td>
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<td>0.22*</td>
<td>0.19</td>
<td>0.18</td>
<td>0.13</td>
</tr>
<tr>
<td>N</td>
<td>159</td>
<td>163</td>
<td>157</td>
<td>151</td>
<td>90</td>
</tr>
<tr>
<td>TV</td>
<td>-0.03</td>
<td>0.05</td>
<td>-0.01</td>
<td>0.006</td>
<td>0.18</td>
</tr>
<tr>
<td>N</td>
<td>163</td>
<td>170</td>
<td>163</td>
<td>156</td>
<td>93</td>
</tr>
<tr>
<td>Video tapes</td>
<td>-0.06</td>
<td>0.22*</td>
<td>-0.07</td>
<td>0.08</td>
<td>0.07</td>
</tr>
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<td>164</td>
<td>168</td>
<td>162</td>
<td>157</td>
<td>92</td>
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<tr>
<td>MTV</td>
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<td>0.15</td>
<td>0.05</td>
<td>0.06</td>
<td>0.01</td>
</tr>
<tr>
<td>N</td>
<td>159</td>
<td>163</td>
<td>157</td>
<td>153</td>
<td>92</td>
</tr>
<tr>
<td>Computer</td>
<td>0.04</td>
<td>-0.003</td>
<td>0.10</td>
<td>0.12</td>
<td>0.06</td>
</tr>
<tr>
<td>N</td>
<td>159</td>
<td>161</td>
<td>156</td>
<td>152</td>
<td>92</td>
</tr>
<tr>
<td>Ed TV</td>
<td>0.16</td>
<td>-0.06</td>
<td>0.08</td>
<td>0.006</td>
<td>0.12</td>
</tr>
<tr>
<td>N</td>
<td>154</td>
<td>159</td>
<td>153</td>
<td>149</td>
<td>89</td>
</tr>
</tbody>
</table>

* P < .01.
listed except for using the telephone; for collections, with respect to all EEM listed; and for other, with respect to all EEM listed.

**Summary of Hypothesis 3**

Relationships between EEM and social behavior appear to be at variance. Indoor play and outdoor play are positively correlated with seven media (third grade). This suggests that as students spent more time attending EEM they also tended to spend more time in these diverse activities. However, by fourth grade these relationships were reduced from 11 to 4. A downward shift in significant relationships is apparent from third-grade to fourth-grade respondents.

Significant correlations between EEM and verbal expression (conversation) for third-grade respondents appear in 25 instances. For fourth-grade respondents the number was 13. Chatting--communication with family--dropped out completely in the fourth-grade. For visiting--communication with friends and neighbors--there were 9 for third-grade and 5 for fourth-grade. Telephoning--communication with friends and relatives--remained consistent.

Between EEM and hobbies for third-grade respondents there are 18 categories within the four areas of writing, art, music, and collections. For fourth-grade respondents the number dropped to 4.

Table 40 shows a summary for statistically significant findings for hypotheses 1 to 3. Discussion of these findings, as well as recommendations, is found in chapter 5.
Comments on the Findings

With the introduction of the telegraph, radio, and more recently television, a phenomenon of unprecedented media stimulation has invaded virtually all cultures of the world. Data--significant or trivial--flows continuously to the most remote parts of the earth. Walkman-type radios are now standard equipment for nearly all tribes and languages.

Respondents reported an average of five different types of electronic entertainment media (EEM) devices in the home. Specifically, the study sought to determine the extent to which exposure to EEM relates to academic performance as well as time spent in reading, hobbies, and social and/or recreation activities. Although a number of correlations were identified, no clear trends emerged.

The basic premise of this study was the belief that children, exposed to continuous or near-continuous visual/sound/noise, could experience an overload of the senses which may contribute to school difficulty. Given such easy access to personalized sound, to what extent does electronic input infringe upon the more cognitive, contemplative processing of ideas and thought? Conventional wisdom suggests that cognition is jeopardized by the seductive nature of EEM. If true, EEM presents an imminent threat to the new generation and its capacity to function. The mixed results suggest that the complexities of measuring EEM and relating those as a measure of performance in children exceed the capabilities of a simple self-report survey such as used in this study.

Further investigation may show that EEM has more to do with learning disabilities than is now evident. Initial search of available literature appeared to support such a probability. Discussion that emerged in 1990 indicated that the
# TABLE 40

## REJECTION OF THE NULL HYPOTHESIS

*(alpha = .01)*

<table>
<thead>
<tr>
<th>Ho.#</th>
<th>Variables</th>
<th>Variables Grade 3</th>
<th>Variables Grade 4</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>ACADEMIC PERFORMANCE</td>
<td>EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA</td>
<td>EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA</td>
</tr>
<tr>
<td>1a</td>
<td>SRA reading scores</td>
<td>television, MTV radio, audio tapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audio tapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td>1b</td>
<td>SRA math scores</td>
<td>television, MTV, radio, audio tapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audio tapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td>1c</td>
<td>SRA reading scores</td>
<td>TV Preference</td>
<td>TV Preference</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sports, movies, quiz, cartoons, educational, music, comedy</td>
<td>sports, movies, quiz, cartoons, educational, music, comedy</td>
</tr>
<tr>
<td>1d</td>
<td>SRA math scores</td>
<td>sports, movies, quiz, cartoons, educational, music, comedy</td>
<td>sports, movies, quiz, cartoons, educational, music, comedy</td>
</tr>
<tr>
<td>2</td>
<td>DISCRETIONARY ACAD ACTIVITIES</td>
<td>EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA</td>
<td>EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA</td>
</tr>
<tr>
<td>2a</td>
<td>Recreational reading--books</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td></td>
<td>newspapers</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td></td>
<td>letters</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td>2b</td>
<td>Time spent on homework</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Ho.#</th>
<th>Variables</th>
<th>Variables Grade 3</th>
<th>Variables Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2c</td>
<td>Time spent on homework</td>
<td>Number of media types</td>
<td>Number of media types</td>
</tr>
<tr>
<td>2d</td>
<td>Student init. reading: books, letters, etc...</td>
<td>Preference for noise during study: none, some, much</td>
<td>Preference for noise during study: none, some, much</td>
</tr>
<tr>
<td>2e</td>
<td>Student init. reading: books, newspapers, letters</td>
<td>TV program preference: sports, movies, quiz, cartoons, educational, music, comedy</td>
<td>TV program preference: sports, movies, quiz, cartoons, educational, music, comedy</td>
</tr>
<tr>
<td>3</td>
<td>SOCIAL/RECREATIONAL ACTIVITY</td>
<td>EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA</td>
<td>EXPOSURE TO ELECTRONIC ENTERTAINMENT MEDIA</td>
</tr>
<tr>
<td>3a</td>
<td>Passive indoor play</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
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<tr>
<td></td>
<td>goofing off</td>
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</tr>
<tr>
<td></td>
<td>video games</td>
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<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td>3b</td>
<td>Active sports</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td></td>
<td>outdoor play</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td>3c</td>
<td>Conversation chatting, family</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td></td>
<td>visiting, friends</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td></td>
<td>talk, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
</tbody>
</table>
Table 40—Continued.

