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Multi-level Analyses of Television Viewing Among High School Students: A Contrast Between Nonmetropolitan Rural and Other Communities

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Using a hierarchical linear model (HLM), we investigated the patterned social distribution of television watching among high school students and the impact of social environments on this distribution. Factors that influence the length of watching were identified at both the individual and environmental levels. In particular, students living in nonmetropolitan rural communities were found to watch more TV than their counterparts in other types of communities. Further, students' perceptions of environmental safety had a greater impact on length of watching in rural than in urban schools. By contrast, the difference between white and minority students in length of watching was smaller in rural areas than in urban communities. Our findings demonstrate the effects of environmental forces on mundane behaviors such as television watching.

Introduction

As television becomes an increasingly inseparable part of children's everyday life, researchers have intensified their investigation of the possible impact of extensive television watching on America's youngsters. During the past few decades, considerable research has focused on such popular topics as the influences of television viewing on students' cognitive and academic development (e.g., Comstock & Paik, 1987; Johnson, 1986; Singer & Singer, 1983) and television's influence on children's social behavior (e.g., Honig, 1983).

Some research also has focused on the social distribution of television watching among American young viewers. Although most such studies have linked television viewing with students' demographic characteristics such as race (e.g., Bogart, 1972; Bower, 1973; Greenberg & Dervin, 1970; Haertel & Wiley, 1979), socioeconomic status (Abel, 1976; Himmelweit & Swift, 1976; McCarthy, Langner, Gersten, Eisenberg, & Orzeck, 1975), and gender (Levin, 1978; McLeod, Atkin, & Chaffee, 1972), few have gone beyond the direct effects of these characteristics to analyze television watching from an environmental or a contextual perspective. In particular, little research has been conducted to investigate the differences in television viewing between rural and urban dwellers.

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There are reasons to expect that environmental context affects television watching of children independent of other individual demographic characteristics. Rural localities, for example, do not offer as great an array of cultural and leisure time activities for children as larger towns and suburbs (Schneller, 1988). Thus, the relative absence of alternative leisure activities in rural areas is likely to lead rural students to devote more time to television watching than their larger town and suburban counterparts. By the same token, other environmental factors, such as differences in subculture norms, also can dramatically influence the pattern of television viewing.

Based on the recent development in statistical theory of hierarchical linear models (Raudenbush & Bryk, 1986) and a preliminary analysis conducted by Sun, Elder, and Hobbs (1992), the present study examined (a) patterned social distribution of television watching among high school students at the individual level, (b) the impact of social environments on this distribution, and (c) differences between television viewing in nonmetropolitan rural and other types of communities.

Background

The Social Distribution of Television Viewing

Previous research on the social distribution of television viewing has been largely descriptive. For instance, many studies have noted that African American children watch considerably more than their white peers (Bogart,

1972; Bower, 1973; Tangney & Feshbach, 1988). Similarly, students from lower socioeconomic background watch more than their middle- and upper-class counterparts (e.g., Hollenbeck, 1978; Morgan & Gross 1982). With regard to gender differences, previous studies have reached less consistent conclusions (Tangney & Feshbach, 1988). Some researchers found boys watch more than girls (Chaffee & Mcleod, 1972; Singer, 1979), while others found the opposite (Lyle & Hoffman, 1972). Finally, Schneller (1988) identified a much higher number of adolescent video watchers in rural small towns than in urban areas in Israel. However, research in Sweden indicated that urban students watch more than their rural peers (Roe, 1987).

There are at least four limitations of previous research in this area. First, the variables on which television viewing is distributed are often restricted to simple demographic characteristics of the individual. To overcome that limitation, other influencing factors need to be taken into consideration whenever data permit (e.g., parents' education, students' educational aspirations). Second, previous investigations often did little more than use simple frequency distributions to describe general trends. Understanding could be improved by use of statistical control for other factors that might affect television watching. Third, analyses based on individual students have recently been under increasing attack in educational research. Bryk and Raudenbush (1992), for example, have argued that the current educational system in the United States, by its very nature, involves multiple levels of structure. Thus, single-level analyses of student behavior and school effects can easily lead to misinterpretation of findings (Cronbach, 1976). Finally, with a few exceptions (e.g., Schneller, 1988), previous studies largely have failed to seriously investigate the differences in television watching between urban and rural residents. As Schneller (1988) found in the case of Israeli adolescents, rural students in the United States are more likely to be dependent upon television as an alternative source for social contacts, companionship, and educational entertainment due to the limited resources for social activities and entertainment in rural areas.

