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Biegen, Elaine Ruth Ebert

THE EFFECTS OF VIDEO GAME USAGE, FAMILY PRESS FOR
ACHIEVEMENT, AND SCHOOL-RELATED ACTIVITIES ON SCHOOL
OUTCOMES

City University of New York

PH.D. 1985

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**THE EFFECTS OF VIDEO GAME USAGE,
FAMILY PRESS FOR ACHIEVEMENT,
AND SCHOOL-RELATED ACTIVITIES
ON SCHOOL OUTCOMES**

By

ELAINE RUTH EBERT BIEGEN

**A dissertation submitted to the
Graduate faculty in Educational
Psychology in partial fulfillment of
the requirements of Doctor of Philosophy,
The City University of New York.**

1985

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ELAINE RUTH EBERT BIEGEN
1985

This manuscript has been read and accepted for the Graduate Faculty in Educational Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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Abstract

The Effects of Video Game Usage, Family Press for Achievement,
and School-Related Activities on School Outcomes

By

Elaine Ruth Ebert Biegen

Adviser: Professor Barry J. Zimmerman

This study addressed itself to several questions associated with video game usage: the impact of video games on children's academic achievement, how the social-psychological processes of the family relate to children's video game usage, and the relationship of video game usage to school-related activities. It also concerned itself with the relationship between Family Press for Achievement (within the Marjoribanks framework, 1979) and students' attitudes towards school, as well as whether these attitudes are differentially affected by video game usage. The theoretical framework of the study was Hornik's conceptualization of displacement (1981), which alleges that video game usage diverts children's time and attention from school-related activities such as reading and processes of interaction within the "live" family environment, and in so doing affects school outcomes.

It was hypothesized that:

- 1) Family Press for Achievement has a direct negative influence on Video Game Usage;
- 2) Family Press for Achievement has a direct positive influence on School-Related Activities;

- 3) Video Game Usage has a direct negative influence on School-Related Activities;
- 4) Video Game Usage has a direct negative influence on School Achievement Outcomes;
- 5) School-Related Activities have a direct positive influence on School Achievement Outcomes;
- 6) Family Press for Achievement has a direct positive influence on School Attitude Outcomes;
- 7) School-Related Activities have a direct positive influence on School Attitude Outcomes;
- 8) Family Press for Achievement has a direct positive influence on School Achievement Outcomes; and
- 9) Video Game Usage has a direct negative influence on School Attitude Outcomes.

In addition to direct effects, a number of indirect effects were also hypothesized.

Seventy children randomly selected from a pool of students from grades 3-5 of an upper middle income suburban elementary school participated in the study. Boys and girls were equally represented. Three questionnaires were administered to the students. One questionnaire was filled out by their parents.

Path Analysis was utilized to test the hypothesized model, through a series of multiple regression equations, which obtained the path coefficients. A Chi-Square Likelihood Ratio Test was used to test the viability of the restricted path model compared to the unrestricted model. The

restricted model was found acceptable.

Hypotheses 1, 2, 4, 5, 6 and 7 were supported by the data. Hypotheses 3, 8 and 9 were not. None of the indirect effects were supported by the data.

Other analyses of the questionnaire on video games were performed and provided descriptive information.

Results of the study provided evidence of displacement. Time spent playing video games did appear to replace time devoted to other school-related activities, such as reading, and academic achievement decreased. However, this effect was found for only one-third of the sample--those who played video games three or more hours per week--and did not suggest a substantial problem for children as a population group.

Limitations of the study were noted, as well as recommendations for future research. Implications for education were also discussed.

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CHAPTER I
STATEMENT OF THE PROBLEM

After addressing the Western Psychiatric Institute conference (1982), Surgeon General C. Everett Koop invited questions from the audience. During this question and answer period, the Surgeon General voiced his concern about the possible detrimental effects the use of video games has among American children. His comments stirred great response among the participants, undoubtedly because of the concern throughout the country regarding the impact of video games on young people. In a follow-up call to the Surgeon General's office, this researcher (personal communication, November 28, 1982) learned that although no research had as yet been undertaken on this issue, the National Institute of Mental Health was considering proposals for future empirical investigations.

Parents have become concerned over the long and short term effects of video game usage on young people. With reports that video game arcades were becoming gathering places for large numbers of young people (The New York Times, April, 1982), concerned parents began to press government agencies to pass laws restricting game playing in commercial establishments. They cited arcades as locales for potentially harmful and objectionable behavior. Some parents argued that the

proliferation of video game machines and arcades frequently resulted in truancy problems (The New York Times, April, 1982). Several municipalities including Babylon, Long Island; Oakland, California; Marlboro, Massachusetts; and Durham, New Hampshire, passed laws in 1982 prohibiting the use of coin-operated video games by teenagers during school hours (Ibid).

The Surgeon General's desire for empirical research on the impact of video games is due to the perceived importance of the problem. The media have reported the pervasiveness of video game use through news programs, in magazine articles, and in numerous newspaper reports. Reading, hearing, or seeing commentaries about children's fascination with "Pac-Man," "Space Invaders," and other video games has become an everyday occurrence.

Historically, the video game business began modestly with an electronic table tennis game called "Pong" in the early 1970s. The industry grew rapidly, with profits of over one-half billion dollars by Christmas of 1977 (Video Games, December 1982, pp. 68-69). Video games were estimated to be a \$5 billion-a-year industry in 1983. More than twenty billion quarters were dropped into arcade machines in 1981 (Time Magazine, February, 1982). Pac-Man, one of the most popular games among females as well as males, earned \$200 million in machine sales in 1981 for Bally Corporation's Midway Division (The New York Times, April, 1982). The popularity of the games and the profits to commercial establishments offering

them for usage is further attested to by Assistant Commissioner Borack of the Department of Consumer Affairs in New York City. Ms. Borack reported that the Department had issued summonses to close several dozen unlicensed game parlors in 1982 (Ibid).

A variety of adverse effects of video games have been suggested. Government agencies such as Departments of Consumer Affairs are concerned that video game usage may increase violence and other antisocial behavior (The New York Times, 1982.) Educators have questioned the influence that video games may have on students' school achievement (The New York Times, 1983). Parents are concerned that normal family work and social interactive processes may be disrupted by games in arcades. Mental health professionals also fear that video game playing may negatively influence family processes and academic achievement, and that time spent playing video games diverts youngsters away from school-helping activities such as leisure time reading for pleasure and interest (Ibid).

Although there are larger implications, the present study will focus on the impact of video game usage on family interactive processes, students' school-related activities and school outcomes.

Purpose of the Study

This study will attempt to ascertain whether video game playing diverts children's attention and involvement from school-related activities, such as reading, and in so doing

adversely affects academic achievement. Specifically, this study will address several questions associated with video game usage. What is the impact of video games upon children's academic achievement? How are the social-psychological processes of the family related to children's video game usage? And, what is the relationship of video game usage to school-related activities?

In order to evaluate each of the above questions, it will be necessary to take a closer look at current literature on home environment processes associated with academic achievement. Since the subject of video games is a relatively recent phenomenon, and since empirical research on its psychological impact on children is scarce, pertinent research in the area of television and how it influences academic achievement will be considered. Both media were developed as sources of entertainment and share some similar content features. Both media use cathode ray tubes as a source of information, and both can occupy many hours of children's leisure time and divert their attention away from active family interaction, reading, and other school-related activities. Television has played an important role in the modification of traditional family life patterns. Findings of studies of television bearing on these issues thus have implications for future research on video games.

CHAPTER II
VIDEO GAME LITERATURE

To my knowledge, only two studies concerning video games have been conducted to date. Turkle (1984) interviewed hundreds of video game users during the past two years in an attempt to determine the relationship between video game usage and violence. She found no evidence that playing video games made children behave more aggressively. However, Turkle mentioned that other consequences were evident with children who played video games (Personal communication, January 1983). She reported that video games were an important means of socialization for youngsters into the computer culture. She found that children who played video games were more comfortable in approaching computers without intimidation.

In an unpublished dissertation, Malone (1981) analyzed the "fun" elements of video games. The purpose of his study was to identify the components necessary to design video games for use as teaching aids in the classroom. Malone discerned that video games had four essential properties: (1) goals, (2) automatic score keeping, (3) audio effects, and (4) randomness.

Video Games and Television

Although newspapers, magazines and television programs have

chronicled the impact of video games, researchers have just begun to investigate the similarities and differences shared by video games and television. In a New York Times article, Lewis (1983) stated, "We are in the realm of no information. There are no important studies that give us useful information about the effects of these games." He reported that parents and professionals working with youngsters were concerned about the effects of video game playing. One parent was quoted as saying that not having a home video game was much like being "the last kid on the block who didn't have a television set back in the 50s." All the parents interviewed for this newspaper article seemed concerned with the time element involved in video game usage. Much like television, the question of what activities were being replaced by video game play was of major import, as well as the impact video game usage was having on children's development, education and family interaction. They agreed that like television, video games had become a major contender for children's time and energies.

The most widely cited difference between television and video games is that television is a passive medium, whereas video games are interactive. In Art, Mind & Brain, Gardner (1982) referred to a video game called "Chess Challenger" as an example of the interactive quality of video games. Gardner stated, "Chess Challenger is a fully interactive setup in which the player can use his wits as inventively as possible and count on the machine-opponent to respond at an adult

level. The style of play can be varied, and the effect upon the machine-opponent can be assessed."

Another proponent of the interactive quality of video game playing was writer Samuel Vaughn. In the Winter 1983 issue of Daedalus, the Journal for the American Academy of Arts and Sciences, Vaughn stated, "Video games are teaching kids that there is joy in the interaction between hand, eye and screen."

By contrast, television is considered a passive medium in which children rely on what is seen, i.e. on how someone appeared to feel rather than upon their own personal experience and inferences drawn from it, with the visual element paramount (Gardner, 1982).

Review of Literature on Television

The influence of video media on social processes is not disputed. As noted by McLuhan (1964), the effect of video media is pervasive on people's personal, political, economic, aesthetic, psychological, moral and social functioning. McLuhan further suggests that any understanding of social-psychological and cultural change seems to require a knowledge of the way media works. Morgan and Gross (1982) report that historically each successive form of media that was developed, including novels, movies, comic books, and television, has been variously characterized as villain or redeemer. Positive effects of television have been reported by Williams, Haertel, Haertel & Walbert (1982). They reported that television has been regarded by some advocates as curative for environ-

mental limitations and a stimulus to creativity. They stated that television affords children a remarkable opportunity to come into contact with fantasy, a richer vocabulary, information about other countries, history and unfamiliar cultures, not generally available. In contrast, opponents of television (Mandler, 1978) have claimed that it produces shortened attention spans and decreased ability to process written information. Singer (1981) suggested that it is almost impossible to ignore a television set if it is turned on while you are in the same room; the visual image is continuous and evokes an orienting response. Singer stated that television, in its rapid sequencing of material, can cause interference problems in short-term memory systems, and negatively affect the retrieval of material from long-term memory. According to Rowher (1970), the rapid presentation of novel material can interfere with immediate recall and comprehension, and can impede rehearsal processes. Witelson (1976) suggested that the visual attention of television may produce a strong general preference for visual information, and this may in turn reduce children's preference for purely auditory, verbal material, such as school discussion or lectures, or reading material.

In a study investigating the recent drop in standardized achievement test scores, Harnischfeger and Wiley (1976) identified television more than any other form of media as a potential contributing factor in the decline of students'

test scores during the last two decades.

Winn (1977) discussed the potentially addictive qualities of television viewing and suggested that current problems such as juvenile violence, the drop in SAT levels, and even perhaps the increase in drug use may be attributable to the medium. Research on the relationship of student achievement and television viewing has not revealed consistent results. Childers and Ross (1973) questioned 100 elementary school children to determine how many hours of television were viewed on an average night. The relationship between these youngsters' TV usage and grade point average was calculated for each subject area. They did not find a significant relationship between the amount of hours a child spent watching television and his/her grades in school. IQ and prior achievement were used as controls in their statistical analysis. In contrast, Furu (1971) surveyed 4th, 7th and 10th grade Japanese children and found a negative relationship between television viewing and school achievement when the children's intelligence was controlled statistically.

Singer (1981) stated that although some of Winn's hypotheses may be debated, he agreed with the conclusion that time spent watching television can create a certain kind of cognitive passivity which leads to a "show me or entertain me" orientation by school children. In addition, Singer suggested that the spontaneous play of children involving a mixture of games of mastery, games with rules, exploration and make-believe, are critical experiences through which

children learn about themselves and their environment. Singer discussed further children's need to practice their verbal skill, and various affective reactions and problem-solving behavior, in preparation for adult life. The danger is that television viewing may preempt these activities and others that could be of great value to children's learning and development.

