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# Relation between Parental Restrictions on Movies and Adolescent Use of Tobacco and Alcohol

**CONTEXT.** Viewing smoking and drinking in movies may prompt adolescents to initiate these behaviors. Movies with R ratings contain more smoking than do movies in all other rating categories.

**OBJECTIVE.** To evaluate the extent to which parents restrict the exposure of adolescents to R-rated movies and to determine whether such restrictions are associated with decreased tobacco and alcohol use in adolescents.

**DESIGN.** Cross-sectional, self-administered survey.

**PARTICIPANTS.** Students in grades 5 through 8 enrolled in New Hampshire and Vermont schools.

**SAMPLING STRATEGY.** Fifteen schools in Vermont and New Hampshire were randomly selected from all middle schools with ≥ 150 students.

**OUTCOME MEASURES.** Students who had tried smoking cigarettes or tried drinking alcohol without parental knowledge.

**RESULTS.** Of 4544 students surveyed, 18% had tried cigarettes and 23% had tried alcohol. Although 90% were younger than 14 years of age, only 16% were completely restricted from viewing R-rated movies. The prevalence of having tried smoking was 35% for those with no restrictions on viewing R-rated movies, 12% for those with partial restrictions, and 2% for those with complete restrictions. The prevalence of having tried alcohol was 46% for those with no restrictions on viewing R-rated movies, 16% for those with partial restrictions, and 4% for those with complete restrictions. Even after controlling for other factors, including grade, parental disapproval of smoking, maternal supervision, maternal responsiveness, peer and family smoking, and child personality characteristics, children who were completely restricted from viewing R-rated movies were significantly less likely to smoke (relative risk, 0.29; 95% CI, 0.19 to 0.45) or drink (relative risk, 0.30; CI, 0.21 to 0.42) compared with those who had no restrictions on viewing R-rated movies.

**CONCLUSION.** Limiting the exposure of adolescents to R-rated movies may prevent early use of alcohol and tobacco.

Access to visual media has increased dramatically in the past decade, with video cassette recorders, cable, and satellite television greatly expanding the access of

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ORIGINAL ARTICLE

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children to movies and programs intended for adults. Today, children and adolescents choose a variety of R-rated movies available on premium channels or at the local video store. These movies represent a significant social influence in which celebrities model alcohol and tobacco use, often in the context of other adult behaviors.[1–6] R-rated films portray more tobacco use than do movies in any other rating category.[1] In addition, portrayals of tobacco and alcohol use in R-rated movies may be particularly salient to adolescents because of their intrinsic curiosity about adult behaviors and their desire to become more "adultlike."[7]

Several studies support the hypothesis that visual media influence adolescent behavior. In a cross-sectional study, Klein and colleagues showed that the more time adolescents spent watching television (movies and music videos), the more likely they were to engage in risky behaviors, including alcohol and tobacco use.[8] Television and music video viewing were also linked with the start of drinking in a prospective study of adolescents.[9] The beginning of smoking in adolescents was linked with the smoking behavior of their favorite movie stars in two independent studies.[10, 11] In another study, viewing tobacco use in movies was associated with an increased likelihood of starting to smoke in adolescents.[12] These findings raise concern about the extent to which children are exposed to movies that pervasively portray alcohol and tobacco use.

A recent report by the Federal Trade Commission,[13] which showed that R-rated movies and violent media are directly marketed to children in the United States, sparked a public debate about who should be responsible for protecting children from inappropriate media content. Although some believe the government should regulate marketing and labeling of media, others believe it is up to parents to restrict their children's access. In this article, we tried to determine the extent to which parents restrict the exposure of young adolescents to R-rated movies and to evaluate whether such restrictions are associated with lower rates of tobacco and alcohol use. Our study allowed an assessment of whether this relationship persists after controlling for parenting style (e.g., parental supervision and parental responsiveness)[14] and a variety of adolescent characteristics (e.g., rebelliousness and sensation seeking).