In order to overcome these limitations, research methods capable of handling multivariate and multi-level analyses are obviously needed. Recent developments in the statistical theory of hierarchical linear models (HLM) have provided researchers with such an approach. A detailed introduction to the HLM can be found elsewhere (e.g., Bryk & Raudenbush, 1992; Lee & Bryk, 1989; Raudenbush, 1988; Raudenbush & Bryk, 1986). Since the current study employs HLM to study the contextual effects on television watching, we provide a simple description of HLM based on the work of Lee and Bryk (1989) and Bryk and Raudenbush (1992).

An Introduction to HLM

While HLM is capable of dealing with three or more levels of analysis, our model consists only of a within-school (individual level) equation and a between-school (contextual level) equation. In the former, the within-school model represents the hours of television watched by student i in school j, Y_{ij}, as a linear function of the individual student's characteristics, X_{ij}, plus random error, R_{ij}. Thus, the equation at the individual level is

$$Y_{ij}=\beta_{jo}+\beta_{j1}X_{ij1}+\beta_{j2}X_{ij2}+\ldots+\beta_{jk}X_{ijk}+R_{ij} \quad (1)^1$$

where $i=1,2\ldots I_j$; $j=1,2\ldots J$.

In equation (1), β_{jk} are regression coefficients that represent the linear relations between students' characteristics and the length of daily television viewing for students within school j. At the next level, β_{jk} are used as outcome variables, which in turn, are linear functions of the environmental factors at the school level. One key factor that differentiates HLM from ordinary regression methods is that HLM assumes that the structural relationships between television watching and other student characteristics can vary across schools. This is like running a separate regression within each of the J schools, producing a set of β_{jk}, for each school. Thus, the variation observed on β_{jk} can be explained by school-level variables (contextual factors), as represented in Equation (2):

$$\beta_{jk}=\gamma_{0k}+\gamma_{1k}W_{1j}+\gamma_{2k}W_{2j}\ldots+\gamma_{pk}W_{pj}+U_{jk} \quad (2)$$

where $j=1,2\ldots J$. Here, W_{pj} are contextual factors at school level; γ_{pk} are second-level regression coefficients of W_{pj} and U_{jk} are error terms.

Given that β_{jk} are not directly observed, we can use $\hat{\beta}_{jk}$ to estimate β_{jk}, with errors, e_{jk}. Adding this factor into Equation 2 yields a new equation:

$$\hat{\beta}_{jk}=\gamma_{0k}+\gamma_{1k}W_{1j}+\gamma_{2k}W_{2j}\ldots+\gamma_{pk}W_{pj}+U_{jk}+e_{jk} \quad (3)$$

In short, hierarchical models allow us to investigate how television viewing behavior is distributed with regard to socioeconomic characteristics modeled at the student level, and how contextual factors help explain variance observed across schools.

Method

Sample and Data

The data used in this study are from the Missouri School Improvement Program (MSIP). Initiated and sup-

[1]Equations (1), (2), and (3) are from Lee & Bryk (1989).

Table 1
Description of Variables

Student-Level Dependent Variable

TVHOURS:	Hours of daily television watched by an individual student.

Student-Level Independent Variables

SEX:	1 = male, 0 = female.
GRADE:	Grade-level of student (ranging from 7-12).
MINORITY:	1 = African-American or Hispanic, 0 = other.
PARENTED:	The average of two parents' education: 1 = 8th grade, 2 = high school graduate, 3 = 2-year college, 4 = college graduate.
SAFETY:	Student's perception that one's school is safe: 1 = strongly disagree to 5 = strongly agree.
ASPIRE:	Student's plans after high school: 1 = 2 or 4 year college, 0 = other.

