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ABSTRACT

Drawing on communications, psychological, and educational studies, this paper examines television's influence on reading performance and school achievement. The first section of the paper reviews and synthesizes major studies dealing with the introduction of television in a community and with correlations between television use and school achievement, pointing out that many of the studies have flawed methodologies and weak links between theory and methodology. The second section of the paper synthesizes the results of eight statewide reading assessments and a secondary analysis of the 1984 National Assessment of Educational Progress using hypotheses based on four theories of displacement (the idea that watching television replaces other activities in children's lives). It concludes that television viewing is associated with a different set of needs and gratifications than reading. The report includes extensive tables of data and eight pages of references. (FL)

# Television and reading: A research synthesis

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## Abstract

This paper examines television's implications for reading performance and school achievement. The first section reviews and synthesizes major studies to date, drawing on literature from communications research, psychological and educational studies. The second section reports the results of a synthesis of eight statewide reading assessments and a secondary analysis of the 1984 National Assessment of Educational Progress, which include measures of scholastic achievement, out-of-school activities and reported television viewing exposure. The study examines four theories of displacement: functional similarity, physical and psychological proximity, marginal fringe activities, and functional reorganization, as a method of analyzing the relationship between television viewing and reading in greater depth. The results of the analysis suggest that television viewing is tied to a different set of needs and gratifications than reading activities.

Television has become a ubiquitious phenomenon in our lives; it escapes no one. It has been hailed by media enthusiasts as a "great technology for great purposes", rekindling the hope of providing universal learning to a geographically and ethnically diverse public (A public trust,1979). At the same time, it has been cast by sceptics as a manipulator of public opinion, encouraging conformity, fostering a homogenized culture (Gerbner et al., 1982). These contradictions, between the utopian possibilities of the medium and the fears associated with its holding power reflect intuitive assumptions about the effects of media on socialization, learning and performance.

Historically, the introduction of new media has generated considerable rejoicing as well as dismay. In the 1930's, movies were the target. The Payne Fund studies were designed to "definitively and scientifically" examine the potentially deleterious effects of movies on youth. By the mid-30's radio, once praised as an "important cohesive force" in society, was criticized for becoming increasingly commercial, appealing to low level popular tastes (DeFleur & Ball-Rokeach, 1975). Even the emergence of paperback books in the 1950's caused a good deal of concern. At one point these books were described as a "revolutionary cultural technique" responsible for democratizing reading; at the other extreme, they were considered a threat, a "menace to morals", destroying independent thinking, producing

intellectual malaria" (Geller, 1984).

Much of the supposed threat arises out of the inordinate amount of time people (especially children) spend on media activities. In the case of television, the average high school graduate has spent 50% more time viewing than attending school (Kaye, 1974). With an estimated 27.6 hours watched per week, television occupies a major portion of children's leisure time (Comstock, Chaffee, Katzman, McCombs, & Roberts, 1978). Like other media designed to entertain, it is the quality of that time that continues to concern parents and educators. There is an unwritten assumption that without television, children would spend time on more worthwhile pursuits.

The research literature, for the most part, consists of small-scale studies conducted with different age groups using diverse methodological strategies. As a result, there has been a lack of convergence across studies regarding the relationship between television and learning. Not unlike other fields of inquiry, however, two schools of thought have emerged: one which claims that there are no apparent effects, and the second, that the strength of the effects have been masked due to flaws in research designs.

Unfortunately this polarization has seriously limited progress in the field. Study designs often reflect researcher bias by assuming deleterious effects of television on learning. Most

studies have not distinquished between different styles of learning and different media preferences. Furthermore, various research communities have tended to study only one aspect of the television-learning issue. For example, psychologists have developed important theories of how children comprehend information from television. Mass communications researchers have analyzed the functions of the media. This traditional specialization among disciplines, however, fails to relate the parts to the whole. A dominant paradigm integrating information from cognitive psychology, education, and mass communications research does not exist.

Another limiting factor is what Hornik describes as "the fly by night" character of the research (1981). Few people tend to follow up unanswered questions from first studies using improved methodology. Rather the field tends to attract 'instant experts', those who claim that television "seriously damages children's ability to think" (TV's "disastrous" impact, 1981). These media experts have exerted considerable influence on public opinion. It is not unusual for educators and laypeople alike to report television's negative effects without substantiating evidence.

This paper examines television's implications for reading performance and school achievement. The first section reviews and synthesizes major studies to date, drawing on literature from

communications research, psychological and educational studies. The second section reports the results of a synthesis of eight statewide assessments and a secondary analysis of the 1984 National Assessment of Educational Progress, which include measures of scholastic achievement, out-of-school activities, and reported television exposure. The sample size of over two million children allows for accurate estimation of correlations without the problems of statistical inference from small samples and limited geographical locations. From this review and analysis, implications regarding the relationship between television, reading performance, and school learning will be drawn.

## A Review of the Literature

Issues involved in research on television and school achievement are complex theoretically, conceptually, and methodologically. Home television viewing has been measured and compared using many different approaches. In an effort therefore, to eliminate significant alternative explanations for findings, studies in this review are grouped according to their methodological approach.

### Studies relating to the introduction of television in a community

An early strategy for analyzing the effects of television called for the comparison of children from homes or communities without television to those where TV was available. Sometimes the comparison involved the same subjects, before and after the onset of television, and sometimes a control group was added as well. These studies concentrated on the role television played in the socialization processes of children focusing on two broad categories of effects: a) medium or displacement effects and b) content effects. Displacement effects refer to the reorganization of activities by children after the introduction of television in a community. Content effects relate to the influence of particular types of programs on thinking and knowledge gained.

These pre and postest ownership/reception studies have been conducted in a number of different countries during the last three decades (see Figure 1). Drawing on seven major studies, the pattern that emerges is one of initial marked decline in a range of activities followed by a return to former levels of interest in most of these displaced activities. Our focus here will be limited to those activities presumed to be associated with achievement in schools.

Himmelweit et al. (1958) and Schramm et al. (1961) conducted the early major studies on the effects of television. Himmelweit, in a British investigation of over 4,000 children,

compared matched groups of children, ages 10-11,and 13-14, with or without television in their home. Schramm compared two Canadian communities, one with television (referred to as Teletown) and one without access to television (Radiotown) with three age groups represented: 6-7, 11-12, 15-16 year olds, with a total sample of 913. Two different methods of measuring the amount of time spent on various activities were used in these studies, diaries and ratings on frequency scales to measure time spent on activities. Children were asked to report the frequency of use of media, including books, newspapers, comic books etc., giving a detailed picture of leisure behavior.

Both studies noted a similar pattern of displacement. Those activities most affected were the use of other media and certain types of play. Bedtimes and time devoted to homework were among those activities least influenced. In regard to book reading, the British researchers found that children, when first beginning to view television, read significantly less than the controls. However, this pattern changed after a few years of viewing, with reading reverting to its pre-viewing pattern. Schramm's study noted little difference in the average number of books read per month between viewers and non-viewers (2.2 and 2.3 respectively).

Two hypotheses emerged from these analyses. Himmelweit noted that 'marginal fringe activities' were most likely to be

displaced. That is, activities regarded as unstructured such as outdoor play, were displaced by television viewing. Schramm et al., however, suggested a more complex pattern of displacement. Those activities most readily altered, such as comic book reading and cinema going were thought to satisfy the same needs or 'functions' as television. This is the principle of 'functional similarity' which has been widely accepted as an explanation of displacement. The child, confronted with multiple leisure alternatives, will sacrifice those activities appearing to satisfy the same needs as television, only less effectively. Activities, determined to be functionally different, however, will remain unaffected by the availability of television.

There are numerous difficulties in accepting this principle. First, there is the problem of establishing what function the medium is serving. That children watch television for entertainment and read strictly for information is clearly a false dicotomy. Reading provides opportunities for wish-fulfillment and vicarious problem solving, only in a different form than television. Second, the principle assumes that one function dominates the child's behavior. Reading comic books, for example, was hypothesized as serving the escapist function. There may well be other reasons for reading comics as well. Third, the notion that displacement is a straightforward process is probably overly simplistic. Rather than provoking piecemeal displacement, new media tend to create changes in the

communications environment, thereby suggesting a more comprehensive restructuring of choices.

More recent studies of television's impact have attempted to broaden these original findings. In a series of studies in Japan, Furu (1971) noted slight disparities (for example, television caused a greater reduction in homework activities), and attempted to explain these differences using the principle of 'psychological and physical proximity'. Activities were displaced on the basis of their immediate accessibility as well as the satisfactions derived from the activity.

Brown et al. (1974) studied the introduction of television into a small Scottish community. Their findings generally reproduced those recorded in the earlier studies: comics and radio listening declined with essentially no change in newspaper reading or book reading. But what was particularly noted in this study were age related differences in the functions of particular media. Television, for example, reported to be the most exciting medium at age 9, dropped sharply by age 15. Adolescents turned from television to radio, records, and interaction with peers. The need to control media selection was considered a major force in changing media habits. The hypothesis that emerged from this analysis was defined as 'functional reorganization', indicating that as children grow older, they increasingly want control over the selection of content, suggesting a complex restructuring of

the functions and uses of various media.

Murray and Kippax (1978) analyzed three towns in New South Wales and Queensland which differed in the magnitude, duration and content of television viewing. Again, they noted a 'novelty' effect after the introduction of television in a community. Cinema attendance, record listening, radio listening, were curtailed by this 'novelty' effect. However, a number of displaced activities, such as playing with friends and toys, reading books, hobbies re-emerged to former levels of interest after extensive experience with television. Murray and Kippax suggest that these activities may actually have been stimulated by television viewing by serving as a focal point for shared activities. This hypothesis was partially supported by higher levels of involvement in visiting and playing with friends, book reading, and discussions in the High-TV town.

Williams et al. (1979) and Hornik (1978) studied the specific relationship between the introduction of television and the growth of reading skills. William's study involved three Canadian towns (Notel--no TV; Unitel, one channel only; and multitel, which had several) before and after television for children in grades 2, 3, and 8. In the first phase of data collection, Notel's second and third graders had better reading scores than Unitel children, who in turn scored higher than Multitel. No differences were found for eighth graders. Two

years later, however, the advantage of the Notel children in the second and third grades in reading ability had disappeared.

Hornik's El Salvadoran study of seventh to ninth grade students reported 'a striking negative association' between recent acquisition of television and long term reading skills growth. Those students whose families acquired television during the course of the study advanced in reading ability at significantly lower rates than those who either never got sets or had them already. The independent variable in Hornik's study, however, was television access only: no amount of time spent viewing was recorded. Television content was not reported either, even though Hornik indicates that some students in each cohort studied with instructional television. Furthermore, 'long-term' growth was defined as a two to three year period. If there are any plausable causal connections here at all, these results, rather than indicating a permanent decline in reading growth, might substantiate Murray and Kippax's 'novelty' effect.

There are a number of design flaws in these 'access' studies, ranging from problematic matching procedures to the lack of appropriate control groups. They also contain a critical theoretical drawback: it is difficult to generalize the effects of television viewing for children where television has been ubiquitous for their entire lives. But these studies are useful for two reasons: one, they attempt theoretically to explain

changes in communications patterns. We will see in later studies, that an underlying theoretical model is missing from many experimental designs. Two, these studies basically outline the major issues that have influenced furtner studies on television and learning. Experimental studies have either attempted to 'prove' or 'disprove' these principles. To some extent then, the field of television and learning has not gone beyond these initial studies.

Studies reporting correlational relationships

In this category are studies that report correlational relationships between television use and achievement. The underlying theoretical principle here is one of displacement. These studies measure whether the time spent watching television displaces other activities presumed to be related to school learning. The causal connection between ese out-of-school activities and achievement are assumed but, unfortunately, not measured. We do not know, for example, if those children watching a good deal of television are neglecting homework or leisure reading. As a result, they are limited to describing the extent of the relationship between television and achievement, yet do not extend nor build new information to describe the nature of this relationship.

Figure 2 describes 12 studies measuring the relationship between television and achievement. The methodology used in

these studies was quite similar: television viewing habits were assessed using logs which listed each program on the air. In addition, most studies reported using questionnaires designed to determine the number of hours watched, favorite programs, opinions of the quality of television, and the amount of parental supervision in controlling the television set.

Nine of the studies analyzed the relationship between the log data and standardized achievment tests as a measure of reading proficiency. The others used a variety of different methods. Busch (1978), for example, used a case study approach, interviewing children and teachers. Greenstein (1954) compared the amount of television watched with grade point averages. Starkey and Swinford (1974) used teacher assessments of reading achievement levels. Adams and Harrison (1975) used a questionnaire asking students for their subjective judgements of how television affected their reading habits. Witty, conducting a broad survey from 1949 through 1965, assessed children's television viewing patterns, movie attendance, radio listening, and attitudes toward the mass media.

Studies generally focused on intermediate elementary students; four dealt with students at the beginning secondary level, with only two studies at the high school level. Only one of the more recent reports indicated media trends over different ages (Telfer and Kann, 1984). None of these studies controlled for sex,

socioeconomic status or IQ.