## Methods

**Figure 1** provides an overview of the design of this cross-sectional survey. The data analyzed are from a larger study describing tobacco use in movies and its association with smoking uptake in adolescents.[12]

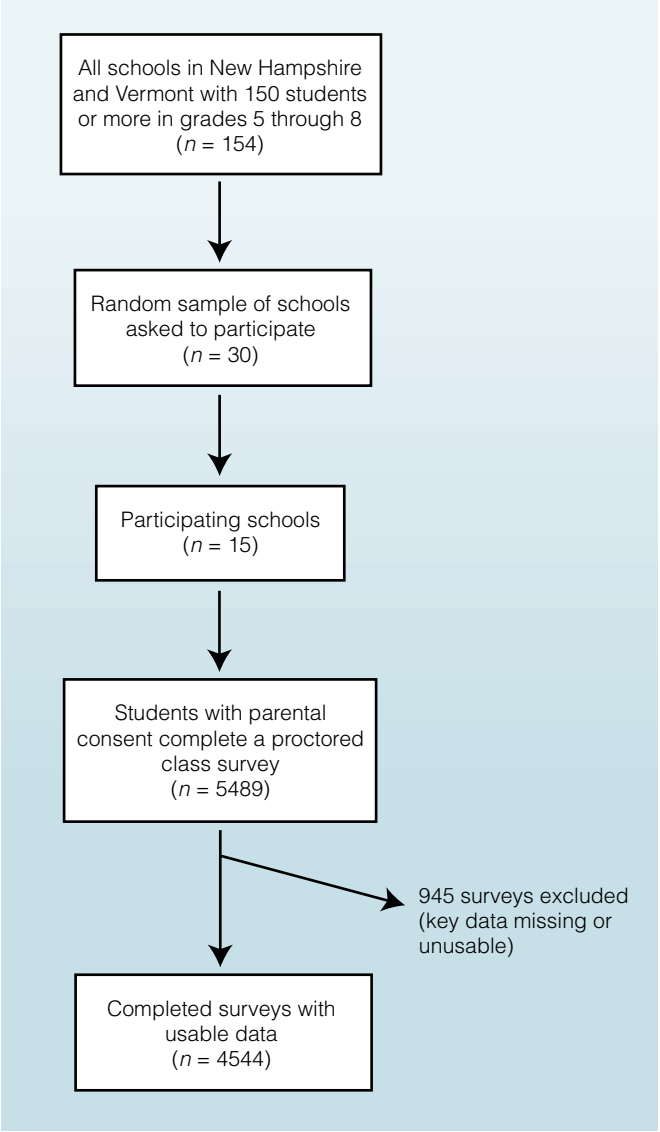



**FIGURE 1. Sample selection.**

## Sample

### *Schools*

We identified all schools in New Hampshire and Vermont with at least 150 students enrolled in grades 5 through 8 ($n$ = 154). We randomly selected 30 schools from this list and asked them to participate in the study. Each school was offered a $500 stipend for participating. Fifty percent of the schools agreed to participate (seven from New Hampshire and eight from Vermont).

### *Students*

Passive parental consent was obtained for 98% of students enrolled. The average participation rate by school was 93%. Of the 5489 surveys completed, 15 were eliminated because of inconsistent or extremely out-of-range answers. An additional 930 questionnaires were

dropped because of missing data (**Figure 1**). Students with missing data were more likely to be in fifth or sixth grade, to perform poorer in school, and to have parents who smoked. They were less likely to report that their parents disapproved of adolescent smoking or that both parents graduated from high school. These students also reported slightly lower levels of maternal supervision and maternal responsiveness, but there was no difference in the level of parental movie restriction or the prevalence of having tried smoking or drinking alcohol.

The final sample of 4544 students was primarily white (93%) and equally distributed by gender. Almost half (48%) the students attended schools in communities with more than 10, 000 residents. The mean age was 12 years (SD, ±1.1). The distribution by grade was 8% in grade 5, 26% in grade 6, 37% in grade 7, and 35% in grade 8. The youngest students were under-represented because not all schools had a fifth grade.

## Survey

### *Administration*

Students completed the self-administered, written questionnaire in a classroom setting during regular school hours. They were asked to provide their names and telephone numbers on a separate sheet of paper that was collected before completing the survey. To protect confidentiality, the identification number on the name page did not match the identification number on the corresponding questionnaire, but it could be linked using an algorithm. Survey proctors distributed and collected all surveys; instructed the students on how to complete them; and provided assistance, when needed. Fewer than 3% of the students required reading assistance or interpretation of the survey. Teachers were present in the classroom but did not assist with survey administration. This study was approved by the Committee for the Protection of Human Subjects at Dartmouth College.

## Measures

### *Exposure: Parental Restriction on R-rated Movies*

Parental restrictions on R-rated movies were measured by asking, "How often do your parents let you watch movies or videos that are rated R?" Students who answered "never" were classified as having complete restriction, those who answered "sometimes" or "once in awhile" as having partial restriction, and those who answered "all the time" as having no restriction.