School-Level Independent Variables

$\overline{X}$PARENTED:	Average parental educational attainment in school j.
%MINORITY:	Percentage of black and hispanic enrollment in school j .
$\overline{X}$SAFETY:	Mean value of students' perception that their school is safe in school j.
%ASPIRE:	Percentage of students planning to go to a four-year college in school j.
MURBAN:	1 = urban schools located in metropolitan counties, 0 = other.
NURBAN:	1 = urban schools located in non-metropolitan counties, 0 = other.
MRURAL:	1 = rural schools located in metropolitan counties, 0 = other.

ported by the Missouri Department of Elementary and Secondary Education, this project aims to evaluate the quality of education within each of Missouri's 538 school districts following a five-year cycle using a combination of data on school resources, practices, and outcomes. To implement such an evaluation, questionnaires were developed pertaining to 17 different kinds of people (including students and parents) who play important roles in public education.

The current study was largely based on the responses from the high school students surveyed during the first 2½ years of the MSIP project. The final sample includes 53,539 students studying in 179 Missouri high schools, reflecting a wide range of socioeconomic-geographic characteristics. The procedure used by the MSIP to include these schools in the first 2½ years of the project followed a stratification sampling strategy. Two important aspects were stratified according to the population in the state of Missouri: geographic location and size of districts. Once the schools were chosen, all the students enrolled were given a questionnaire, which was administered in class by the teacher. Cases with missing values on any of the variables used in our first-level HLM analysis were dropped. Among the 179 schools, the final numbers of respondents range from 24 to 2063, with 93% of schools having 50 or more respondents.

Within-School Variables

The operational definitions of the variables used in the within- and between-school levels are summarized in Table 1. The ultimate dependent variable is the daily hours of television watched by a given student.[2] Among the within-school independent variables, we first included basic demographic characteristics such as gender (1 = male, 0 = female) and minority status (1 = African American or Hispanic, 0 = other). An earlier preliminary study (Sun, Elder, & Hobbs, 1992) revealed significant differences in amount of television watching between males and females and between minorities and whites. Parent education also was included insofar as this variable has been reported in many studies to be a key factor influencing children's behavior. This measure was the average of both parents' educational attainments, which were ordinally ranked as 8th grade, high school graduates, some college, and college graduates. In addition, educational aspirations, measured by the student's intention to continue on to four-year higher education, was

[2]We remind the reader of possible measurement errors associated with self-reported length of television watching. However, these errors are not observable or estimable without longitudinal data.

Table 2
Descriptive Statistics by Geographical Locations

Student-Level Variable	Metro-Urban (N = 23,028)		Nonmetro-Urban (N = 11,584)		Metro-Rural (N = 7,070)		Nonmetro-Rural (N = 11,857)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
TVHOURS	2.668	1.648	2.700	0.162	2.586	1.534	2.853	0.861
SEX	0.502	0.500	0.496	0.500	0.495	0.500	0.501	0.499
SAFETY	3.469	1.127	3.601	1.101	3.754	1.036	3.750	1.068
PARENTED	2.900	0.793	2.687	0.827	2.888	0.799	2.562	0.781
MINORITY	0.170	0.376	0.053	0.225	0.016	0.125	0.017	0.130
ASPIRE	0.660	0.474	0.634	0.482	0.675	0.468	0.573	0.495

included for similar reasons. Finally, a five-level ordinal variable ranging from "strongly agree" to "strongly disagree" was used to measure students' perceptions of whether they feel safe in their school. This variable represents our attempt to assess a possible "push effect" of the physical environment surrounding the student. Since television watching mostly occurs at home, extensive viewing could be a result of the viewer either being "pulled" by program content or "pushed" home by a physically or socially threatening environment. Another reason to include this safety measure at the individual level is to allow us to investigate how such "push effects" may vary across different social environments in our school-level analyses. In particular, we are interested in contrasting the "push effect" in rural areas with that in other types of communities.