The results of these studies indicate, that regardless of the specific research designs or measures being used, the relationship between the amount of television viewed and achievement in the schools was not significant. Of course, correlational studies reporting only simple measures of the numbers of hours viewed and achievement do not provide firm foundations for causal inferences. Furthermore, many of these studies report confusing results, from no association, to weak association, to inconsistent effects (Telfer and Kann, 1984, Busch, 1978; Quissenberry and Klasek, 1976). Gross and Morgan (1980) suggest three possible reasons why the correlations tend to be so small. First, they might accurately reflect the relationship. Second, they might be masking a non-linear association. Third, small overall correlations may obscure larger effects for specific subgroups.

We can reach at least one conclusion about the simple patterns of association between the amount of television viewed and reading achievement on the basis of these studies. The relationship between the number of hours viewed and achievement scores resulted in null findings. It would be wrong, however, to extrapolate from this research that there are no other potential linkages between television viewing and achievement. These studies examined only rather crude measures of time spent on one

activity, television, with overall achievement. While more sophisticated research designs will be presented in the next section, methodological problems will continue to plague these experimental studies.

## Sorting out causal connections

Despite the rather large number of studies recently conducted (see Figure 3), there are few that can be considered as carefully controlled nonexperimental research. Samples, in general, have been selected on the basis of their availability for study, rather than on random selection. Introduction of control variables has been haphazard, often without regard to the specific hypothesis the research was set out to study. In some cases, the sheer number of control variables suggests data dregging. It is difficult to imagine, for example, why one study would report a significant inverse relationship between reading achievement scores and the watching of 1/4 hour of game shows per week, if it were not to suggest negative findings. The measurement of television viewing and reading varies considerably among studies. One study analyzed week day viewing only, others, weekly, but within only certain time periods. Reading, as well, has been measured using many different approaches: in some cases it has been reported by the number of books read per month, or the time spent reading, or interest in reading. Comparability among studies becomes difficult.

There are, however, a number of interesting research strategies that might be used to enhance further work in the field. Scott (1958) devised an innovative approach for validating television log information for sixth and seventh grade students. At

irregular intervals, investigators monitored television and developed 2-3 recall questions that could only be answered if the program had been viewed. These questions were used to validate the self reported television log information. Pierce (1983) had parents and their children independently fill out television logs. These questionnaires not only measured television viewing time and content, but examined whether viewing time was restricted, whether they watched alone, whether they discussed programs together. Parents assessment of their child's viewing habits and the child's logs correlated highly. Neuman (1980) and Zuckerman et al. (1980) measured children's television viewing for two weeks, three times in one year using a TV guide television log. This method provided a more robust analysis of television viewing by taking into account different times of the year.

Several studies benefitted from more sophisticated methodology. Roberts et al. (1984) examined the relationship between television and reading within a conceptual framework of constructs such as media availability, parental media behavior, and children's use and attitudes toward print and television. This framework was examined for children at three different stages of reading development as defined by Chall: grades 2,3, and 6. The pattern of results indicated that predictors of reading achievement varied depending on the child's stage of reading development. Thus, for example, while environmental

variables, SES, print availability, and TV attitudes, strongly predicted reading achievement at grade 3, they were somewhat less important by grade 6. Among these older children, individual usage of media, personal involvement and attitudes toward reading and television were greater predictors.

Williams et al. (1982) conducted a meta-analysis of 23 studies of television and learning. Synthesizing the results of these studies, the investigators reported 277 correlations between measures of achievement and television viewing time. For all the correlations, the median association between television and achievement was -.06. More interesting, however, were the reported curvilinear effects. For those students watching from 1-10 hours per week, the correlation was positive indicating that a moderate amount of viewing was associated with higher achievement than no viewing at all. From 11-35, there were negative relationships (-.09), showing that within this level as viewing increased, achievement declined slightly. This pattern of curvilinearity was also noted by Fetler, (1984) in his analysis of the California statewide achievement test in reading.

But this improved methodology has not necessarily enhanced theory development. Still, we are left with the perplexing issue of why television might affect learning. Multivariate analysis might suggest relationships at different developmental stages,

with different types of children. Yet the source of this variation is not explained. Morgan and Gross, for example, in a panel study of 625 sixth through ninth graders, showed differences in reading comprehension scores and television viewing for students with differing IQ levels. Heavy viewers tended to have low IQ's with more regularity than light viewers. While they caution against using these data to infer causality (i.e. television causes a decline in thinking ability), they do not suggest alternative explanations. Though not specifically articulated, these studies, for the most part, assume displacement effects.

There are three studies, however, that offer new explanations for the relationship between television and learning. Two of them are post hoc, that is, the hypotheses are not directly tested but inferred from the data (Morgan, 1980; Zuckerman, Singer, & Singer, 1980). The third study, in contrast, (Salomon & Leigh, 1982) specifically measures a new theoretical construct of television and reading behavior.

The first hypothesis, described in the Zuckerman et al. study, and other reports by the Singers (1979; 1983) involves the 'language' of the medium. Watching television, they consider, is easier than homework or reading because it does not require the same degree of sustained concentration. Heavy viewing can reinforce impatience with the slow, deliberate pace of reading,

hence, these skills may remain underdeveloped. Even the educational program Sesame Street might be harmful, for it caters to children's short attention spans, making them unwilling to learn in the relatively "calm, bland environment of most public schools". Zuckerman et al.'s study, however, did not find total television viewing related to school behaviors. A modest correlation between the viewing of game shows and cartoons and lack of enthusiasm for school was reported, but given the time devoted to these activities (.25 and less than 2 hours per week), the results seem spurious. The reactive theory has not been supported by further work of other researchers (Bryant & Anderson, 1983; Lesser, 1974).

The second hypothesis uses the construct of 'mainstreaming' to account for differences between groups of learners (Fetler, 1984; Morgan, 1980). The theory itself is not new, only its application to the television and learning issue. Mainstreaming, as defined by Gerbner et al. (1982) refers to a tendency for television to cultivate a commonality of outlooks; heavier viewing diminishes differences related to social factors. Fetler extends this notion to achievement in schools. Given that variables measuring socio-economic status a ' academic success correlate, it was hypothesized that heavier viewing of television diminishes differences in academic achievement. The data appears to support his theory. Differences in achievement for sixth grade students of different social classes (as measured by parents' occupation)

were large when viewing was light; however, these differences diminished as the amount of viewing increased. What might account for this pattern? The issue, once again, returns to displacement. Fetler theorizes that children from professional homes, if not for television, would be reading books, and playing stimulating games. Children from the unskilled social classes, would only be involved in other nonlearning activities. Television, therefore, obstructs further learning for the elite, thereby creating a more homogenized culture in terms of academic achievement.

That a 'mainstreaming' effect is evident from Fetler's and Morgan's studies is certainly not clear. In Morgan's study, for example, no leisure activities are recorded; in Fetler's, only homework and leisure reading, both of which were not correlated with the amount of viewing. Further, Bloom, in his comprehensive studies of achievement in schools, reports that the correlation between socio-economic status and achievement ranges from .30-.50 at best (1976). To date, there is no empirical evidence to support the 'mainstreaming' theory. Gerbner et al.'s assertions that television viewing cultivates distorted perceptions of the real world and his numerous refinements of this hypothesis have been widely criticized (Hirsch, 1980; 1980b, Hughes, 1980). To use 'mainstreaming' to explain differences in achievement perhaps demonstrates its over-extension from a highly questionable social theory to an implausible learning theory.

The third hypothesis describes a rationale for explaining differential effects of television and print. Salomon and associates refer to this theory as AIME: the amount of invested mental effort that people use in 'processing' what they see and hear (1981). According to this theory, children's preconceptions of the effort needed to understand media affect the depth to which they process information. In a study of 64 sixth graders, Salomon and Leigh measured student's preconceptions of print and television (1982). Students were then assigned to one of two conditions: watching a television show called "The Violin" or reading a version of the same story. While children felt the television show was far easier and less demanding, they learned significantly less than from the comparable print version. But whether these findings were medium related, as the Singers suggest, was further tested. This time the investigators asked 87 sixth graders to read or watch television in one of two ways, for 'fun' or 'to see how much can be learned'. Children, watching in the 'television to learn' condition, processed more 'mindfully' than those watching for fun. In fact, the TV group outscored the print group on the number of inferences generated from the story.

The AIME quotient therefore relates to the set of expectations children bring to each medium. These expectations reflect whether children will view or read superfically or meaningfully.

Given the time spent and the importance of reading instruction in schools, most students naturally regard reading as a highly demanding activity. This is not true, however, with television viewing. In order for television to become a medium for learning, one that deserves deeper processing, the context of expectations must change.

Salomon's hypothesis is intriguing. His study represents the first experimental design based on a priori theory in this review thus far. While the construct AIME obviously needs further experimental study, it does suggest some possible answers for the results of these multivariate studies. It could be that those children who tend to view television 'mindlessly' also read, comprehend, complete homework 'mindlessly'. Those who invest more effort, learn more from it. Students who watch an excessive amount of television (5-7 hours per day) might be those who chose not to involve themselves in tasks that require a good deal of mental effort. AIME, to some degree, could be synonymous with passivity.

Summary

There is little evidence that television use affects school achievement. Neither the before/after community studies nor the quasi-experimental comparisons have produced clear indications of a relationship. Many of these studies can be faulted in one aspect or another. A large number have not controlled for IQ or

other background variables; others have used skewed samples which are clearly not representative of average populations, still others have had serious measurement difficulties. In addition, anecdotal evidence, such as "there is no doubt that children read fewer books when television is available" (Winn, p. 57), has often guided research design, sometimes blurring the distinction between what is regarded as 'research' and what could be called a 'moral crusade'.

But the major problem in these studies has been the weak linkage between theory and methodology. Understandably, the before/after community studies were designed to be hypothesis generating research. These studies were specifically designed to develop educated guesses regarding the relationship between television and social behavior. Experimental studies, however, are expected to have a stated hypothesis in mind. This has often not been the case. There are a number of studies reviewed here, for example, that have analyzed the relationship between television and reading behavior without any hypothesis to guide them. Other studies, designed ostensibly to explore the displacement hypothesis, have neglected to measure any other leisure behaviors. Indeed, if displacement is to be analyzed, we should determine and measure exactly what is being displaced.

The issue of 'why' keeps returning. If we find a relationship between television viewing and writing for example, then we must

try to understand why this is the case. Is it that children would be writing at home, if they were not watching television? This appears far-fetched. Is it that children's eyes are being affected, therefore not allowing them to focus accurately on a piece of paper? Again, this seems unlikely. Is a child's interest in writing related to other active interests in schooling? Probably so. But without clear-cut hypotheses with appropriate methods to test these relationships, the conclusions drawn from these studies remain problematic.

II. A secondary analysis of television and reading achievement

In the light of differences in research design, results, and methods of collecting data, the corpus of studies relating televiewing to reading achievement has left a number of important questions unanswered. Clearly the most important of these questions continues to be the issue of displacement. Does the time spent watching television displace reading time, and in the long run affect reading achievement? Are certain areas in reading more affected than others? Is there a differential effect for students at various age levels? Would children spend more time on leisure reading if it were not for television?

Our work began as an extension of the meta-analysis conducted by Williams, Haertel, Haertel, & Walberg (1982) on the impact of leisure-time television on school learning. Their synthesis indicated minimal effects between televiewing and achievement.

However, most of the studies in the meta-analysis reported only simple bivariate relationships between the two media. Few studies controlled for background variables. In addition, most studies only analyzed achievement scores and time spent watching television. There was little information available to measure the relationship between out-of-school leisure time activities and television viewing. We also questioned whether an analysis of school learning in general (which included reading vocabulary, spelling, mathematics, social studies and science) might mask effects on specific areas of school achievement such as reading. This analysis, therefore, was designed to examine the relationship between television viewing, reading performance and related reading activities in greater depth.

The theoretical assumption underlying most studies of television and reading achievement is one of displacement. Displacement effects refer to the reorganization of activities by children as a result of various media options. In the case of television, it implies that children tend to substitute television viewing for other activities that they would normally be engaged in during that time. Our review of the studies of the introduction of television in a community have even further articulated this hypothesis (Brown et al., 1974; Furu, 1971; Himmelweit et al., 1958; Schramm et al., 1961). These studies suggest that displacement may take the following forms:

1. Functional similarity: Children will sacrifice those media activities appearing to satisfy the same needs as television, only less effectively. This theory suggests that the time spent with other media, book reading, movies, radio, records, newspaper might be negatively associated with time spent watching television.

2. Physical and psychological proximity: Children will sacrifice those activities which share the same physical space and provide more satisfaction. This hypothesis suggests that homework, household chores and family responsibilities might be negatively related to the amount of television viewed.

3. Marginal fringe activities: The more casual, unstructured activities, such as playing with friends, outdoor activities are more likely to be displaced. Therefore, informal activities such as getting together with friends, according to this hypothesis, might be sacrificed for television viewing but homework would not.