As early as 1958, Himmelweit, Oppenheim and Vince, in a study involving 1845 matched pairs of TV viewers in primary and secondary schools, compared the performance of viewers and non-viewers in their classes on reading, written English, arithmetic, and general science. They questioned the students about their amount of viewing time, the programs they viewed, parental involvement in TV viewing, the effects of aggressive programs on viewers, the effect of TV on other activities, i.e. reading, radio, newspaper reading, homework, comics reading, and family verbal interaction patterns. Of utmost concern to them was television's overall effect on the students' general knowledge and school achievement. Their research indicated a trend, although not statistically significant, in which high TV viewers' school performance was poorer than that of their matched controls (students were matched on the basis of age, IQ, sex, and SES).

Contrasting results were reported by Schramm, Lyle and Parker (1961). They found that first graders who watched TV had higher vocabulary scores than those who did not watch TV.

However, the authors also reported (p. 151): "Most and least intelligent children in a television community now start school about one grade higher in vocabulary than do their fellow students in non-television communities. By the sixth grade this fast start seems to have been lost."

From the above studies it can be concluded that TV may help pre-schoolers. However, it may have an adverse effect on upper school-age children, since most programs are written at the 6th grade level of linguistic functioning.

There is further evidence of the adverse effect of TV on adolescent children's school achievements. Hornik (1978) conducted a study in El Salvador, examining the impact of television use on cognitive growth in reading skills of 7th through 9th grade students. In particular, he examined the effects of recent acquisition of a TV set on each of three separate cohort groups of students over a two to three year period. There was no obvious effect on short-term achievement as found in the results of tests given after each period of learning. There were, however, consistent negative effects on reading improvement for all three cohort groups, and a significant negative effect on general ability growth for one cohort group. Hornik asked how the adverse effect could occur. Noting the lack of television viewing effects on specific subject matter achievement, he concluded that television watching is not primarily depressing learning through missed homework assignments and lack of sleep, etc.,

as other earlier researchers might have suggested. If missed homework and lack of sleep were the causal factors, mathematics, science and social studies would be more likely to show the effects than would reading achievement. Hornik continued: "A more reasonable explanation would suggest displacement of attention from more intellectually stimulating activities (reading, interaction with other people and with one's own immediate environment) to the watching of intellectually undemanding television programming."

Following this line of thought, Williams, Haertel, Haertel & Walberg (1982) reviewed research findings from 23 educational and psychological review articles, doctoral dissertations, statewide assessments, national surveys, journal articles, technical reports, books, and unpublished papers. They found that there is a slight negative relationship between television viewing and achievement. This negative effect, despite its size, was found in large national surveys and statewide assessments, in small studies in single schools, in different regions of the United States, and abroad. This negative effect was found in studies spanning a period of 26 years, using a variety of achievement measures and research methodologies. They also found that the influence of television on achievement depends on the amount of weekly viewing time. The negative effect emerged for viewing times greater than 10 hours weekly, and this effect became increasingly deleterious until viewing time reached 35

to 40 hours, beyond which additional viewing time had little further detrimental effect. The authors suggested that in homes where children view less than 10 hours of television per week, parents may be exercising substantially more control over programming than in homes where children view several hours of television daily. It is possible that televiewing begins to interfere significantly beyond 10 hours a week with activities such as reading, homework, or other more intellectually stimulating activities, as well as with interaction with other people in the home. Inasmuch as the average weekly viewing of 6- to 11-year-olds is 25 hours and 41 minutes (Comstock, 1978), the negative impact of television viewing could reflect the displacement of other, more school-related activities and verbal interaction within the home environment.

This body of research suggests that any medium which usurps so much of children's time can be expected to have an influence on schooling outcomes. Like television, video games have captured a large amount of children's time. Although television is regarded as a passive medium, and video games are considered a more interactive medium, both are major time-consumers for children. If our youngsters are watching TV, what other activities are displaced? One might also ask, if students are playing video games, what is it displacing in their lives? Could those experiences affect school outcomes? The present study seeks to test the following hypothesis: time spent on video games will divert a student away from school-related activities

such as reading or homework, or from family interactive processes that lead to achievement in school.

Family Press for Achievement and the Family Environment Schedule

Marjoribanks (1974,1979) has developed a model for describing family processes that affect children's achievement in school. He found that Family Press for Achievement, as measured by the Family Environment Schedule, directly influences School Outcomes. According to Marjoribanks, an "ideal" academically-oriented family is defined as one which creates a social-psychological learning environment in the home that optimizes a child's school achievement.

His "ideal" type of academically-oriented family is derived from studies that examined the press of families (Marjoribanks, 1974, 1979). Murray (1938) suggested that in order to understand the behavior of individuals, it is necessary to devise a method of analysis that will lead to dynamic formulations of external environments. He proposed that an environment should be classified by the kinds of benefits or harms that it provides. If the environment has a potentially harmful effect, Murray suggested that individuals attempt to prevent its occurrence by avoiding the environment or defending themselves against it. If the environment has a potentially beneficial effect, then individuals should approach the environment and attempt to interact with it. The directional influence of the environment implied in Murray's framework is designated as the press of the environ-

ment. Murray (1938, p. 122) distinguished between the alpha press of the environment, "which is the press that actually exists, as far as scientific discovery can determine it," and an environment's beta press, "which is the subject's own interpretation of the phenomena that he perceives." In this study, the Family Press for Achievement is based on Murray's conceptualization of the alpha press.

The notion that a child's intellectual level is influenced to a large degree by home environment processes has led to studies that sought to identify features of home environment that facilitate intellectual development. Bradley and Caldwell (1976, 1978) documented moderate to high relationships between the family background of individuals and the intellectual, occupational and economic attainments of these individuals as adults.

Davé (1963) and Wolf (1964) reviewed the literature for possible home influences on intellectual performance, and postulated a number of environmental press variables on the basis of their findings. Both Davé and Wolf used the same sample of children. Thirty-two girls and twenty-eight boys were included. Their average age was 11 years. They were selected from 19 schools in the Illinois school system.

Davé assessed the academic achievement of the children using the Metropolitan Achievement Test. He identified a specific component which he labeled the educational environment of the family. It was composed of six press variables: (1) achievement, (2) language models; (3) academic guidance;

(4) activeness of the family; (5) intellectuality in the home; and (6) work habits in the family. Each of the six press variables was further defined by 21 process characteristics. A nine-point rating scale was devised for each characteristic. Scores on the six press variables were obtained by averaging the ratings on the process characteristics.

In Wolf's study, three variables were labelled; press for achievement, press for language development, and provisions for general learning. Incorporated into the three press variables were thirteen process characteristics.

Davé found a multiple R of .80 for the environmental measures and academic achievement; Wolf found a multiple correlation of .79 between environmental measures and academic achievement. The family measurement developed by Davé has been used in other settings. Dyer (1967) examined the family environment in relation to academic achievement in Port of Spain, Trinidad. He found a multiple R of .67 and a multiple R of .78 between environmental measures and academic achievement for middle SES students and lower SES students, respectively. Kellaghan (1977) found a multiple R of .55 between environmental measures and achievement in arithmetic, a multiple R of .60 in Irish reading, and a multiple R of .63 in English reading test scores, in a study done within a socially disadvantaged area of Dublin.

Marjoribanks developed a more structured and refined measure of the Family Press for Achievement of the academically oriented family from the original scales. Marjoribanks' studies in Canada (1972, 1974) and Australia (1978, 1979) examined the relationship between family environment measures and cognitive performance. His Canadian sample consisted of 90 boys, all 11 years old. The Family Environment Schedule used in the study assessed eight press variables in the areas of: achievement, intellectuality, activeness, independence, English, a second language, father dominance and mother dominance. The press variables were defined by 23 process characteristics. A six-point rating scale was developed to score each item in the interview schedule, and the score for each of the environmental characteristics was obtained by adding the scores on the relevant environmental items. Each press variable score was the sum of the scores on each of the relevant process characteristics for that press variable.

Marjoribanks' Australian sample included over 900 urban Australian families. Each family had an 11 year old child attending an urban elementary school. Included in the sample were 447 girls and 471 boys. The variables used to define family environment are shown in Table 1.

Table 1

Marjoribanks' Press Variables

and Process Characteristics

- 1. Press for achievement**
 - 1a Parental expectations for the education of the child
 - 1b Social press
 - 1c Parents' aspirations for themselves
 - 1d Preparation and planning for child's education
 - 1e Knowledge of child's educational progress
 - 1f Valuing educational accomplishments
 - 1g Parental interest in school

- 2. Press for activeness**
 - 2a Extent and content of indoor activities
 - 2b Extent and content of outdoor activities
 - 2c Extent and purpose of the use of TV and other media

- 3. Press for intellectuality**
 - 3a Number of thought-provoking activities engaged in by children
 - 3b Opportunities made available for thought-provoking discussions and thinking
 - 3c Use of books, periodicals and other literature

- 4. Press for independence**
 - 4a Freedom and encouragement to explore the environment
 - 4b Stress on early independence

- 5. Press for English**
 - 5a Language (English) use and reinforcement in the home
 - 5b Opportunities available for language (English) use in the home

- 6. Press for second language**
 - 6a Second language use and reinforcement in the home
 - 6b Opportunities available for second language use in the home

- 7. Father dominance**
 - 7a Father's involvement in child's activities
 - 7b Father's role in family decision-making

- 8. Mother dominance**
 - 8a Mother's involvement in child's activities
 - 8b Mother's role in family decision-making.

Henderson (1981), in his research of home environment and achievement, found that parental interest in educational attainments is reflected in the concrete knowledge they have of the developmental or educational progress of their children and the specific plans and preparations they have made to ensure that the educational goals they have for their child can be attained.

Slater (1974) commented that the activeness of a family may influence the range of environmental stimulation for the child. The greater the exposure to a vast variety of learning experiences and opportunities, the more information a child will bring to the classroom. The amount and quality of assistance and guidance provided by parents concerning their child's schoolwork, encouraging verbal interaction and reading to the child, will have impact on their child's readiness and his/her attitude towards school. Parents are also models of information-seeking: reading books, magazines, newspapers, etc., which will serve for observational learning on the part of the child.

From his studies, Marjoribanks (1972, 1974, 1979) identified three environmental dimensions that have strong associations with children's achievement, including:

(a) Home processes - These are related to processes such as whether parents discuss their child's school progress, know what topics their children are studying in school, praise their children for doing well in school, expect their children to spend an allotted amount of time for homework, etc.

(b) Parents' aspirations for their child - This includes parents' hopes and expectations for their child's educational future as well as occupational future.

(c) Parents' self-aspirations - This includes parental desire for more education, employment satisfaction or dissatisfaction, and what steps they might take to make their lives more "successful."

Marjoribanks' final scales for the environmental dimensions were constructed, using factor scaling techniques (see Armor, 1974). The three hypothesized dimensions were identified using factor analysis. After eliminating those items in the three factors with small factor loadings (less than .40), the remaining items were refactored to maximize the theta reliability estimates of the final environment scales. Family environment scores for the children were obtained by adding the scores on those items making up each of the three dimensions. Theta reliability estimates of the final scales were greater than .75.

Displacement Theory

It is postulated that video game usage has a direct adverse influence upon school-related activities because, like television, it diverts students' time and attention away from those activities. The absence of school activities in turn affects school outcomes.

Early studies (Himmelweit, Oppenheim and Vince, 1958) investigated the simple relationship between television use

and academic achievement (i.e. television hours/reading performance), but did not test hypotheses concerning the underlying causes of the decline. However, in his 1978 study of the effects of recent acquisition of home television sets in El Salvador, Hornik suggested a displacement hypothesis. He concluded that the critical question that needs to be answered is specifically "how" television adversely affects children's development of reading skills. Hornik stated,

The present data are more useful in specifying the direction and magnitude of effects than in answering the more interesting question of how the effects occur. However, the lack of effects upon specific subject achievement does suggest that television watching is not primarily depressing learning through missed homework assignments and lack of sleep. If either of these were the mechanism, mathematics, science and social studies achievement would be more likely to show the effects than would the basic skills exam. A more reasonable explanation would suggest displacement of attention from more stimulating activities (reading, interaction with other people and with one's environment) to the watching of intellectually undemanding television programming. The replication of the negative association of ownership and reading improvement is particularly supportive of the notion that displacement of activities related to reading skill is important.

In a later paper (1981), Hornik concluded that no researcher had yet established a reliable relationship between television exposure and achievement in any specific school subject except reading skills. He found that when he controlled students' IQ, social background and other characteristics, the correlation between their television exposure and achievement in any specific subject other than reading was invariably zero. He concluded that television viewing is displacing outside reading, not homework in subject areas.

According to a displacement hypothesis, television watching supplants personal reading activities, and also family social interactions that relate to reading. In the present research it is hypothesized that video games have a similar displacement effect on children's personal reading and family interaction as television viewing has. This effect is expected to influence children's reading scores, since video games, like TV, are primarily a visual and graphic and not an orthographic medium. It is suggested that reading at home, activities fostering reading, and interactional family processes related to reading within the home environment are being displaced by playing video games.