Between-School Variables

In addition to examining how television viewing is socially distributed, our research also aims to study whether such distributions vary across different geographic-social environments. To serve this purpose, we focus on the "contextual effects" and contrast such effects between rural and other types of communities. Within HLM, a contextual effect refers to the school aggregate of a student-level variable that is included in the school-level analysis for differentiating effect (Lee & Bryk, 1989). We should emphasize here that, when measured at two different levels, the same variable may be subject to different interpretation. Parent education provides a good example. In our case, this variable, when measured at the individual student level, indicates no more than the averaged educational attainment of both parents. Thus, the effect of this variable, if any, should pertain only to that particular student. At the school level, however, a high percentage of parents with high educational attainment represents far more than some aggregated demographic characteristics of a neighborhood: It also is indicative of a given culture or social environment. The effects of such a culture, if any, might be expected to exercise an influence on all members participating in such an environment regardless of individual differences in parental educational attainment.

The formulation of the four contextual-effect variables is straight forward. As illustrated in Table 2, for each of J schools, we calculated the mean values of parent education ($\overline{X}$PARENTED), students' perception of school safety ($\overline{X}$SAFETY), percentage of African American and Hispanic students (%MINORITY), and percentage of students who plan to pursue a four-year college education (%ASPIRE).

Compared with the contextual-effect variables, the measure of geographic location of a given school is more problematic. A major problem lies in the variation of locations found within the widely used "urban versus rural" and "metropolitan versus nonmetropolitan" classifications (e.g., see Elder, 1992). Rural-urban and metropolitan-nonmetropolitan are not the same dichotomies: The metropolitan classification pertains to counties whereas rural-urban refers to places. Classifying a school as urban because it is located in a metropolitan county may be misleading. In an earlier study, Elder (1992) found that more than 25% of the nation's rural schools were located in metropolitan counties. Conversely, the nonmetropolitan classification included counties with towns as large as 50,000.

In the past few years, we have argued that these different classification systems should be merged to categorize the geographic-social location of a given school more accurately. We followed a procedure of first sorting schools by the metropolitan status of the county they are located in and then further sorting schools according to the geographic

characteristics of the particular place where the school is located. With this combined classification, rural schools located in relatively isolated parts of a large metropolitan county can be differentiated from schools located in an urban part of the same metropolitan county. By the same token, schools that are obviously located in an urban part of a nonmetropolitan county can also be grouped differently from the ones located in more remote, rural areas of the same county.

In this study, we used a simplified version of these classifications. Based on the geographic characteristics of a school's county and its specific location within the county, schools included in our sample were classified into four groups: metropolitan urban, metropolitan rural, nonmetropolitan urban, and nonmetropolitan rural. Since these categories are nominal, three dummy variables—metro-urban, metro-rural, and nonmetro-urban—were created according to our geographic assignment (see Table 1). Nonmetro-rural schools were deliberately left out since our primary interest in this study was to contrast such schools with the other three types. Descriptive statistics for each type are presented in Table 2.

Results

As indicated above, the within-school model represents hours of television viewing (TVHOURS) for student i in school j as a function of the student's minority status (MINORITY), sex (SEX), grade-level (GRADE), parent education (PARENTED), perception of school safety (SAFETY) and student's educational aspiration (ASPIRE). That is,

$$\begin{aligned} TVHOURS_{ij} = \beta_{j0} &+ \beta_{j1}SEX \\ &+ \beta_{j2}GRADE \\ &+ \beta_{j3}MINORITY \\ &+ \beta_{j4}PARENTED \\ &+ \beta_{j5}SAFETY \\ &+ \beta_{j6}ASPIRE \\ &+ R_{ij} \end{aligned} \qquad (4)$$

As Bryk and Raudenbush (1992) suggested, it is useful to try an unconditional model at both individual and school levels. Using the HLM program (Bryk, Raudenbush, Seltzer, & Congdon, 1989), we first separated the total television viewing variance into its within-school and between-school components. The within-school equation specifies the amount of individual television viewing as a within-school intercept function of hours of television watching in a given school:

$$y_{ij} = \beta_{j0} + R_{ij} \qquad (5)^3$$

[3]Equation (5) is from Lee & Bryk (1989).

where y_{ij} = number of hours of television watched daily by student i in school j, β_{j0} is the average television viewing hours in school j, and R_{ij} is error associated in predicting y_{ij}.

