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Pediatrics 2004;114;149-156

DOI: 10.1542/peds.114.1.149

This information is current as of January 30, 2006

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Effect of Parental R-Rated Movie Restriction on Adolescent Smoking Initiation: A Prospective Study

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ABSTRACT. *Objective.* To determine if young adolescents who report that their parents restrict viewing R-rated movies have a lower risk of trying smoking in the future.

Design. Prospective observational study. Students from 15 schools in New Hampshire and Vermont, randomly selected from all middle schools with >150 students, were surveyed in 1999. Baseline never-smokers were surveyed again by telephone 13 to 26 months later to determine smoking status.

Outcome Measure. Trying smoking during the follow-up period.

Results. The majority of the 2596 students were white, with ages ranging from 10 to 14 years. Nineteen percent reported that their parents never allowed them to view R-rated movies, 29% were allowed once in a while, and 52% were allowed sometimes or all the time. Ten percent of students tried smoking during the follow-up period. Smoking-initiation rates increased as parental restriction of R-rated movies decreased (2.9% for adolescents reporting that their parents never allowed them to view R-rated movies, 7.0% for those allowed to view them once in a while, and 14.3% for those allowed to view them sometimes or all the time). There was a strong and statistically significant effect of parental R-rated movie restriction on adolescent smoking even after controlling for sociodemographics, social influences (friend smoking, receptivity to tobacco promotions), parenting style (maternal support and control, parental disapproval of smoking), and characteristics of the adolescent (school performance, sensation seeking, rebelliousness, self-esteem). Compared with adolescents whose parents never allowed them to view R-rated movies, the adjusted relative risk for trying smoking was 1.8 (95% confidence interval [CI]: 1.1, 3.1) for those allowed to watch them once in a while and 2.8 (95% CI: 1.6, 4.7) for those allowed to watch them sometimes or all the time. The effect was especially strong among adolescents not exposed to family (parent or sibling) smoking, among whom the adjusted relative risk for smoking was 4.3 (95% CI: 1.4, 13) for those allowed to view R-rated movies once in a while and 10.0 (95% CI: 3.6, 31) for those allowed to view them sometimes or all the time.

Conclusions. Parental restriction from watching R-rated movies strongly predicts a lower risk of trying smoking in the future. The effect is largest among adolescents not exposed to family smoking. By exerting control over media choices and by not smoking themselves, parents may be able to prevent or delay smoking in their children. *Pediatrics* 2004;114:149–156; *smoking, mass media, parenting, movies.*

ABBREVIATIONS. RR, relative risk; CI, confidence interval.

The onset of tobacco use typically occurs during childhood or adolescence. Smoking is a stylized social behavior that is acquired, in large part, through observation and imitation. Social influences such as observational learning are important determinants of children's beliefs and expectancies about what they might gain by smoking.¹ Children imitate the behavior of role models, especially those they admire or with whom they identify. For children whose parents smoke, the modeling of the behavior is continuous through early childhood and elementary school. These children know sundry details about how to smoke before many of their peers whose family members do not smoke. Children who live in smoking households also have access to cigarettes without having to purchase them. It is not surprising, then, that smoking by parents and other family members has been shown in multiple studies to lead to positive attitudes about smoking and the early adoption of smoking behavior.^{2–5} An unanswered question is how other social-influence factors such as media influence children already exposed to smoking in the home.

Movies are a common source of exposure to smoking. Indeed, more than four fifths of movies, including many specifically meant for young audiences, contain smoking.⁶ At a general level, movies play an important social-influence role in contemporary Western cultures; they not only depict modern societal norms but also help define them. Multiple studies have linked seeing smoking in movies with adolescent smoking.^{7–11} This finding prompts a search for factors that determine exposure to movie smoking depictions among children. To the extent that they control media access, parents may influence how much smoking their children see in movies. In a cross-sectional study, we demonstrated that adolescents who report parental restrictions on viewing

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Received for publication Sep 19, 2003; accepted Mar 2, 2004.

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R-rated movies are less likely to smoke.¹² Additional analysis suggests that the effect of parental movie restriction is mediated through reduced exposure to movie smoking.¹³ Thus, parents seem to influence their children's smoking behavior either directly, by modeling the behavior, or indirectly, through controlling access to other sources of social influence such as movie smoking.

To examine these social influences further, we studied the effect of parental R-rated movie restriction on smoking initiation in a prospective study of adolescent never-smokers whose restriction from R-rated movies was measured at baseline and again 1 to 2 years later (along with their smoking status). The goals of this study were to examine the effect of parental R-rated movie restriction on trying smoking overall and by whether family members smoke. We also examined whether changes in movie restriction over time are associated with a greater or lesser risk of trying smoking. This is the first study to evaluate, prospectively, the protective effect of parental R-rated movie restriction on adolescent smoking.