School-Related Activities and Their Measurement

In his television study (1978), Hornik hypothesized that leisure time reading for pleasure, and general family interactional processes and attitudes in the home (the affective component), are school-related, and thus affect academic achievement. The School-Related Activities Schedule and the Students' School Attitude Schedule are the measurement instruments used in this study to assess the influence of these activities and attitudes on School Outcomes.

School-Related Activities Schedule

In the present study, items were separated from the Family Environmental Schedule that dealt with reading in the home and with family processes related to academic achievement, and were formed into a School-Related Activities Sche-

dule. Example of these items were: did parents read at home, what books are in the home, and did the child bring library books into the home. Activities participated in by parents and child together, as well as parental involvement in the child's choice of leisure time activity, were also incorporated into the School-Related Activities Schedule.

Reading at home for leisure was selected as an indicator of a school-related activity leading to academic success (Marjoribanks, 1977). There is a body of literature that supports this. In data from the Connecticut statewide reading assessment, Neuman & Prowda (1982) analyzed the relationships between television viewing habits, leisure reading behavior, and reading achievement. Their sample included 7,787 students from grades 4, 8 and 11. Each grade level was assessed through a separate criterion referenced, multiple choice test. A number of demographic, attitudinal, and general descriptive questions were included to obtain the students' age, sex, and number of educational reading materials (e.g. newspapers, encyclopedias) that were available in the home, along with general attitudes in the home towards reading. They reported that the number of educational materials in the home was positively related to reading in the home, and that reading for pleasure was indeed associated with achievement gains in school at all ages. The strength of this correlation increased with each grade level. Negative relationships between reading achievement and TV viewing were reported at all grade levels, and low test scores were associated with

more than four hours of viewing per day.

Another study investigating reading at home and students' achievement was reported by Callaway, Jerrolds & Gwaltney (1974). They investigated the relationship between a number of variables and reading and language achievement, using 277 tenth graders living in rural and small town areas of Georgia. Information concerning the students' chronological age at time of school entrance, race, and occupation of parents was obtained from school files. Teachers rated each student on a 5-point scale concerning the student's adjustment to the classroom situation, amount of reading material in the home, and family income. Reading and language achievement data were obtained from the California Achievement Tests. Intelligence assessments were derived from the California Test of Mental Maturity. Results indicated no differences in reading or language scores relative to age at the time of school entrance. Subjects who were highest in adjustment to the classroom situation also appeared to be the highest in reading and language achievement. Generally, subjects who were highest in amount of reading material at home were also highest in reading and language achievement at school. The same result was repeated when family income was examined. Occupational status of the principal wage earner in the home was unrelated to reading and language achievement.

The major focus of the investigation by Koppenhaver (1976) was to study the relationship between various home

environment factors and the reading achievement of grade five children. A random sample of 30 high-achieving and 30 low-achieving readers was selected. Specific procedures and test information are not reported. However, the author stated that the quality of home environment was positively related to reading achievement scores. The six subscores of academic environment were (1) climate for achievement motivation, (2) opportunities for verbal development, (3) nature and amount of assistance provided in overcoming academic difficulty, (4) level of intellectuality in environment, (5) kinds of work habits expected, and (6) activity level of significant individuals in the environment. The three subscores of intellectual environment were (1) stimulation provided for intellectual growth, (2) opportunities provided for and emphasis on verbal development, and (3) provision for general types of learning in a variety of situations. No significant differences were found in mean scores for either academic or intellectual environments of homes when pupils were grouped on the basis of intelligence into high and low groups. With IQ held constant, no significant sex differences were noted for scores on academic and intellectual home environments.

Whitehead, Capey, Maddren & Williams (1977) analyzed responses to questionnaires completed by a stratified random sample of 2,477 children age ten, 2,613 children age thirteen, and 2,480 children age twelve, in England and Wales. The responses concerned the children's reading and televiewing interests and habits. Schools rated youngsters on their atti-

tudes toward achievement and their ability and achievement. Characteristics at each school were included in the school questionnaire. Among the numerous findings reported are the following: The average number of books read during the previous month ranged from 2.95 at age ten to 1.95 at age fourteen. At all ages girls read more books and periodicals than did boys. The average amount of televiewing per day was 2.4 hours for the entire sample, with boys watching more television than did girls. The amount of book reading was positively related to the number of books owned by the child, the regularity of the child's visits to the public library, the parents' reading of library books, the presence of newspapers in the home, and the child's favorable attitude towards school.

The findings of these studies indicate that parent-child activities fostering reading, parents' attitude towards leisure time reading, and reading at home for pleasure are related to reading achievement in school, as well as to a positive attitude towards school.

Students' School Attitude Schedule

Schools are concerned not only with cognitive development but also with the affective development of pupils (Krathwohl, 1964). Although many studies have been concerned with cognitive performance, research into affective variables has been somewhat limited. Studies of the relationship between school attitude and achievement have con-

sistently revealed positive correlations (e.g. Jordan, 1941, Biggs, 1959). Baraheni (1962) suggests that the relationship between students' attitudes and scholastic achievement might stem from such factors as effective teaching, favorable environmental background, and high ability, acting together to foster high achievement and positive attitudes towards school activities.

In 1963, The National Foundation for Educational Research initiated a large scale study to investigate the effects of streaming (grouping by ability) in schools (Barker Lunn, 1967). Measurement of pupils' attitudes was particularly important, and since no measures assessing a broad variety of attitudes were available, attitude scales were developed. Since little was known about which attitudes were important and relevant to measure, exploratory discussions and interviews were carried out. The aim was to determine what attitudes children actually held and how these feelings were expressed. Based on a review of the literature, four areas of attitude were developed into scales: anxiety (Himmelweit and Petrie, 1951; Sarason, 1960), self-image (Bills, Vance & McLean, 1961), attitude to school (Fitt, 1956; Jackson and Getzels, 1959; Flanders, 1965), and attitude to teacher (Tcheschtelin, Hipskind & Remmers, 1940). Each of these scales, by itself, seemed limited in its scope of attitudinal measurement.

Because of these shortcomings, Barker Lunn decided to develop a new attitude scale using items created from state-

ments made by the children. This particular method had not been used before, and was considered more desirable than using questions that were formulated by adult researchers. Items created by researchers may be biased and/or artificial, i.e. represent the researcher's ideas about how children think rather than the way they actually do. Barker Lunn chose to hold discussions with children, and the children's own language was used in the construction of the scales. Ten separate attitudes emerged from these discussions: attitude to school; interest in schoolwork; importance of doing well; attitude to class; "other" image of class; conforming vs. nonconforming pupil; relationship with teacher; anxiety about schoolwork; social adjustment; and self-image.

The final scales were derived empirically, using factor analyses and inter-item correlations. The aim was to achieve homogeneity of content and a cumulative structure. Barker Lunn measured internal consistency among the scales using Cronbach's alpha coefficient (1951). The intercorrelations of the ten attitude subsets with each other were given, as well as the inter-correlations between the scale and external data. These external data were: (a) personality and ability ratings of the pupil by the teacher; (b) parents' ability ratings and educational aspirations for the child; (c) sociometric data; (d) achievement test scores; and (e) interest scores.

This student school attitude scale was adapted for use by

Marjoribanks in 1977, based on the theoretical framework of Thomas and Znaniecki (1958), which linked the subjective social-psychological elements of social reality (attitudes) with social personality and behavior. Marjoribanks' model is useful in examining relations between family learning environments, children's attitudes towards school and their academic achievement. Family home environments were considered to reflect parents' social values (attitudes) towards school which may arouse intellectual reactions.

CHAPTER III

HYPOTHESES

The present research examined the impact of students' video game usage upon their academic achievement as measured by standardized reading scores and students' attitudes toward school. It examined the influence of Family Press for Achievement (Marjoribanks, 1979) on children's Video Game Usage and School-Related Activities such as reading. This study sought to ascertain whether or not video game playing diverts children's time and attention away from school-related activities, and in so doing affects academic achievement and students' school attitudes.

The specific hypotheses are presented below. Please refer to Figure 1 for visual depiction of these hypotheses.

1. It is hypothesized that Family Press for Achievement as postulated by Marjoribanks (1972, 1974, 1979) has a direct negative influence on Video Game Usage.

2. It is hypothesized that Family Press for Achievement has a direct positive influence upon School-Related Activities, such as reading.

3. It is hypothesized that Video Game Usage has a direct negative influence upon School-Related Activities, based on displacement theory (Hornik, 1980).

4. It is hypothesized that Video Game Usage has a direct negative influence on School Achievement Outcomes.

This is congruent with Hypotheses 1, 2 and 3, in that children who are allowed heavy use of video games should not be as involved with School-Related Activities.

5. It is hypothesized that involvement in School-Related Activities will have a direct positive influence on School Achievement Outcomes.

6. It is hypothesized that Family Press for Achievement will have a direct positive influence on School Attitude Outcomes (Barker Lunn, 1969, 1970, 1972).

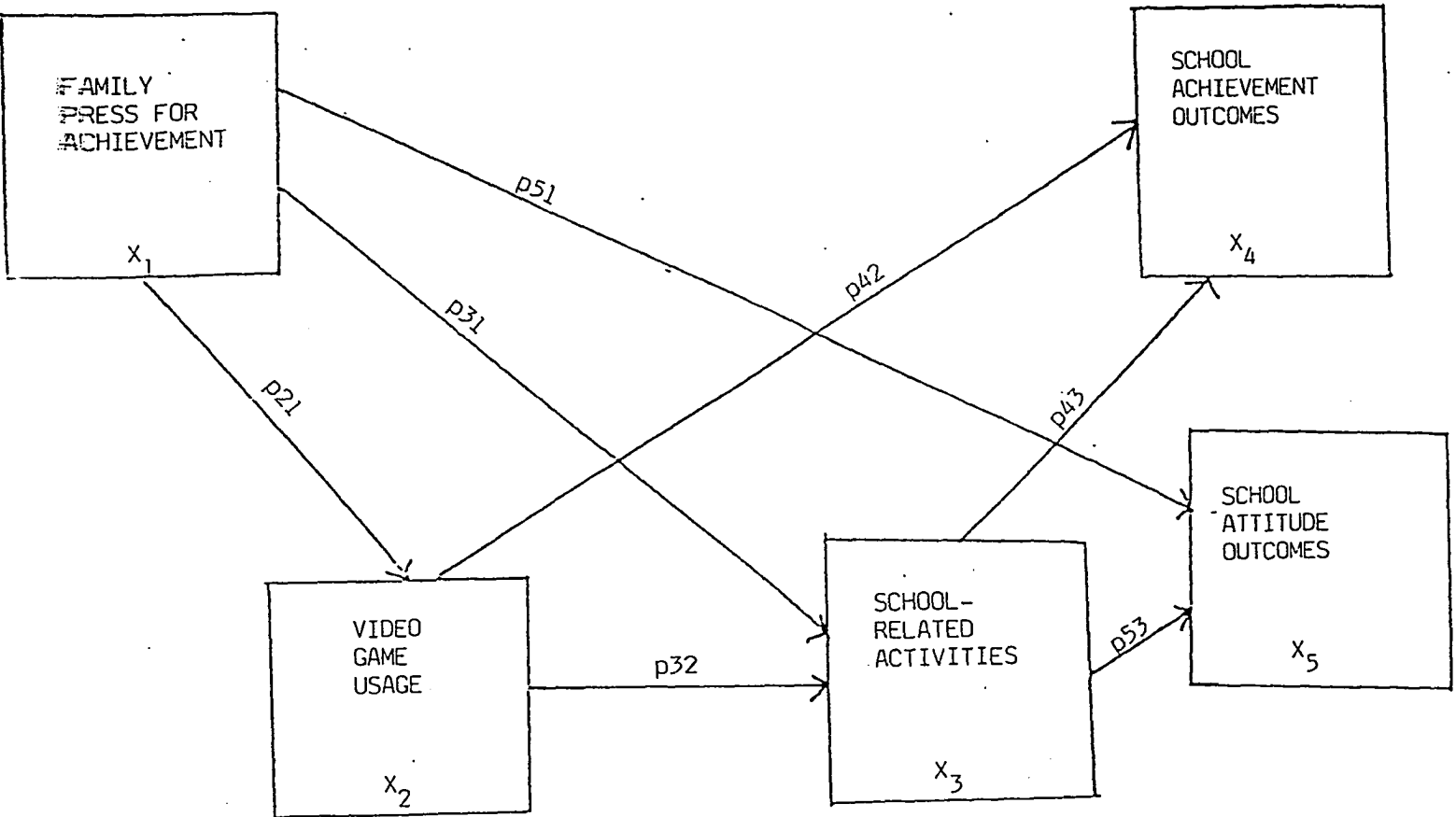
7. It is hypothesized that School-Related Activities have a direct positive effect on School Attitude Outcomes, as they did in prior research by Neuman and Prowda (1982).