<table>
<thead>
<tr>
<th>Ho.#</th>
<th>Variables</th>
<th>Variables Grade 3</th>
<th>Variables Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3d</td>
<td>Social/Recreational Activity</td>
<td>Exposure to Electronic Entertainment Media</td>
<td>Exposure to Electronic Entertainment Media</td>
</tr>
<tr>
<td></td>
<td>Hobbies</td>
<td></td>
<td></td>
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<td></td>
<td>writing</td>
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<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td></td>
<td>art</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td></td>
<td>music</td>
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<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
<tr>
<td></td>
<td>collections</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
<td>television, videotapes, MTV, radio, audiotapes, CDs, computer, ed TV, telephone</td>
</tr>
</tbody>
</table>

Note: Underlined variables are positively correlated; Bold variables are negatively correlated.

question was more multi-dimensional than was first supposed. Thought leaders theorized that structure and function were co-dependent in infants and children and that the negative effects of over-exposure although subtle were largely unalterable (Schroeder, 1987). With the aid of newly developed electronic devices, neuroscientists have begun the ambitious undertaking of mapping brain functions (Begley et al., 1992).

Exposure to EEM

To put the question of media exposure in perspective, consider just the two primary media—radio and television. The average listening time for radio is 3 hours per day (Wheeler, 1993). Though the television set is on an average 7
hours and 5 minutes per day, the average viewing time is 4 hours and 9 minutes per day (including cable time). The average high-school graduate will have spent 22,000 hours in front of the television set (9,000 hours more than full-time classroom attendance). American youngsters, on average, now spend more hours in front of the television set than at any other activity except sleeping. Yet, larger by far than either sleep or work are the hours adults spend with EEM—more than 9 hours per day (Wheeler, 1993). A study involving 226 fifth- and sixth-graders discovered average weekly television viewing times of 28 hours for girls and 30 hours for boys (Anderson, 1988). An additional 2 hours per day are spent on video games (Sheff, 1993). The state of literacy in the United States is declining so precipitously, while video and computer technologies are becoming so powerful, that the act of reading itself may well be on the way to obsolescence. Cullinan (1987) reports on one large group of typical fifth graders queried about the average amount of time they spent reading outside of school:

1. 50% read four minutes a day or less
2. 30% read two minutes a day or less
3. 10% read nothing.

These findings are consistent with the results of this study. Radio was found to be the most durable medium. Television was found to be the most dominant medium. Reading for personal fulfillment is not being realized.

Tables 41, 42, and 43 present summary data. In the "often" columns the percentage of respondents attending to media is in sharp contrast with the percentage of respondents "seldom" attending to media ("often" being derived by combining response columns 4 and 5 of the Time Tally Checklist; "seldom being derived by combining response columns 1 and 2 of the Time Tally
Checklist.). For example (see Table 41), 55% of third-grade respondents attended to radio as opposed to 24% who seldom attended to radio. Attending to television is even more startling--78% attended to television as opposed to 10% who did not. Percentages of respondents attending to educational television programming are reversed with those respondents attending to regular television. There is a 18% increase between third-grade and fourth-grade respondents attending to radio, whereas percentages attending to television increased slightly.

Does the shift from grade 3 to grade 4 signal the beginning of a trend? In January of 1993, the Time Tally Checklist (TTC) was administered to 78 students of a private elementary school in the state of Washington. The purpose was two-fold: to affirm data derived from Michigan respondents and to extrapolate TTC data through the 10th grade. A comparison of these data is presented in Tables 42 and 43 and infers a trend in those two areas. Radio listening progresses from a 38% "often" response by second-grade respondents to a 100% "often" response by tenth-grade respondents. Viewing educational television programming, after a modest 13% beginning for grade 2, proceeds to 0% for grades 8, 9, and 10.

Table 43 presents summary data for student-initiated reading. In the table "seldom" is derived from combined responses of the first two columns in the TTC and "often" is derived from combined responses of the last two columns in the TTC. Comparing the "seldom" and "often" columns in the various categories, a slight trend emerges, with interest in books peaking at grades 7 and 8. This trend is supported by the literature which indicates a moderate-to-
substantial interest in reading from first grade to fifth grade (Healy, 1990, p. 23). Beginning with fifth grade there was a precipitous decline in student-initiated reading that continued through high school (Rothman, 1988).

Does this decline in interest correspond with reading disability? Approximately 90% of young people can read simple material. Yet the majority have difficulty understanding text above elementary-school reading level (Lapointe, 1987). Many poor readers do not recognize that they have a problem. A survey of 443 students entering a community college showed that although 50% were reading below ninth-grade level, only 18% acknowledged
TABLE 42
PERCENTAGE OF SUMMARY RESPONSES FOR EEM BY GRADE

<table>
<thead>
<tr>
<th>State</th>
<th>Grade</th>
<th>N</th>
<th>Seldom</th>
<th>Often</th>
<th>Seldom</th>
<th>Often</th>
<th>Seldom</th>
<th>Often</th>
</tr>
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<tbody>
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<td>Washington</td>
<td>2</td>
<td>8</td>
<td>50</td>
<td>38</td>
<td>25</td>
<td>63</td>
<td>75</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>12</td>
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<td>17</td>
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<td>6</td>
<td>17</td>
<td>83</td>
<td>0</td>
<td>100</td>
<td>83</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>11</td>
<td>18</td>
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<tr>
<td>Michigan</td>
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<td>122</td>
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<td>78</td>
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<td>4</td>
<td>129</td>
<td>11</td>
<td>73</td>
<td>10</td>
<td>80</td>
<td>85</td>
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</tbody>
</table>

that they needed help with reading. Among the 221 (50%) who scored from third-to-eighth-grade level, 178 or 81% of them believed they were doing just fine (Reed, 1989). Students disinterested in reading may not be aware that a problem exists.
### TABLE 43
PERCENTAGE OF SUMMARY RESPONSES FOR READING BY GRADE

<table>
<thead>
<tr>
<th>State</th>
<th>Grade</th>
<th>N</th>
<th>Books Seldom</th>
<th>Books Often</th>
<th>News papers Seldom</th>
<th>News papers Often</th>
<th>Letters Seldom</th>
<th>Letters Often</th>
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</table>

**Media Exposure and Academic Performance**

Three main hypotheses were tested in this study. Hypothesis 1 asked the question, Do levels of exposure to EEM relate to academic performance? The findings are inconclusive across grades.

For example, significant positive relationships were found in two EEM media (video tapes and audio tapes for both reading and mathematics) for third-grade respondents, whereas significant negative relationships were found in
two visual EEM media (MTV and CDs for reading only) for fourth-grade respondents (see Table 40). (Results for third-grade respondents also showed negative significance between reading and EEM in TV programs preferred.) These results differed from what was expected in that for the dominant media--television and radio--there were no significant relationships. Upon reflection, however, such a finding should be expected of third-grade respondents because their age was consistent with the use of children's stories and songs found on audio tapes. Also, school-related activity (such as tests or written assignments) might have influenced the results. Altogether, for hypothesis 1, third-grade, there were three significant responses. For hypothesis 1, fourth-grade, there were four significant responses, all of which were negative.

The shift of fourth-grade respondents away from audio tapes toward the more sophisticated media of compact disks and MTV was surprising due to the expense and relative recency of the technology. A more modest difference of significance within the same media might perhaps have been expected because there were no other important differences. Not only did the significant relationships for the fourth grade differ in media, they differed also in the direction of the relationship. (Whereas the third-grade relationships were positively correlated, the fourth-grade relationships were negatively correlated.)