4. Functional reorganization: Children's media interests might change over time. As they grow older, children will lean toward those media that serve particular functions and that allow them increasing control, in terms of the selection of content and its accessibility. This hypothesis suggests a restructuring of media patterns across different age groups.

This study analyzes these hypotheses in terms of the television viewing-reading relationship. To answer our questions, data from eight statewide assessments and the 1984 National Assessment of Educational Progress were analyzed. Combining eight separate statewide data sets, we examined the pattern of reading and viewing behavior of over two million students in elementary, intermediate and secondary grades. By standardizing scores, it was possible to identify broad trends regarding the relationship between the two media and to relate the magnitude and direction of the relationship to characteristics such as grade level, and socio-economic status. By using the 1984 National Assessment, in particular, profiles of leisure activities and their relationship to television viewing for three subgroups in the sample were measured.

The use of state-wide assessments had several advantages over other studies conducted on television viewing and reading achievement. First, of course, is the size of the sample. Together, these studies represent a significant database from all geographical locations in the U.S. Second, is the use of a standardized dependent measure. In one state, Rhode Island, a well-known reading achievement test was used to assess vocabulary, comprehension and study skills (Iowa Test of Basic Skills). In other states, an objective-based test was constructed and standardized usually based on the NAEP reading and writing test. Third, is the range of students. These data represent

students at all levels of schooling and thus show the patterns of media preference as they change over time.

There are a number of limitations as well. For one, the demographic and attitudinal information was self-reported in items accompanying the test. There was no opportunity to observe students' reading or viewing habits either in the home or at school. Two, only the amount of television watching was assessed. No other television-related behaviors were measured. Third, IQ information was not available and the socio-economic variables, in some cases in particular, were weak.

This analysis, therefore, cannot predict causal connections. We will not be able to show that television 'causes' poor reading achievement. Neither can we say that television stimulates interest in other activities that 'cause' more leisure reading. But this analysis can determine the magnitude of the relationship between television viewing, reading achievement, and leisure reading for children at different age levels. It can also describe common leisure behaviors associated with those children who tend to watch a good deal of television as opposed to those who watch little or a more moderate amount. To this extent, this analysis is likely to provide a sound basis to accept or reject the displacement hypothesis.

## Sample

In February, 1983, a letter was sent to the 50 state departments of public instruction in research and evaluation, requesting information on their statewide assessment measures. Specifically, we were interested in whether an attitudinal measure, containing a television-related question was included along with the overall reading assessments. All 50 states responded to our inquiry. Nine of these states reported conducting a statewide test in reading with an accompanying attitudinal measure. Eight states were able to provide us with a data-tape which included either the complete sample of students or a representative sample.

The characteristics of the assessments are reported in Table 1. Two states, Pennsylvania and California, used matrix sampling, a method whereby each student takes only a portion of the total number of items for every subskill, broadening the scope of the instrument, while decreasing the time of administration. The grade levels measured ranged from grades 4 through 12. The objective-based tests varied considerably across assessments according to the number of items and the relative emphasis of skills. Comprehension items were far more numerous than the number of items in other categories.

As part of each state's attitudinal measure, students were requested to report the average amount of television viewed on a daily basis. This question was phrased in a number of ways. Several states requested information about the previous days' viewing. Other states asked only for weekday viewing information. In addition, different scales were used to measure the time spent viewing. California, for example, used a five point scale at grade 6, a seven point at grade 12, ranging from 1/4 hour of viewing to six or more hours. Connecticut asked students to report their televiewing behavior per day on a five point scale from less than 1 hour of viewing to more than 4 hours.

Socio-economic status was a control variable of interest in a number of studies in the sample. Here, again, the questions varied widely. Several states attempted to include a measure asking students the number of various items in the home (such as books, TV's, typewriters) as a broad SES measure. Pennsylvania included the most comprehensive indicator, requesting information on the mother's and father's occupation, educational level, and educational expectations. A number of states did not ask for any SES information.

The National Assessment of Educational Progress in reading and writing for 1983-1984, commissioned by the Office of Education, was also included in this analysis. Designed to measure

educational progress for students ages 9, 13, and 17, this assessment provided a broad portrait of students' reading skills and attitudes toward reading. The assessment was designed to be generalized to an entire national population. Using a powerful variant of matrix sampling called balanced incomplete block spiralling which allowed for greater coverage of reading and attitudes, a larger pool of attitudinal variables were measured. The NAEP study, therefore provided additional information regarding outside academic and leisure activities and their possible linkage to television viewing and reading achievement.

Procedure

All information including the test booklets, summaries of assessment reports and data-tapes was requested from each state. Test booklets were examined and categories of skills in the broad areas of vocabulary, comprehension, and study skills were developed. For those states using matrix sampling, individual test booklets (California used 16 at grade 6; 18 at Grade 12) were analyzed. Due to the varied interpretation of what constituted these subskills in different states, each item on all tests was read and categorized. Broadly defined, vocabulary items included measures of word meaning; comprehension related to main ideas and their applications, and study skills, to finding and interpreting information from other resources.

The grade levels measured in the assessment were grouped into

class intervals: elementary (K-5), intermediate (6-9), and high school (10-12). The states were coded according to geographical location. Mean hours of viewing per day were recoded to establish specific number of hours. For example, responses of 0-1 hours, were recoded as .5 hours. In addition, scales were recoded to ensure that the numbers in each study indicated a similar direction. SES information was coded as a control variable when available according to the scale provided in each state.

Using the random function of the SAS program, we reduced the sample size of Michigan and California to include approximately 18,000 in each sample group. To summarize statistically the results of the assessments, all scores had to be expressed in a common scale or metric. Subskill scores for each grade level were standardized (mean of 0, S.D. 1) by calculating z scores from average distributions, and weighted according to sample size [1]. These standardized scores were placed on one data-tape to synthesize the results of the television viewing-reading achievement relationship.

The National Assessment of Education Progress was analyzed apart from the statewide assessment measures. Our intent here

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1. Whenever possible, dependent variables, vocabulary, comprehension, and study skills were regressed on socio-economic status and residuals were plotted against TV time

was to examine the relationships between reading performance, academic and leisure activities with television viewing as a method of testing the different theories of displacement.

## Results

The displacement hypothesis assumes that, given the limited amount of leisure time students have available, television viewing will take precedence over other activities, including those more academic pursuits. In this respect, reading achievement is likely to be affected, as well as time spent on other outside activities.

The results that follow examine this hypothesis in two ways. The first part analyzes the extent of the relationship between reading achievement scores and television viewing time for students at three age levels using the statewide assessments. Following this broad overview, the second part of the analysis is designed to more closely measure the different theories of displacement. Using the 1984 NAEP study, a large number of leisure and academic activities and their relationship to television viewing for three different subgroups in our population were analyzed. By examining measures related to school performance and leisure activities using two different datasets, these results are able to review the displacement hypothesis and its manifestations in a broad, yet, comprehensive manner.

### Reading Achievement Scores and Television Viewing Time

This analysis includes a synthesis of eight statewide assessments in reading and self-reported television viewing time. By combining test results from states all across the country with time spent television viewing, it provides a strong measure of the relationship between the two media. Results are described by grade level to indicate trends in TV viewing at different ages. Reading performance is further detailed in terms of three separate subskills in reading: vocabulary, comprehension and study skills.

Cross-age comparisons of television viewing, noted in Table 2, indicated an inverse relationship between grade level and the amount of time spend viewing. On the average, 1/4 or more of the students at the elementary levels are watching more than four hours daily. This pattern changes slightly at the intermediate level and quite dramatically at the high school level where a substantial number of students are watching less than one hour per day, and only a small portion are viewing more than four hours. These patterns appear to be consistent with previous research on children's television viewing habits (Brown et al., 1974 Comstock et al. 1978).

But these trends are not all that stable. The data indicate that there is considerable inconsistency among children at the same age level. Michigan, at all three levels, California, at the intermediate and high school levels show significant differences in television viewing time than other states in the

sample. Michigan and California phrased the television question quite differently by asking in terms of the amount of time spent viewing 'yesterday'. These differences might then be indicative of the manner in which the item was measured.

However, looking within other states which asked the television question in a similar manner, it is apparent that these variations can not simply be related to differences in the question given. For example, students at the high school level in Connecticut compared to students at the same age in Maine show significant differences in their television viewing habits. Furthermore, these frequencies are not consistent with data from the NAEP assessments (1980; 1984). The broad fluctuations among students at the same age level suggest that this self-reported item of the time spent viewing television may not be a reliable measure of actual viewing time.

Keeping in mind this limitation, combined regression analyses of the time spent viewing with reading achievement scores were run for all of the eight states in the study. Based on the summary reports of the assessments, there was reason to believe that some of the relationships between television and reading achievement might be curvilinear in form. Polynomial regressions were used to measure curvilinearity by regressing achievement scores on powers of the amount of viewing (see Table 3). To the extent that squared terms contributed significantly to the regression, the results can be interpreted as a description of

some degree of curvilinearity.

In accordance with previous findings, the next three graphs show evidence of a curvilinear relationship between the amount of viewing and reading achievement (Tables 4a,b,c). These graphs describe the relationship for all students in the state samples for each reading subskill, controlling for sex and SES.[1]

These tables show a similar pattern. In most cases, students watching relatively moderate amounts of television (between 2-3 hours) had higher achievement scores than those who reported watching less. Scores from Rhode Island and California seemed somewhat atypical from other states. In these two cases, the relationship appeared to be more linear, indicating the more television viewed, the lower the achievement score. Four or more television hours per day appeared to strongly relate to lower achievement scores in all statewide assessments. The shape of the curves seemed similar for vocabulary and reading comprehension subskills; study skills appeared to be somewhat flatter than the other two.

The next three graphs describe the television viewing-reading achievement for each subskill across the three class intervals (Tables 5a,b,c). Note here that the metric for the vertical axis

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1. The vertical axis indicates the standardized reading scores. Note that they are represented in tenths of a percentile to illustrate the shape of the curve. The horizontal axis indicates the number of hours spent viewing on a daily basis.

has been changed to reflect a more meaningful unit of analysis. (The area between z= -1 and z= +1 represents approximately 68 % of the normal curve; the area between z= -2 and z= +2, approximately 98%). Beyond the small variations between elementary, intermediate and high school regression lines, these graphs dramatically show the lack of a relationship between the two media. It suggests that the substantive results of the individual statewide assessment reports, as well as the regression line reported in Williams, Haertel, Haertel, and Walberg (1982) were indicative of small, insignificant differences between those children who spend a good deal of time watching television and those who do not.

The power of this analysis is that, given eight different assessment instruments which measure a broad variation of reading skills, and television viewing, assessed in varied formats, no significant differences were reported across grade levels for the three reading skills. These patterns did not substantially change across different socio-economic status groups, for either gender, or in different regions of the country.

There is reason for expecting that the effects of television might not be evident in reading achievement scores. After all, despite the ability to control for socio-economic status, and gender, there are many confounding variables which might account for differential patterns of achievement. Compared to some of these important factors, such as the home environment, and

school-related variables, the number of hours of television watched might appear to exert only a minor influence on achievement in reading and success in schooling.

## Reading performance, leisure reading and out-of-school activities

Since television viewing takes place outside of school, we might assume a more direct association between the amount of viewing and out-of-school activities. This second part of the analysis is designed to further test the displacement hypothesis by examining the relationship between reading performance, leisure reading and other activities. The National Assessment of Educational Progress was most appropriate for this analysis. Many background variables were measured which included outside academic and leisure activities. However, as in the case of many secondary analyses, the variables included provide only a partial analysis of each displacement hypothesis. Table 6 lists the variables analyzed for each of these hypotheses in this section.

### Functional Similarity

According to the theory of functional similarity, children will sacrifice other media activities appearing to satisfy the same needs as television only less effectively. Book reading, listening to music, newspaper reading, are some of the media

activities generally considered to be functionally similar.

The NAEP '84 surveyed a large number of student's leisure time activities. Of these activities, leisure reading was most comprehensively measured. The analysis that follows first reports the relationship between these leisure reading variables and television viewing, then briefly looks at the other media activities surveyed.

If television is taking time away from other, more academically oriented activities, it is natural to assume that its major influence would be in the area of time spent leisure reading. Table 7 shows the average amount of time spent reading for students ages 9, 13, and 17 from the 1984 assessment. The question on the assessment was phrased in two ways: one focusing on reading during leisure time, and the other, on reading for pleasure. In both graphs, students at the fourth grade level appeared to read the most; at the upper grade levels, interest in books declined, particularly at the high school level. During free time, students as they grow older increasingly read on a weekly rather than on a daily basis.

If students are watching television instead of leisure reading, significant inverse correlations between the two activities should be reported. These correlations would indicate the functional similarity of these activities; that is, given equal opportunity to read or to watch television, children would select the medium that most effectively satisfied their needs. However,

Table 8 demonstrates quite powerfully that this is not the case. No significant relationship was reported between recreational reading and television viewing. Nine-year old students who read the most, also watched the most television per day. Students, at the intermediate and upper grade levels, tended to read as well as watch a moderate amount of television.