8. It is hypothesized that Family Press for Achievement has a direct positive influence on School Achievement Outcomes as it did in prior research by Marjoribanks (1972, 1974, 1979).

9. It is hypothesized that Video Game Usage has a direct negative influence on School Attitude Outcomes.

These hypotheses imply a number of direct causal relationships. Figure 1 shows the pattern of causal relationships among the five variables implied by the hypotheses. Paths in the model are unidirectional, with each arrow drawn from the variables taken as causes (independent) to the variable taken as effects (dependent). For example, the paths leading from variable X_1 and variable X_2 to variable X_4 indicate that variable X_4 is dependent on variables X_1 and X_2 .

Figure 1.
Path Analysis Model 1.



In addition to its direct negative effect on School Achievement Outcomes, video game usage is hypothesized to have an indirect influence on School Achievement Outcomes through the mediating variable School-Related Activities. Also, game use is hypothesized to have an indirect effect on School Attitude Outcomes through the mediating variable, School-Related Activities. Furthermore, Family Press for Achievement is hypothesized to have an indirect influence on School Attitude Outcomes and School Achievement Outcomes through the mediating variables School-Related Activities and Video Game Usage.

Data Analysis

The path coefficients were computed by the use of four regression equations. Each equation is discussed below.

In the first equation, X_2 (Video Game Usage) was the dependent variable, and X_1 (Family Press for Achievement) the independent variable. Use of the SPSS computer package (Nie, et al., 1975) provided the beta weight between variables X_2 and X_1 which is p_{21} , the path coefficient from X_1 to X_2 .

In the second equation, X_3 (School-Related Activities) served as the dependent variable, and X_2 and X_1 as the independent variables (path coefficients p_{31} and p_{32} respectively).

In the third equation, X_4 (School Achievement Outcomes) was the dependent variable, and X_2 and X_3 the independent variables (path coefficients p_{42} and p_{43} respectively).

In the fourth equation, X_5 (School Attitude Outcomes)

was the dependent variable, and X_1 and X_3 the independent variables (path coefficients p_{51} and p_{53} respectively).

To test the viability of the model in Figure A, the following Chi Square likelihood ratio test was used:

$$X^2 = N \ln \left(\frac{\sigma_i^{2r}}{\sigma_i^{2u}} \right)$$

where all endogenous variables (X_2 , X_3 , X_4 and X_5) are summed, "N" equals the sample size for the study and σ_i^{2r} stands for the error (or residual) variance of endogenous variable i in the restricted model, and σ_i^{2u} is the same value in the unrestricted model. Specifically, in this case,

$$X^2 = N \left(\ln \frac{\sigma_2^{2r}}{\sigma_2^{2u}} + \ln \frac{\sigma_3^{2r}}{\sigma_3^{2u}} + \ln \frac{\sigma_4^{2r}}{\sigma_4^{2u}} + \ln \frac{\sigma_5^{2r}}{\sigma_5^{2u}} \right)$$

the ² values are the error variances for variables 2 through 5 in the restricted and unrestricted models. To obtain σ_4^{2u} and σ_5^{2u} , two additional regression equations were computed: X_4 and X_5 are dependent variables and X_3 , X_1 and additionally X_2 , which was omitted from the restricted model, are independent variables. Since the regression equations with X_2 and X_3 as dependent variables are the same in the restricted and unrestricted models, the formula for Chi Square becomes $X^2 = N \left(\ln \frac{\sigma_4^{2r}}{\sigma_4^{2u}} + \ln \frac{\sigma_5^{2r}}{\sigma_5^{2u}} \right)$ since $\ln \frac{\sigma_2^{2r}}{\sigma_2^{2u}}$ and $\ln \frac{\sigma_3^{2r}}{\sigma_3^{2u}}$ are both $\ln 1 = 0$. The X^2 value obtained was compared to a critical X^2 with 2 degrees of freedom (for the two additional restrictions). If the computed Chi Square is less than the critical Chi Square, the model is considered acceptable.

CHAPTER IV

METHOD

Subjects

The subjects for this study were students from grades three to five in a suburban New York elementary school. Between 20 and 25 students from each grade were selected randomly from a pool of students whose parents had given their permission to participate in this study. The 70 students who participated were of middle-class socio-economic background. The students' language was English. Both boys and girls were equally represented. They were predominantly Caucasian, although both Oriental and Eastern Indian races were represented.

Instruments of Measurement (Appendix C)

1. Family Environmental Schedule. The Family Press for Achievement variable was measured using the "Family Environmental Schedule" (Marjoribanks, 1972, 1976). "Achievement press" refers to the goals and aspirations parents hold for themselves and for their children. It includes the academic achievement standards they hold and the standards of reward for their children's educational achievement. This schedule was mailed to the parents for their completion at home, in January 1984.

2. Students Video Game Questionnaire. This measure was developed to assess the amount of time children spend on video games, the categories of video games that children play, their feelings about them, and how video game usage affects their relationships with friends and family. It also addressed the effects that video game playing had upon children's schoolwork and other daily activities.

3. Students School Attitude Schedule. This instrument measured in a Likert format students' cognitive and affective judgments of school and school outcomes.

4. Standardized reading achievement scores for word knowledge and word comprehension were obtained from the elementary school from the student's academic file folder.

5. School-Related Activities Schedule. For purposes of this study, this scale was a subsection of the Family Environment Schedule. It involved questions used in the schedule that dealt with family involvement in educational activities at home and family aspiration processes. Marjoribanks (1979), using data from an earlier study (Plowden, 1967), reported findings indicating that early parent socialization influences (i.e. developing intellectual and motor skills and learning items of information and systems of thought that organize them interdependently with affective socialization) and parent aspirations are positively related to reading achievement at the elementary school level.

The School-Related Activities Schedule includes that subset of items from the Family Environment Schedule concern-

ing (a) literacy in the home, i.e. books in the home, parental reading habits, children's library books in the home, etc., and (b) parents' interest, support and aspirations, i.e. whether parents do things with their child during weekends, engage in recreational activities together at home, and parental involvement or restriction of their child's selection of home activities.

Procedure

The Video Game Usage Scale was given to the students in small groups. The scale and the subject of the research were described to the students by the experimenter as follows: "I am interested in knowing what children do when they go home from school. More specifically, I want to know something about your interest in video games and other activities you may choose to do when you are not in school." Each question in the scale was read aloud to the subjects.

Following the completion of this scale, the researcher administered the Students' School Attitude Schedule. The questions in the scale, as well as the Likert format of answering them, was explained to the children through the use of three sample questions. The questions were read aloud to the students. The same procedure was then used for the administration of the School-Related Activities Schedule.

After administering these instruments, the researcher briefly discussed the Family Environment Schedule that had been mailed to the students' parents at home, to be filled

out by them and returned to school. The importance of returning the forms fully completed to school was emphasized. The children were rewarded with video game stickers for their help in returning the completed Family Environment Schedules.

Scoring of Schedules and Questionnaires

The Family Environment Schedule was scored according to the procedures outlined by Marjoribanks (1979). A separate rating scale for each response in the schedule was used by Marjoribanks to assess all dimensions of the Family Press for Achievement. This includes home processes, parents' aspirations for their child, and parents' aspirations for themselves. The scores for this measurement (not including questions 1 through 7, which give demographic data) were labelled as variable X_1 (Family Press for Achievement) in the path analysis.

The Marjoribanks rating scale was also utilized for scoring questions included in the School-Related Activities Schedule. This scale for measuring the family learning environment was adapted from the Family Environment Schedule and used the same rating system. The scores for this measurement were labelled as variable X_3 (School-Related Activities) in the path analysis.

The Video Game Usage Questionnaire was scored in the following way: the total score for question #2 (a, b, c) was labelled as variable X_2 (Video Game Usage) in the path analysis. Question #3 (a through e) was correlated separately with the Family Environment Schedule scores. Analyses of

variance were used for questions #5 through #22, due to the nominal nature of these questionnaire results. The total score on the Family Environment Schedule served as the dependent measure.

The students' responses to School Attitude Schedule questions were rated on a five-point scale, as outlined by Barker Lunn (1969, 1970). These scores were labelled as variable X_5 (School Attitude Outcomes) in the path analysis. Standardized reading scores on the Stanford Achievement Test, in percentiles, obtained from the school, were labeled as X_4 (School Achievement Outcomes) in the path analysis.

CHAPTER V

RESULTS

Path Analysis (See Appendix A)

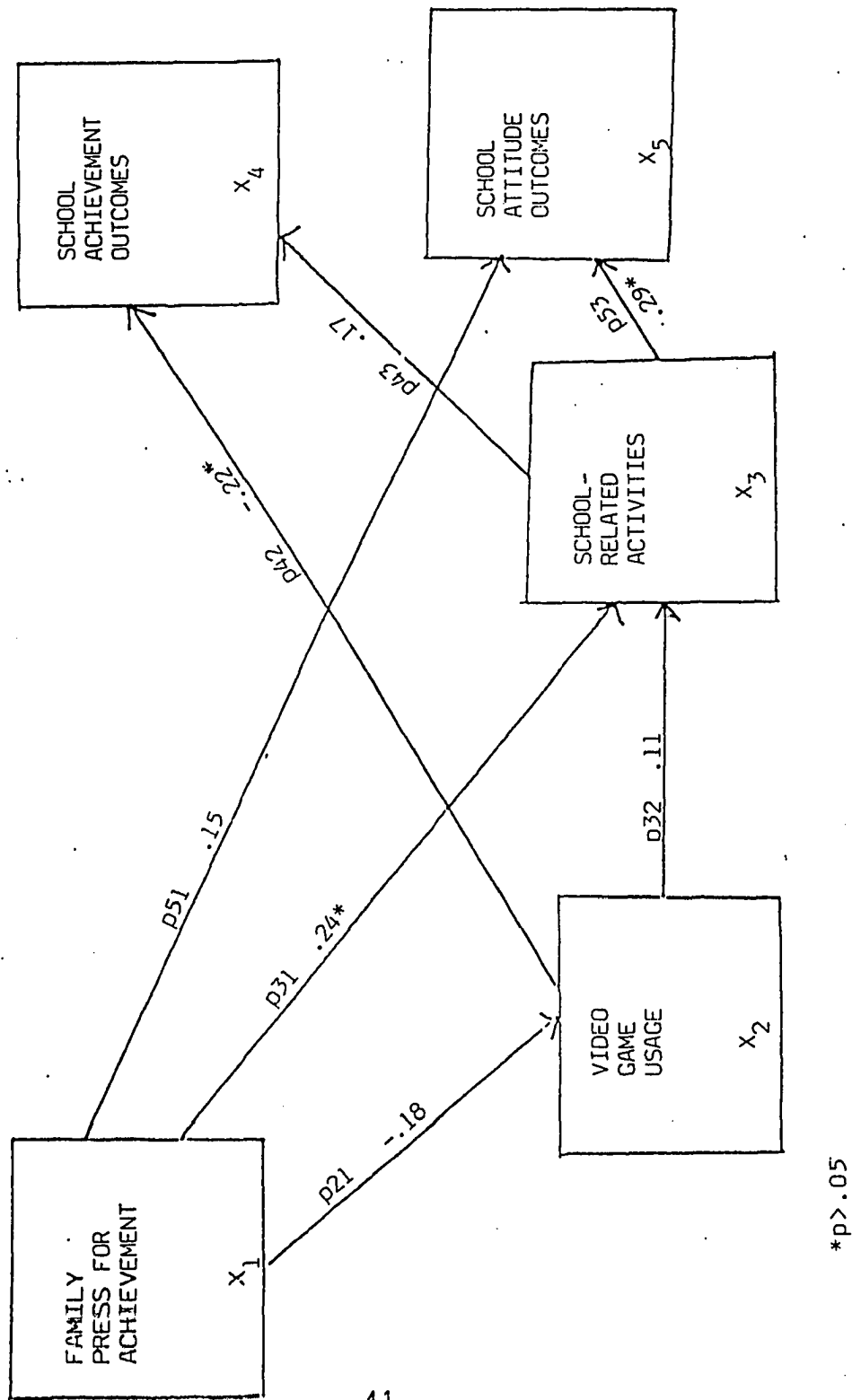
The outcomes of the Path Analysis are given in Figure 2. Hypothesis 1 stated that Family Press for Achievement has a direct negative influence on Video Game Usage. The path equation with X_1 (Family Press for Achievement) as the independent variable and X_2 (Video Game Usage) as the dependent variable yielded the path coefficient of $-.18$, which approached significance ($p < .10$). According to these results, there is marginal support for Hypothesis 1.

Hypothesis 2 stated that Family Press for Achievement has a direct positive effect upon School-Related Activities. The path analysis with X_1 (Family Press for Achievement) as the independent variable and X_3 (School-Related Activities) as the dependent variable produced a significant path coefficient of $.24$ ($p < .05$). These results support Hypothesis 2.