At the between-school level, each school's viewing mean, $\hat{\beta}_{j0}$, is predicted with the overall mean, μ, and the errors associated with predicting the mean of school j, U_{j0}, and errors, e_{j0}, associated with predicting β_{j0} with $\hat{\beta}_{j0}$. That is,

$$\hat{\beta}_{j0} = \mu_0 + U_{j0} + e_{j0} \qquad (6)$$

With the two equations merged, the model resembles a simple unbalanced one-way ANOVA (Lee & Bryk, 1989) in which school allocation is the only random factor. In our case, the within-school variance pooled across schools was estimated as 2.502 and between-school variance as 0.159. Thus, the proportion of between-school variance to the total variance is .06, or 6%. Clearly, most of the variability in television viewing reflects individual difference among students, rather than differences among schools.

Next, we formulated a similar unconditional model at the school level based on outcomes of the within-school analysis. For each of the six β_{jk} obtained in Equation 4, the between-school model is merely

$$\hat{\beta}_{jk} = \mu_k + U_{jk} + e_{jk} \qquad (8)$$

where k=1,2, . . . 6. Here, $\hat{\beta}_{jk}$ refers to the observed beta coefficients for SEX, GRADE, MINORITY, PARENTED, SAFETY and ASPIRE; μ_k refers to the overall means for k parameters; U_{jk} is the error resulting from using μ_k to predict β_{jk}; and e_{jk} is associated with predicting β_{jk} from $\hat{\beta}_{jk}$. To facilitate our analysis, we centered all the independent variables except sex and minority. Table 3 summarizes the results of the two unconditional models and illustrates the regression estimates based on Equation (6) and (8).

We see that, in a typical high school, male students watch television 0.182 of an hour more per day (11 minutes) than female students, holding constant other factors. Moreover, independent of other factors, students in each succeeding higher grade spend 0.191 of an hour less (11 1/2 minutes) watching television than students in the preceding lower grade. Similarly, in the average high school, students with plans for a four-year higher education or whose parents have a higher level of educational attainment watch approximately 9 minutes less daily. In addition, students in a typical high school watch 0.115 of an hour more (6 1/2 minutes) with each unit decrease in their safety rating. Finally, on average, African American and Hispanic students spend 0.902 hour more (54 minutes) per day watching television than other students, controlling for social and economic characteristics. The estimated t-values are all large and statistically significant for these factors. Moreover, the homogeneity of variance tests, as illustrated by the

Table 3
Unconditional Model

	Gamma Coefficients		*t*
TVHOURS			
Mean	2.846067	(.031013)	91.771
SEX Gap			
Mean	.182055	(.018496)	9.843
GRADE Differentiation			
Mean	-.191081	(.007753)	-24.645
SAFETY Differentiation			
Mean	-.114884	(.009158)	-12.545
PARENTED Differentiation			
Mean	-.150001	(.012039)	-12.460
MINORITY Gap			
Mean	.901843	(.058773)	15.345
ASPIRE Differentiation			
Mean	-.165971	(.018157)	-9.141
	Estimated Parameter Variance		χ^2
BASE COEFFICIENT	.15744		4154.80
SEX slope	.02121		245.69
GRADE slope	.00390		234.72
SAFETY slope	.00564		240.14
PARENTED slope	.00812		235.93
MINORITY slope	.17952		315.19
ASPIRE slope	.01332		209.50

Note. These values are based on the 142 of 179 units having sufficient data for computation. Standard errors appear in parentheses. All *t*-ratios and χ^2 statistics are statistically significant at the .001 level.

chi-square values (Table 3), show significant variation among all six distributive effects: The probability of the β_{ij} to be a constant, under a homogeneity hypothesis, is less than 0.001 in each case. The latter finding encourages us to explore the possible effects of the school-level variables.