Exposure to movies was used to verify the impact of parental restrictions. To evaluate movie exposure, we selected 603 popular movies released between 1988 and 1999. The sample included the top 25 box-office "hits" each year from 1988 through 1995 ($n$ = 200); the top 100 "hits" each year from 1996 through 1998 ($n$ = 300); the top 50 "hits" from January 1 through June 30, 1999; and an additional 53 movies that featured actors popular with adolescents. Box-office ranking based on gross revenues was determined through an Internet site that compiles box-office data from multiple sources (http://www.worldwideboxoffice.com).

Adolescents were surveyed using unique lists of 50 movies randomly selected from the complete list of 603 movies. We used stratified sampling, based on ratings, to create each individual list of 50 movies in order to preserve the rating distribution of the larger sample; on average, each survey queried students about 22 R-rated movies, 16 PG-13 movies, 10 PG movies, and 2 G-rated movies. Each movie title appeared on approximately 470 (SD ± 6.7) surveys. The titles were listed in table format, and students circled "yes" or "no" to indicate whether they had seen a movie. Movie ratings were not divulged in the survey.

### *Outcome: Adolescent Smoking or Alcohol Use*

The primary behavioral outcomes in this analysis were whether a student had ever tried smoking or alcohol. We determined smoking behavior by asking, "How many cigarettes have you smoked in your life?" Responses ranged from "none" to "more than 100." Any student who answered "just a few puffs" or more was classified as having tried smoking. Alcohol use was evaluated by asking, "Have you ever had beer, wine, or other drink with alcohol that your parents didn't know about?" Students replied "yes" or "no."

### *Covariates*

We also measured a number of variables that could potentially confound the relation between media restriction and adolescent smoking or alcohol use. These included student characteristics (sex, school, grade, school performance, rebelliousness, sensation seeking, and self-esteem), exposure to smoking (parent, sibling, or friend smoking), and parenting characteristics (maternal supervision and responsiveness, parental disapproval of adolescent smoking, and parent education). The individual items used to measure student personality characteristics are reported elsewhere.[12] From these questions, a 21-point scale was created for rebelliousness, an 18-point scale for sensation seeking, and a 24-point scale for self-esteem.

Maternal supervision and responsiveness were measured by items selected from Jackson's Authoritative Parenting Index.[14] Students used a four-point response scale to indicate how well certain statements

described their mothers. For maternal supervision, the statements were: "She tells me what time I have to be home," "She asks me what I do with my friends," "She knows where I am after school," and "She always makes me follow her rules." For maternal responsiveness, the statements were: "She makes me feel better when I am upset," "She listens to what I have to say," "She is too busy to talk to me," and "She wants to hear about my problems." Chronbach's alpha correlation for these indices were 0.64 and 0.79, respectively.

Student perception of parental disapproval of adolescent smoking was measured by asking: "If you were smoking cigarettes and your mother [father] knew about it, what would she [he] say?" Based on their responses to these two questions, students were categorized into one of three groups: 0 = one or both parents would not tell them to stop; 1 = they did not know what their parents would say or their parents gave conflicting messages; 2 = both parents would tell them to stop (or one parent in the case of single-parent households).

#### *Reliability*

To evaluate test–retest reliability of the survey questions, we administered the questionnaire twice to 74 students in fifth and sixth grades at another school in Vermont. We allowed a 3-week interval between the surveys. The percentage of agreement for having tried smoking was 92%, for having tried alcohol was 86%, and for having R-rated movie restrictions was 86%.

### Analysis

We used chi-square tests to compare differences in proportions and *t*-tests to evaluate mean differences by group. Our main analysis evaluated whether movie restrictions were related to tobacco and alcohol use in adolescents. For this, we used overdispersed log-linear quasilikelihood models programmed in Splus (MathSoft Inc., Seattle, WA) to provide unadjusted and adjusted estimates and confidence intervals for the relative risk of having tried smoking or having tried alcohol.[15] The multivariate models controlled for all student characteristics, exposure to smoking, and parenting characteristics described in the preceding section. Possible interactions were considered with the use of a product interaction term. All *P* values were two-sided, and $P < 0.05$ was considered significant.

## Results

### Parental Movie Restrictions

Although 90% of the students were younger than 14 years of age, only 16% reported they were never allowed to watch R-rated movies; one third (31%) indicated that their parents never restricted them from viewing R-rated movies. **Table 1**, as expected, shows that the level of restriction was inversely related to grade. Movie restrictions were positively associated with maternal supervision and responsiveness, parent education, parental disapproval of smoking, and the child's school performance ($P < 0.001$) and inversely associated with parent, sibling, and friend smoking ($P < 0.001$).