Hypothesis 3 stated that Video Game Usage has a direct negative influence on School-Related Activities. The same regression equation used to test Hypothesis 2 indicated a path coefficient of $.11$ for the direct effect of X_2 (School-Related Activities) on X_3 (Video Game Usage), which was not

Figure 2.

Path Analysis Model with Path Coefficients.



significant. These results do not provide support for Hypothesis 3.

Hypothesis 4 stated that Video Game Usage has a direct negative influence on School Achievement Outcomes. The regression analysis with X_2 (Video Game Usage) as the independent variable and X_4 (School Achievement Outcomes) as the dependent variable produced a path coefficient of $-.22$, which was significant ($p < .05$). These results support Hypothesis 4.

Hypothesis 5 stated that School-Related Activities have a direct positive influence on School Achievement Outcomes. The path analysis with X_3 (School-Related Activities) as the independent variable and X_4 (School Achievement Outcomes) as the dependent variable yielded a path coefficient (p_{43}) of $.17$ which approached significance ($p < .10$). Thus, some support exists for the hypothesis that School-Related Activities have a direct positive influence on School Achievement Outcomes is provided in the study.

Hypothesis 6 stated that Family Press for Achievement has a direct positive influence on School Attitude Outcomes. The path analysis with X_1 (Family Press for Achievement) as the independent variable and X_5 (School Attitude Outcomes) as the dependent variable yielded a path coefficient of $.15$ ($p < .10$), which approached significance. Thus, these results gave some support to the hypothesis that Family Press for Achievement has a direct positive effect on School Attitude Outcomes.

Hypothesis 7 stated that School-Related Activities have a direct positive influence on School Attitude Outcomes. The path analysis with X_3 (School-Related Activities) as the independent variable and X_5 (School Attitude Outcomes) as the dependent variable yielded a path coefficient (p_{53}) of .29, which is significant ($p < .01$). These results provide support for Hypothesis 7.

Hypothesis 8 stated that Family Press for Achievement has a direct positive influence on School Achievement Outcomes. The path analysis with X_1 (Family Press for Achievement) as the independent variable and X_4 (School Achievement Outcomes) as the dependent variable yielded a path coefficient of .09, which is not significant. Thus, the data did not support Hypothesis 8.

Hypothesis 9 stated that Video Game Usage has a direct negative influence on School Attitude Outcomes. The path analysis with X_2 (Video Game Usage) as the independent variable and X_5 (School Attitude Outcomes) as the dependent variable yielded a path coefficient of .08, which is not significant. Therefore, Hypothesis 9 was not supported.

It was also hypothesized that Video Game Usage has an indirect effect on School Achievement Outcomes through the mediating variable School-Related Activities. This effect was obtained by multiplying the path coefficient from Video Game Usage to School-Related Activities (p_{32}) by the path coefficient School-Related Activities to School Achievement

Outcomes (p_{43}). This resulted in a value very close to zero, indicating no support for this hypothesis.

Similarly, it was hypothesized that Video Game Usage has an indirect effect on School Attitude Outcomes through the mediating variable School-Related Activities. Multiplying path coefficient (p_{32}) by path coefficient (p_{53}), the value obtained was again close to zero, indicating no support for this hypothesis.

It was also hypothesized that Family Press for Achievement has an indirect effect on School Attitude Outcomes through the mediating variable School-Related Activities. This effect is obtained by multiplying path coefficient (p_{31}) by path coefficient (p_{53}). This results in a path coefficient of .07, indicating no support for this hypothesis.

Similarly, to obtain the indirect effect of Family Press for Achievement on School Attitude Outcomes through the mediating variables Video Game Usage and School-Related Activities, path coefficient (p_{31}) was multiplied by path coefficient (p_{32}) and path coefficient (p_{53}). The value obtained was close to zero, indicating no support for this hypothesis.

To obtain the indirect effect of Family Press for Achievement on School Achievement Outcomes through the mediating variable Video Game Usage, path coefficient (p_{21}) was multiplied by path coefficient (p_{42}). This yielded a value close to zero, indicating no support for this hypothesis.

To obtain the indirect effect of Family Press for Achievement on School Achievement Outcomes through the

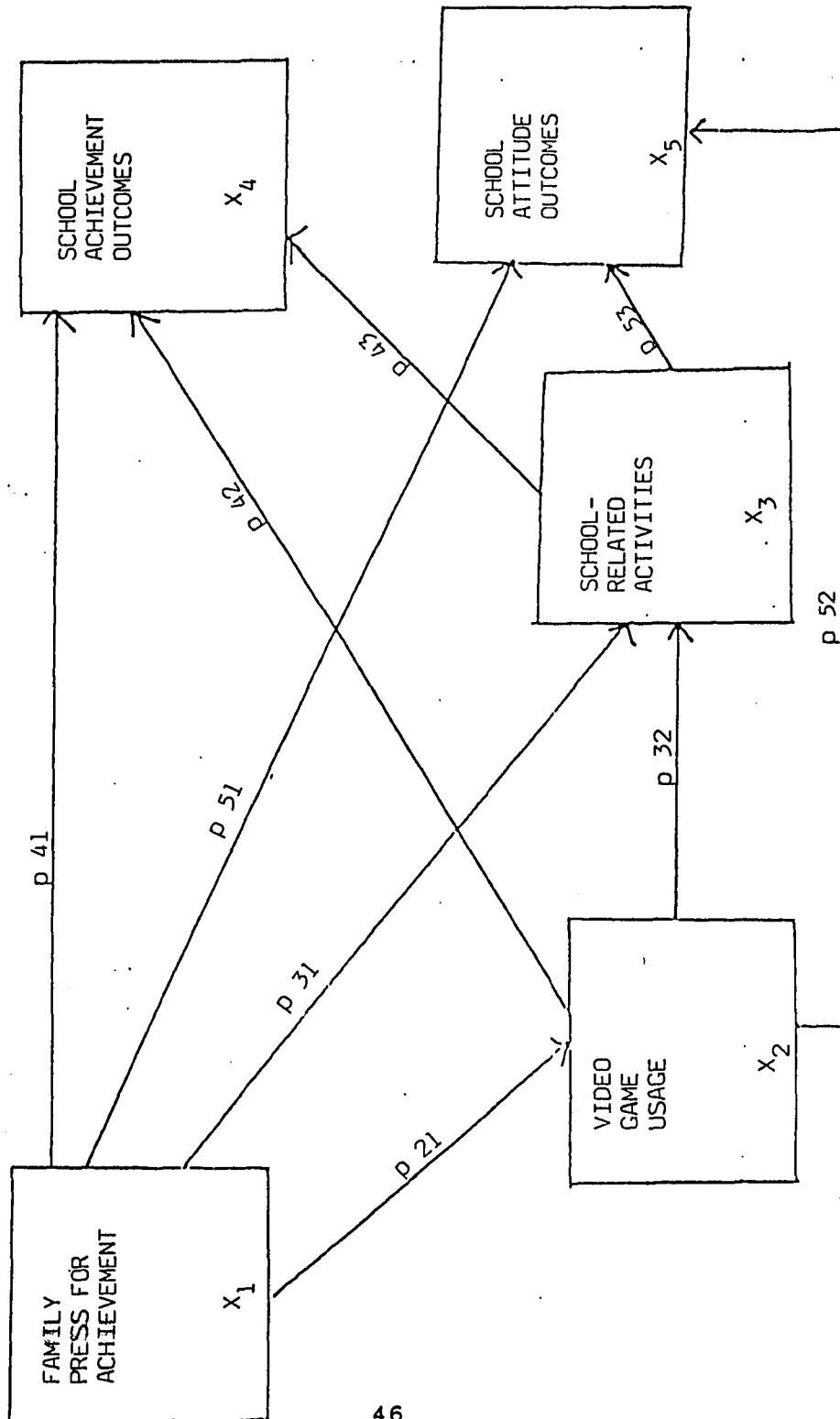
mediating variable School-Related Activities, path coefficient (p_{31}) was multiplied by path coefficient (p_{43}). This yielded a value of .04, and thus this hypothesis was not supported.

Similarly, multiplying the path coefficient (p_{43}) by the path coefficient (p_{32}) by the path coefficient (p_{21}) to obtain the indirect effect of Family Press for Achievement on School Achievement Outcomes through the mediating variables School-Related Activities and Video Game Usage, yielded a value close to zero. Thus, support for this last indirect effect was not obtained.

To test the viability of the model in Figure 2, a Chi Square Likelihood Ratio Test was performed, comparing the restricted model with the unrestricted model in which the two omitted paths from X_1 to X_4 and from X_2 to X_5 are included (see Figure 3). This test resulted in a χ^2 value of 1.82 which was not significant (critical $\chi^2 = 5.991$, $df=2$). Thus, the restricted model cannot be rejected and was hence considered acceptable.

Figure 3.

Unrestricted Path Model.



The path analyses described above were computed using the children's scores for Question #2 of the Student Video Game Questionnaire (the total number of hours children play video games each week). At this point in the analysis, other questions concerning children's use of video games will be analyzed.

Video Game Usage Response

The frequency of various responses to each item of the video games questionnaire will be analyzed initially. Questions #1 and #2 were separated into three subcomponents, and frequencies were tabulated for each subcomponent as well as for the total score.

Table 3 gives the percentage of subjects who reported each level of video game use between none and four or more times per week. The highest percentage of the subjects, 31.4%, played at home four or more times a week. The corresponding figures for an arcade and a friend's house were only 10% and 7.1% respectively. Thus, we see that the highest rate of playing occurred at home rather than at an arcade or a friends' house. The lowest rate of playing occurred at an arcade. Forty percent of subjects reported that they never played video games at an arcade, and 27% of subjects played at most once a week at an arcade. The amount of playing at a friend's house fell in between the frequencies reported for video game play at home and in an arcade. Sixty-six percent of the subjects reported playing video games once or twice a week at a friend's house.

Table 4 gives the percentage of subjects who played video games each week for a certain number of hours at each of the three locations: home, friend's house, arcade. The results are quite similar to those of Table 3. The highest usage was reported for video game playing at home. Over two-thirds of the subjects (68%) played one or two hours each week at home. Once again, the lowest rate reported by subjects was for video game playing at an arcade: 83% reported one hour or less of game usage, and 43% reported never playing video games in this setting. The time reported for playing at a friend's house was less than one hour for 84% of subjects, of which 18.6% reported zero time spent playing video games at a friend's house.

Regarding total playing time, only 4% of subjects reported no hours per week. The remainder of the subjects reported their total times as follows:

- (1) 30%, up to one hour of use
- (2) 28%, up to two hours of use
- (3) 19%, up to three hours of use
- (4) 19%, more than three hours of use.

Table 3

Frequency of Play with Video Games in Various Settings Each Week (percentages)

Location	Frequencies				
	None	Once	Twice	3 Times	4 or more times
At home	14.3	24.3	12.9	15.7	31.4
At arcade	40.0	27.1	15.7	7.1	10.0
At friend's	18.6	44.3	21.4	8.6	7.1

Table 4

Number of Hours Subjects Play Video Games at Different Places (percentages)

Location	Frequencies				
	-0- Hours	Up to 1 Hour	Up to 2 Hours	Up to 3 Hours	More than 3 Hours
At home	15.7	44.3	24.3	14.3	1.4
At arcade	42.9	40.0	11.4	5.7	0.0
At friend's	18.6	65.7	11.4	4.3	0.0

Analyses of Variance

A series of one-way analyses of variance were performed to assess the relationship between responses to relate individual items of the Video Game Questionnaire that were nominal in form and other variables that were metric in form (i.e. the Total Family Press for Achievement, Total Family Environment Schedule, Total Parents' Aspirations for Themselves, Total Parents' Aspirations for Their Children, and School-Related Activities).

The nominal variables which served as the independent variable for these analyses were the responses to Questions #5 through #10 and Question #17 of the Student Video Game Questionnaire. For example, the groups for the analyses for Question #6 were those subjects who played video games most often (1) at home; (2) in a store; (3) in an arcade, and (4) at a friend's house. Since the number of subject responses for each of these categories was different, the cell sizes (N's) for these analyses of variance were unequal, and an Anova was used.

The first dependent variable in these analyses was the Total Family Environment Schedule, which is the sum of three subdimensions of the schedule--Total Family Press for Achievement, Total Parents' Aspirations for Themselves, and Total Parents' Aspirations for Their Children--which also served as dependent variables in this analysis. Each of the above subdimension variables was attained from adding appropriate items on the Family Environment Schedule. Each item

on the schedule was related to only one subdimension. The last dependent variable, School-Related Activities, was obtained from the School-Related Activities Schedule.

No significant differences were found on any of these five dependent variables according to subjects' responses to Question #5 (what one's favorite video game was, e.g. Pac-Man, Donkey Kong, etc.) and Question #8 (what one liked best about video games, e.g. graphics, sounds, goals, or computer scoring). These results are given in Tables 5 and 6.