"Time spent" appears to be the key factor to much of the effectiveness in human election. Healy (1990) has asked, "Why don't--or can't--most young people read? Many have trouble with the mental organization and sustained effort demanded by reading." The ability to "bark at print" is not reading. She concluded with the caveat: tests which show that young children's scores are rising may be focusing on the lower-level skills of word reading.
A statistic that did not emerge in proportions anticipated was a lack of negative relationship between an increase of time spent watching television and a decline in SRA scores. Perhaps television exposure is so pervasive that standards of comparison are washed out.

**Media Exposure and Leisure-time Activity**

Hypothesis 2 asked the question, Do high levels of exposure to EEM relate to leisure-time activities? The dynamics of EEM were again reflected by sharp differences between third- and fourth-grade respondents (see Tables 12 and 14). Third-grade respondents reacted positively to EEM stimulus and leisure-time reading in 9 pairings out of 27. Their reaction does not appear to be unusual or unexpected. For example, watching educational television could be expected to complement or even stimulate reading. Audio media listening by third-graders was probably peculiar to their unique interests at that age, just as watching "MTV" was not.

Fourth-grade respondents reacted strongly to only 2 pairings out of 27 with respect to leisure-time reading. There was significant positive correlation between audio tapes and telephone and reading letters. Perhaps these media were associated with relatives or close personal acquaintances.

Educational television (grade 3) was positively correlated with leisure reading of books--an expected result. However, educational television was also negatively associated with homework. The negative link between homework and educational television deserves further investigation. Could it be that the more facile student needs less time for homework? Altogether, for
hypothesis 2, third grade, there were nine significant correlations—one negative. For hypothesis 2, fourth grade, there were three significant correlations. This suggests that perhaps some dynamic may be present in the intervening year other than simple maturation.

**Media Exposure and Recreational/Social Activity**

Hypothesis 3 asked the question, Do high levels of exposure to EEM relate to recreational/social activity? An intuitive response could generate a lengthy list of social specifics that are thought to be impacted by preoccupation with electronic media. Third-grade respondents reacted robustly with 69 significant correlations (see Table 42). Fourth-grade correlations were noticeably less robust with only 37 significant pairings, 3 negative. This is only 54% of the significant correlations of third grade. For third-grade respondents, sedentary activity was positively significant for 14 of the 18 pairings. However, watching television was related to video games only. This unexpected finding might be explained by the numbing familiarity most watchers have with the TV medium. Could it be that television is so pervasive that there is not sufficient variance among the population to draw definitive conclusions?
Chapter 5 presents an overview of the study, discussion of findings, conclusions, and recommendations for further study.

Summary

This summary includes a statement of the problem, a brief overview of the literature, the purpose of the study, and a review of the methodology applied, including population and sample, techniques and instruments, and analysis of data.

Statement of the Problem

Research is lacking on how sensory overload impinges upon the brain and mind of developing children with respect to learning and adapting socially. However, exposure to electronic entertainment media has generated much speculation, discussion, and study. Anderson and Collins (1988) energetically assert that research to date has been inconclusive.
Research is needed that addresses sensory overload phenomena and academic performance and social behavior.

Overview of the Literature

Much of the literature reviewed was related to t'he use of passive media--principally television as opposed to radio. But other media such as computer, VCR, video games, and CDs were subjects of dialogue as well.

The earliest discussion incorporating the term "sensory overload" in a socially oriented context was initiated by Bellak (1975) in his book Overload. His use of sensory overload was in the institutional sense rather than the personal sense. Winn (1977) and Moody (1980) were both early critics of electronic entertainment media (EEM), principally television.

As early as 1978, Mander produced an extensive treatise on television viewing with the title Four Arguments for the Elimination of Television. He saw no redeeming qualities in either the concept or the technology, claiming that neither reality nor perception could be fairly represented by that medium. Other studies of environmental overloading and dysfunctional behavior became topics for Postman (1985) and Healy (1987). They were among the first to suggest a link between EEM and learning disorder.

A cross-media comparison of television and radio, done by Beagles-Roos (1983) found that the same story presented to children by the two media yielded significantly different results. The radio presentation "facilitated recognition of expressive language and inferences drawn from
verbal content and specifically induced younger children to go beyond the explicit and implicit story content to substantiate their inferences."

The television presentation augmented knowledge of audiovisual story details, picture sequencing ability, and inferences based on actions. This study elucidates the specific impact of radio and television for transmitting explicit and implicit content.

In a study by Burton et al. (1979) it was found that first-graders who watched a lot of television in their preschool years earned lower grades than those who watched less--and tended to choose each other as friends (p. 164). The amount of preschool television viewing was inversely related to sociability (p < 0.001).

Looking at television viewing habits, Medrich (1979) found that a large number of children live in constant television households in which (1) parents are less likely to control, regulate, or monitor their children's viewing behavior, (2) there is a particular attitude or ethic that does not question the message, and (3) television dominates children's out-of-school lives. A family was designated a "constant television household" if the child responded "yes" to all three of the following statements:

1. At my house the TV is on most of the afternoon.
2. At my house the TV is usually on during dinner.
3. At my house the TV is on most of the evening.

It was found that children from constant television households were more likely to watch as much television as they wanted, watch television because they had nothing else to do, watch whatever was on television, and were permitted to stay up later to watch television. Fewer than 1% of these
children included a public television program among their two favorite television programs.

A second emphasis of early research literature emerged in the field of health care. It was found that hospital environments in particular were antagonistic to speedy recovery due to the invasion of lights, bells, and technical equipment. Especially was this true in ICU (intensive care units). These studies rivaled Belak's work in the early use of the term "sensory overload" to describe dysfunctional behavior related to exposure to unmanaged sensory input.

Purpose of the Study

The purpose of this study was to explore the possibility of a link between exposure to electronic entertainment media and behavior in school-age children.

Methodology

A correlational research design was used to determine the extent to which time spent exposed to EEM corresponded to academic performance, discretionary academic activities, and social/recreational activity.

Population and Sample

The population for this study was comprised of an intact sample of 349 third-and fourth-grade students in 14 classrooms of two schools located in
southwestern Michigan. Represented within the population were sub-populations of White, Black, and Hispanic students. Also represented were chapter 1 (at-risk, LD) children, inner-city children, and a wide range of socioeconomic elements. The two schools were contrasted respecting teaching strategies. One school was traditional and the other utilized an innovative curriculum identified as CUE in which the administration, staff, students, and parents were cooperatively involved.

Techniques and Instruments

Techniques used in this study were (1) staff and administration interviews, (2) classroom observation, (3) checklist survey, and (4) SRA reading and math scores.

The instrument (Time Tally Checklist) employed for data collection was developed to accommodate the questions peculiar to this study. It underwent two pre-tests resulting in a Likert-type questionnaire. Data gathered from the TTC were compared with test data (SRA levels 22 and 23).

Analysis of Data

Three hypotheses, each with a number of sub-hypotheses, were generated from the three research questions. The first of these was, To what extent does exposure to electronic entertainment media correlate with formal academic performance? Each of the nine types of electronic entertainment
media (EEM)--television, video cassette tapes, MTV, radio, audio cassette tapes, compact discs, computer, educational TV, and telephone--was paired with third-and then fourth-grade SRA reading scores and again with third-and fourth-grade SRA math scores in four sub-hypotheses. (Actually there were only seven types of EEM with television further subdivided into MTV and educational TV as a means of determining their separate exposure amounts.) Altogether, there were 36 pairings. In a further attempt to determine if a significant relationship exists between formal academic performance and EEM (narrowed to television), the same reading and math scores for third-and fourth-grades were paired with TV program preference.