METHODS

Study Sample

Potentially eligible study participants were 3540 students who reported never smoking in a survey conducted at 14 randomly selected New Hampshire and Vermont schools (Fig 1). Smoking initiation was assessed through a follow-up telephone interview conducted 13 to 26 months after the baseline cross-sectional survey. Follow-up was achieved for 71% of the baseline sample. Students lost to follow-up did not differ from those retained by age, gender, or parental R-rated movie restriction but were more likely to have parents who did not complete high school, report poor school performance, and have friends or parents who smoke. Those lost to follow-up were only slightly more likely to be attitudinally susceptible to smoking than those retained (26% vs 23%, respectively). The final sample of 2596 students was primarily white (94.9%) and included comparable numbers of males and females.¹⁰

Survey Administration

Baseline Survey

The details of the initial survey have been reported.⁹ Briefly, completion of the paper-and-pencil survey was overseen by study personnel in the classroom. The baseline survey queried students about smoking behavior and factors that might influence it, including demographics, social influences, student attributes, and parenting style. Adolescents were assured confidentiality, and parents were informed of the survey by mail. The baseline and follow-up surveys were approved by the Committee for the Protection of Human Subjects at Dartmouth College.

Follow-up Survey

The follow-up survey was conducted by trained telephone interviewers using a computer-assisted telephone interview system. Students entered their answers to questions by touch tone to minimize the possibility that answers would be overheard by other family members. In addition to updating student smoking status, we reassessed friend smoking status and parental restriction of R-rated movies.

Risk Factor Assessment

Parental restriction of R-rated movies was determined at baseline and follow-up by asking: "How often do your parents let you watch movies or videos that are rated R?" Answers included "never," "once and a while," "sometimes," and "all the time." We combined categories "sometimes" and "all the time" because the smoking rates were similar across these categories. Change in parental restriction between baseline and follow-up was measured by change scores based on the adolescents' reports of parental R-rated movie restrictions at both waves. Scores were collapsed into 3 categories: greater strictness (moving to a more restrictive category at follow-up), no change (same category at both time points), or greater leniency (moving to a less restrictive category at follow-up).

We also measured potential confounders including sociodemographics (gender, school, age, parental education), social-influence factors (exposure to smoking by family members [parents or siblings], smoking by friends; receptivity to tobacco promotions),¹⁴ characteristics of the student (rebelliousness,¹⁵ sensation seeking,^{16,17} self-esteem,¹⁸ school performance), parenting style (maternal support, maternal control),¹⁹ and parent disapproval of smoking.²⁰ We used items from Jackson et al²¹ to measure maternal support (also termed responsiveness) and control (an index

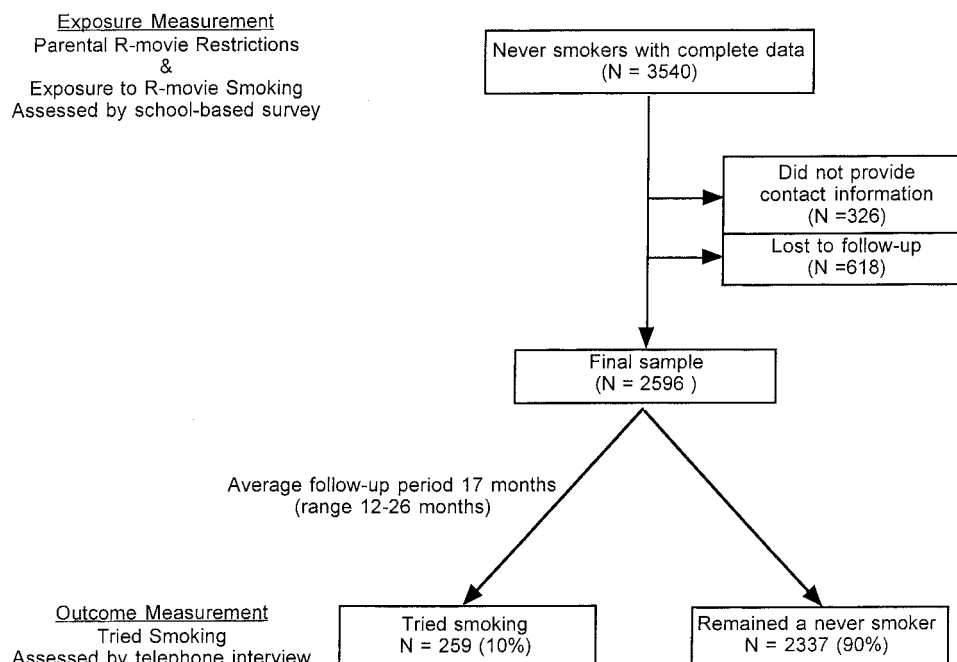


Fig 1. Study sample.