Table 5

Means of Responses to Question 5 of the Video Game
Questionnaire^a on TFENVS, TFPA, TPAP, TPAC and TSRA

Variable	Response Choices			
	Donkey Kong	Pacman	Missile Command	Other
T. ^b Family Env. Sched.	98.8	97.3	100.0	98.0
T. Family Press Achievement	52.1	54.1	47.0	52.7
T. Parents' Aspir. Selves	15.4	15.0	19.0	14.8
T. Parents' Aspir. Child	31.3	28.2	34.0	30.1
T. School-rel. Activities	31.9	35.3	35.0	32.4

^a What is your favorite video game?
^b Total

Table 6

Means of Responses to Question 8 of the Video Game
Questionnaire^a on TFENVS, TFPA, TPAP, TPAC and TSRA

Variable	Response Choices			
	Graphics	Sounds	Game Goals	Computer Scoring
T. ^b Family Env. Sched.	97.8	102.2	97.9	97.0
T. Family Press Achievement	52.4	53.5	52.7	54.5
T. Parents' Aspir. Selves	14.4	16.0	15.4	15.0
T. Parents' Aspir. Child	30.0	32.8	30.1	27.5
T. School-rel. Activities	32.9	37.0	32.2	31.2

^a What do you like best about video games?

^b Total

Significant differences found were as follows: Total Family Press for Achievement was higher for those who indicated that they played most often in a store, such as a stationery or candy store (58.5 average), as compared to those who played in an arcade (50.7) $p < .04$. However, only 4 subjects of the total of 67 who answered this question indicated they played in a store most often, and thus these results are not very typical. These results are presented in Table 7.

Family Press for Achievement varied significantly depending upon with whom subjects said they played video games most often. Family Press for Achievement was significantly lower for the 26 students who played most often with their sisters or brothers (49.9 average score) compared to those who played most often with friends (54.1 average, $N=21$), alone (54.4 average, $N=17$), or with parents (50.3 average, $N=3$) ($p < .01$). (See Table 8.)

Table 7

Means on Total Family Press for Achievement
for Where Children Play Video Games

	Home	Store	Arcade	Friend's House
Mean	52.2	58.5	50.7	55.1
n	8	4	46	9

Table 8

Means on Total Family Press for Achievement
For With Whom Children Play Video Games

	Parents	Friends	Siblings	Alone
Mean	58.3	54.1	49.9	54.3
n	3	21	26	17

Response to the Total Family Environment Schedule varied significantly depending upon with whom subjects said they played video games most often. Scores were significantly lower for the 26 students who played most often with their siblings (95.3 average score) compared to 17 subjects who played alone (101 average) ($p < .05$). (See Table 9.)

Also, responses to the Total Family Environment Schedule were significantly lower ($p < .05$) for the 36 subjects who played video games most often after school ($M=95.9$) in contrast to the 31 subjects who played most often on weekday evenings ($M=100.6$). (See Table 10.)

Table 9

Means on Total Family Environment Schedule for
With Whom Children Play Video Games

	Parents	Friends	Siblings	Alone
Mean	102.3	98.6	95.3	101.0
n	3	21	26	17

Table 10

Means on Total Family Environment Schedule for
When Children Play Video Games Most

	Before School	Lunch Hour	After School	Weekday Evenings
Mean			95.9	100.6
n	0	0	36	31

Total Parents' Aspirations for Themselves differed significantly depending on which days their children played video games the most frequently. Children who played most on Monday through Thursday had parents with significantly lower aspirations for themselves than those who played video games most on Fridays (13.8 to 16.6) ($p < .03$). (See Table 11.)

Total Parents' Aspirations for Themselves differed significantly depending on why their children played video games. Children who wanted to learn to play better had parents with significantly higher aspirations for themselves than those children who played video games to obtain a high score (18.5 to 12.3) ($p < .02$). (See Table 12.)

Table 11

Means for Total Parents' Aspirations for Themselves
on What Days Children Play Video Games Most

	Saturday	Sunday	Friday	Mon.-Thurs.
Mean	14.7	15.4	16.6	13.8
n	24	14	11	19

Table 12

Means for Total Parents' Aspirations for Themselves
for Why Children Play Video Games

	Obtain high score	Beat opponent	Learn to play better	Have fun
Mean	12.3		18.5	14.9
n	3	0	2	64

Also, Total Family Press for Achievement differed significantly depending on whether subjects had a video game at home. Of the 62 subjects who said they owned a home video game, the Total Family Press for Achievement average score was 52.3 as compared to the 7 subjects who reported not owning a home video game, whose mean Family Press for Achievement score was 56.6 ($p < .05$). (See Table 13.)

Table 13

Means for Total Family Press for Achievement for
Whether Children Owned a Video Game at Home

	Owned Video Game	Did Not Own Video Game
Mean	52.3	56.6
n	62	7

Chi Square Analysis

The impact of video games on children's other free time activities was also examined. Since first playing video games, 9 subjects reported a decrease in playing with friends and 7 subjects an increase; 53 subjects reported no change. A Chi Square Test comparing two proportions revealed no significant difference between the children reporting a decrease and those who reported an increase.

Ten subjects reported an increase and 9 subjects a decrease in talking with their parents since playing video games; 50 subjects reported no change. Concerning sports activities, 16 subjects indicated an increase in sports activities since playing video games, and 11 mentioned a decrease; 42 reported no change. For these two activities, the differences between the proportion of increase versus decrease were not significant.

Two other activities produced significant differences in response. For reading, 22 subjects (31.9%) indicated a decrease, compared to only 9 subjects (13.0%) who indicated an increase in reading ($X^2 = 5.45$, $df=1$, $p<.025$); 38 subjects reported no change. Regarding TV viewing, 15 subjects (21.7%) stated a decrease had occurred since playing video games, and only 3 subjects (4.3%) indicated an increase ($X^2 = 8.00$, $df=1$, $p<.01$); 51 subjects reported no change.

Comparison of "Light" vs. "Heavy" Video Game Usage

Although an overall F test was not significant, it was thought that a significant difference would be found between

the heaviest and lightest users of video games. A t-test comparing those students who played video games less than one hour a week (n=8) with those students who played video games three or more hours a week (n=25) was significant. Those who played video games three or more hours a week had a mean reading percentile that was 13 points lower than those students who played less than one hour a week (see Table 14).

Table 14

Comparison of Students Who Play Video Games

Less Than One Hour Each Week With Those

Who Play Three or More Hours Each Week

Level of Use	N	Mean Rdg. Pc'tile	2-Tail Prob.
Less than one hour	8	85	.043*
Three or more hours	25	72	

*significant at $p < .05$

Factor Analysis

A factor analysis was conducted on responses of the Video Game Questionnaire that were metric in numerical form to determine the underlying structure of the scale. Since Questions #1 and #2 both measured time spent on video games, responses to Question #1 were not included in the factor analysis. Question #2 was separated into three parts: video game usage at home, video game usage at an arcade, and video game usage at a friend's house. These responses were tested as separate items in the analysis. The other questions that were included in this analysis were Question #3 and Questions #11 through #22. An oblique factor analysis was utilized. None of the factors correlated with any other. (See Appendix B.)

These analyses revealed six factors with eigenvalues exceeding 1. These six factors accounted for 70% of the total variance. Table 15 gives the results of the factor analysis. A loading of .30 was considered meaningful. Table 16 reports eigenvalues and proportion of variance.

Factor 1 accounted for 20% of the total variance. This factor was interpreted as the amount of arcade usage and money spent. The highest item loadings on this factor were money (1.00), video game hours at an arcade (.59) and preference for video games (-.34). Because of scaling procedures, preference for video games is indicated by a lower numeral as compared to other activities listed. This produced the negative factor weight.

Table 15

Factor Analysis of the Video Game Questionnaire

VARIABLE	FACTOR NO.					
	1	2	3	4	5	6
VG Hrs. Home		.50			.39	
VG Hrs. Arcade	.59					
VG Hrs. Friend's		.35				
Rank VG	-.34	.42				
TV viewing					.61	
Play friends			.91			
Talk parents			.42			
Reading		.61	.29			
Sports					.67	
Parents' attitude						.51
Money spent	1.00					
Time with friends			.49	.32		.42
Time homework		.50		.40		
Attitude to schoolwork						.71
Friends' attitude				.81		

Table 16

Eigenvalues and Proportion of Variance for the Six Factors

Factors	Eigenvalues	Proportion of Variance
1	2.93	20%
2	1.83	12%
3	1.70	11%
4	1.53	10%
5	1.27	9%
6	1.14	8%

Factor 2, which accounted for 12 percent of the variance, was interpreted as video games replacing reading and homework. The highest loadings for the items on this factor were video game hours at home (.50), reading (.61), preference for video games (.42), video game hours at a friend's house (.35), and time spent on homework (.50). The positive loadings for reading and time spent on homework indicate decreases in these activities.

Factor 3, accounting for 11 percent of the total variance, represents a lessening of social interaction since playing video games. The highest loadings were for the items, playing with friends (.91), time spent with friends (.49), talking with parents (.42), and reading (.29). These positive loadings indicate decreases in all these listed activities.

Factor 4, accounting for 10 percent of the total variance, reflects a change in friendship relationships. The highest loading item was for attitude of friends towards video game playing ability (.81). This positive loading indicated that friends would like the subject less if he or she played video games well. Another high loading on this factor was for time spent on homework (.40), indicating a decrease in time spent on homework since playing video games. The last important loading was time spent with friends (.32), indicating an increase in such time since playing video games.

Factor 5, accounting for 9 percent of the total vari-

ance, is a reflection of video games as a replacement for TV and sports. The items giving the highest loadings here were time spent on sports (.67), time spent on TV viewing (.61)--both of these figures indicate a decrease--and video game hours at home (.39).

Finally, Factor 6, accounting for 8 percent of the total variance, was called negative consequences of video game playing. The highest loading item was for attitude towards schoolwork (.71), indicating that schoolwork was more difficult to learn since playing video games. The other two high loadings were for parents' attitudes toward video games (.51), indicating parents' disapproval, and time spent with friends (.42), indicating a decrease in such time since playing video games.

Table 17, showing the means and standard deviations for the five variables in this study, given by grade and gender, may be found in Appendix B.

CHAPTER VI

DISCUSSION

Video Game Usage appears to have a different impact upon School Outcomes depending on how much video game playing occurs, where it takes place, and also when and with whom video games are played. It is best to consider each of these conclusions separately.

Video Game Usage in the path analysis was negatively related to School Achievement Outcomes. Furthermore, it was found that Video Game Usage was negatively related to children's engagement in School-Related Activities. Together, these findings provide evidence of displacement. Time spent playing video games does appear to replace time devoted to other School-Related Activities, such as reading, and academic achievement goes down. To my knowledge, this is not only the first evidence of the negative impact of video games on children's achievement, but also the first evidence that this is due to activity displacement.

Further evidence supporting this conclusion is found in the factor analyses. Two of the six factors accounted for in this research were indicators of displacement. Factor 2 revealed several components of displacement; it loaded highly on children's preference for video game playing to a lessening of time spent reading, and also on children spending less

time on homework since playing video games. Factor 5 was another indicator of displacement, loading high on children's preference for video game playing to watching television and/or playing sports. Factor 3 also indicated that children were having less social interaction with friends after their introduction to video games.

A closer perusal of the questionnaire reveals that approximately 31% of the subjects reported a decrease in time spent reading since they began playing video games. The amount of time children spent on other activities, such as talking with parents, participating in sports, and involvement in musical activities, showed no significant change since their introduction to video games. It is also interesting to note other reported data concerning video game usage. Approximately 19% of parents disapprove of their children's playing of video games, whereas 34% approve. When asked what the main reason for playing video games was, 91% of the students said they were playing video games just to have "fun." Students did not appear motivated to get a high score, beat their opponent, or to learn the game better. Thus, video game playing does not appear to be a competitive activity among the students, nor one that challenges their need to improve learning skills. The high percentage of students who report that they are "just having fun" indicates video games to be a pleasurable activity, unpressured by the concept of winners and losers. Two-thirds of the subjects spent less

than \$1.00 a week, indicating that most students played video games at home or at a friend's house. Subjects reported playing video games most often during the weekdays after school, and most often play these games with a brother and/or sister. Again, this could be a reflection of the age group in the sample as well as the age appropriateness for most subjects to be playing these games at home.

Reading appears to be the skill most influenced by the introduction of video game usage. When ranking reading relative to video games, students in the sample significantly preferred the video games. Of the five activities rated, including watching television, participating in sports or music, playing with a friend, playing video games, or reading, only 12.9% of the subjects chose reading first. It ranked last among these activities.

In conjunction with these findings, ranking video games as a favorite activity coincided with spending more time playing video games at home or at a friend's house, and spending less time on reading and homework, according to the factor analysis. In addition, the analysis revealed that since playing video games, students found schoolwork more difficult.

In the review of reading research literature, it was found that reading for pleasure leads to reading achievement in school. Similarly, the subjects in this study reported reading for pleasure less since introduced to video games. More hours playing video games clearly leaves less time for

reading as a leisure time activity. This can in turn be expected to lead to decreased reading achievement, as was found.