The second research question was, To what extent does exposure to electronic entertainment media correlate with informal reading activity? The second main hypothesis generated five sub-hypotheses. EEM exposure included not only the nine types but also the number of types of EEM devices in the students' homes and the noise level preference. Variables related in sub-hypothesis 2a were the reading of books, newspapers, and letters, each correlated with the nine types of media. Sub-hypothesis 2b related homework to each of the media types and sub-hypothesis 2c related homework to the number of EEM types in students' homes. Sub-hypothesis 2d related the reading of books with noise-level preference, and sub-hypothesis 2e related the reading of books with TV program preference.

The third research question. To what extent does exposure to electronic entertainment media correlate with recreational and social behavior? involved three main sub-hypotheses with further secondary sub-

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hypotheses in the area of passive play, active play, and hobbies for recreational behavior, and conversation for social behavior.

Frequencies, cross tabulations, Pearson product-moment, and Spearman correlations were used in the data analysis. The 0.01 confidence level was used for determining significant correlations.

Summary of Findings
This section presents a summary of the results of the hypothesis testing.

Null Hypothesis 1

Null hypothesis 1 states: No relationship exists between exposure to electronic entertainment media and formal academic performance.

1a sub-hypothesis: No relationship exists between exposure to electronic entertainment media and formal academic performance.

Null sub-hypothesis status was as follows: Rejected for grade 3 (significant positive correlation between reading and audio tapes); rejected for grade 4 (significant negative correlation between reading and MTV and CDs).

1b sub-hypothesis. No relationship exists between exposure to electronic entertainment media and academic achievement outcomes as measured by the SRA Math Achievement Test.
Null sub-hypothesis status was as follows: Rejected for grade 3 (significant positive correlation between math and audio tapes); rejected for grade 4 (significant negative correlation between math and MTV and CDs).

1c sub-hypothesis: No relationship exists between TV program preferences and reading as measured by the SRA Reading Test.

Null sub-hypothesis status was as follows: Rejected for grade 3 (significant positive correlation between reading and quiz shows); retained for grade 4.

1d sub-hypothesis: No relationship exists between TV program preferences and mathematics as measured by the SRA Math Achievement Test.

Null sub-hypotheses' status were as follows: Retained for grade 3 and grade 4.

With reference to sub-hypothesis a, out of 18 comparisons of grade 3 SRA reading and mathematics scores with the nine media types, only 2 pairings (reading and mathematics each with audio tapes) were significantly positively correlated. For grade 4, four of the 18 comparisons (reading and mathematics, each with CDs and MTV) were significantly negatively correlated. Out of 28 pairings of reading and mathematics for both grades with preferences for seven types of TV programs (sports, movies, quiz, cartoon, educational, music, and comedy) there was only one negative correlation. That was for quiz and reading scores for grade 3.

So far as these data indicate, with only seven significant correlations out of 64 pairings (19%), there appears to be little relationship between amount of EEM exposure and formal academic performance.
Null Hypothesis 2

Null hypothesis 2 states: No relationship exists between exposure to electronic entertainment media and discretionary reading activities.

2a sub-hypothesis: No relationship exists between exposure to electronic entertainment media and discretionary academic activities.

Null sub-hypothesis status was as follows: Rejected for grade 3 (significant positive correlation between books and educational television; between newspapers and radio, audio tapes, CDs, and educational television); rejected for grade 4 (significant positive correlation between newspapers and educational television; between letters and audio tapes and telephone).

2b sub-hypothesis: No relationship exists between exposure to electronic entertainment media and time spent on homework.

Null sub-hypothesis status was as follows: Retained for grade 3 and grade 4.

2c sub-hypothesis: No relationship exists between the number of types of electronic media devices in the home and time spent on homework.

Null sub-hypothesis status was as follows: Retained for grade 3 and grade 4.

2d sub-hypothesis: No relationship exists between noise-level preference and time spent in student-initiated reading.

Null sub-hypothesis status was as follows: Retained for grade 3 and grade 4.

2e sub-hypothesis: No relationship exists between TV program preferences and time spent on student initiated reading.
Null sub-hypothesis status was as follows: Rejected for grade 3 (significant negative correlation between books and quiz shows); retained for grade 4.

With reference to 2a, out of 36 pairings of grade 3 student-initiated reading (books, newspapers, and letters) with the nine media types, 9 were significantly positively correlated. For grade 4, three of the 36 pairings (educational TV, audio tapes, and telephone) were significantly positively correlated.

No significant relationship was found for sub-hypothesis 2b between time spent on homework and the nine media types.

No significant relationship was found for sub-hypothesis 2c between time spent on homework and the number of different types of EEM devices in the home (television, computer, walkman, video game, radio, VCR). It is interesting to note, however, that 86% of grade 3 respondents and 91% of grade 4 respondents reported having four or more media device types in the home. Thus, without a control population against which comparisons could be made, statistics for (c) were moot.

No significant relationship was found for sub-hypothesis 2d between student-initiated reading and a preference for noise (none, some, much). However, for both grades, 75% to 80% preferred noise as an ambient element during reading.

For sub-hypothesis 2e, out of 21 pairings of books, newspaper, and letters for both grades with seven types of programs (sports, movies, quiz, cartoons, educational, music, and comedy), there was only one significant correlation (negative) for third-grade reading scores with quiz programs.
So far as these data indicate, with only 13 significant correlations out of 132 pairings, there appears to be little relationship between amount of EEM exposure and discretionary reading activity.

Null Hypothesis 3

Null hypothesis 3 states: No relationship exists between exposure to electronic entertainment media and recreational/social behavior.

3a sub-hypothesis: No relationship exists between exposure to electronic entertainment media and time spent in sedentary play.

Null sub-hypotheses' status were as follows:

1. Rejected for grade 3 (significant positive correlation between indoor play and all nine of the media except for educational television)

2. Rejected for grade 4 (significant positive correlation between indoor play and audio tapes)

3. Rejected for grade 3 (significant positive correlation between goofing off and all nine of the media except for television, computer, and educational television)

4. Rejected for grade 4 (significant positive correlation between goofing off and all nine of the media except for computer, educational television and telephone)

5. Rejected for grade 3 (positive significance between video games and all nine of the media except for educational television)

6. Rejected for grade 4 (significant positive correlation between video games and all nine of the media except for radio and educational television).
3b sub-hypothesis: No relationship exists between exposure to electronic entertainment media and time spent in active play.

Null sub-hypothesis status was as follows:
1. Rejected for grade 3 (significant positive correlation between sports and all nine of the media except for educational television)
2. Rejected for grade 4 (significant positive correlation between sports and all nine of the media except for television, computer, educational television, and telephone and negative significance between sports and educational television)
3. Rejected for grade 3 (significant positive correlation between outdoor play and all nine of the media except for television, CDs, computer, and educational television)
4. Rejected for grade 4 (significant positive correlation between outdoor play and educational television).

3c sub-hypothesis: No relationship exists between exposure to electronic entertainment media and time spent talking to friends/family.

Null sub-hypothesis status was as follows:
1. Rejected for grade 3 (significant positive correlation between chatting with family members and all nine of the media except for television)
2. Retained for grade 4
3. Rejected for grade 3 (significant positive correlation between visiting with friends and all nine of the media)
4. Rejected for grade 4 (significant positive correlation between visiting with friends and all nine of the media except for video tapes, CDs, computer, and educational television)
5. Rejected for grade 3 (significant positive correlation between talking on the telephone and all nine of the media except for educational television)

6. Rejected for grade 4 (significant positive correlation between talking on the telephone and all nine of the media except for educational television).