Table 9 a,b, and c describe the interactive patterns between reading time, television time and average reading scores for all students in the sample (approximately 28,000). Students who rarely read and watched television at the elementary and intermediate levels, tended to score lowest in reading achievement. Differences in scores at the high school level, however, were significant. Those students who watched six hours or more per day scored lower on their reading performance test than others in the sample. But looking across this graph at the time spent reading, whether on a daily, weekly, or monthly basis, it is evident that the amount of leisure reading did not appear to be related to scores. These data suggest that television is not displacing leisure reading.

The NAEP '84 included additional leisure reading behavior variables. Using Pearson product moment correlations, these variables were analyzed along with the time spent reading and viewing (see Table 10). All the correlations are small, with the exception of one: reading for enjoyment. Those students who enjoyed reading spent their leisure time on the activity . This

finding, of course, is obvious. However, the relationship between time spent reading and enjoyment has often been overlooked. It suggests 'time' may not be the determining variable between whether one choses to read or watch television. Rather, a primary consideration in selecting a media activity might be perceived 'satisfaction'.

Cross-tabulations of other leisure activities were analyzed for three subgroups in the sample: hispanic, black, and white students from the NAEP 1984. These figures describe the media activities students engage in most during their leisure time (see Table 11). Nine and thirteen year old students clearly favored television viewing to other media activities. This pattern changed at the high school level where listening to music became the favorite activity. Reading books received low priority at all three grade levels. Nine year old students appeared to spend time playing video-games but their popularity declined for the older students. None of the students surveyed read newspapers on a regular basis.

Based on this analysis, there is no evidence to suggest that television viewing is displacing other media activities. Even as television viewing declines for the 17 year-olds, time spent reading books and newspapers during leisure time does not increase. To suggest then that students would be reading if it were not for television viewing is to ignore a fundamental issue that underlies the principle of functional similarity. Media

activities, determined to be functionally different from television, tend to remain unaffected by the medium. As a result, time spent leisure reading might be related to a completely different set of needs and gratifications than television viewing.

Physical and Psychological Proximity

According to the theory of physical and psychological proximity, activities most likely to be displaced by television will be those that share a similar space, but do not provide as much satisfaction to the child. Children tend to take the 'path of least resistence'. Given the opportunity to watch television or complete homework, the theory implies that the child will chose to do the easier activity of the two. Consequently, there should be a negative relationship between homework activities and television viewing.

Table 12 describes frequency distributions for three subgroups from the NAEP '84 on homework activities. The question was measured by asking students, "Yesterday, how much time was spent on homework". As might be expected, approximately 1/3 of the students in the fourth grade did not receive any homework. Of those nine-year olds that did, over 40% spent less than one hour completing assignments. This pattern changes gradually with the older students. Over 1/4 of the 13 and 17 year-olds spent between one and two hours per night on homework activities. Still the proportion of time spent on outside academic

assignments remained rather minimal. More than 1/3 of the students at age 17 were not given or did not do homework the previous night. Differences between the three subgroups were negligible with the exception of students at the high school level. Hispanic students were not assigned or did not complete homework more than the other two groups.

Correlations between homework and reading performance scores were small (.06, .10, .13, for 9, 13, and 17 year-olds respectively). Television viewing and homework were negatively correlated for students at the upper grade levels (-.08; -.10) but again these relationships were small. These results do not indicate a significant relationship between television viewing and homework activities.

Marginal fringe activities

The theory of marginal fringe activities suggests that the more casual, unstructured activities, such as playing, spending time with friends, might be more readily displaced by television viewing than organized activities. From this perspective, we would expect that there would be negative relationships between the amount of television viewed and other unstructured leisure activities rather than homework, or outside required reading. [2]

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2. The question on the NAEP test asks "During your free time, which activity do you do the most." While we have included sports among these unstructured activities, we cannot state definitively that they are so.

Frequency distributions of these unstructured leisure activities are shown in Table 13. Television watching is included to analyze the relative proportion of time spent viewing with other activities. Nine and thirteen year old students watched television more than any other unstructured activity. This pattern changed, however, for students at the high school level. Television watching became subsumed by other, more social activities. These students spent more time involved with friends, and sports activities than the more solitary activity of television viewing. While there are differences among the three subgroups on the relative emphasis of each social activity, this pattern appeared to be consistent throughout the high school level.

Correlations between spending time with friends and television viewing were small (.00, -.02, -.02) for each of the sample groups. This pattern was also reported for the relationship between television viewing and sports activities (.01, .00, -.02). These data indicate that there is no significant relationship between television viewing and unstructured leisure time activities.

Functional Reorganization

Unlike the preceding theories of displacement, the theory of functional reorganization suggests a more comprehensive restructuring of activities as a result of television viewing. Rather than provoke piecemeal displacement, this theory

hypothesizes that as new media become available, two changes are most likely to take place. First, new media offers new choices; outside leisure activities may become more diverse. Second, new media may displace particular functions of the older media, therefore fostering a change in the communications environment. For example, television tends to serve informational and entertainment functions. Movies, and radio, once serving similar needs, now fulfill more social functions. But media choices are not static. Based on their functionality, people select different options at different times in their lives.

A review of the data presented in this section indicates that media choices change as students become older. Nine year olds spend a good deal of time watching television. These students also play video-games, the new media, however, these games do not appear to have made significant inroads in available leisure time. Television viewing, once such a primary activity decreases as students grow older. At the high school level, new demands are made on student's time. But these changes are probably not only related to time. Television viewing, reading, and video-games tend to be rather solitary in nature. As students grow older, they seem to turn to more social activities. Music, spending time with friends, and sports become more dominant in their lives. Media choices tend to be related to their social functions.

The theory of functional reorganization emphasizes the

individual's role in selecting media. Mass media does not compel certain behavior; rather, the control lies within the individual to use mass media in certain ways. Media use therefore, can be characterized as an on-going process of reorganization, which is fostered by changes in the communications environment as well as changes in the needs of children as they grow older.

## Conclusions

This synthesis of eight statewide assessments and analysis of the National Assessment of Educational Progress were designed to examine the displacement hypothesis. The study began by first looking at the relationship between television viewing and reading achievement for the statewide assessments, and then, at a more in-depth analysis of displacement by examining leisure reading and free time activities outside of the school context.

Individual states' summary reports suggested a negative relationship between the two media: those watching more than 2-3 hours per day showed lower achievement scores than those watching a more moderate amount. But the combined synthesis indicated that these differences were extremely small. Television viewing accounted for little variance in achievement. Rather, it would be more accurate to describe these results as 'null findings'.

Television viewing did not appear to displace the time spent

leisure reading. Leisure reading variables indicated that when students defined reading as an enjoyable activity, they tended to do more reading during their free time. This is certainly not surprising. However, it suggests what might really be the issue in the television and reading debate. Children enjoy television and often do not enjoy reading. Instead of blaming television for this phenomenon, it makes sense to try and change this attitude. Children often regard reading as a difficult school subject. We must develop ways to extend their understanding of its compelling uses outside the school setting.

The displacement theories of functional similarity, physical and psychological proximity, and marginal fringe activities did not appear to be related to the amount of television viewed. Homework, sports activities, spending time with friends seemed independent of the time spent with television. However, it was evident that children's media activities change over grade levels. Changes in activities seemed to be related to the increasing social needs of youngsters at the intermediate and high school levels. These data strongly indicate a functional reorganization of media choices. Activities that give children access and control over their media environment become increasingly important as they grow older.

One limitation of this study, as well as other studies that measure television viewing, is the self-reported nature of the television variable. The variation in scores seen on the

statewide assessments suggests that the television variable may lack reliability. Furthermore, these figures of reported television viewing by children tend not be corroborated by Neilson and Arbitron figures. Self-reported items may reflect attitudes toward viewing rather than actual viewing time. Before additional studies are conducted, it is imperative that the validity and reliability of this method of measuring television viewing be analyzed.

It is clear that more research on television, leisure reading and achievement is needed. But media effects studies, that is, research that analyze the predictive nature of the relationship between the two media, are not needed. In addition to a large number of individual studies reviewed, a meta-analysis (Williams et al.) and, now, this large-scale secondary analysis indicate that there are no deleterious effects of television on learning achievement. On this basis, it seems reasonable to recommend that researchers refrain from producing additional studies of this nature. Rather than continue to describe what 'is' the relationship between television and learning achievement, perhaps we should turn to what could be.

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Figure 1

Ownership/reception studies

| Study | Date | Country |
|---|---|---|
| Himmelweit, Oppenheim & Vince | 1958 | England |
| Schramm, Lyle & Parker | 1961 | U.S. and Canada |
| Furu | 1971 | Japan |
| Brown, Cramond & Wilde | 1974 | Scotland |
| Murray & Kippax | 1978 | New South Wales and Queensland |
| Hornik | 1978 | El Salvador |
| Williams | 1979 | Canada |

Figure 2

Bivariate Studies of Television and Achievement

| Study | No. of Subjects | Grade Levels | Research Design |
|---|---|---|---|
| Witty (1967) | ----- | Elementary | Survey* |
| Clark (1951) | 1000 | 6,7 | Survey* |
| Greenstein (1954) | 67 | 4,5,6 | Correlation |
| Ridder (1963) | 2428 | 7,8 | Survey* |
| Slater (1965) | 500 | 3 | Survey* |
| La Blonde (1967) | 294 | Elementary | Correlation* |
| Starkey & Swinford (1974) | 226 | 5,6 | Correlation |
| Adams & Harrison (1975) | 228 | 4,5,6 | Correlation |
| Quisenberry & Klasek (1976) | 341 | Intermediate | Correlation* |
| Busch (1978) | ------ | All grades | Case study |
| Moldenhauer & Miller (1980) | 78 | 7 | Correlation |
| Telfer & Kann (1984) | 234 | 4,8,11 | Correlation* |

*Used a standardized instrument

Figure 3

Multivariate Studies of Television and Achievement

| Study | Date | Control Variables | Viewing Measure | Achievement | No. of Subjects | Grade Level | Relationship | Theoretical Framework |
|---|---|---|---|---|---|---|---|---|
| Childers & Ross | 1964 | I.Q. | Questionnaire | Iowa Test S.P.A. | 100 | Elem. | Insign. | Displacement |
| Fetler | 1984 | Parents Occ. Home environmental Variables | Question: On a typical day, how much TV watched? | Proficiency Test | 250,000 | 4th | Insign. | Mainstreaming |
| Gaddy | 1984 | No. of Educational Resources | Question: During week, how much TV watched? | 4 Multiple Choice tests: vocabulary comprehension, basic and more advanced math | 5,074 | N.S. | Insign. | Displacement |
| Lu & Tweeten | 1973 | S.E.S. | ---- | SRA, 4th & 8th I.T.B.S. 11th | 1,073 | 4,8,11 | Sign. 4th Insign. 8, 11 | Displacement |
| Morgan | 1980 | I.Q., Educational Aspirations, Parental Viewing, reading and media habits | Logs | C.A.T. | 650 | 6-10 | Insign. for total group Sign. specific groups | Mainstreaming |
| Neuman | 1980 | I.Q.; SES | Logs | Circus Test (ETS) | 200 | Preschool | Insign. | Reactive theory |
| Neuman & Prowda | 1982 | Educational materials in the home | Number of hours viewed | Proficiency Test* | 7,787 | 4,8,11 | Insign. | Displacement |

*Represents a secondary analysis

| Study | Date | Control Variables | Viewing Measure | Achievement | No. of subjects | Grade | Relationship | Theoretical Framework |
|---|---|---|---|---|---|---|---|---|
| Pierce | 1983 | Number of books read; parent interest | Hours per day Favorite type Restricted or not | Writing Achieve. | 102 | 5-9 | Sign. | Displacement |
| Ridley-Johnson, Cooper & Chance | 1983 | _____ | Questionnaire TV Log | C.A.T. | 322 | 5-8 | Insign. | Displacement |
| Roberts, Bachen, Hornby, & Hernandez-Ramos | 1984 | SES; IQ Orientations toward Print and TV | Questionnaires | Questionnaires C.T.B.S. | 539 | 2,3,6 | Insign. 2nd Sign. 3rd Sign. 6th | Examined TV and reading within a theoretical conc which included media avai and parental media behavi |
| Salomon & Leigh | 1982 | IQ | Print story Televised story | Questionnaires | 64 | 6 | Sign. | AIME |
| | | | | | 456 | 6,7 | Insign. | Displacement |
| Scott | 1958 | _____ | TV logs Questionnaire | C.A.T. | 100 | 3 | Insign. | Displacement |
| Thompson | 1964 | IQ | _____ | _____ | 23 ind. studies | Elem. Inter. Second. | Insign. | Meta-analysis |
| Williams et al. | 1982 | IQ, SES | Data from ind. studies | Data from ind. studies* | 282 | 3,4,5 | Insign. | Displacement Reactive theory |
| Zuckerman, Singer & Singer | 1980 | IQ; SES | Logs | McGraw-Hill | | | | |