that combines monitoring and limit setting [also termed demand-iness]). Students used a 4-point response scale to indicate how well certain statements described their mother. For maternal support, 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." For maternal control 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." Responses from each of the items were summed to create indices (possible range: 0–12 for the support and control index). Students' perception of parental disapproval of adolescent smoking was determined by asking "If you were smoking cigarettes and your mother [father] knew about it, what would she say?" Responses included: "She/he would tell me to stop," "She/he would not tell me to stop," and "Don't know." Items used to measure student personality characteristics and parenting style and their Cronbach's α are reported elsewhere (see Appendix).⁹

Exposure to Smoking in R-Rated Movies

Our method for determining exposure to movie smoking has been described.^{9,13} Briefly, through an extensive content-coding procedure, we counted occurrences of smoking in each of 601 popular contemporary movies selected based on box-office success and analyzed their content for smoking. From this set of 601 films, we generated, at random, unique lists of 50 movie titles stratified by Motion Picture Association of America rating to reflect the proportion of each rating in the larger sample. On average, each list of 50 titles contained 23 R-rated movies. We estimated exposure to R-rated movie smoking by asking respondents whether they had seen the individual titles. Smoking occurrences were summed for affirmative responses to the individual R-rated movie titles and adjusted to reflect exposure to the entire sample of R-rated movies.¹³ For the analysis, adolescents were classified into 3 categories: no exposure to R-rated movie smoking ($n = 594$), low exposure (exposure to 1–499 R-rated movie smoking depictions; $n = 1109$), and high exposure (exposure to 500–3376 R-rated movie smoking depictions; $n = 893$).

Outcome Assessment

We determined at baseline and follow-up whether students had initiated smoking by asking: "How many cigarettes have you smoked in your life?" Response options included "None," "Just a few puffs," "1 to 19 cigarettes," "20 to 100 cigarettes," and ">100." Only baseline never-smokers (those who answered "none") are included in this study. A student who reported any smoking behavior at follow-up was classified as having tried smoking during the observation period.

Analysis

Preliminary analyses consisted of descriptive frequencies, χ^2 tests to compare differences in proportions, and t tests to evaluate mean differences by group. We examined trying smoking as a function of parental restriction from viewing R-rated movies and other covariates using generalized linear models to determine adjusted relative risks (RRs) and 95% confidence intervals (CIs) for trying smoking during the follow-up period.²² A log link rather than logistic regression was used so that RRs could be estimated directly. An overdispersion parameter was used to account for possible clustering by schools. Multivariate analyses were conducted by using both minimally adjusted (age, gender, parental education and school) and fully adjusted models. We evaluated potential interactions between parental R-rated movie restriction and all covariates. Indexed variables (sensation seeking, rebelliousness, self-esteem, maternal support, maternal control) were entered as continuous variables. In a similar analysis, we determined the effect of a change in R-rated movie restriction (between baseline and follow-up) on trying smoking. Model fit and interaction were assessed by using changes in deviances and standard diagnostic plots. Results were considered statistically significant if $P < .05$, using a 2-sided test.

Sensitivity Analysis

We conducted simulation analyses, described previously,⁹ to assess the possibility that a missing covariate could confound the relationship we report. We generate a missing covariate associated

at varying degrees with both trying smoking and parental R-rated movie restriction but independent of all other covariates. For each simulation, we calculated a test statistic ($z-d$) for the association of the missing covariate with movie restriction and a test statistic ($z-l$) for the association of the missing covariate with smoking uptake (z of 1.96 corresponds to a P value of .05). We report the minimum value of $z-d \times z-l$ that would be necessary to confound the main effect.

We also used simulation analyses to explore whether nonparticipation could have biased our results. We restricted our analysis to the 3540 respondents who had complete data at baseline, of which 944 did not participate in the follow-up survey. We examined attrition in the context of 2 possibilities: 1) no effect of parental R-rated movie restriction among the missing, and 2) the missing were high risk for smoking with respect to other variables. In the latter case, the simulation determined how much stronger the other risk factors would have to be in the nonparticipants to raise the smoking rate to the point at which the contribution of parental R-rated movie restriction would no longer be statistically significant.

RESULTS

The final sample of 2596 students contained comparable numbers of boys and girls (Table 1). On average, adolescents were 12.1 years old at baseline. Most students had parents who graduated from high school, and approximately one third had parents or friends who smoked. Most viewed their mothers as supportive (mean: 9.1 of a possible 12); scores for maternal control were somewhat lower (mean: 7.9). Thirty-five percent had family members who smoked. Only 19% of adolescents at baseline reported that their parents never allow them to view R-rated movies, 29% were allowed to see them once in a while, and 52% reported being allowed to view them sometimes or all the time.