3d sub-hypothesis: No relationship exists between exposure to electronic entertainment media and time spent on hobbies.

Null sub-hypothesis status was as follows:

1. Rejected for grade 3 (significant positive correlation between writing and all nine of the media except for television, video tapes, computer, and educational television)

2. Rejected for grade 4 (significant positive correlation between writing and CDs)

3. Rejected for grade 3 (significant positive correlation between art and MTV, radio, audio tapes, and CDs)

4. Rejected for grade 4 (significant positive correlation between art and video tapes and CDs)

5. Rejected for grade 3 (significant positive correlation between music and telephone)

6. Rejected for grade 4 (significant positive correlation between music and telephone)

7. Rejected for grade 3 (significant positive correlation between collections and all 9 of the media except for educational television)


With reference to sub-hypothesis 3a, out of 27 pairings of grade 3 passive play with the nine media types, there were 22 significant positive
correlations. For grade 4, passive play, out of 27 pairings, there were 14 significant positive correlations.

With reference to sub-hypothesis 3b, out of 18 pairings of grade 3, active play, with the nine media types, there were 12 significant positive correlations. For grade 4, active play, there were 6 significant positive correlations and 1 significant negative correlation.

With reference to sub-hypothesis 3c, out of 27 pairings of grade 3, conversation, with the nine media types, there were 25 significant positive correlations. For grade 4, conversations, there were 13 significant positive correlations.

With reference to sub-hypothesis 3d, out of 36 pairings for grade 3, hobbies, with the nine media types, there were 18 significant positive correlations. For grade 4, hobbies, there were 3 significant positive correlations.

So far as these data indicate, with 122 significant correlations out of 270 pairings, there appears to be a fair relationship between amount of EEM exposure and social behavior.

Discussion

Students (grade 3) who spent more time listening to audio tapes tended to have higher reading scores. The popularity of children’s sing-a-long and story-time tapes could have an influence in such findings.

Students (grade 4) who spent less time listening to CDs or watching MTV tended to have higher reading and mathematics scores. There was a
general increase in time spent exposed to EEM from grade three to grade four except for MTV and educational TV. An enculturation phenomenon--away from simple, juvenile interests to more sophisticated, adolescent entertainment--could have an influence in such findings.

An expected correlation did not emerge between the amount of time spent listening to the radio and watching TV and reading and mathematics scores. Conventional wisdom places these popular media at variance with academic excellence. The amount of documented time spent attending to radio and television as well as the vacuous content of these media are cited as major elements supporting the belief. As stated elsewhere in this study, correlation between these variables may be masked by the pervasiveness of media. For example, that which is normal within one culture is not readily visible unless contrasted with a culture in which the normal phenomenon is not present or varies appreciably. Hence, EEM as an endemic phenomenon within the United States might not correlate significantly in a study of this type.

Null sub-hypotheses 1c and 1d address the relationship between media content and academic success. No significant relationships emerged from this study. This research was primarily focused on time spent with media rather than on the content of media. However, among researchers and critics, more attention has been given to content than to time spent exposed to media. Therefore, it was important that content as an influencing factor be considered in this study. Certainly content, as a powerful element in media attendance, is suggested by the variance between a preference for popular programming and educational television.
Hypothesis 2 addresses the relation between exposure to electronic entertainment media and discretionary reading and time spent on homework. As might be expected, a significant positive relationship was found between time spent watching educational television and time spent reading books--grade 3. However, this relationship was not sustained by grade 4 respondents. The topical nature of educational television--nature, science, experimentation, and social activity--tends to reinforce print media. The trend by grade 4 respondents observed in this study (six significant correlations for grade 3 as opposed to three significant correlations for grade 4) suggests a shift toward popular media and away from print media. No significant correlation emerged between exposure to EEM and time spent doing homework. Concurrent media exposure and homework was common among respondents. This is consistent with Anderson and Collin's (1988) assessment:

There is little evidence that television viewing displaces valuable cognitive activities. The clearest evidence indicates that viewing displaces movie attendance, radio listening, comic book reading, and participation in organized sports. Homework, however, is often done concurrent with TV viewing. There is no evidence that homework done during television viewing is of lower quality than homework done in silence. (p. 8)

While no significant relationship exists between noise preference and time spent in student-initiated reading, most respondents (81%) preferred noise at some level during reading. The type of media generating noise appears to be irrelevant. Anderson and Collin's (1988) analysis of research literature found no evidence that homework done during television viewing is of lower quality than homework done in silence. No mention is made of variance in time spent on homework with and without electronic distraction.
The relationship between EEM and discretionary reading activities, specifically reading and time spent on homework, differed slightly between the two grades. The percentage of significant correlations of all variable pairings for sub-hypothesis 2a showed a difference of 15% (19.5% for grade 3 and 4.3% for grade 4).

The relationship between EEM and social behavior, specifically play, conversation, and hobbies, also differed widely between the two grades. The percentage of significant correlations of all variable pairings showed a difference of 37% (70% for grade 3 and 33% for grade 4).

The concept of interpersonal and community discourse on an informal level showed fewer significant correlational variations in family conversation for grade 4 than for grade 3. Friendly conversation decreased slightly for grade 4, but telephone conversation remained the same for both grades.

**Research Questions**

This study sought to answer three questions about exposure to electronic entertainment media and relationships between the capacity of children to learn and behave socially. The findings suggest the following answers to these questions:

1. To what extent does exposure to electronic entertainment media (sensory overload) correlate with formal reading and mathematics?

   Even though there was weak significant correlation evident in the population surveyed, the question was not definitively answered. Both third- and fourth-grade respondents tested (SRA) well above the national average...
in reading and math. Thus, it is possible that a significant relationship with EEM could be masked.

2. To what extent does exposure to electronic entertainment media (sensory overload) correlate with discretionary reading and related tasks?
   A weak relationship was evident with some of the media but no strong inference can be made.

3. To what extent does exposure to electronic entertainment media (sensory overload) correlate with recreational and social behavior?
   Compared to the relationships evident in questions 1 and 2, significant relationships are here firmly apparent.

Conclusions

Exposure to electronic entertainment media may be related to academic achievement of third-and fourth-grade students. However, relatively little evidence for it is found in this preliminary investigation. Anderson's (1988) conclusions agree that, indeed, very little support is found in research literature supporting the effects of media upon academic behavior. Limitations of this study, on the one hand taken together with other studies and commentary by education specialists, suggest that a more definitive examination of EEM and its relationship with the developing child is warranted.

There are definite differences indicated between the third-and fourth-grade respondents of this study respecting EEM and social behavior, but whether those indications are meaningful or aberrational remain to be seen.
The apparent significant relationship between social/recreational activity and EEM (hypothesis 3)—many more significant correlations than in hypotheses 1 and 2—could be accounted for by the comparison of two types of pleasurable variables. However, a study by Anderson and Maguire (1978) which examined a population consisting of third-, fourth-, and fifth-graders found that the differences among third and fourth graders were not significant, whereas the difference between the age-groups was very significant. For their sample, a negative relationship existed between the number of TV shows viewed and educational attainment.

Exposure to electronic entertainment media may be related to third- and fourth-grade student-initiated activities such as reading for personal fulfillment, homework, and noise preference. However, in this study there were only eight significant positive correlations and just one significant negative correlation between EEM and student-initiated activity. A more critical examination of the implications of hypothesis 2 should be undertaken, though, because it is here where personal initiative is brought to bear most decisively. How students behave while under their own volition better reflects the state of their structure and function. The relationship between level of noise preference and task efficiency is especially critical to young students whose developmental dynamics are so encompassing and complex. Not only must they develop cognitive and social faculties but they must manage developing physical structures as well.