*Represents a secondary analysis

Table 1
Characteristics of Studies

| State | Sampling | Grade Level | N | Dependent Measure |
|---|---|---|---|---|
| Rhode Island | Random Sample | 4<br>3 | 2,785<br>3,985 | Iowa Test of Basic Skills Vocabulary, comprehension, study skills |
| Texas | Random Sample | 6 | 10,400 | Objective-based test--44 reading items at grade 6 |
| Pennsylvania | Matrix Sampling | 5<br>8<br>11 | 32,000<br>34,000<br>37,000 | Objective-based test, covering all major cognitive areas, as well as affective items. 200 items, 11 forms; 3 at grade 5, 4 at grade 8 4 at grade 11. |
| Connecticut | Random Sample | 4<br>8<br>11 | 2,776<br>2,598<br>2,413 | Objective-based test; 35 items, covering seven reading areas |
| Michigan | All students in grade levels | 4<br>7<br>10 | 120,837<br>130,173<br>129,721 | Objective-based test; 42 items including vocabulary, literal comprehension, interpretive reading, critical reading, and study skills. |
| California | Matrix Sampling | 6<br>12 | 280,000<br>230,000 | Objective-based test; 30 items, 8 reading items per test. 16 forms at grade 6, 18 forms at grade 12. |
| Maine | Random Sample Stratified Cluster Design | 4<br>8<br>11 | 1,711<br>1,498<br>1,283 | Objective-based test, 43 items across 9 subject areas |
| Illinois | Random Sample | 4<br>8<br>11 | 2,500<br>2,381<br>2,261 | Objective-based test of language arts and math, 7 vocabulary items, 18 comprehension items |

Table 1 (cont.)

| State | TV Question | SES Question | Year of Study | Time/year |
|---|---|---|---|---|
| Rhode Island | No. of hours of television watched per day | ------- | 1981 | fall |
| Texas | No. of hours watched the previous night | (Question asked but not transferred to data-tape | 1978 | spring |
| Pennsylvania | No. of hours watched from the time the child get home from school until bedtime | Parents occupation<br>Parents education | 1983 | fall |
| Connecticut | No. of hours per day of TV viewed | No. of educational resources in the home | 1979 | 4: Feb.<br>8: Oct.<br>11: April |
| Michigan | Yesterday, how much time was spent on TV viewing | Title I | 1981-82 | fall |
| California | Yesterday, how much time was spent on TV viewing---Grade 6<br>On a typical weekday how many hours viewed Grade 12 | Parents Occupation | 1980-81 | 6: April<br>12: Dec |
| Maine | On an average weekday how much time do you spend watching TV | ------ | 1982-83 | Dec. |
| Illinois | About how many hours a day do you watch TV | Parents Ed | 1982-3 | Fall |

Table 1(cont.)

| State | Substantive Results of Assessment |
|---|---|
| Rhode Island | Fourth graders, watching two to three hours a day had higher achievement scores than others. Eighth graders, watching more than four hours a day showed a negative effect. |
| Texas | Students, reporting up to 2 hours of TV a day scored at the national average of above on all tests. Those watching more than 4 scored below national norms. |
| Pennsylvania | Substantial drop in achievement when students watched 5 or more hours of TV. |
| Connecticut | Students watching more than 4 hours of TV scored lower in reading than others watching a more moderate amount. |
| Michigan | Drop in achievement when substantial amount of TV was viewed. |
| California | Students watching a good deal of TV generally scored lower than those watching little or no TV. |
| Maine | Student who watched less TV (1-3 hours per day) did significantly better than those who watched more. |
| Illinois | Drop in achievement for those students who watched an excessive amount of television per day. |

Table 2

Percentage of Students Watching TV

**Elementary**

| Response Category | R.I. | Pa. | CT. | Mich. | Maine | Ill. |
|---|---|---|---|---|---|---|
| Less than 1 hour | 10 | 10 | 7.4 | 29 | 15 | 7 |
| 1-Less than 2 | 18 | 17 | 19.4 | 27 | 23 | 12 |
| 2-Less than 4 | 42 | 40 | 40.9 | 18 | 34 | 34 |
| 4 or more | 32 | 33 | 32.3 | 26 | 28 | 47 |

**Intermediate**

| Response Category | R.I. | PA. | CT. | Mich. | Maine | Ill. | Texas | Calif. |
|---|---|---|---|---|---|---|---|---|
| Less than 1 hour | 8 | 11 | 6.6 | 24 | 9 | 5 | 10 | 27 |
| 1 - Less than 2 | 22 | 19 | 23.8 | 30 | 23 | 14 | 32 | 23 |
| 2- Less than 4 | 45 | 43 | 51.8 | 24 | 44 | 49 | 33 | 28 |
| 4 or more | 25 | 27 | 17.8 | 22 | 24 | 32 | 25 | 22 |

High School

| Response Category | Pa. | CT. | Mich. | Maine | Ill. | Calif. |
|---|---|---|---|---|---|---|
| Less than 1 hour | 29 | 23.6 | 34 | 18 | 9 | 30 |
| 1 - Less than 2 | 25 | 34.2 | 30 | 54 | 23 | 22 |
| 2 - Less than 4 | 33 | 36.3 | 23 | 14 | 50 | 32 |
| 4 or more | 23 | 5.9 | 23 | 14 | 18 | 16 |

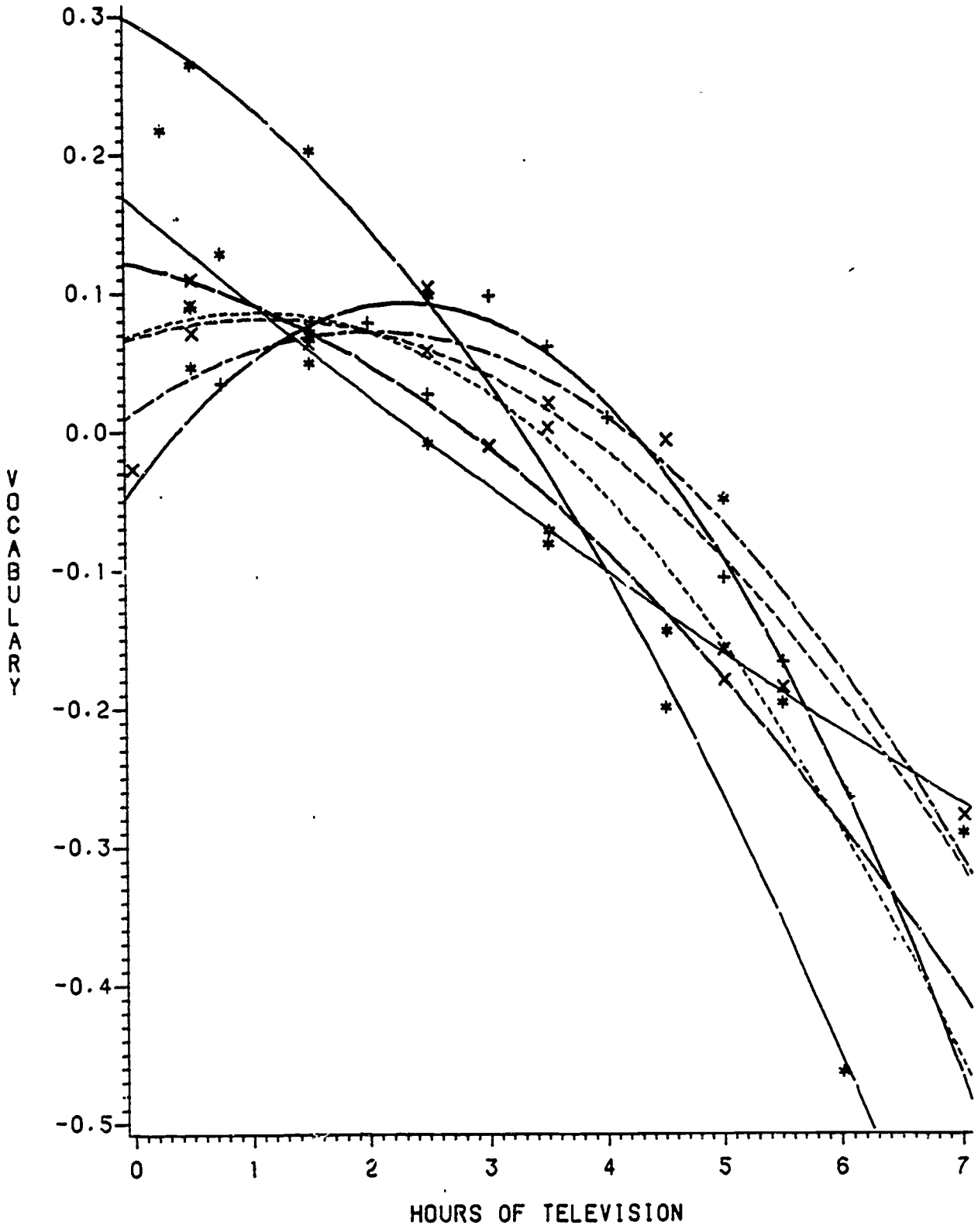
Table 3

Polynomial regression of achievement on Amount of viewing

| Parameter Estimate | Voc. | Comp. | St. Sk. |
|---|---|---|---|
| **Elementary** | | | |
| Intercept | .02 | .016 | .03 |
| Viewing | .08 | .10 | .05 |
| Viewing Squared (Test for curvilinearity) | -.02*** | -.03*** | -.02** |
| **Intermediate** | | | |
| Intercept | .04 | .07 | .001 |
| Viewing | .04 | .05 | .05 |
| Viewing squared | -.01*** | -.02*** | -.01*** |
| **High School** | | | |
| Intercept | .07 | .14 | .10 |
| Viewing | .03 | -.01 | -.02 |
| Viewing squared | -.02** | -.02** | -.01 |