Predictors of Trying Smoking

Overall, 10% of the sample reported trying smoking during the follow-up period. Smoking-initiation rates increased as parental restriction of R-rated movies decreased (2.9% for adolescents reporting that their parents never allowed them to view R-rated movies, 7.0% for those allowed to view them once in a while, and 14.3% for those allowed to view them sometimes or all the time). Smoking rates were higher in adolescents exposed to family smoking compared with those not exposed (Fig 2). Adolescent smoking increased with decreased parental restriction from viewing R-rated movies, with the impact being greater in nonsmoking families than in smoking families. Among adolescents whose family members did not smoke and who were never allowed to watch R-rated movies, only 3 of 399 (0.75%) tried smoking. Trying smoking also was associated with lower maternal responsiveness but not with maternal control, parental disapproval of smoking, higher age at baseline, lower parent education, all social-influence variables, and poor school performance. In addition, adolescents with poor self-esteem and higher levels of sensation seeking and rebelliousness were significantly more likely to try smoking.

After controlling for these variables and all others included in Table 1, parental R-rated movie restriction retained a strong and statistically significant effect on subsequent smoking initiation (Table 2). Compared with the reference group, risk of trying

TABLE 1. Risk of Trying Smoking by Covariate ($N = 2596$; Smoking Initiation Rate = 0.10)

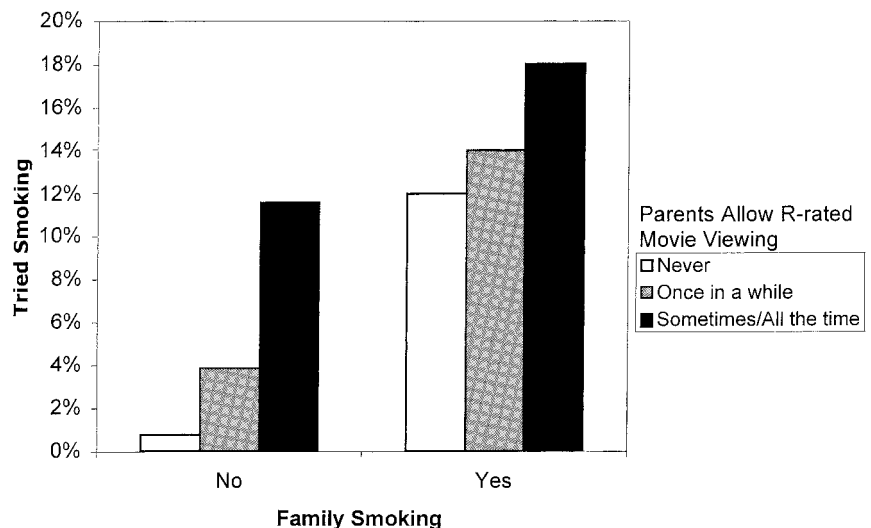
Risk Factor	<i>N</i>	Percent Trying Smoking	RR* (95% CI)	Adjusted† RR (95% CI)
Student characteristics				
Age				
10–11 y	806	6.2	Reference	Reference
12 y	803	8.5	1.4 (0.98, 2.0)	1.2 (0.86, 1.7)
13–14 y	987	14.3	2.4 (1.7, 3.3)	1.6 (1.1, 2.2)
Gender				
Female	1367	10.2	Reference	Reference
Male	1229	9.7	0.93 (0.73, 1.2)	0.70 (0.54, 0.90)
Parent education				
Both completed high school	2218	9.3	Reference	Reference
Neither or one completed high school	378	14.0	1.6 (1.2, 2.1)	1.0 (0.77, 1.4)
School performance				
Excellent	1109	4.8	Reference	Reference
Good	1003	11.4	2.2 (1.6, 3.1)	1.8 (1.3, 2.4)
Average or below average	484	19.0	3.5 (2.5, 4.9)	2.1 (1.5, 3.1)
Social influences				
Friend smoking				
No	1926	7.6	Reference	Reference
Yes	670	16.7	1.8 (1.4, 2.4)	1.2 (0.91, 1.5)
Receptive to tobacco promotions				
No	2155	8.3	Reference	Reference
Yes	441	18.1	2.0 (1.5, 2.6)	1.2 (0.94, 1.6)
Parenting characteristics				
Maternal support‡ (4-item index, range 0–12)	9.13 (2.86)		0.92 (0.88, 0.97)	1.0 (0.95, 1.0)
Maternal control‡ (4 item index; range 0–12)	7.94 (2.81)		0.97 (0.92, 1.0)	1.0 (0.99, 1.1)
Parental disapproval of smoking				
Both disapprove	2152	9.2	Reference	Reference
Neither or mixed disapproval	444	14.0	1.5 (1.1, 1.9)	1.1 (0.81, 1.4)
Personality characteristics				
Sensation seeking‡ (6-item index, range 0–18)	5.27 (3.74)		1.2 (1.1, 1.2)	1.0 (1.0, 1.1)
Rebelliousness‡ (7-item index, range 0–21)	3.38 (3.78)		1.2 (1.1, 1.2)	1.0 (0.99, 1.1)
Self-esteem‡ (8-item index, range 0–24)	17.34 (4.86)		0.94 (0.91, 0.97)	0.99 (0.97, 1.0)

* Crude estimates are adjusted for age, gender, parent education, and school.