Exposure to electronic entertainment media is related in complex ways to social behavior such as play, talk, hobbies, and discipline. There were only positive significant correlations (with one exception) between EEM and
social behavior. Hypothesis 3 revealed many contrasting relationships between third- and fourth-grade respondents. Differences related to EEM were especially apparent in play, talk, and hobbies. There were twice as many positive relationships for third-grade respondents as there were for fourth-grade respondents. When viewed with the other data in this study, the research indicates a drift away from traditional social attitudes such as talking and hobbies toward more media oriented culture as students move through the grades.

Recommendations for Future Research

This section explores potential strategies for further study of the question respecting sensory overload. Given time, resources, and hindsight, how might the study be pursued to better advantage?

Analysis of the Question

Primary elements that are constructive or destructive to the information process must be identified, analyzed, and made operational. For this study, this was superficially done. Questions that might well have been asked early on were: When is the brain most critically informed and by what means? Are there developmental stages of readiness wherein nurture or its absence are most crucial to long-term well-being? What aspects of environmental sound/noise impinge upon structure and function (i.e., interval, intensity, quality, content)? If the research question is recast, then different hypotheses result.
Selection of the Population

This study was undertaken in conjunction with other studies of the same schools on unrelated topics without due consideration of its appropriateness. Consequently, an intact sample with unique, non-generalizeable elements was selected which tended to weaken the findings. Needed was a sample more representative of the population.

Having determined approximate stages of development, population selection should correspond to those stages. An example: 2 to 3 years old, 12 to 14 years old, and 25 to 30 years old represent intervals of physiological development pertaining to brain/mind maturation. Equally important to studies of this nature is the concept of control grouping: selecting subjects within each of the age stages that contrast with respect to sensory experience.

Statistical Treatment

Undertaking a study as dynamic and as complex/compound as human behavior should include both qualitative and quantitative analysis. All of the tools, instruments, and strategies available should be brought to bear upon the question being studied.

An innovative system of mathematics called "chaos" is being developed to respond to extremely complex questions. It was initially intended to apply to weather prediction. Human behavior is certainly as "chaotic" as the weather. And the systems within systems of one are not more momentous than those within the other. If, as suggested in chaos
theory, a butterfly can move its wings in Beijing and a hurricane is born in Havana, or if a whisper in the Kremlin produces chaos in the Pentagon, then how much more intricate are the dynamics of human behavior!

Phenomenology with its interviews, notebooks, observations, and empathies is as useful to a study of sensory overload as are numerical data and quantitative analysis.

Resources in Time and Money

Doctoral studies are often too limited in time, money, or scope to accommodate in depth many of the questions to be asked. A longitudinal study of sensory overload and EEM would be much more informative. The use of technological instruments such as PET, MRI, CAT, and EEG are potentially exciting but are prohibitive financially.

It is suggested that the following are valid topics for wider investigation.

1. It is recommended that this study be replicated using different population age groups such as samples from middle school and high school as well as additional methods and techniques such as the use of diaries, logs, and interviews.

2. It is recommended that a study be done on sensory overload utilizing imaging devices for brain scan analysis. Children, exposed to continuous or near-continuous sound/noise, could experience an overload of the senses producing gridlock to learning. With the introduction of the telegraph, radio, and more recently television with its satellite devices, a phenomenon that has insinuated itself virtually within all cultures of the
world, data--significant or trivial--flows continuously to the most remote parts of the earth. Walkman-type radios are now standard equipment for nearly all tribes and languages. (The respondents of this study were reported to have an average of five different types of EEM devices in each home.)

Given such easy access to personalized sound, the passive nature of receiving electronic input could be expected to infringe upon the more cognitive, contemplative processing of ideas and thought. Even the necessary skills (structures) for cognition or contemplation are endangered by the seductive nature of EEM. The problem, therefore, is the immanent threat to the new generation and its capacity to function as decision-makers and cultural preservationists. To what extent, then, if at all, does time spent exposed to EEM threaten the capacity of children to function in responsible ways?

Could EEM distraction exacerbate root causes of LD and ADHD? Perhaps they may even contribute to learning difficulties in very basic ways. Feinberg (1977) has postulated that mass media tend to over-stimulate parts of the brain. They have singularly shaped and molded this generation of students, she said. And television more than any other medium has created passive, disinterested learners who have abdicated responsibility for their own education. Perhaps long before a child can be expected to assume responsibility for his/her own education, vital structures may have been already irreversibly compromised by exposure to EEM.

Literature that emerged since 1988 indicated that the question was more multi-dimensional than was first supposed. EEM was being discussed as developmentally threatening as well as being a distraction from social
pursuits, potentially addictive, or displacing educational skills. Thought leaders theorized that structure and function were co-dependent in infants and children and that the negative effects of over-exposure were largely unalterable (Schroeder, 1987). With the aid of newly developed electronic devices, neuroscientists had begun the ambitious undertaking of mapping not only the known brain functions, but those unknown as well (Begley et al., 1992). Electronic devices being employed included those mentioned above.

Anderson, D. (personal communication, 1993), however, cautioned against optimism respecting the use of imaging devices for educational research. The artificial setting required for measurement could distort any findings, he said.

3. It is recommended that a study on boredom be initiated. As with "attention," "boredom" is difficult to test since the term as commonly used has no technical meaning. Nevertheless, boredom as a construct is referred to by students, parents, and teachers, alike, as a major reason for academic inefficiency. Do EEM contribute to task boredom?

Paraphrasing Anderson, rather than rhetoric supported by anecdote and bolstered by unstated political and social bias, the question of EEM's cognitive, social, and attitudinal effect should be approached by careful empirical observation and analysis combined with clearly stated and testable hypotheses and theory.

4. It is recommended that a study on developmental media disability be initiated. A phenomenon consistent throughout the hypotheses of this study was the disparity of the data between third grade and fourth grade. A
question of extrapolation should logically follow. Would the disparity widen if populations of older subjects were studied? And if such disparity emerged, what would it indicate respecting EEM, if anything? An informal sampling of such a study was done in a small ten-grade school on the West Coast.

5. It is recommended that a study on sensory overload be re-initiated. In its initial stages this study embraced a more inclusive concept. The pure question then was--When overloaded by external stimuli do the five senses compromise the brain in explicit ways? Constraints that naturally impinge upon a doctoral study compelled the focus of this study. However, the original question appears to be more imperative now than ever.
TIME TALLY CHECKLIST PILOT STUDY
(Private) Elementary School
April 30, 1991, 9:00 AM
4th Grade, XXXXX - teacher

Friday, April 26, 1991 I made an appointment to see Dr. XXXXX, principal of (pvt. elementary school) to discuss the possibility of using one of the classroom populations for the Time Tally Checklist pilot study. After listening to my presentation and examining the questionnaire, Dr. XXXXX gave me permission to contact (3rd grade teacher) and (4th grade teacher). I could not make contact with (3rd grade teacher) but was able to speak to (4th grade teacher). She invited me to administer the questionnaire at 9:00 AM on Tuesday, April 30 in her classroom at (school). I arrived at school by 8:45 AM and registered my presence at the administration office. I left a copy of the questionnaire there for Dr. XXXXX. An administrative assistant gave me directions to the 4th grade classroom. I entered the classroom at 8:55 AM. (Teacher) was completing an introductory activity and at nine o'clock introduced me to the class. I gave her a full copy of the questionnaire (cover letter, proctoring procedures, and text). I stated my name again, my affiliation with Andrews University, and the nature of my business with the 4th grade students. I informed them clearly that their involvement was not required, that they could omit any part of the questionnaire they felt was offensive and that they were not obligated to finish the test once it was started. The questionnaire was distributed and I led them through an overview of the complete document, explaining its purpose and function. I explained the scaling and took the entire class through the demographic page and through the Reading section of page
two. The students continued on their own. I circulated among them helping individuals interpret questionnaire items. The questionnaire was completed by all in the class in 20 minutes total time.