What can be concluded about the impact of video games on students' school achievement? Video games appear to be neither a "villain" nor a "redeemer" to the educational system. Although it appears that video game playing diverts children's attention away from school-related activities such as reading, and in so doing affects academic achievement and school attitude, how serious is the problem? How much do our children play video games? Forty-four percent report playing these games once a week at a friend's house. Thirty-one percent report playing these games four or more times a week at home. The next largest group, 27%, report playing only one time each week at an arcade. How do these numbers add up in hours? Fourteen percent of subjects reported playing up to one hour each week; 28% reported playing up to two hours per week; 19% reported playing up to three hours per week; and 35% of the subjects reported playing video games more than three or more hours each week. Thus, 65% of children play video games less than three hours a week, and this does not suggest a substantial problem for children as a population group. However, it was found that students who played video games three or more hours a week had a mean reading percentile that was 13 points lower than those who played video games less than one hour a week, supporting a greater displacement effect among the 35% of the children who

are heavy game users. Greater attention should be directed to this group in future research.

The above results do support the hypotheses of the Path Analysis Model. Family Press for Achievement has a direct positive influence upon School-Related Activities; Video Game Usage has a direct negative influence upon School Achievement Outcomes; and School-Related Activities have a direct positive influence on School Attitude Outcomes. From this research we have seen reading achievement decline as video game playing hours increased. We have also noted the key importance of School-Related Activities as a necessary link between Family Press for Achievement and School Outcomes. Without the actual participation and involvement of the family members in out-of-school activities, the aspirations, hopes and values of the family press do not appear to eventuate into successful academic outcomes.

Several limitations should be considered when interpreting these results. This was a self-report study using a sample from a suburban elementary school. Follow-up studies might seek to obtain observational measures of the above-mentioned activities. Possibilities for future experimental research could include interviewing parents in their homes, and the use of videotapes to record certain family processes, during and separate from video game use. As mentioned previously, using a sample from urban and rural areas and using subjects of junior high school and high school age, would also

give a broader picture.

It is also important to note that although the Path Model for this study examined the influence of video game usage on school-related activities, other causal sequences are possible. For example, school-related activities might have an effect on video game usage, and this possibility should be addressed in future research.

This study focused on video game usage as displacing school-related activities such as reading and family interactional processes. Future research may wish to explore the possibility that increases in video game play may not only detract from time spent reading or family interaction, but may also cut into television viewing hours, or other leisure activities to which children devote their time and attention.

More research is needed to assess the difference in video game play within the home and arcade playing. Which comes first? Do certain family processes lead to game usage at home, while other processes lead to arcade playing? Or is arcade playing a function separate and apart from Family Press for Achievement? Not enough is known at this time about the arcade environment and what needs or purposes it may be filling in youngsters' lives. Based on this introductory study, arcades do not appear to be providers of the kind of stimulation and activity that fosters academic success.

What are the implications for teachers and schools of these results? For two-third of the students there need not be too much concern, because they play with video games only three hours a week or less. These students do not appear to be experiencing the displacement effect. Heavy users, i.e. those students who play video games three or more hours each week, and also arcade users, should be monitored more carefully to evaluate school outcomes. Third, consultation by school personnel with the parents could help foster better parent-child home processes and awareness of their influence on video game usage and school outcomes.

The present research focused on the possible adverse effects of video games on elementary school children's achievement in school. This is but one of many effects such games may have. These games may have other outcomes that are desirable, such as increasing eye/hand coordination and simulating problem-solving in some real world situations. Undoubtedly the individual qualities of each game must ultimately be studied separately and conclusions should be drawn separately for each game, based on a particular purpose. As an initial investigation, the present study sought merely to survey children's levels of use of video games and to determine if nonselective use of the games might have adverse effects. The data indicate clearly that they can.

Appendix A

Table 2

Decomposition Table

Explained Variable	Predictor	Direct Causal	Indirect Causal	Total Causal	Non-Causal	r
X ₂	X ₁	-.18	--	-.18	0	-.18
X ₃	X ₁	.24*	-.02	.22*	0	.22*
X ₃	X ₂	.11	--	.11	-.04	.07
X ₄	X ₃	.17	--	.17	.02	.19
X ₄	X ₂	-.22*	.02	-.20*	-.01	-.21*
X ₅	X ₃	-.29*	--	-.29*	-.03	-.32**
X ₅	X ₁	-.15	-.06	-.21*	0	-.21*
X ₄	X ₁	.09	.04	.13	-.01	.12
X ₅	X ₂	.08	0	.08	0	.08

* p<.05

** p<.01

Table 2A

Correlation Matrix for Path Analysis

	<u>T.FPA</u>	<u>T.VGHRS</u>	<u>T.SRA</u>	<u>RDGPCT</u>	<u>T.ATT</u>
T.FPA	1.00				
T.VGHRS	-.18	1.00			
T.SRA	.22*	.07	1.00		
RDGPCT	.12	-.21*	.19	1.00	
T.ATT ^a	-.21*	.08	-.32**	-.13	1.00

*p<.05

**p<.01

^aT.ATT is reversed due to scoring procedure.

Table 15A
Correlation Matrix for Factor Analysis

	VG HRS HOME	VG HRS ARCADE	VG HRS FRIEND	RANK VG	TV VIEW	PLAY FRNDS	TALK PARNTS	READ
VG HRS HOME	1.00							
VG HRS ARCADE	.08	1.00						
VG HRS FRIEND	.38	0.33	1.00					
RANK VG	-.32	-.39	-.34	1.00				
TV VIEW	.14	-.07	-.13	.09	1.00			
PLAY FRNDS	.03	.12	-.05	-.11	.04	1.00		
TALK PARNTS	-.08	.13	.09	.03	-.05	.35	1.00	
READ	.29	.22	.18	-.42	-.06	.26	.22	1.00
SPORTS	.31	.03	-.02	.03	.40	.21	.13	.15
PARNTS ATT	.06	.17	.05	-.06	-.18	-.19	.06	.17
MONEY	.26	.59	.30	-.39	-.01	.17	.02	.07
TIME FRIENDS	.17	.15	.09	-.34	-.09	.45	.26	.14
TIME HW	.19	.04	.03	-.09	-.15	-.17	-.10	.25
SCHOOL	.04	.03	.01	-.04	-.05	-.07	.06	.13
FRIEND ATT	-.07	-.02	-.17	.05	.05	.01	-.00	-.04

	SPORTS	PARNTS ATT	MONEY	TIME FRIEND	TIME HW	SCHOOL	FRIEND ATT
SPORTS	1.00						
PARNTS ATT	-.15	1.00					
MONEY	-.01	.20	1.00				
TIME FRIENDS	.08	.28	.21	1.00			
TIME HW	.02	-.01	-.03	-.27	1.00		
SCHOOL	.10	.29	-.05	.26	.08	1.00	
FRIEND ATT	-.02	-.13	.07	-.23	.33	.28	1.00

Appendix B

Table 17

Means and Standard Deviations for Variables Family Press for Achievement, Video Game Usage, School-Related Activities, School Achievement Outcomes, and School Attitude Outcomes, by Grade and Gender

Variable	Grade	Gender	Mean	Std. Dev.
Family Press for Achievement	3	M	98.75	6.39
		F	97.36	6.62
	4	M	95.14	8.71
		F	98.38	5.24
	5	M	94.92	7.78
		F	101.47	6.58
Video Game Usage	3	M	5.25	2.09
		F	3.00	1.84
	4	M	3.28	1.70
		F	2.50	.93
	5	M	4.00	1.29
		F	2.42	1.54
School-Related Activities	3	M	33.92	5.74
		F	33.36	2.50
	4	M	32.86	4.81
		F	33.38	2.06
	5	M	32.15	3.48
		F	33.15	5.31

Table 17 (continued)

Variable	Grade	Gender	Mean	Std. Dev.
School Achievement Outcomes	3	M	73.83	19.94
		F	81.09	12.38
	4	M	72.85	22.65
		F	77.63	19.60
	5	M	68.69	26.99
		F	73.95	19.81
School Attitude Outcomes	3	M	42.25	11.08
		F	43.90	12.43
	4	M	42.86	9.42
		F	41.36	14.73
	5	M	41.15	8.53
		F	42.58	9.77

Appendix C

September, 1983

Dear Parents:

As a doctoral candidate at the City University of New York Graduate Center, I am presently doing research for my doctoral dissertation. My study concerns the use of video games and its influence on school outcomes.

In order to complete this research it will be necessary to meet with your child in a group session with other children in school, for approximately 40 minutes. I would also need to meet with you, the parents, for a brief interview concerning your thoughts and ideas about your child's use of these games and their possible relationship to school attitudes and achievement.

I am requesting your consent for you and your child to participate in this study. Anonymity would be guaranteed to all research participants, and it would be my pleasure to discuss with you the results and implications of this study once it is completed. We at the Graduate Center believe the findings will be important to all of us who are concerned about children, their growth, and their success at school.

Thanking you for your time and interest in this endeavor.

Sincerely,

Elaine Biegen

I consent for my son/daughter and myself to participate in the above described study.

Name

Date

Child's Name

I do not consent for my son/daughter and myself to participate in the above described study.

Name

Date

Child's Name

Please sign and return this letter to your child's school in the enclosed, stamped, addressed return envelope. Thank you.

January, 1984

Dear Parents:

I want to thank you for consenting to participate in our research study regarding families and their children's leisure time activities, including the use of video games, and their relationship to school. I very much enjoyed meeting your children, found them stimulating to work with, and look forward to meeting you.

Presently, I am enclosing a questionnaire called, "The Family Environment Schedule". (Marjoribanks, 1979). Each question should be answered as accurately as possible. Of course there are no right or wrong answers, only those which apply to you and your family. The research guarantees anonymity. All questions from number eight on may be answered by mother and/or father individually or together.

I look forward to meeting with you to discuss the results of this research. It may be interesting for you to know that it is the first of its kind, incorporating video games as part of the integral design.

Please be sure to enclose the completed form in its envelope, and have your child return it to his/her teacher at school the next day.

Again, thanking you for your time, interest, and help.

Sincerely,

Elaine Biegen
Elaine Biegen

FAMILY ENVIRONMENT SCHEDULE

1. The questions are associated with numbers. Place a circle around the number which is closest to the answer supplied.
2. In the questionnaire, whenever "X" appears, would you substitute your child's name.
3. An 'other answer' space is provided for most questions. If the responses given do not fit easily with the categories that are supplied, then write in the response. Also please supply any comments you feel might be useful when the schedule is being scored.
4. If any of the questions provide difficulty in answering, please read the possible alternatives that are provided once more, so that an answer might be more easily selected.

1. Date of interview _____
2. Name of child _____
3. Sex of child Male Female
4. Date of birth of child _____
5. Who is providing these answers. (circle appropriate number)
mother _____ 1
father _____ 2
both parents _____ 3
other (specify) _____
6. What language is generally spoken in the home? (specify) _____

7. How many children are there in your family?

Name	Age	Gender
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

8. How much education do you want your child to receive?

Mother Father

1	1	postgraduate education (a higher degree)
2	2	graduate from a university (a first degree)
3	3	at least some university
4	4	high school plus some professional training school
5	5	finish high school, or as much school as possible
6	6	leave school as soon as possible

9. How much education do you really expect your child to receive?

Mother Father

1	1	postgraduate education
2	2	graduate from university
3	3	at least some university
4	4	high school plus training school
5	5	finish high school, or as much as possible
6	6	leave school as soon as possible

10. How long have you had these ideas about the amount of education you expect your child to receive?

Mother	Father	
1	1	since child was born
2	2	before child started school
3	3	just after child started school
4	4	since last year
5	5	just this year

11. What kind of job would you really like your child to have when he/she grows up, if at all possible?

Mother	Father	
1	1	job requiring postgraduate education or long period at university (doctor, lawyer, scientist, professor.....)
2	2	job requiring university degree (architect, public servant, engineer, high school teacher...)
3	3	parents have high expectations, but it is up to the child to decide.
4	4	job requiring high school graduation and some college training (draughtsman, nurse...)
5	5	job requiring some high school education
6	6	job requiring little education or "I don't care"

Name of job desired: _____

other answer: _____

12. Do you really think your child will become job that you just mentioned?

Mother	Father	
1	1	Yes (emphatically)
2	2	I hope so
3	3	No (I don't think so) or I don't care, or it's up to the child

other answer: _____

13. How long have you had these ideas about the kind of job you would like your child to have?

Mother	Father	
1	1	since child was born
2	2	before child started school
3	3	just after child started school
4	4	since last year
5	5	just this year

14. What jobs do you, the parents have?

Mother	Father	
1	1	job requiring highest education level
2	2	job requiring university degree
3	3	job requiring high school plus some professional college
4	4	job requiring some high school education
5	5	job requiring little education
6	6	no job

name the job: _____

15. would you, the parent, like to change your job, or are you nappy to stay in your present job?