To verify an impact of movie restrictions on adolescent movie exposure, we examined, by level of parental restriction, the average number of movies seen within each rating category from the list of 50 movies (**Table 2**). Students who reported complete or partial restriction for R-rated movies viewed significantly fewer PG-13 and R-rated movies than did students whose viewing was not restricted (e.g., mean for complete restriction of R-rated movies, 0.9; mean for partial restriction, 4.0; mean for no restriction, 7.8). This association was consistent across all grades, indicating that parents who set restrictions were effective in limiting their children's exposure, regardless of age. Because the ratings were not listed on any of the movie titles, students were not able to simply select movies based on whether they were R rated.

### Impact of Restrictions on Smoking and Alcohol Use

Overall, 18% of the student sample had tried smoking and 23% had tried drinking alcohol. Smoking and drinking were significantly associated with the level of restriction for R-rated movies. Thirty-five percent of students who reported no restriction on R-rated movie viewing had tried smoking, 12% of those with partial restrictions had tried smoking, and 2% of those who were never allowed to view R-rated movies had tried smoking. Similarly, the proportion of students who had tried drinking alcohol were 46%, 16%, and 4%, respectively.

Since smoking and alcohol use typically increases with age, we examined how parental restrictions of R-rated movies related to these behaviors at each grade level. As shown in **Figures 2** and **3**, the association was consistent across all grades. The increase in experimentation with tobacco and alcohol use among children with no movie restrictions paralleled what is typically seen in cross-sectional studies of adolescents. In contrast, there was only minimal rise with grade among children with complete restrictions for R-rated movies. In fact, children in eighth grade with complete movie restrictions were no more likely to have tried smoking and were less likely to have tried drinking than children in fifth grade who had no such restrictions (6% vs. 6% for smoking; 9% vs. 15% for drinking).

To identify the independent effect of parental restrictions on smoking and alcohol use, we created a mul-

**TABLE 1**

**R-Rated Movie Restrictions by Student and Parenting Characteristics**

| CHARACTERISTIC | RESTRICTION ON R-RATED MOVIES* | | |
|---|---|---|---|
| | NONE (*n* = 1427) | PARTIAL (*n* = 2402) | COMPLETE (*n* = 715) |
| **Students** | | | |
| Grade | | | |
| 5 | 3% | 9% | 17% |
| 6 | 18% | 27% | 37% |
| 7 | 28% | 34% | 31% |
| 8 | 51% | 31% | 15% |
| Sex | | | |
| Male | 61% | 47% | 34% |
| School performance | | | |
| Average or below | 41% | 22% | 11% |
| Good | 36% | 40% | 33% |
| Excellent | 23% | 38% | 56% |
| Rebelliousness (median)† | 4 | 2 | 1 |
| Sensation seeking (median)† | 7 | 4 | 2 |
| Self-esteem (median)† | 17 | 18 | 20 |
| Exposure to smoking | | | |
| Friends smoke | 61% | 32% | 10% |
| Sibling smokes | 24% | 13% | 6% |
| Parent smokes | 53% | 36% | 17% |
| **Parents** | | | |
| Parental disapproval of smoking | | | |
| Neither disapproves | 4% | 2% | 1% |
| Do not know or mixed messages | 27% | 18% | 12% |
| Both disapprove | 69% | 81% | 87% |
| Maternal supervision | | | |
| Lowest quartile | 41% | 24% | 17% |
| Low–middle | 24% | 26% | 21% |
| High–middle | 22% | 28% | 30% |
| Highest quartile | 13% | 22% | 32% |
| Maternal responsiveness | | | |
| Lowest quartile | 34% | 23% | 13% |
| Low–middle | 23% | 23% | 20% |
| High–middle | 22% | 25% | 24% |
| Highest quartile | 22% | 29% | 43% |
| Parent education | | | |
| Neither parent graduated from high school | 7% | 4% | 2% |
| One parent graduated from high school | 22% | 16% | 10% |
| Both parents graduated from high school | 71% | 80% | 88% |

**All comparisons significantly different at* P *<0.001.*

†*Scale ranges: rebelliousness, 0 to 20; sensation seeking, 0 to 17; self-esteem, 0 to 23. Higher scores signify more of each characteristic.*

tivariate model to adjust for parenting characteristics (maternal responsiveness and supervision, parental disapproval of smoking, parental education); exposure to smoking (parent, friend, and sibling smoking); and child characteristics (sex, school, grade, school performance, rebelliousness, sensation seeking, and self-esteem). Although adjustment reduced the magnitude of these associations, parental restrictions were still strongly associated with smoking and alcohol use (**Figure 4**). Compared with children who had no restrictions on viewing R-rated movies, the relative risks for having tried smoking were 0.74 (CI, 0.65 to 0.85) for those who were partially restricted and 0.29 (0.19 to 0.45) for those who were completely restricted, from viewing R-rated movies. Similarly, the adjusted relative risks for having tried alcohol were 0.70 (0.62 to 0.79) and 0.30 (0.21 to 0.42), respectively. The **Appendix** shows the adjusted relative risk for each covariate. No significant interaction exists between movie restrictions and any of the other parenting measures.