† This model includes all variables listed in this table plus family smoking, parental R-rated movie restriction, and a term for the interaction between these variables.

‡ RRs are estimated for each 1-point increase on the index, and means (SD) are given in the first column.

Fig 2. Effect of parental R-rated movie restriction on trying smoking by whether family members smoke (defined by the presence of parent or sibling smoking).



smoking was extremely high in those with family members who smoked, but parental movie restrictions had little impact in this group. In contrast, among those with nonsmoking families, risk of trying smoking increased dramatically with decreasing parental movie restriction (Table 2). The interaction between family smoking status and parental movie restriction was statistically significant ($P < .001$). In the multivariate analysis, only older age, poor school

performance, and sensation seeking also retained a statistically significant association with trying smoking (Table 1).

The relation between R-rated movie restriction and trying smoking remained unchanged after controlling for time until follow-up, hours spent watching television, and playing video games, whether parents blocked television channels or restricted television, and whether the family had cable television

TABLE 2. Multivariate Model of the Effect of Parental R-Rated Movie Restriction on Smoking Initiation During the Follow-up Period ($N = 2596$)

	Adjusted* RR of Trying Smoking (95% CI), Allowed to Watch R-Rated Movies		
	Never	Once in a While	Sometimes/All the Time
Main effects model†	Reference	1.8 (1.1, 3.1)	2.8 (1.6, 4.7)
Interaction model‡			
Family smoking			
No	Reference	4.3 (1.4, 13)	10 (3.6, 31)
Yes	13 (4.1, 44)	12 (4.1, 37)	13 (4.4, 38)

* Estimates are adjusted for all covariates listed in Table 1.

† The rate of smoking initiation in the reference group for the main effects model is 2.9%.

‡ This model demonstrates the interaction between the effect of family smoking and the effect of being allowed to watch R-rated movies on smoking initiation. The rate of smoking in the reference group (never allowed to watch R-rated movies and no family smoking) is 0.75%.

(none of these factors predicted smoking in the multivariate model). The effect was unchanged when parenting style was modeled by using the tercile-split procedure as described by Jackson et al.²¹ and Steinberg et al.²³

Exposure to R-rated movie smoking decreased significantly with increasing parental R-rated movie restriction ($P < .001$), suggesting that the effect of parental R-rated movie restriction on adolescent smoking is mediated through lower exposure to R-rated movie smoking. As shown in Fig 3, only 4.9% of those never allowed to view R-rated movies had high exposure to R-rated movie smoking, compared with 20% for those allowed to watch them once in a while and 54% among those allowed to watch them sometimes or all the time.

Effect of Change in Parental R-Rated Movie Restriction on Trying Smoking

Only 32% of adolescents reported decreased restriction at follow-up; some 51% reported no change, and 17% reported increased restriction at follow-up. Increased restriction was significantly associated with the following baseline factors: higher levels of sensation seeking, poor school performance, presence of a premium movie channel at home, and watching more videos per week. Within each baseline category of parental R-rated movie restriction, more lenient rules at follow-up were associated with higher risk of trying smoking and stricter rules with

decreased risk, compared with adolescents reporting no change (Fig 4). Similar RRs were observed for changes in smoking status of friends over the same time period. Time until follow-up was associated with change in parental restriction, with longer follow-up periods associated with greater lenience. However, time until follow-up was not associated with trying smoking, and its inclusion in the analysis did not change the adjusted RRs reported in Fig 4.

Sensitivity Analysis

The simulations indicate that $z-d \times z-l$ would need to be >100 for an unmeasured independent variable to confound the relationship between parental R-rated movie restriction and trying smoking. Furthermore, even if there were no relation between parental R-rated movie restriction and smoking among missing adolescents, the overall effect would still be statistically significant. Finally, the prevalence of trying smoking (due to other risk factors) among adolescents lost to follow-up would need to be at least 97% to nullify the reported effect of parental R-rated movie restriction (this would be equivalent to raising the RR of each of the other covariates by a factor of 4.2). These scenarios are highly unlikely.