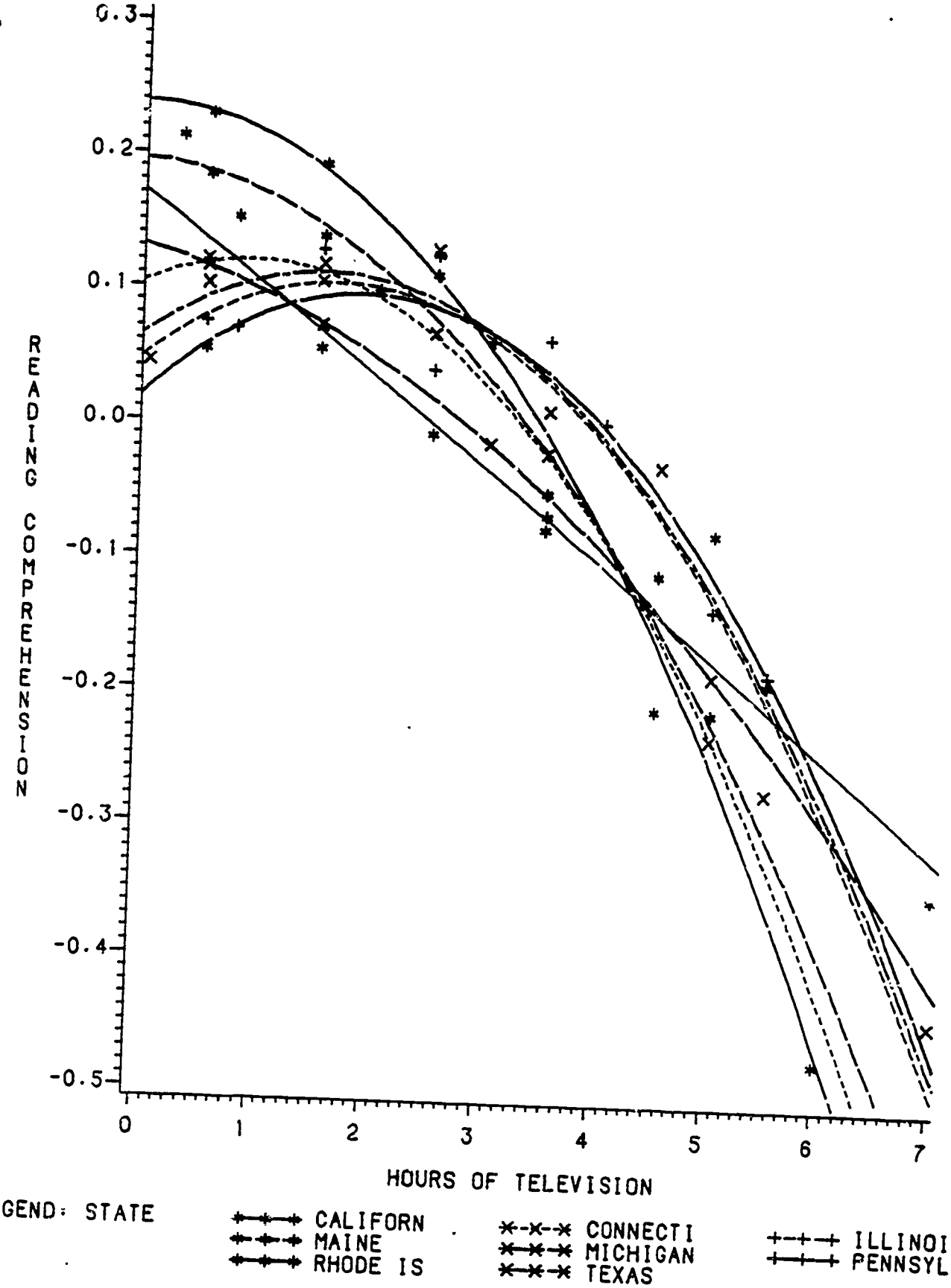
*** $p < .0001$
** $p < .01$

# OVERLAID PLOTS OF EIGHT STATES




SCORES WEIGHTED ACCORDING TO SAMPLE SIZE

# OVERLAID PLOTS OF EIGHT STATES

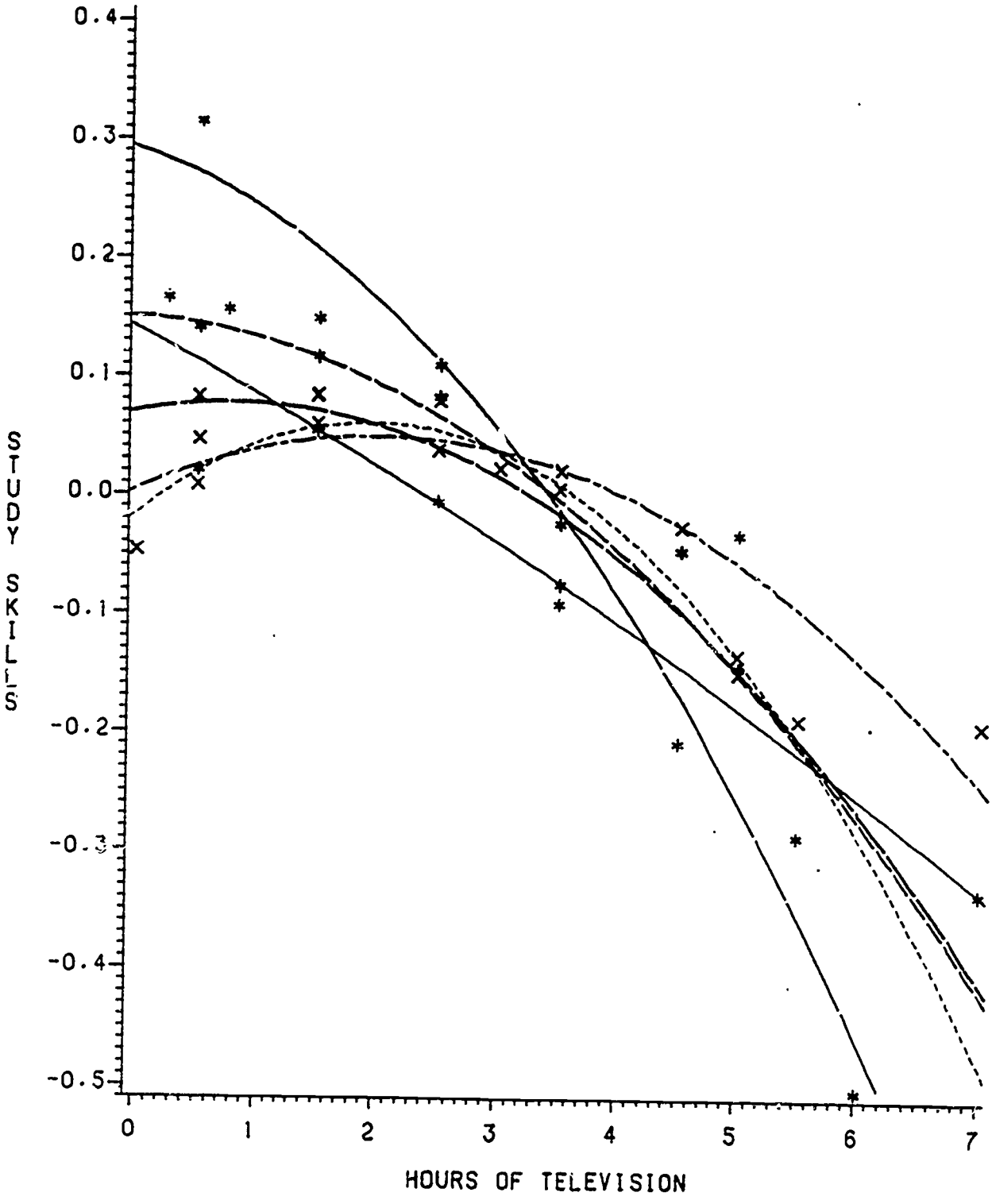



SCORES WEIGHTED ACCORDING TO SAMPLE SIZE



Table 4b

# OVERLAID PLOTS OF EIGHT STATES

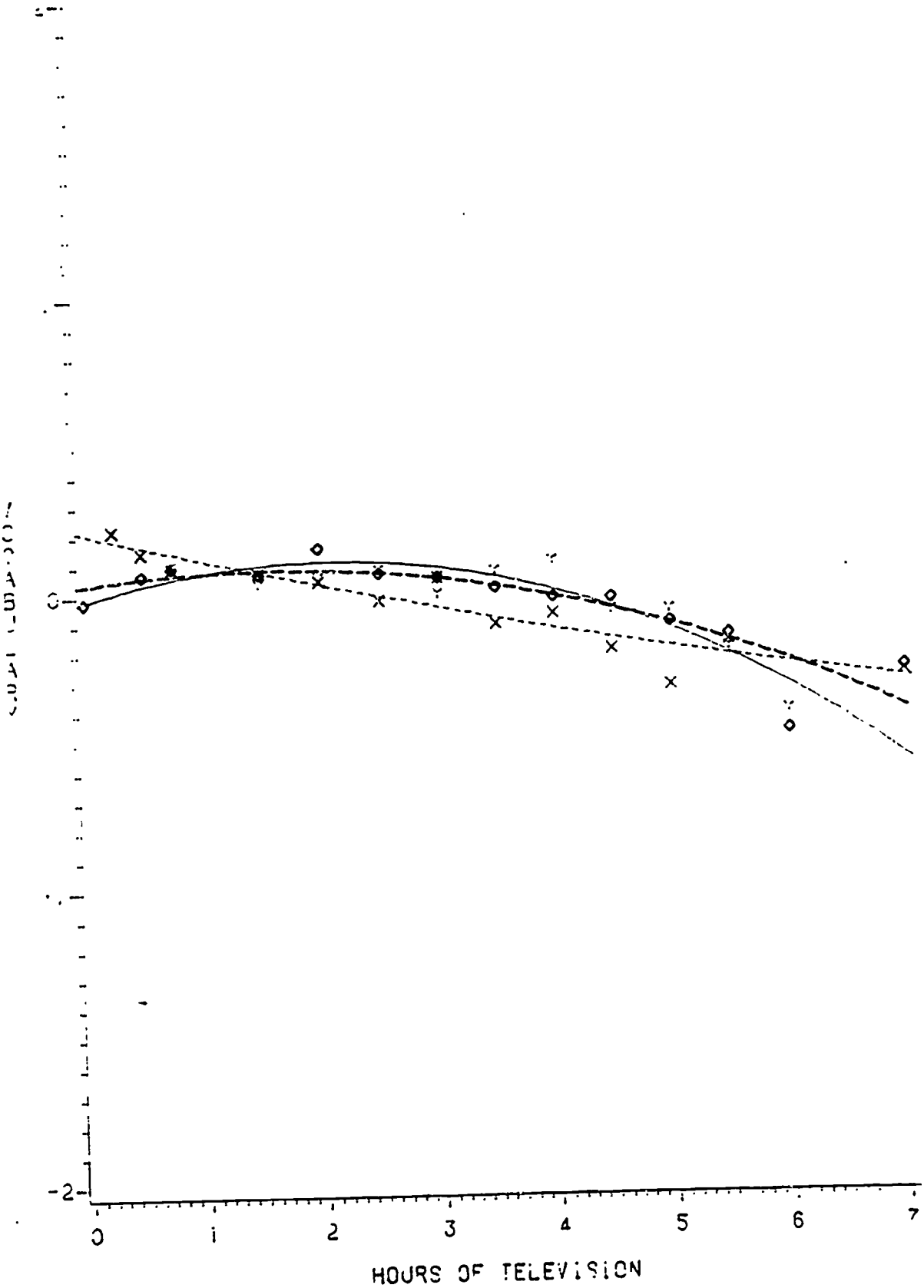





SCORES WEIGHTED ACCORDING TO SAMPLE SIZE

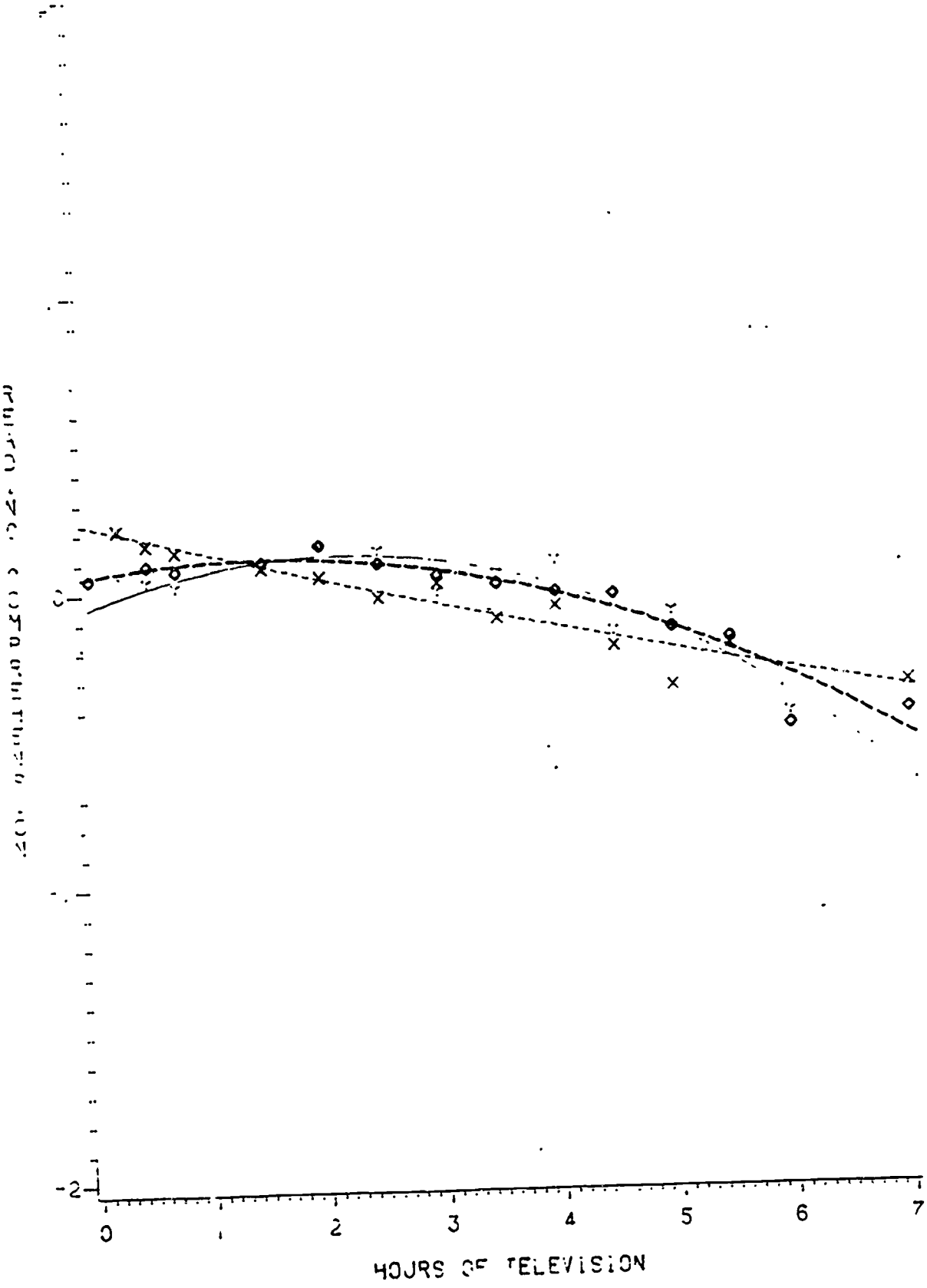
# OVERLAID PLOTS FOR THREE LEVELS



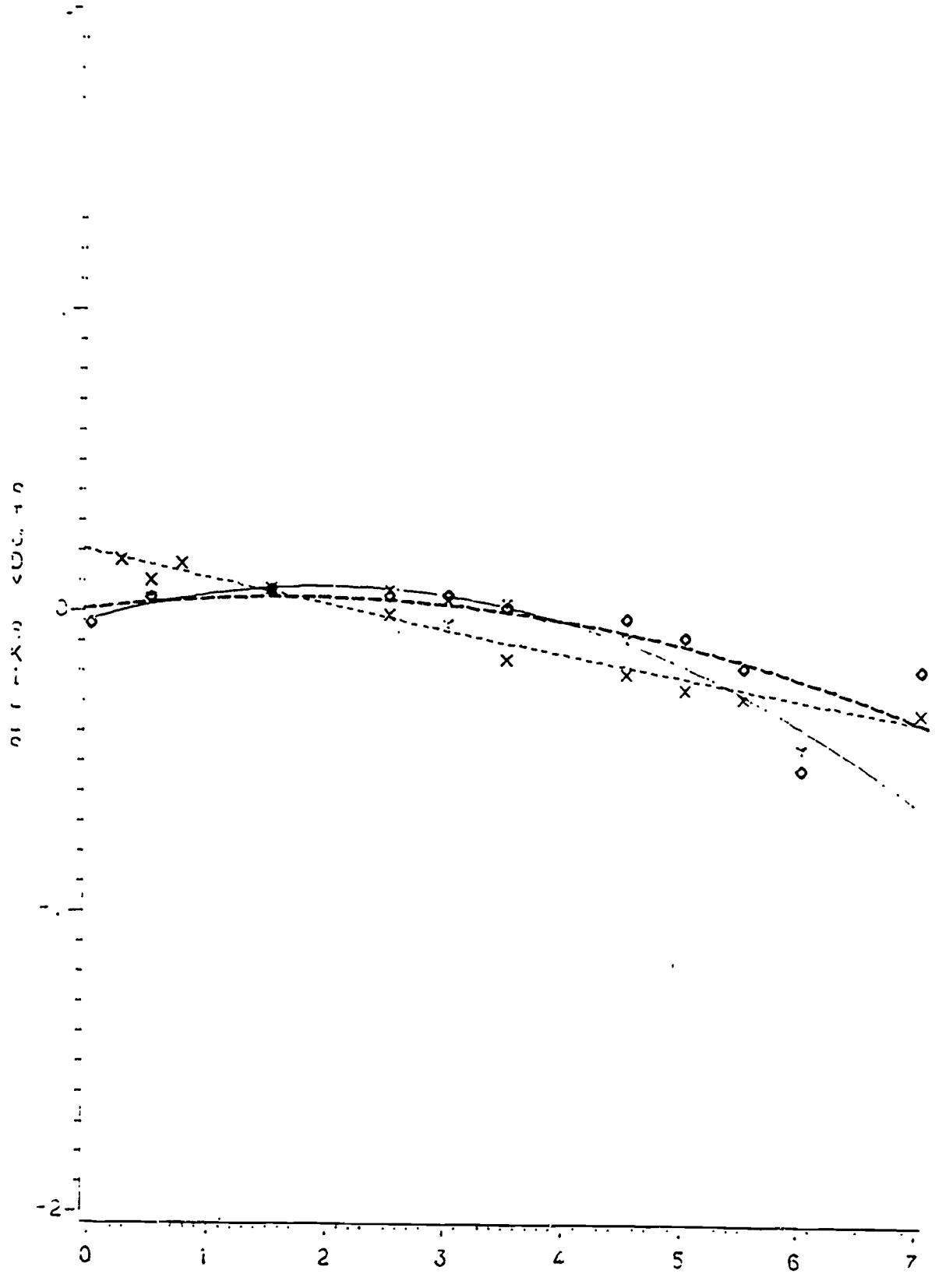


# OVERLAID PLOTS FOR THREE LEVELS





# OVERLAID PLOTS FOR THREE LEVELS




LEGEND: LEVEL ELEMENTA HIGH SCH INTERMED
QUADRATIC REGRESSIONS
STANDARD DEVIATION UNITS
SCORES WEIGHTED ACCORDING TO SAMPLE SIZE

Table 6

Out-of school leisure variables

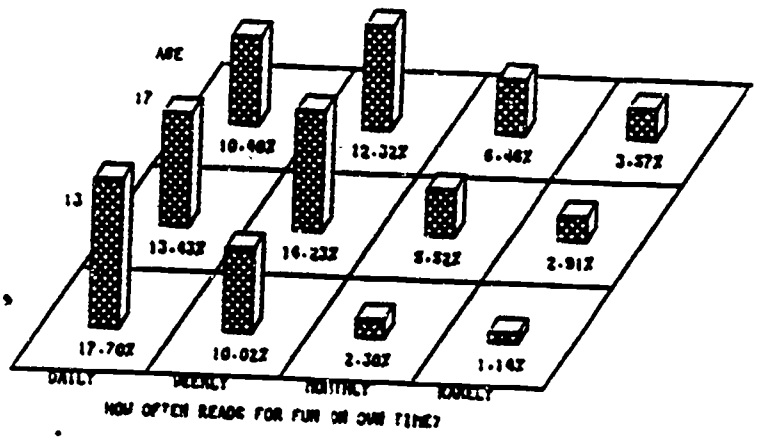