An Exploratory Contextual Model

In exploring the contextual model, we took the $\hat{\beta}_{jk}$ obtained from each of *J* schools as dependent variables, which were then treated as linear functions of the four contextual school characteristics. The three geographical dummy variables were also included to compare their effects on each of β_{jk} with those of nonmetropolitan rural communities. The preliminary analyses showed that some of these effects were statistically nonsignificant. Given that the current version of HLM software (Bryk et al., 1989) has a limitation in the number of within- and between-group effects, we reanalyzed these data by including only those significant effects in the final composite model. If one (or more) of the geographical dummy variables was significant in a given equation, all three were included. These contextual effects are illustrated in Table 4.

Averaged length of watching. The contextual factors make a large contribution to explaining the between-school variance in television viewing: approximately 57% (see Table 5). Controlling for geographic differences and other contextual variables, average parent education has a moderate negative effect on television watching (-.477). This means that after controls, each unit increase in average parent education is associated with an average decrease of 0.477 hours (28 minutes) in viewing. Similarly, after controlling other geographic and contextual variables, each increase of 10% in African American or Hispanic students in the overall student population leads to an increase of 6.6 minutes (0.013 x 10 = 0.113 hours) in school means. Finally, each unit increase in average safety concerns is associated with students in that school watching 21 more minutes (0.350 hours) of television on average.

Table 4
HLM Contextual Effects

	Gamma Coefficient	Standard Error	*t*
TVHOURS			
BASE	5.410728	.402409	13.446***
$\overline{X}$SAFETY	-.350245	.085770	-4.084***
$\overline{X}$PARENTED	-.477123	.119020	-4.009***
%MINORITY	.011336	.001415	8.009***
MURBAN	-.247091	.076437	-3.233**
NURBAN	-.235723	.062499	-3.772***
MRURAL	-.096009	.074577	-1.287
SEX slope			
BASE	.216550	.020125	10.760***
%MINORITY	-.003076	.000874	-3.521***
GRADE slope			
BASE	-.569123	.105408	-5.399***
$\overline{X}$PARENTED	.142835	.041017	3.482***
MURBAN	.005854	.022225	.263
NURBAN	.001051	.020633	.051
MRURAL	-.055840	.025470	-2.192*
SAFETY slope			
BASE	-.149807	.016145	-9.279***
MURBAN	.075314	.021366	3.525***
NURBAN	.037332	.023970	1.557
MRURAL	.012385	.028962	.428
PARENTED slope			
BASE	-.169949	.013196	-12.879***
%MINORITY	.001591	.000579	2.748**
MINORITY slope			
BASE	.636821	.143248	4.446***
MURBAN	.348986	.164772	2.118*
NURBAN	.426084	.186316	2.287*
MRURAL	-.000853	.248070	-.003
COLLEGE slope			
BASE	-.121540	.032277	-3.766***
%MINORITY	.002274	.000918	2.478*
MURBAN	-.083249	.045262	-1.839
NURBAN	-.177150	.047602	-3.722***
MRURAL	-.048681	.056820	-.857

	Estimated Variance	Degrees of Freedom	$\chi^{2\,a}$
PARAMETER			
BASE COEFFICIENT	.06829	135	1539.60
SEX slope	.01824	140	220.74
GRADE slope	.00314	137	216.43
SAFETY slope	.00465	138	220.43
PARENTED slope	.00739	140	229.52
MINORITY slope	.16870	138	294.80
COLLEGE slope	.01144	137	192.48

[a]All χ^2 statistics are significant at 0.001 level.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 5
Summary of Results for Proportion of Variance Explained by the Contextual Model

	Unconditional Model		Contextual Model	Percent of R^2 Explained by the Contextual Model
TVHOURS	$Var(\beta_0)$	.157	.068	56.78
SEX	$Var(\beta_1)$	.021	.018	14.28
GRADE	$Var(\beta_2)$	.004	.003	25.00
SAFETY	$Var(\beta_3)$	.006	.005	16.60
PARENTED	$Var(\beta_4)$	.008	.007	12.50
MINORITY	$Var(\beta_5)$	.180	.168	6.70
ASPIRE	$Var(\beta_6)$	.013	.011	15.39