DISCUSSION

Parental restriction from watching R-rated movies is associated with substantially lower risk of trying smoking in the future. The effect is particularly

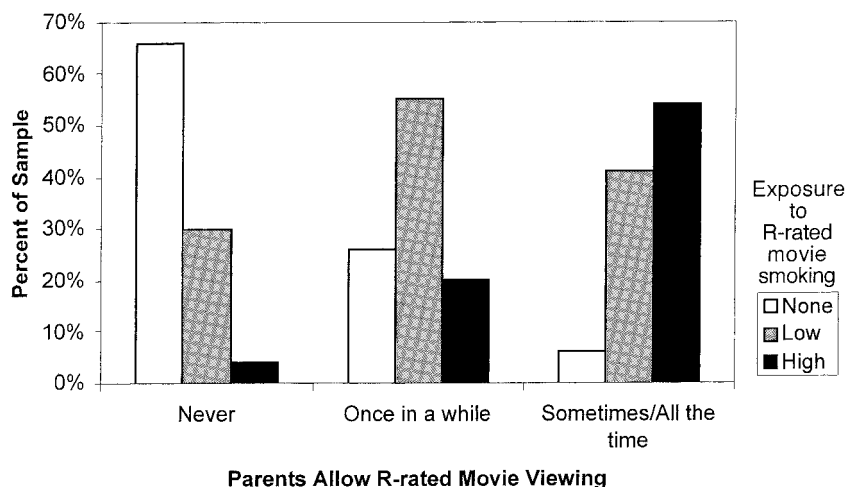


Fig 3. Exposure to R-rated movie smoking by parental restriction on viewing R-rated movies (number of R-rated movie smoking occurrences seen: none, 0; low, 1-499; high ≥ 500).

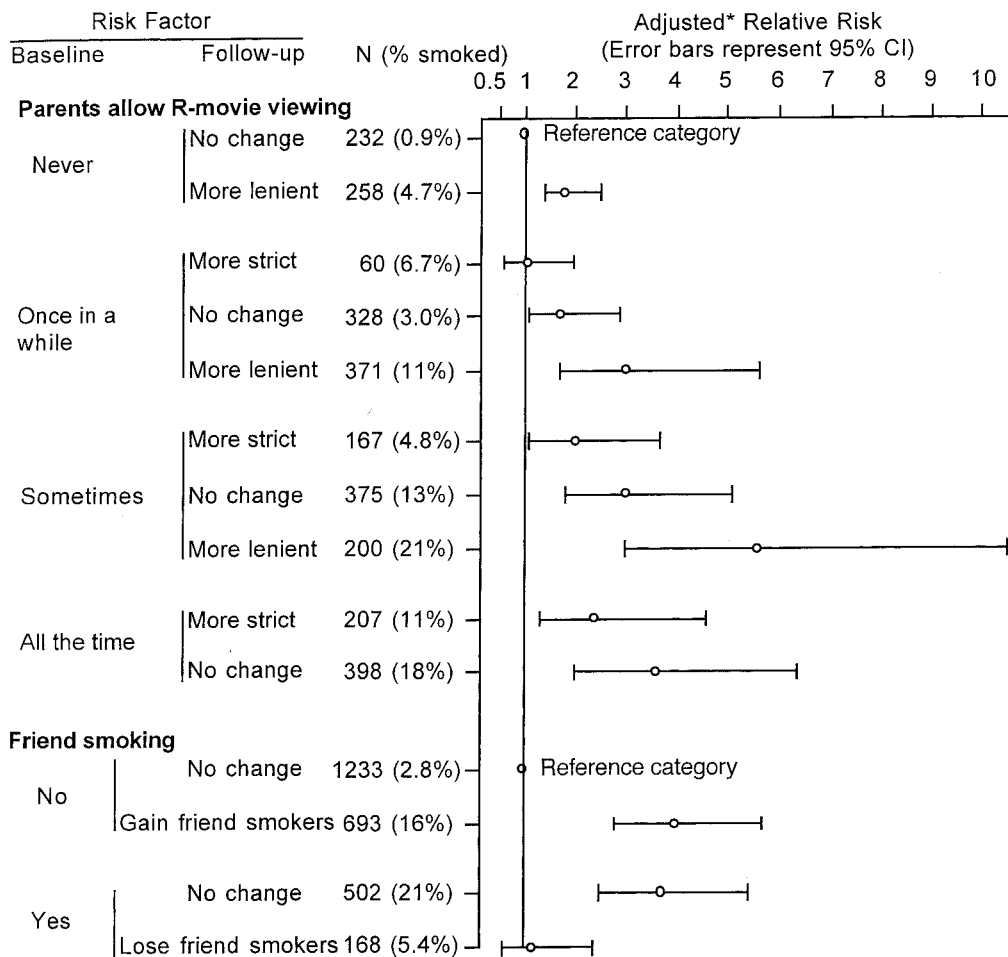


Fig 4. Effect of changes in parental R-rated movie restrictions (and friend smoking) on trying smoking (adjusted for age, gender, parent education, school, friend smoking, sibling smoking, parent smoking, receptivity to tobacco promotions, school performance, sensation seeking, rebelliousness, self-esteem, maternal support, maternal control, and parental disapproval of smoking). Error bars represent the 95% CI for the RR estimate.

strong for adolescents never allowed to watch R-rated movies and not exposed to family smoking, among whom <1% tried smoking during the follow-up period. Moreover, change in R-rated movie restriction over time affects risk of smoking, with greater lenience conferring greater risk and more strictness reducing risk. We expected to see most adolescents report relaxation of R-rated movie restriction over time. Instead, we found that most reported no change or stricter rules at follow-up, suggesting that many parents are successful at maintaining restriction on R-rated movie viewing as their sons and daughters make their way through junior high school. Considered together, these results indicate that, by exerting control over media choices and by not smoking themselves, parents can prevent or delay the adoption of smoking in their children.