## Discussion

Data from this study demonstrate a striking association between parental movie restrictions and less smoking

**TABLE 2**
**Mean Number (SD) of Movies Seen in Each Rating Category by Level of Parental Restriction**

| MOVIE RATINGS | RESTRICTION OF R-RATED MOVIES* | | |
|---|---|---|---|
| | NONE | PARTIAL | COMPLETE |
| G and PG | 6.3 (2.6)† | 6.3 (2.4) | 5.4 (2.2) |
| PG-13 | 7.7 (3.0) | 6.1 (3.0) | 3.2 (2.4) |
| R | 7.8 (4.7) | 4.0 (3.8) | 0.9 (1.8) |

**All comparisons significantly different at P <0.001 unless noted otherwise.*
*†Not significantly different from "partial restriction."*

and drinking among adolescents. The association was independent of our measures of maternal supervision, maternal responsiveness, and parental disapproval. These findings imply that the association is specific to movie restrictions rather than simply reflecting stricter parenting styles or greater parental involvement. Moreover, lack of parental movie restrictions showed a stronger association with having tried smoking or drinking than any of the other parenting measures. Since this effect was consistent across all grade levels, it was not due to younger children simply being less likely to use alcohol or tobacco. Although the cross-sectional nature of the data precludes an assumption of causality, the belief that viewing smoking and drinking in movies can influence adolescents to adopt these behaviors is consistent with Social Learning Theory[16] (which purports that children acquire their behavior in part through observation) and with multiple empirical studies confirming social factors (such as when a friend smokes) as contributors to adolescent smoking.[17–19]

Our findings on alcohol are not consistent with those of Robinson and coworkers who found that television and music videos were risk factors for alcohol use, but viewing movies on videotape was associated with a lower risk for alcohol use.[9] The authors explained this finding by stating that movies contain fewer portrayals of alcohol use than does television programming and that videos do not contain beer advertisements. Although beer advertising may be a partial explanation, the suggestion that movies may prevent the start of alcohol use is problematic for several reasons. Contrary to the authors' assertion, movies are more likely than prime-time television programs to portray alcohol use.[20,21] Moreover, because of the wide availability of movie channels, television viewing time is really a mixture of prime-time shows and movies. Because the researchers did not evaluate the amount of television viewing spent watching movies or exposure to movies of different ratings, this study could not separate the effects of television viewing from the effects of movie viewing.

The findings from our study have important implications for defining a parental role in alcohol and tobacco prevention. Limited success with school-based programs for adolescents has prompted researchers to