Regarding geographic differences, students in nonmetropolitan rural schools watch the most on average, after controlling for parent education, safety factors, and minority enrollment. For instance, in an all-white school located in a nonmetropolitan rural area with school means of parent education and safety concerns each equal to 3, the average viewing length is 2.931 hours [5.411 - (.350x3) - (.477x3) + 0 = 2.931]. In contrast, students in a typical metropolitan urban white school with the same control values watch 2.691 hours on average [5.411 - (.350x3) - (.477x3) + 0 -.247 = 2.691]. In short, after controlling for minority enrollment, parent education, and safety issues, youngsters in either a metropolitan or a nonmetropolitan urban school watched about 15 minutes less daily than their counterparts in a typical nonmetropolitan rural school. The difference between the two kinds of rural schools (metropolitan and nonmetropolitan) was small and statistically insignificant.

Effects on other slopes. Only minority enrollment has a significant impact on the gender slope. To be specific, each 10% increase in minority enrollment is associated with less than a 2-minute decrease in the gender gap. In other words, the gender gap is slightly narrower in schools with high minority enrollment.

The difference in viewing between grades, mentioned in the student-level analysis, is reduced in schools where parent education is higher. This is, with each level of increase in average parent education, the difference between grades in viewing length tends to be 9 minutes (or .143 hours) less. However, the grade gap tends to be slightly larger (3 minutes) in metropolitan rural than in nonmetropolitan rural schools.

To our surprise, the safety slope is about 50% flatter in metropolitan urban schools than in nonmetropolitan rural schools. In other words, aggregate student perceptions of safety in schools exercises a much stronger "push effect" on rural students than it does on urban students. In contrast, the minority gap is more than 50% larger in the two kinds of urban areas than in the two kinds of rural schools. Thus, although rural students watch more than their urban counterparts, the racial difference in the length of viewing among rural students is considerably smaller than among urban students.

Finally, the influence of parental educational attainment on students' television watching is slightly weaker in high-minority enrollment schools than in schools with low-minority enrollment. In the same direction, high-minority enrollment also reduces the effect of aspiration on television viewing. Although statistically significant, these two effects are so small (0.0016 and 0.0023) that we exclude them from our discussion.

Discussion

Within-School Results

The current analyses yielded several interesting findings. First, the length of television watching is not equally distributed among different socioeconomic groups. As for our findings at the individual level, one possible explanation for sex variance has to do with sex images on television. As researchers have documented, female images on popular television series are repeatedly vulnerable, indecisive, and powerless. This tendency of having negative personality traits embedded in female characters may turn away some female viewers. Another reason is content: With a steady increase in violence and sex, television programs may have a further gender effect.

Our findings concerning the negative relationship between age (grade) and hours of viewing lend support to the findings of Gunter and McAleer (1990), who reported that after age 12, the length of viewing tends to be sharply reduced. Greater involvement in other activities or chances to work part-time are likely explanations.

Results from this study also reinforce the argument that family and cultural traits have important influences on

children's social behavior. As our analyses show, children whose parents have more education tend to watch much less. By the same token, white students watch considerably less than African Americans and Hispanics. These effects seem to support Bourdieu's notion of "cultural capital," which children acquire from their family and/or cultural environments (Bourdieu, 1977a; Bourdieu & Passeron, 1978). In her study of two different types of California schools, Lareau (1989) found that elements of cultural capital were embedded in different parental perceptions of "work" and "schooling" by middle and working classes. Here, we further may argue that the perceptions of television, leisure, entertainment, and education are formed differently across social groups. The more highly educated have not only economic, but also educational and cultural, resources that afford them sources of entertainment or education other than television.