Why is the effect of R-rated movies restriction on smoking so powerful? We do not believe that parental R-rated movie restriction is simply a proxy for more effective parenting generally, because it is not highly correlated with parenting style (maternal support or maternal control).¹³ We suggest that R-rated movie restriction is a unique aspect of parenting that relates to how parents influence the media environ-

ment within the household. By exerting control on media access, parents may influence the type and amount of a particular social influence, eg, media smoking depictions, and thereby influence risk for smoking initiation. Parental R-rated movie restriction could also be a marker for restriction from other unmeasured exposures that depict smoking, such as television dramas. In addition, there could be another aspect of parenting not captured in our survey, such as teaching media literacy. However, the fact that adolescents who report parental restriction also have much lower exposure to R-rated movie smoking supports the notion that lower exposure to R-rated smoking mediates much of the effect of R-rated movie restriction. Ultimately, the best test of efficacy would be a randomized trial, and this study strengthens the case for developing and testing an intervention to motivate and assist parents in enforcing R-rated movie restriction.

Why would the effect of R-rated movie restriction on smoking be a function of whether adolescents are exposed to smoking in the home? Theoretically, early exposure to smoking in the household should enhance the social influence of movies, because positive images of movie smoking further reinforce pos-

itive beliefs and expectancies that come about from seeing family members smoke. Moreover, to the extent that children of those who smoke have already become attitudinally receptive to smoking, they may be more likely to identify with the characters who smoke on screen. Such identity processes have been shown to play an important role in adolescent smoking initiation.^{24,25} Our findings, which showed less impact of exposure to movie smoking among adolescents from smoking families, do not support this interpretation. One possibility is that the main effect of familial smoking is so strong that exposure to media smoking confers little additional risk. Alternatively, children who see family members smoke could have a more realistic understanding of cigarette smoking, resulting in greater skepticism and less reactivity to the glamorized version of smoking depicted in the movies.

One limitation of our study is that our outcome measure is trying smoking, and not every adolescent that tries becomes an adult smoker. However, the evidence indicates that trying smoking does place adolescents at substantially higher risk for future smoking.^{26–28} It will be important to examine the effect of restricting access to R-rated movies on outcomes that link more strongly with nicotine addiction, such as daily smoking of >10 cigarettes or smoking within 1 hour after waking. These outcomes were not possible to examine in this sample because of the young age of the subjects, the relatively limited follow-up time, and the low proportion of established smokers at follow-up. Another limitation is that our adolescent sample was not nationally representative, and additional studies are needed to determine if the findings apply to a nationally representative sample.

CONCLUSIONS

Adolescents whose family members do not smoke and whose parents restrict their exposure to R-rated movies see less movie smoking and are at extremely low risk for initiating smoking within the next 1 or 2 years. These findings imply that parental interventions can protect children from the adverse effects of observing actors smoking in movies, which is a leading modern contributor to adolescent smoking.

ACKNOWLEDGMENTS

This work was supported by National Cancer Institute grant CA-77026.

We thank Susan Martin for assistance in organizing the implementation of the study; Bridget Ahrens for management; and Susan Remacle for help with the reference material and final production of the manuscript. Thanks also go to Dan Nassau and Ezra Hays for coding the movies and Anna Adachi-Mejia, PhD, for careful review of the manuscript.