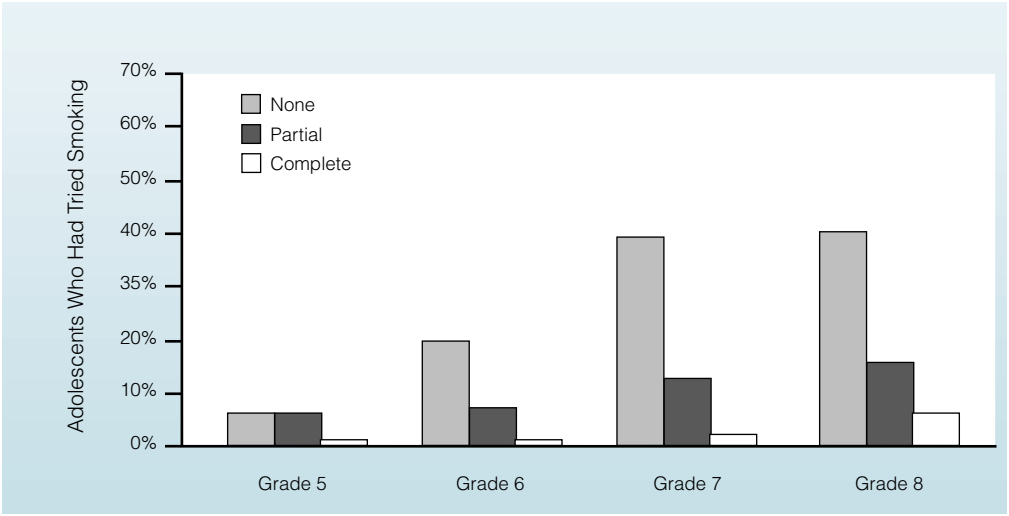



**FIGURE 2. Adolescent smoking and R-rated movie restrictions.**

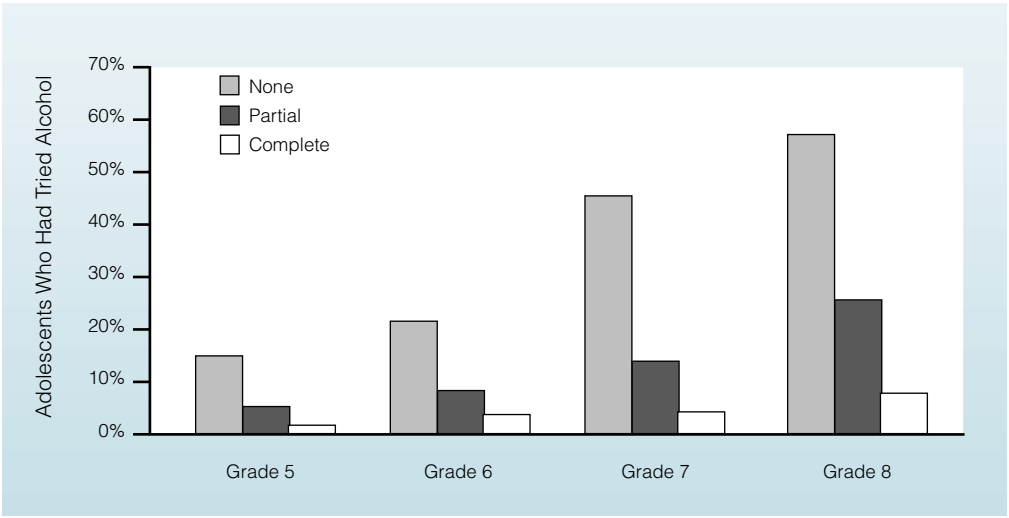
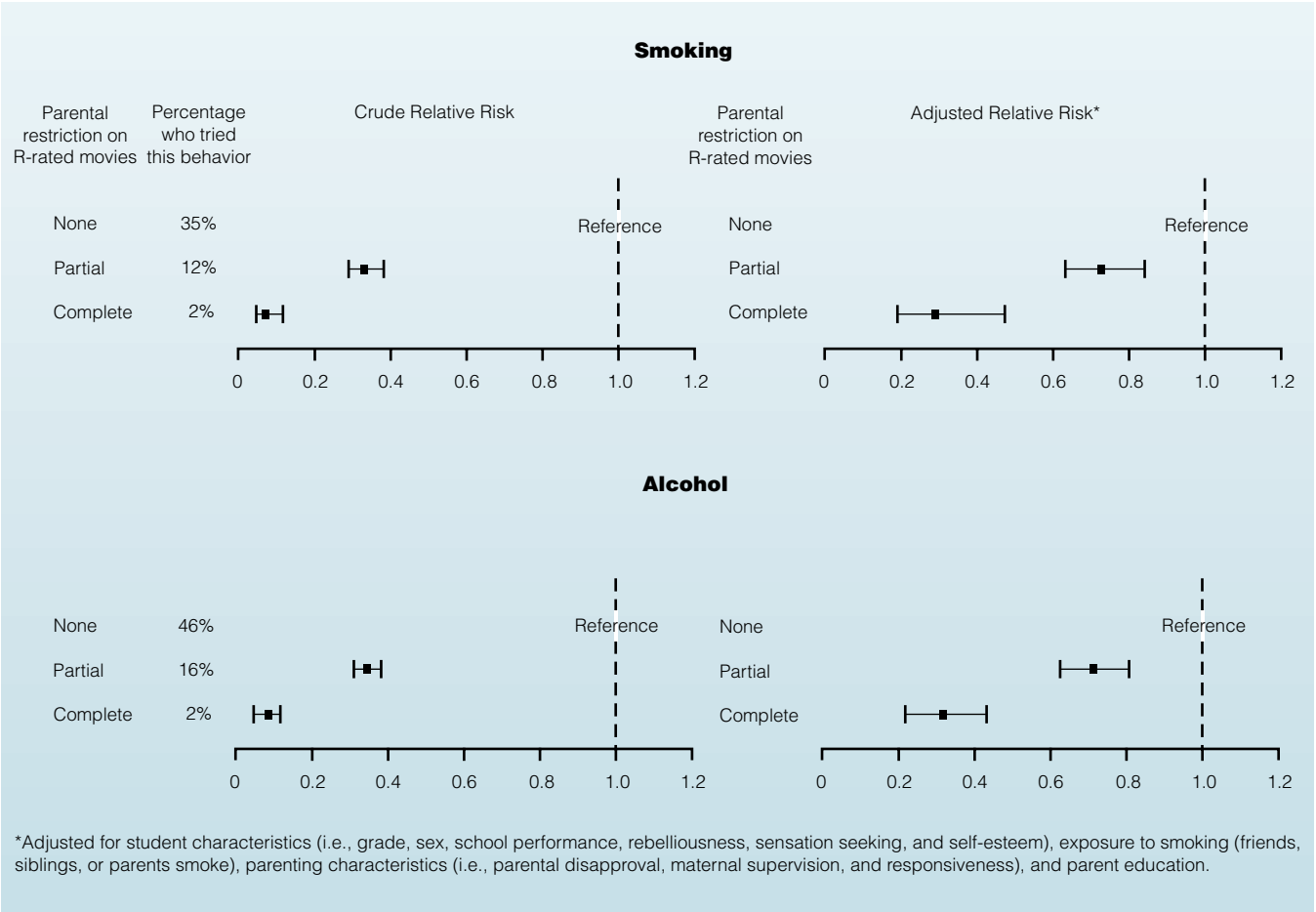