It is well established that the physical environment influences mundane activities of a youngster. In this study, our hypothesis of a "push effect" associated with perceptions of safety seemed to be supported. It is of concern to observe that watching television at home may represent an escape for many students to avoid a threatening social environment. This finding is particularly important to school administrators, educators, and communities. As research consistently documents that extensive television viewing is associated with lower academic achievement while extracurricular activities enrich learning, the availability of safe and constructive out-of-school activities could contribute to improved student performance. This appears to be a relevant concern for both rural and urban environments.

Between-School Results

The impact of social, cultural, and geographic environments became more obvious from our between-school analyses. First, as mentioned earlier, the contextual factors (measured by the average of parent education, the percentage of minority students, and the perception of environmental safety) go far beyond a mere average of individual family traits or an aggregate of personal perceptions. Rather, they represent the existence of a certain culture. In our school-level analysis, the contextual factors explained 57% of the variance among school-viewing averages. This finding lends considerable support to the "structural-cultural" approach to understanding video use (Roe, 1987). Based on work of Bourdieu and his associates (Bourdieu, 1977a, 1977b; Bourdieu & Passeron, 1978), the structural-cultural approach persuaded us not to view culture as being automatically determined by demographics and social positions (Roe, 1987). Rather, the dynamic relationship between objectivism and subjectivism is perceived as circular. For Bourdieu, objective social structures form "habitus" (culture), which, in turn, determines practice within habitus, which, in turn, reinforces and reproduces objective structures.

Within the framework of the structural-cultural approach, television viewing can be regarded as a cultural practice or ritual. The influences of habitus on this practice work through factors such as how much peers in the same subculture watch television, the general attitude of the environment toward excessive viewing, and the kinds of leisure activities the community encourages or prohibits. Thus, it is the cultural capital shared and educated within a certain cultural setting that contributes to differences at the school or community level. In its turn, differences in viewing observed within different "habitus" serve as group identities, reproducing and reinforcing social structures.

Different Environmental Effects: Nonmetropolitan Rural and Other Communities

Our efforts to compare nonmetropolitan rural and other types of communities in regard to television watching yielded some interesting results. As in Israel (Schneller, 1988), American children in rural areas watch considerably more than their peers in an urban setting. While the structural-cultural approach still applies, a simpler explanation would focus on "leisure deprivation" in rural areas, resulting from limited resources. Given that children in rural areas have more limited alternatives to spend their leisure time and relatively fewer chances to participate in organized activities with peers, television becomes a convenient companion. As psychologists point out, this substitution of television for real interpersonal contacts can have undesirable effects on the development of self-identity among adolescents (Schneller, 1988) and deserves more research focus.

Like safety concerns, leisure deprivation in rural areas also exercises a push effect on students' television viewing. This second push helps explain why the safety slope in our school level analysis is twice as steep in rural schools as in the two kinds of urban schools. In the case of former, the two push effects become additive and double their force. When students perceive the environment as unsafe and when other leisure activities are limited, chances that children will turn to television as an alternative form of leisure are much greater. In the case of urban schools, a greater variety of recreational activities and more convenience to interact with peers tend to counter-balance the push effect of safety concerns. In other words, the safety factors need to be much more serious in urban communities to overcome the attraction of other leisure activities.

The much smaller minority gap observed in nonmetropolitan rural schools can be of relevance to understanding effects of integration. Although students in such environments watch the most, minority students tend not to

differ from their majority peers as much as in the urban environment. Once again the structural-cultural approach may offer an explanation. Since different racial groups are larger in size and more segregated in residence, a greater cultural boundary often exists, separating cultures and subcultures based on their respective social structures. Thus, a larger difference in viewing observed between minority and majority students in our analyses represents different cultural rituals or identity. In the rural areas, however, the cultural boundary might be less clear and rigid. Given that minorities do not form a "critical mass," it is likely that inter-group integration is achieved when students participate in activities together. For instance, an African American student may find himself as the only African American in his high school. Consequently, interacting both with and into the majority group becomes more likely. Thus, the much smaller minority gap found in this study might symbolize cultural integration, with members of minority group adopting cultural practice and rituals of the majority group.

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