The students appeared to have a good general understanding of the mechanical procedures. Weaknesses noticed were items 6G, 1D, and 4E. For three or four students the sequencing function of 6G seemed difficult and for three or four others the exclusive nature of 1D and 4E was resisted.

Recommendations:
1. Scaling be clarified (see Fox, p. 558)
2. 1D be re-structured to include biographies. (e.g. fiction, non-fiction, Bible stories, nature & science, comics, adventure, nothing)
3. Should the scaling be reversed?
4. The proctor(s) supervise the process more closely and deliberately.
APPENDIX B

TIME TALLY CHECKLIST
Hello there!

My name is Mr. Ron Busby. I am studying at Andrews University. For my assignment, I am looking at the different ways in which school children spend their time. Please help me complete my assignment by filling out the checksheet. It will take only a few minutes. There are no right or wrong answers, but please try to be as accurate as you can.

You do not have to fill out this form if you do not want to. And if you start, you don't have to finish. But I hope you DO decide to complete the form so we can learn more about what children like to do with their time.

Thank you very much.

Mr. Busby
Andrews University
TIME TALLY CHECKLIST

Instructions: We wish to study ways in which children spend their time. Please answer each question. Select the response that most closely applies to you. Remember, you do not have to do this. And if you do start, you do not have to finish.

1. Your Name: ______________________________________________

2. Your School: ☐ Coloma Elementary
   ☐ Other: __________________________________________________

3. Your Grade: ________________________________________________

4. How many brothers and sisters do you have living at home?
   ☐ Brothers  ☐ Sisters

5. You are a:  ☐ Boy   ☐ Girl

6. Which of these do you have in your home: (Check any that apply)
   ☐ TV     ☐ Walkman  ☐ Radio
   ☐ Computer/printer  ☐ Nintendo type game  ☐ VCR

7. After school, about how much time do you spend on homework each day:
   ☐ not any  ☐ a few min.  ☐ 1 hr.  ☐ 2 hrs.  ☐ 3 hrs.
HOW MUCH TIME DO YOU SPEND --

1. READING: (other than school assignments)

<table>
<thead>
<tr>
<th></th>
<th>Never or Hardy Ever</th>
<th>Just Once in a While</th>
<th>Once or Twice a Week or so</th>
<th>About Every Day (less than 2 hours)</th>
<th>Every Day (2 hours or more)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Books (magazines and other big stuff)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Newspapers (comics, weekly readers, etc...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Letters (notes, lists, and other small stuff)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. What's the favorite thing you like to read? (Fill in one of the following.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Adventure stories</td>
<td>□ Nature &amp; Science</td>
<td>□ Magazines</td>
<td>□ Nothing</td>
<td>□ Fairy tales, novels</td>
<td>□ Bible stories</td>
</tr>
</tbody>
</table>

2. HOBBIES: (activities away from school)

<table>
<thead>
<tr>
<th></th>
<th>Never or Hardy Ever</th>
<th>Just Once in a While</th>
<th>Once or Twice a Week or so</th>
<th>About Every Day (less than 2 hours)</th>
<th>Every Day (2 hours or more)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Writing (letters, stories, poems, etc...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Art (drawing, designing, modeling, etc...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Music (singing, playing instruments, etc...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Collections (cards, coins, stamps, etc...)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Other: _________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. PLAYING:

A. Sports (baseball, swim, track, and other stuff)
B. Play (tag, hop-scotch, hide 'n-go-seek, etc...)
C. Games (monopoly, checkers, cards, etc...)
D. Goofin'-off (doing nothing much, hanging-out, )
E. Video games (Nintendo, Sega, Atari, etc...)
F. What's the favorite thing you like to play? (Fill in one of the following.)
   □ Video games □ Back yard games □ Table games
   □ Sports □ Card games □ Nothing

4. LISTENING:

A. Radio (music, comedy, sports, and other things.)
B. Tapes (music, comedy, and other things)
C. Telephone (friends, and relatives, etc...)
D. CDs (music, comedy, and other things.)
5. TALKING:

A. Telephone (friends, and relatives)
B. Chatting with your family
C. Talking with friends and neighbors

6. WATCHING:

A. TV (cartoons, movies, sports, and other things)
B. Video-tapes & Theater (movies, & other things)
C. MTV (music videos, and other things)
D. Computer (games, designs, school work)
E. Educational TV (Mr. Rogers, Sesame St., Nat. Geog., P.B.S.)
7. What's the favorite thing you like to watch? Put 1 for your favorite, 2 for your next favorite, 3 for the next, 4 for the next, and 5, 6, and 7 for the least favorites. □ Sports □ Movies □ Quiz shows □ Cartoons
   □ Educational programs □ Music videos □ Comedy
   (nature films, etc...) (MTV) (shows that are funny)

8. The boy in the cartoon is doing homework. When you do homework, do you prefer (1) a lot of noise, (2) a little noise, or (3) no noise at all? Please explain how you do your work.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
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PROCTORING GUIDELINES to the TIME TALLY CHECKLIST

1. Scaling: From least involvement to most involvement.

   A. Never or Hardly Ever: The first increment is designed to measure those
      who have only incidental or no involvement at all.

   B. Just Once in a While: The second increment is designed to measure
      very moderate and sporadic involvement.

   C. Once or Twice a Week or so: The third and middle increment is
      designed to measure those who are periodical bingers or who
      sporadically indulge in a significant way.

   D. About Every Day (less than 2 hours): The fourth increment is designed
      to measure those who have some involvement daily but not in
      immoderate amounts.

   E. Every Day (2 hours or more): The fifth increment is designed to measure
      the dedicated readers and writers, the most vocal talkers, the avid
      players, the habitual listeners and watchers; those who are heavily
      involved on a daily basis.

2. Administering the test would best be done in a group setting such as the
   classroom. The classroom teacher or myself as proctor would then be able
   to ensure an even understanding of each test item.

3. A caution should be emphasized regarding the fifth scaling increment
   (Every Day--2 hours or more). Students should be aware of its cumulative
   effect.

4. The questionnaire was pre-tested on a representative group of 4th graders
   (25 subjects).

5. In the demographic section questions 4 and 5 will be used to correlate
   (no. 4) the differences in the amount of involvement among low sibling and
   high sibling families and (no. 5) the differences between boys and girls in
   the categories being measured.
APPENDIX C
CORRESPONDENCE WITH RESEARCHERS
April 8, 1991

Mr. Ronald Busby
4853 Greenfield Drive
Berrien Springs, MI 49103

Dear Mr. Busby:

I fear I do not have the time to give your letter the attention it deserves. I will say, however, that there's no question in my mind that sensory overload is a major factor in affecting the learning process. In fact, it does more than that. It affects young and old and comes very close to driving the whole culture mad. You're on the right track.