| Displacement.Hypothesis | Variables analyzed |
|---|---|
| Functional similarity | Book reading<br>Video games<br>Newspaper reading<br>Music |
| Physical and psychological proximity | Homework |
| Marginal fringe | Playing a sport<br>Being with friends<br>Snacking<br>Shopping |
| Functional Reorganization | Changes in media activities over grade level |

Table 7

## READING TIME

NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS 1983-84
9-, 13-, AND 17-YEAR-OLDS

PERCENTAGE BLOCK CHART




## READING BOOKS

NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS 1983-84
9-, 13-, AND 17-YEAR-OLDS

PERCENTAGE BLOCK CHART

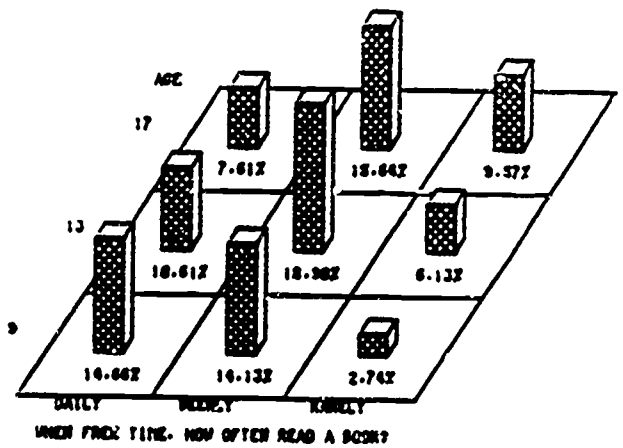


Table 8

# RECREATIONAL READING AND TELEVISION TIME

NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS 1983-84
NINE- THIRTEEN- AND SEVENTEEN-YEAR-OLDS