**FIGURE 3. Adolescent alcohol use and R-rated movie restrictions.**

look for other avenues of intervention.[22–24] Recently, interest has focused on studying what parents can do, beyond modeling good behavior, to prevent their children from smoking and drinking. Several studies have demonstrated that parental supervision and involvement prevent children from engaging in various risky behaviors, including alcohol and tobacco use.[25–27] Our findings support the belief that parents should be more proactive in preventing these behaviors and expand previous research by identifying movie restrictions as an important aspect of parental supervision.

Additional studies are needed to determine why parents do or do not restrict their children's movie viewing and to identify effective ways to assist parents in




*Adjusted for student characteristics (i.e., grade, sex, school performance, rebelliousness, sensation seeking, and self-esteem), exposure to smoking (friends, siblings, or parents smoke), parenting characteristics (i.e., parental disapproval, maternal supervision, and responsiveness), and parent education.

**FIGURE 4. Effect of movie restrictions on adolescent smoking and alcohol use.**

restricting children's access to media. We should also examine whether parents can limit or even reverse the impact of movies by watching them with their children and discussing the content with them. However, not all the responsibility should fall on parents. The movie industry should be prevented from aggressively marketing R-rated movies to children, and theaters and video stores should strictly enforce policies restricting children younger than 17 years of age from viewing movies without an accompanying parent. In addition, a careful examination of the movie rating system is warranted to evaluate whether it adequately informs parents about the content of movies and their possible impact.

Our study has several limitations, which should be acknowledged. Because the influence of parents on adolescent media exposure was not the primary focus of the survey, we limited the number of survey questions used to assess other forms of maternal supervision. This measure may have underestimated the degree of parental supervision for students who were cared for primarily by their fathers or another caregiver. It is also possible that our measures did not capture other aspects of parenting that could be related to movie restrictions, such as setting specific limits about alcohol and tobacco use or restricting peer-group affiliations. In addition, our adolescent sample was not nationally representative. Despite these limitations, we believe it would be prudent for parents to limit the exposure of adolescents to R-rated movies while additional research is being conducted because, as the rating implies, the movies portray a wide range of behaviors and material that are inappropriate for children younger than 17 years of age.[13]

In summary, adolescents whose parents restrict their exposure to R-rated movies not only report lower exposure to movies with R and PG-13 ratings but also report much lower rates of tobacco and alcohol use. These results suggest that limiting exposure to these media may help prevent early use of alcohol and tobacco.

## Take-Home Points

- **R-rated movies frequently portray risk behaviors, such as smoking and drinking alcohol, and studies have linked viewing smoking in movies with adolescent smoking.**
- **We conducted a school-based survey to see whether parental restrictions to R-rated movies relate to whether adolescents try smoking or drinking.**
- **Parental restrictions work: Adolescents who report that their parents restrict them from viewing R-rated movies see fewer of them.**
- **Parental movie restrictions are also associated with a lower prevalence of smoking and drinking among adolescents—an association independent of other traditional measures of good parenting.**
- **The findings reported here suggest that parental restrictions on viewing R-rated movies may prevent the early start of smoking and drinking behaviors.**

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(*continued on next page*)