Motner . Father

1	1	yes; would like to change
2	2	No; is content to stay in present job
3	3	no job

16. Do you have time to read books. If you do, how many books would

you generally read in a month?

Motner . Father

1	1	no books read
2	2	less than one a month
3	3	about one or two a month
4	4	3 to 5 a month
5	5	6 to 10 a month
6	6	just about every day

17. When your child was small, before he/she started school, did you ever read to him/her? If yes, how often.

Motner . Father

1	1	no reading to child
2	2	not very often, less than once a week
3	3	about once a week
4	4	a couple of times a week
5	5	nearly every day (3 to 5 times weekly)
6	6	just about every day (6 or 7)

18. Do you . bring home books to read, either from a library, or friend's place? If yes, about how many each month?

1	no books brought home (or I don't know)
2	1 or 2 books (very rarely)
3	3 to 5 (about 1 a week)
4	6 to 10 (about 2 a week)
5	more than ten

19. Do you think that children who are about 10 years old should be restricted from viewing certain types of TV programs or should they decide themselves what to watch?

a)1	should be restricted from certain programs
2	decide themselves

20. How often would you check to see what your child is reading or watching on TV?

- 1 never check
- 2 only occasional checks
- 3 quite regular checks
- 4 very regular checks
- 5 check most viewing and reading

21. Do you ever discuss your child's progress at school?

- 1 never discuss progress
- 2 not very often, less than once a week
- 3 a couple of times a week
- 4 nearly every day (3 or 4 times a week)
- 5 every school day

22. If you see that your child is having real difficulty with something she/he is doing (like building a model, homework, etc..) what would you do?

- | Mother | Father | |
|--------|--------|--|
| 1 | 1 | generally do it for child |
| 2 | 2 | sit down with child and help |
| 3 | 3 | offer to help |
| 4 | 4 | wait for child to ask for help, and then show child how to do it |
| 5 | 5 | wait for child to ask for help, but insist that child continue to do it by himself/herself |

23. What educational level did you, the parents reach?

- | Mother | Father | |
|--------|--------|------------------------------------|
| 7 | 7 | higher degree level |
| 6 | 6 | University degree |
| 5 | 5 | High school plus training school |
| 4 | 4 | Finished high school |
| 3 | 3 | some high school |
| 2 | 2 | finished primary school |
| 1 | 1 | less than primary school completed |

24. How many hours a day do father, mother and child watch TV?

- | Mother | Father | Child | |
|--------|--------|-------|-----------------------------|
| 1 | 1 | 1 | Never watches it |
| 2 | 2 | 2 | Less than one hour a day |
| 3 | 3 | 3 | Between 1 and 3 hours a day |
| 4 | 4 | 4 | Between 4 and 5 hours a day |
| 5 | 5 | 5 | More than 5 hours a day |

25. At mealtimes, who does most of the talking?

- 1 everybody participates
- 2 the parents do most of the talking
- 3 father dominates the conversation
- 4 mother dominates the conversation
- 5 no one is allowed to talk

other answer: _____

26. If children do well in their schoolwork; do you think parents

should praise them?

Mother Father

- 1 1 no praise given
- 2 2 probably less than once a week
- 3 3 about once a week
- 4 4 a couple of times a week
- 5 5 every day, or nearly every day

27. How much time do you think your child should spend doing homework or schoolwork at home?

Mother Father

- 1 1 no time
- 2 2 about 15 minutes most days
- 3 3 about half an hour
- 4 4 nearly an hour most days
- 5 5 more than an hour most days

28. Do you expect your child to do homework at home?

Mother Father

- 1 1 no time expected
- 2 2 about 15 minutes most days
- 3 3 about half an hour most days
- 4 4 nearly an hour most days
- 5 5 more than an hour most days

29. After the evening meal what does the family generally do?

Mother Father Child

- 1 1 1 Watches TV or listens to the radio
- 2 2 2 Reads and watches TV or listens to radio
- 3 3 3 Mainly reads
- 4 4 4 Gets involved with some hobby
- 5 5 5 goes to bed or to work

other answer; (specify) _____

30. The next question is trying to determine who generally makes family decisions.

Mother Father Both

- 1 2 3 Who generally makes the decisions about the purchase of your child's clothes
- 1 2 3 What about money matters, such as whether your child should have an allowance or pocket money
- 1 2 3 Who would decide whether your child could go out at night or anywhere on the weekend
- 1 2 3 Who will decide when your child should leave school
- 1 2 3 Who would generally make the decision whether your child should spend more time on homework

31. Would you know what topic your child is studying (or has just finished doing) in say, English or Arithmetic at school?

Mother	Father	
1	1	has no idea of the topics
2	2	has no idea of the present topics, but does remember earlier topics that were studied
3	3	Uncertain about general topics, but can name one
4	4	Knows general topic
5	5	Uncertain about specific topic, but mentions one, (e. g. addition of fractions)- thus specificity if given
6	6	Knows specific topics (e. g. division of fractions)

32. Estimate the time your child spends in hours each week playing video games.

a) At home:

<u>zero</u>	<u>up to</u>	<u>up to</u>	<u>up to</u>	<u>more than</u>
hours	1 hour	2 hours	3 hours	3 hours

b) At arcade:

<u>zero</u>	<u>up to</u>	<u>up to</u>	<u>up to</u>	<u>more than</u>
hours	1 hour	2 hrs.	3 hrs.	3 hours

c) At friend's:

<u>zero</u>	<u>up to</u>	<u>up to</u>	<u>up to</u>	<u>more than</u>
hours	1 hour	2 hrs.	3 hrs.	3 hours

STUDENTS' SCHOOL ATTITUDE SCHEDULE

1. I think that I am pretty good at my schoolwork.	Strongly Agree	Agree	Don't Agree or Disagree	Disagree	Strongly Disagree
2. School is boring.	Strongly Agree	Agree	Don't Agree or Disagree	Disagree	Strongly Disagree
3. I enjoy reading.					
4. I'm sorry when school is over for the day.					
5. My schoolwork worries me.					
6. School is fun.					
7. I think the other children in my class like me.					
8. I'd prefer to be in another class.					
9. I find a lot of schoolwork hard to understand.					
10. I work and try very hard in school.					
11. Going to school is a waste of time.					
12. I wish that there were nicer children in this class.					
13. The teacher doesn't care about us in my class.					
14. The other children in this school are very friendly.					
15. Doing well at school is most important to me.					
16. At school they make you do things you don't want to do.					
17. It doesn't bother me if I get my work done.					
18. I would like to be very good at schoolwork.					
19. If I don't understand something, I ask the teacher.					
20. I enjoy it when the teacher asks me questions.					

STUDENT VIDEO GAME QUESTIONNAIRE

1. How often do you play video games each week?

- a) At home:
 none once twice 3 times 4 or more times
- b) At arcade:
- c) At friend's:

 none once twice 3 times 4 or more times

2. Estimate the time you spend in hours each week playing video games.

- a) At home:
 zero up to up to up to more than 3
 hours 1 hour 2 hours 3 hrs. hours
- b) At arcade:
 zero up to up to up to more than 3
 hours 1 hour 2 hours 3 hrs. hours
- c) At friend's:
 zero up to up to up to more than 3
 hours 1 hour 2 hours 3 hrs. hours

3. If given the choice, would you prefer to: (please rank each choice with a number 1 to 5, using 1 = first choice to 5 = last choice)

- | | |
|--------------------------------------|-------|
| | Rank |
| a) watch TV _____ | _____ |
| b) play with friend _____ | _____ |
| c) read _____ | _____ |
| d) play video game _____ | _____ |
| e) participate in sports/music _____ | _____ |

4. Do you own a video game at home? (check one)

 Yes No

5. Which of the following is your favorite video game? (Check one).

- a) Donkey Kong _____
- b) Pac Man _____
- c) The Electric Co. Math Fun _____
- d) Missile Command _____
- e) Other: (give name, _____)

6. Where do you play video games most often? (check one).
- a) Home _____
 - b) Store _____
 - c) Arcade _____
 - d) Friend's house _____
7. With whom do you play video games most often? (check one).
- a) Parents _____
 - b) Friends _____
 - c) Sister and/or brother _____
 - d) Alone _____
8. What do you like best about video games? (check one).
- a) Graphics _____
 - b) Sounds _____
 - c) Goals to games _____
 - d) Computer Scoring _____
9. When do you play video games most? (check one).
- a) Before School _____
 - b) Lunch hour _____
 - c) After school _____
 - d) Weekday evenings _____
10. What days do you play video games most? (check one).
- a) Saturday _____
 - b) Sunday _____
 - c) Friday _____
 - d) Mon. thru Thurs. _____
11. Since playing video games, has your time watching television:
(check one only)
- a) increased ___ b) stayed the same ___ c) decreased ___
12. Since playing video games has you time playing with friends:
- a) increased ___ b) stayed the same ___ c) decreased ___
13. Since playing video games has your talking with your parents:
- a) increased ___ b) stayed the same ___ c) decreased ___

14. Since playing video games, has your time spent reading:
 a) increased ___ b) stayed the same ___ c) decreased ___
15. Since playing video games, has your time spent playing sports and other activities:
 a) increased ___ b) stayed the same ___ c) decreased ___
16. How do your parents feel about your playing video games? (check one)
 a) Greatly approve _____
 b) Approve _____
 c) Disapprove _____
 d) Parents don't care _____
17. What is the main reason you play video games? (check one)
 a) you want to get a high score _____
 b) you want to "beat" your opponent _____
 c) you want to learn to play the game better _____
 d) you're just having "fun" _____
18. How much money do you spend each week playing video games?
 a) less than \$1.00 _____
 b) between \$1.00 and \$2.00 _____
 c) between \$2.00 and \$5.00 _____
 d) more than \$5.00 weekly _____
19. Since playing video games do you spend: (check one)
 a) more time with friends _____
 b) same amount of time with friends _____
 c) less time with friends _____
20. Since playing video games do you: (check one)
 a) do more homework _____
 b) do the same amount of homework _____
 c) do less homework _____
21. Since playing video games does schoolwork seem: (check one)
 a) easier to learn _____
 b) the same as before _____
 c) more difficult to learn _____
22. If you do well playing video games, do your friends: (check one)
 a) like you better _____
 b) don't care (no difference) _____
 c) like you less _____

SCHOOL RELATED ACTIVITIES SCHEDULE

1. Do you have time to read books? If yes, how many books have you read in the past month?
 - 1 no books read
 - 2 one a month
 - 3 two a month
 - 4 about one a week (3 - 5 a month)
 - 5 about two a week (6-10 a month)
 - 6 more than 10

 2. When you were small, before you started school, did your parents ever read to you?
 - 1 never read to by parents
 - 2 not read to very often, less than once a week
 - 3 about once a week
 - 4 a couple of times a week
 - 5 nearly every day
 - 6 every day

 3. Does your mother or father ever listen to you read to them?
 - 1 just about every day
 - 2 nearly every day (3 -5 times a week)
 - 3 a couple of times a week
 - 4 about once a week
 - 5 less than once a week (not very often)
 - 6 never listens

 4. Do you bring home books to read, either from a local library, school library, or friend's place? About how many each month?
 - 1 No books brought home, or I don't know
 - 2 1 - 2 (very rarely brings home books)
 - 3 3 - 5 (about one a week)
 - 4 6 - 10 (about 2 a week)
 - 5 more than 10

 5. Do you think children about 10 years of age should be restricted from viewing certain types of TV programs?
 - 1 yes
 - 2 no
- What about books and comics? Should they be restricted?
- 1 yes
 - 2 no

6. How many recreational activities do you and your parents do together at home? (sports, etc.)

- 1 a great variety of activities (some every week)
- 2 quite a few activities (some nearly every week)
- 3 a moderate amount (1 or 2 a month)
- 4 very few or no activities

7. Do your parents expect you to spend a regular amount of time on homework each day outside of schooltime?

- 1 yes
- 2 no

8. Do you have an encyclopedia or almanac or set of fact books at home?

- 1 yes
- 2 no

How often do you and your parents look at them together?

- 1 about once a week or more
- 2 once or twice a month
- 3 never, or not very often

9. How many educational activities have you and your parents done together during the past six months? (places visited, etc.)

- 1 five or more activities, (such as plays, zoos, museums, etc.)
- 2 3-4 activities of educational value
- 3 1 or 2 educational activities
- 4 none

10. What do you generally do between the time you come home from school and the time you have dinner?

- 1 does homework, reads or studies
- 2 takes lessons, music, art, dance, etc.
- 3 plays games outside of the house with friends
- 4 watches TV or listens to stereo or radio
- 5 plays video games

11. After dinner, what do you generally do?

- 1 does homework, reads or studies
- 2 takes lessons
- 3 plays games with friends outside
- 4 watches TV, or listens to stereo or radio
- 5 plays video games

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