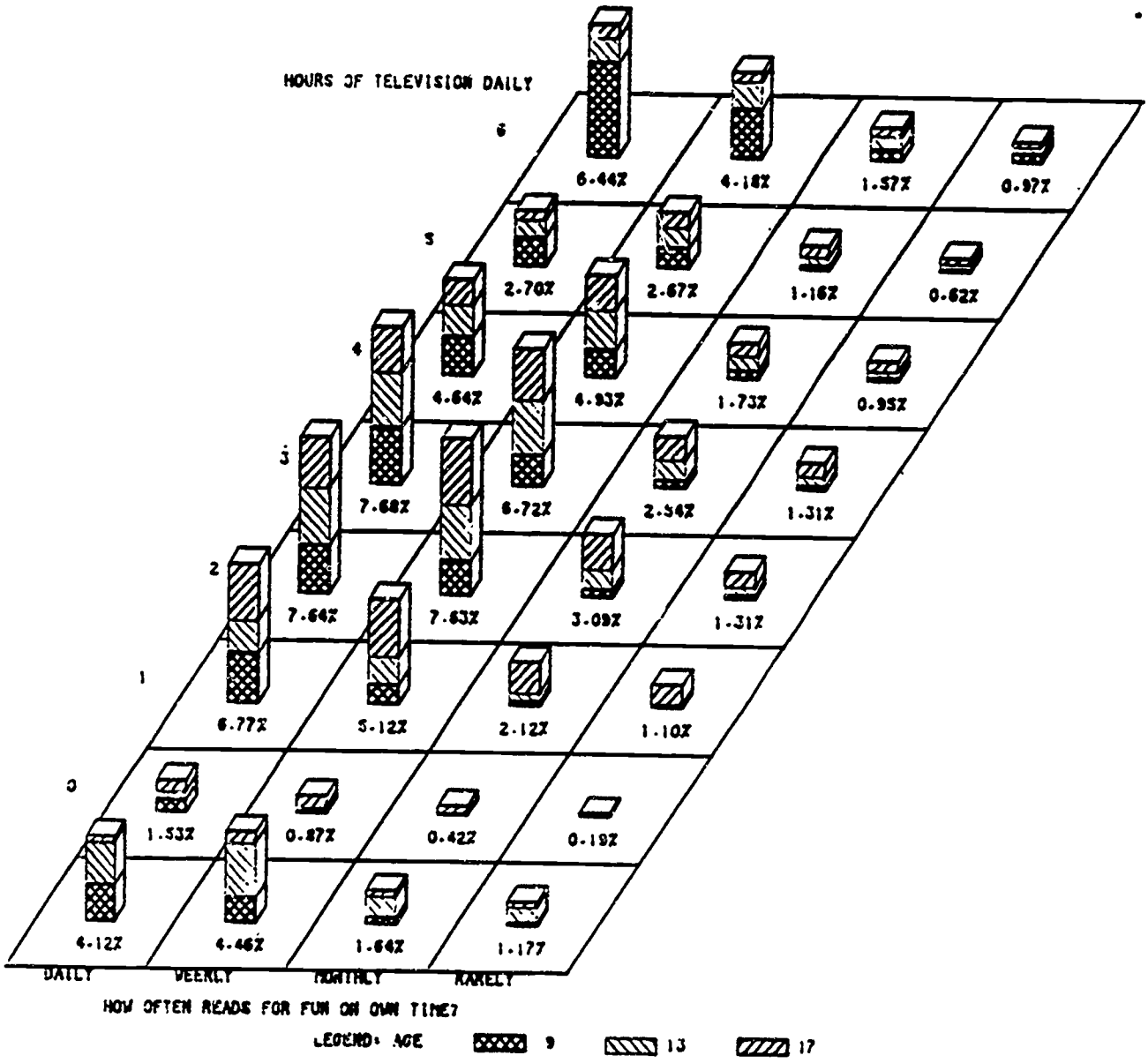


Table 9a

# AVERAGE READING SCORES

BY READING TIME AND TELEVISION TIME
NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS 1983-84
9-YEAR-OLDS

BLOCK CHART OF MEANS

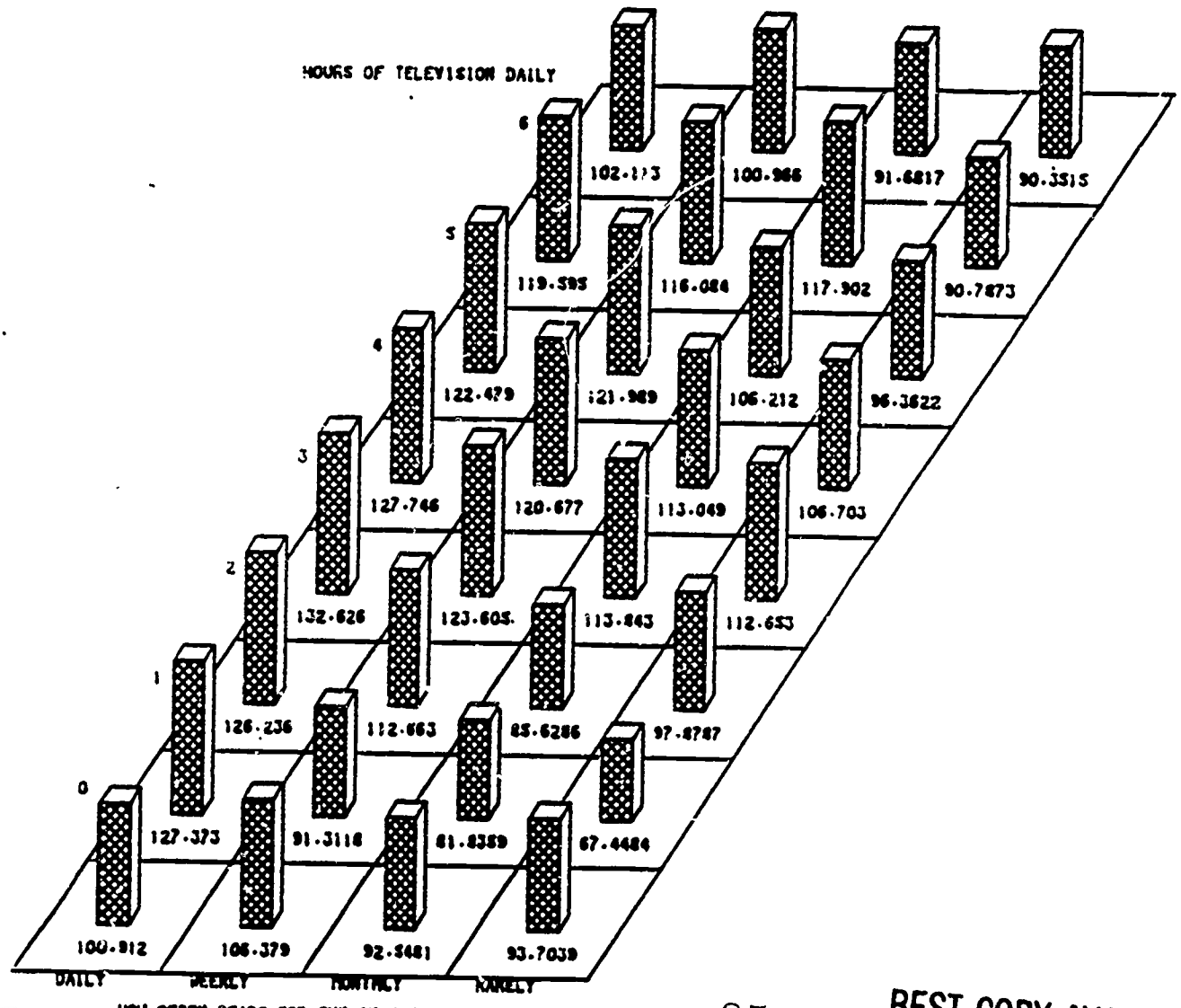


Table 9b

# AVERAGE READING SCORES

BY READING TIME AND TELEVISION TIME
NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS 1983-84
THIRTEEN-YEAR-OLDS

BLOCK CHART OF MEANS

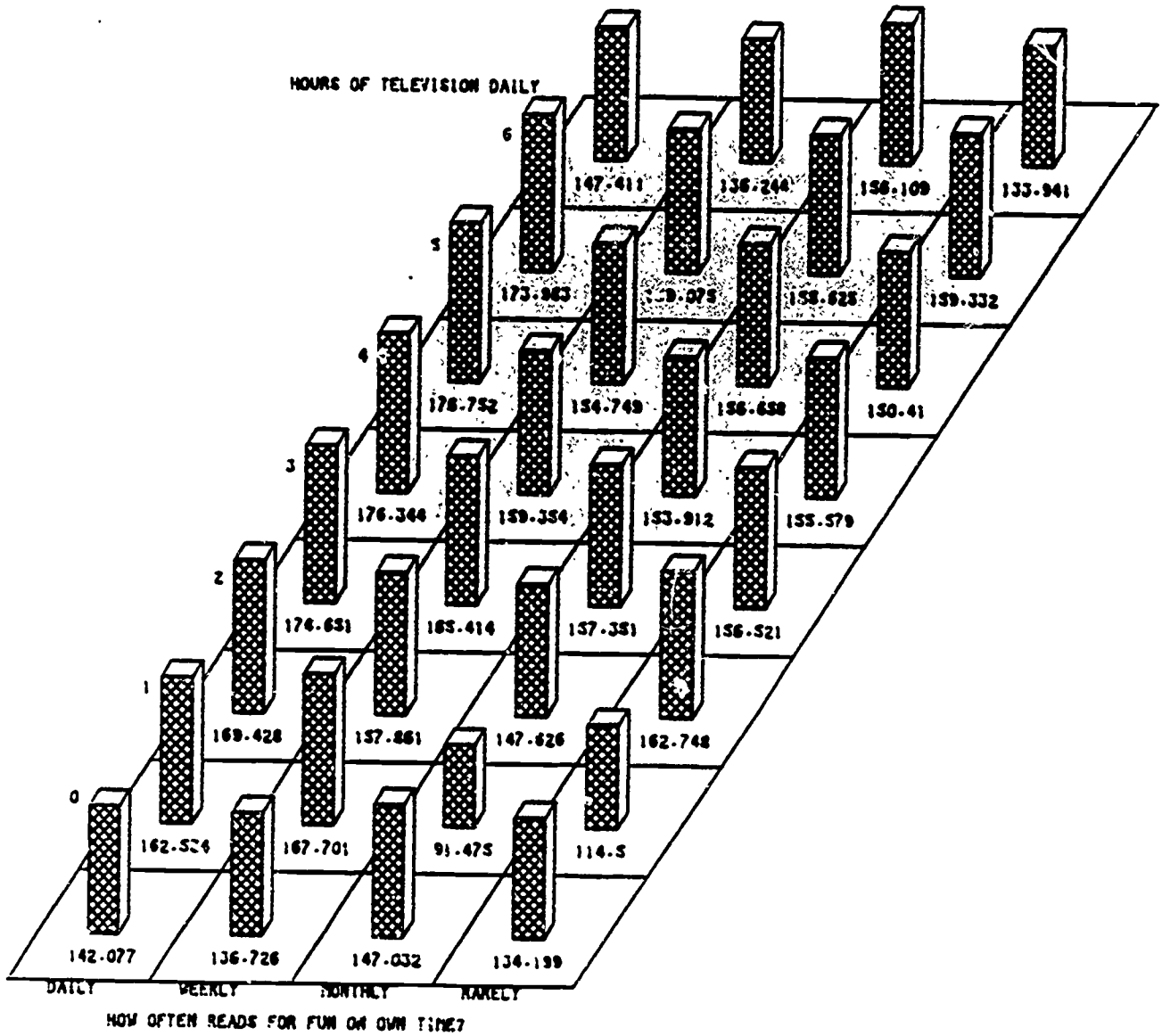


Table 9c

# AVERAGE READING SCORES

BY READING TIME AND TELEVISION TIME
NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS 1983-84
SEVENTEEN-YEAR-OLDS

BLOCK CHART OF MEANS

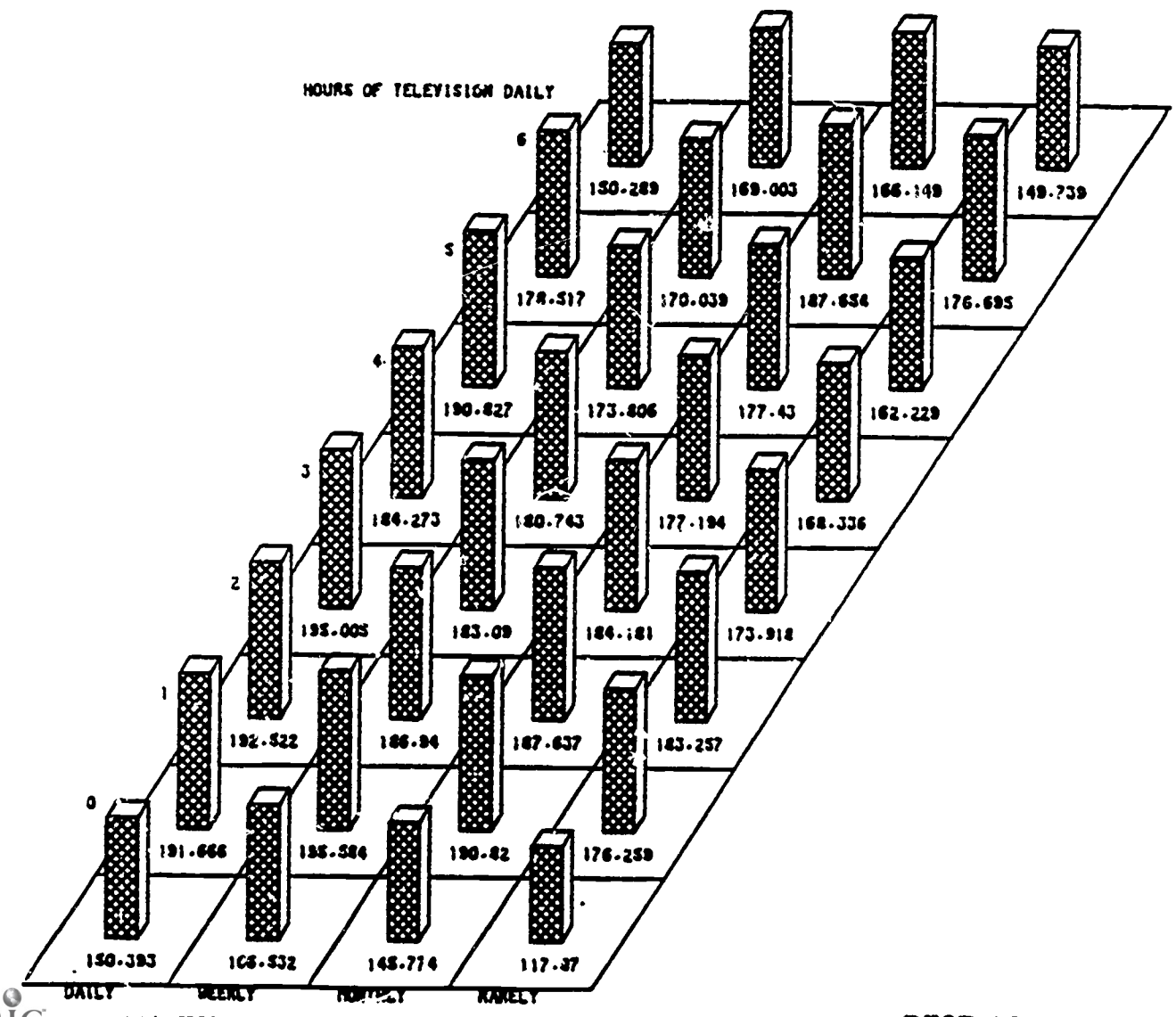


Table 10

Leisure reading variables with

time spent reading and viewing

| Variable | Time spent reading | Time spent viewing |
|---|---|---|
| Reading importance | .02 | .03 |
| Kind of reader | .10 | -.02 |
| Spare time reading | | |
| Read to do certain activities | .006 | -.05 |
| Read to play games | .02 | -.007 |
| Read for enjoyment | .34 | -.07 |

Table 11

Time spent on Media Activities--NAEP '84

| Media Activities | Hispanic | Black | White |
|---|---|---|---|
| 9 year olds | | | |
| Watch TV | 25% | 30% | 29% |
| Read a book | 5% | 9% | 10% |
| Video Games | 9% | 9% | 7% |
| Music | 7% | 6% | 9% |
| Read a newspaper | 1% | 0% | 1% |
| 13 year olds | | | |
| Watch Tv | 25% | 33% | 24% |
| Read a book | 3% | 7% | 6% |
| Video Games | 6% | 5% | 2% |
| Music | 17% | 11% | 14% |
| Read a newspaper | 2% | 1% | 1% |
| 17 year olds | | | |
| Watch TV | 15% | 17% | 12% |
| Read a Book | 3% | 9% | 4% |
| Video Games | 1% | 0% | 0% |
| Music | 18% | 16% | 21% |
| Read a newspaper | 2% | 2% | 1% |

Table 12

Time spent on homework--NAEP '84

| Homework Activities | Hispanic | Black | White |
|---|---|---|---|
| 9 year olds | | | |
| No homework given | 33% | 31% | 36% |
| Didn't do homework | 5% | 6% | 4% |
| Less than 1 hour | 43% | 43% | 42% |
| Between 1 and 2 hours | 12% | 12% | 13% |
| More than 2 hours | 9% | 9% | 5% |
| 13 year olds | | | |
| No homework given | 23% | 22% | 23% |
| Didn't do homework | 8% | 4% | 4% |
| Less than 1 hour | 32% | 35% | 36% |
| Between 1 and 2 hours | 27% | 28% | 29% |
| More than 2 hours | 11% | 11% | 8% |
| 17 year olds | | | |
| No homework given | 27% | 24% | 22% |
| Didn't do homework | 13% | 7% | 11% |
| Less than 1 hour | 24% | 25% | 27% |
| Between 1 and 2 hours | 25% | 31% | 26% |
| More than 2 hours | 12% | 12% | 13% |

Table 13

Time spent on other leisure activities--NAEP '84

| Leisure activities | Hispanic | Black | White |
|---|---|---|---|
| 9 year olds | | | |
| Watching TV | 25% | 30% | 29% |
| Call a friend | 1% | 3% | 2% |
| Be with friends | 8% | 9% | 13% |
| Sports | 9% | 8% | 9% |
| Snacks | 2% | 1% | 2% |
| Playing | 5% | 1% | 1% |
| 13 year olds | | | |
| Watching TV | 25% | 33% | 24% |
| Call a friend | 6% | 8% | 7% |
| Be with friends | 11% | 8% | 14% |
| Sports | 11% | 12% | 14% |
| Snacks | 0% | 1% | 1% |
| 17 year olds | | | |
| Watching TV | 15% | 17% | 12% |
| Call a friend | 9% | 12% | 7% |
| Be with friends | 17% | 13% | 21% |
| Sports | 17% | 13% | 12% |
| Snacks | 1% | 2% | 1% |