**APPENDIX TABLE**

## Adjusted Relative Risks for All Variables in Model

| VARIABLE | DRINKING | | SMOKING | |
|---|---|---|---|---|
| | PERCENTAGE WHO TRIED ALCOHOL | ADJUSTED RR (95% CI) | PERCENTAGE WHO TRIED SMOKING | ADJUSTED RR (CI) |
| **Restriction on R-rated movies** | | | | |
| None | 46% | Reference | 35% | Reference |
| Some | 16% | 0.70 (0.62 to 0.78) | 12% | 0.74 (0.65 to 0.85) |
| Complete | 4% | 0.30 (0.21 to 0.42) | 2% | 0.29 (0.19 to 0.45) |
| **Student characteristics** | | | | |
| Grade | | | | |
| 5 | 5% | Reference | 5% | Reference |
| 6 | 10% | 1.44 (0.97 to 2.15) | 9% | 1.14 (0.74 to 1.76) |
| 7 | 21% | 2.33 (1.59 to 3.42) | 18% | 1.77 (1.17 to 2.68) |
| 8 | 39% | 3.09 (2.11 to 4.52) | 26% | 1.72 (1.13 to 2.61) |
| Sex | | | | |
| Male | 27% | Reference | 19% | Reference |
| Female | 20% | 0.98 (0.88 to 1.09) | 16% | 1.03 (0.90 to 1.16) |
| School performance | | | | |
| Average or below | 43% | 1.38 (1.18 to 1.61) | 35% | 1.33 (1.11 to 1.59) |
| Good | 22% | 0.98 (0.79 to 1.21) | 15% | 1.20 (1.00 to 1.43) |
| Excellent | 11% | Reference | 8% | Reference |
| Rebelliousness* | | 1.03 (1.01 to 1.04) | | 1.05 (1.03 to 1.06) |
| Sensation seeking* | | 1.07 (1.05 to 1.08) | | 1.03 (1.02 to 1.05) |
| Self-esteem* | | 1.00 (0.99 to 1.01) | | 0.99 (0.98 to 1.00) |
| **Exposure to smoking** | | | | |
| Friends smoke | | | | |
| No | 9% | Reference | 4% | Reference |
| Yes | 47% | 2.26 (1.98 to 2.59) | 40% | 4.14 (3.47 to 4.94) |
| Sibling smokes | | | | |
| No | 20% | Reference | 14% | Reference |
| Yes | 43% | 1.09 (0.97 to 1.23) | 39% | 1.28 (1.12 to 1.46) |
| Parent smokes | | | | |
| No | 18% | Reference | 11% | Reference |
| Yes | 32% | 1.01 (0.91 to 1.13) | 28% | 1.19 (1.04 to 1.35) |
| **Other parenting characteristics** | | | | |
| Parental disapproval of smoking | | | | |
| Neither disapprove | 56% | Reference | 52% | Reference |
| Don't know or mixed messages | 32% | 0.98 (0.76 to 1.26) | 26% | 1.01 (0.77 to 1.32) |
| Both disapprove | 20% | 0.98 (0.77 to 1.26) | 14% | 0.94 (0.72 to 1.22) |
| Maternal supervision | | | | |
| Lowest quartile | 33% | Reference | 24% | Reference |
| Low–middle | 24% | 0.91 (0.79 to 1.05) | 17% | 0.87 (0.74 to 1.03) |
| High–middle | 18% | 0.93 (0.80 to 1.07) | 14% | 1.03 (0.88 to 1.21) |
| Highest quartile | 17% | 0.89 (0.77 to 1.03) | 14% | 0.98 (0.83 to 1.16) |
| Maternal responsiveness | | | | |
| Lowest quartile | 38% | Reference | 28% | Reference |
| Low–middle | 23% | 0.88 (0.77 to 1.01) | 18% | 1.05 (0.90 to 1.23) |
| High–middle | 20% | 0.89 (0.77 to 1.03) | 14% | 1.02 (0.86 to 1.21) |
| Highest quartile | 14% | 0.81 (0.69 to 0.95) | 11% | 0.99 (0.83 to 1.19) |
| Parent education | | | | |
| Neither parent graduated from high school | 34% | Reference | 35% | Reference |
| One parent graduated from high school | 29% | 0.98 (0.79 to 1.21) | 29% | 0.94 (0.76 to 1.16) |
| Both parents graduated from high school | 22% | 1.05 (0.86 to 1.29) | 14% | 0.78 (0.64 to 0.96) |

**Entered as continuous variables in the model. RR (relative risk) is for each 1-point increase on index. The range for each of these scales is 0 to 21, 0 to 18, and 0 to 24. Higher scores signify more of each characteristic.*