Best wishes,

Neil Postman
## VARIABLE LISTS

### A

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. School</td>
<td>1. ID</td>
</tr>
<tr>
<td>2. ID</td>
<td>2. Ethnic group</td>
</tr>
<tr>
<td>3. Teacher 9091</td>
<td>3. Regular status</td>
</tr>
<tr>
<td>4. CUE 9091</td>
<td>4. Special ed. status</td>
</tr>
<tr>
<td>5. Ethnicity</td>
<td>5. Chapter I</td>
</tr>
<tr>
<td>6. Regular status</td>
<td>6. School name</td>
</tr>
<tr>
<td>7. Special ed. status</td>
<td>7. Teacher code</td>
</tr>
<tr>
<td>8. Chapter I status</td>
<td>8. CUE9091</td>
</tr>
<tr>
<td>9. Grade 9091</td>
<td>9. Which grade</td>
</tr>
<tr>
<td>10. Teacher 8990</td>
<td>10. # of brothers</td>
</tr>
<tr>
<td>11. CUE 8990</td>
<td>11. # of sisters</td>
</tr>
<tr>
<td>12. Grade 8990</td>
<td>12. Gender</td>
</tr>
<tr>
<td>13. G889 vocabulary</td>
<td>13. # of hrs/day HW</td>
</tr>
<tr>
<td>15. G889 Total</td>
<td>15. &quot; newspapers</td>
</tr>
<tr>
<td>17. G590 comprehension</td>
<td>17. Favorite reading</td>
</tr>
<tr>
<td>18. G590 Total</td>
<td>18. HOBBIES: writing</td>
</tr>
<tr>
<td>20. G1090 comprehension</td>
<td>20. &quot; music</td>
</tr>
<tr>
<td>22. Teacher 8889</td>
<td>22. &quot; other</td>
</tr>
<tr>
<td>23. CUE 8889</td>
<td>23. PLAY: sports</td>
</tr>
<tr>
<td>24. Grade 8889</td>
<td>24. &quot; outside play</td>
</tr>
<tr>
<td>25. S489 reading</td>
<td>25. &quot; inside play</td>
</tr>
<tr>
<td>27. S489 mathematics</td>
<td>27. &quot; video games</td>
</tr>
<tr>
<td>28. S489 comprehension</td>
<td>28. Favorite play</td>
</tr>
<tr>
<td>29. S490 reading</td>
<td>29. LISTENING: radio</td>
</tr>
<tr>
<td>30. S490 language</td>
<td>30. &quot; tapes</td>
</tr>
<tr>
<td>31. S490 mathematics</td>
<td>31. &quot; telephone</td>
</tr>
<tr>
<td>32. S490 comprehension</td>
<td>32. &quot; CDs</td>
</tr>
<tr>
<td>33. S491 reading</td>
<td>33. TALK: telephone</td>
</tr>
<tr>
<td>34. S491 language</td>
<td>34. &quot; family</td>
</tr>
<tr>
<td>35. S491 mathematics</td>
<td>35. &quot; friends</td>
</tr>
<tr>
<td>36. S491 comprehension</td>
<td>36. WATCHING: TV</td>
</tr>
<tr>
<td></td>
<td>37. &quot; video tape</td>
</tr>
<tr>
<td></td>
<td>38. &quot; MTV</td>
</tr>
<tr>
<td></td>
<td>39. &quot; computer</td>
</tr>
<tr>
<td></td>
<td>40. &quot; ed. TV</td>
</tr>
<tr>
<td></td>
<td>41. FAV. watch: sports</td>
</tr>
<tr>
<td></td>
<td>42. &quot; movies</td>
</tr>
<tr>
<td></td>
<td>43. &quot; quiz shows</td>
</tr>
<tr>
<td></td>
<td>44. &quot; cartoons</td>
</tr>
</tbody>
</table>
45. "ed. programs
46. "music
47. "comedy
48. Electronic devices in
    the home: TV
49. "computer
50. "walkman
51. "video game
52. "radio
53. "VCR
54. Noise preference
TIME TALLY CHECKLIST DATA

HYPOTHESES

A. No relationship exists between formal academic performance and exposure to electronic entertainment media.

1. No relationship exists between academic achievement outcomes as measured by the SRA Reading Test and exposure to electronic entertainment media.
   A15, A18, A21 vs. B29-32, B36-40

2. No relationship exists between academic achievement outcomes as measured by the SRA Math Achievement Test and exposure to electronic entertainment media.
   A27, A31, A35 vs. B29-32, B36-40

3. No relationship exists among TV program preferences and academic performance in mathematics as measured by the SRA Math Achievement Test.
   B41-47 vs. A27, A31, A35

4. No relationships exist among TV program preferences and academic performance in reading as measured by the SRA Reading Test.
   B41-47 vs. A15, A18, A21

B. No relationship exists between discretionary academic activities and exposure to electronic entertainment media.

5. No relationship exists between time spent in student initiated reading and exposure to electronic entertainment media.
   B14-16 vs. B29-32, B36-40

6. No relationship exists between time spent on homework and exposure to electronic entertainment media.
   B13 vs. B29-32, B36-40

7. No relationship exists between time spent on homework and the number of electronic media devices in the home.
   B13 vs. B48-53

8. No relationship exists between noise preference and student initiated reading.
   B54 vs. B14-16

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9. No relationships exist among types of reading preference and exposure to electronic entertainment media.
   B17 vs. B29-32, B36-40

10. No relationships exist among TV program preferences and student initiated reading.
    B41-47 vs. B14-16

C. **No relationship exists between social behavior and exposure to electronic entertainment media.**

11. No relationship exists between time spent in sedentary play and exposure to electronic entertainment media.
    B25-27 vs. B29-32, B36-40

12. No relationship exists between time spent in active play and exposure to electronic entertainment media.
    B23-24 vs. B29-32, B36-40

13. No relationship exists between time spent talking to friends/family and exposure to electronic entertainment media.
    B34-35 vs. B29-32, B36-40

14. No relationship exists between time spent listening to auditory electronic entertainment media and time spent in student initiated reading.
    B29-32 vs. B14-16

15. No relationship exists between time spent on hobbies and exposure to electronic entertainment media.
    B18-22 vs. B29-32, B36-40

16. No relationship exists between student behavior as measured by attendance records and exposure to electronic entertainment media.
    C3-5 vs. B29-32, B36-40

17. No relationship exists between student behavior as measured by referral records and exposure to electronic entertainment media.
    C7 vs. B29-32, B36-40

18. No relationships exist among TV program preferences and exposure to electronic entertainment media.
    B41-47 vs. B29-32, B36-40
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VITA

NAME: Ronald Wallace Busby
DATE OF BIRTH: December 28, 1933
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EDUCATION:
1994: Education Doctor
Curriculum & Instruction
Andrews University, Michigan

1978: Master of Education - Educational Administration
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1989-90: Graduate Assistant and Supervisor of Cadet Teachers
Dept. of Curriculum and Instruction
Andrews University, Michigan

1975-88 Teacher of Mathematics, Religion and Physical Education
Grades 7-10
Cypress Adventist School, Washington

1970-74 Principal
Salt Lake Junior Academy, Utah

1966-69 Teacher
Grades 7 and 8
Salt Lake Junior Academy, Utah

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Eastern Montana College, Montana

1958-62 Interstate Truck-driver
Billings, Montana

1953-57 Timber Industry - Sawmill and Logging
Northwestern United States

1950-52 Plastering and Building
Billings, Montana