REFERENCES

- Bandura A. *Social Foundations of Thought and Action. A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall; 1986
- Rowe DC, Chassin L, Presson C, Sherman SJ. Parental smoking and the "epidemic" spread of cigarette smoking. *J Appl Soc Psychol*. 1996;26:437–454
- Chassin L, Presson CC, Sherman SJ, Edwards DA. Four pathways to young-adult smoking status: adolescent social-psychological antecedents in a midwestern community sample. *Health Psychol*. 1991;10:409–418
- Chassin L, Presson CC, Sherman SJ, Corty E, Olshavsky RW. Predicting the onset of cigarette smoking in adolescents: a longitudinal study. *J Appl Soc Psychol*. 1984;14:224–243
- Conrad KM, Flay BR, Hill D. Why children start smoking cigarettes: predictors of onset. *Br J Addict*. 1992;87:1711–1724
- Dalton MA, Tickle JJ, Sargent JD, Beach ML, Ahrens MB, Heatherton TF. The incidence and context of tobacco use in popular movies from 1988 to 1997. *Prev Med*. 2002;34:516–523
- Distefan JM, Gilpin EA, Sargent JD, Pierce JP. Do movie stars encourage adolescents to start smoking? Evidence from California. *Prev Med*. 1999;28:1–11
- Tickle JJ, Sargent JD, Dalton MA, Beach ML, Heatherton T. Favourite movie stars, their tobacco use in contemporary movies, and its association with adolescent smoking. *Tob Control*. 2001;10:16–22
- Sargent JD, Beach ML, Dalton MA, et al. Effect of seeing tobacco use in films on trying smoking among adolescents: cross sectional study. *BMJ*. 2001;323:1394–1397. Available at: <http://bmj.bmjournals.com/cgi/content/full/323/7326/1394>
- Dalton MA, Sargent JD, Beach ML, Ahrens MB, Tickle JJ, Heatherton TF. Effect of viewing smoking in movies on adolescent smoking initiation: a cohort study. *Lancet*. 2003;362:281–285
- Pechmann C, Shih CF. Smoking scenes in movies and antismoking advertisements before movies: effects on youth. *J Mark*. 1999;63:1–13
- Dalton MA, Ahrens MB, Sargent JD, et al. Relation between adolescent use of tobacco and alcohol and parental restrictions on movies. *Eff Clin Pract*. 2002;5:1–10
- Sargent JD, Dalton MA, Heatherton T, Beach M. Modifying exposure to movie smoking: a novel approach to preventing adolescent smoking. *Arch Pediatr Adolesc Med*. 2003;157:643–648
- Evans N, Farkas A, Gilpin E, Berry C, Pierce JP. Influence of tobacco marketing and exposure to smokers on adolescent susceptibility to smoking. *J Natl Cancer Inst*. 1995;87:1538–1545
- Pierce JP, Farkas A, Evans N. *Tobacco use in California 1992: a focus on preventing uptake in adolescents*. Sacramento, CA: California Department of Human Services; 1993
- Russo MF, Stokes GS, Lahey BB, et al. A sensation seeking scale for children: further refinement and psychometric development. *J Psychopathol Behav Assess*. 1993;15:69–85
- Zuckerman M, Bone RN, Neary R, Mangelsdorff D, Brustman B. What is the sensation seeker? Personality trait and experience correlates of the sensation-seeking scales. *J Consult Clin Psychol*. 1972;39:308–321
- Carvajal SC, Wiatrek DE, Evans RI, Knee CR, Nash SG. Psychosocial determinants of the onset and escalation of smoking: cross-sectional and prospective findings in multiethnic middle school samples. *J Adolesc Health*. 2000;27:255–265
- Baumrind D. Parental disciplinary patterns and social competence in children. *Youth Soc*. 1978;9:239–276
- Sargent JD, Dalton MA. Does parental disapproval of smoking prevent adolescents from becoming established smokers? *Pediatrics*. 2001;108:1256–1262
- Jackson C, Henriksen L, Foshee V. The authoritative parenting index: predicting health risk behaviors among children and adolescents. *Health Educ Behav*. 1998;25:319–337
- Liang KY, Zeger SL. Longitudinal data analysis using generalized linear models. *Biometrika*. 1986;73:13–22
- Steinberg LD, Lamborn SD, Dornbusch SM, Darling N. Impact of parenting practices on adolescent achievement: authoritative parenting, school involvement, and encouragement to succeed. *Child Dev*. 1992;63:1266–1281
- Chassin L, Presson C, Sherman S, Corty E, Olshavsky R. Self-images and cigarette smoking in adolescents. *Pers Soc Psychol Bull*. 1981;7:670–676
- Grube JW, Weir IL, Getzlaf S, Rokeach M. Own value system, value images, and cigarette smoking. *Pers Soc Psychol Bull*. 1984;10:306–313
- Chassin L, Presson CC, Sherman SJ, Edwards DA. The natural history of cigarette smoking: predicting young-adult smoking outcomes from adolescent smoking patterns. *Health Psychol*. 1990;9:701–716
- Chassin L, Presson CC, Rose JS, Sherman SJ. The natural history of cigarette smoking from adolescence to adulthood: demographic predictors of continuity and change. *Health Psychol*. 1996;15:478–484
- Choi WS, Pierce JP, Gilpin EA, Farkas AJ, Berry CC. Which adolescent experimenters progress to established smoking in the United States. *Am J Prev Med*. 1997;13:385–391

APPENDIX. Measurement of Child and Parenting Characteristics

Variable	Survey Questions	Response Categories
School Performance	How would you describe your grades last year?	Excellent Good Average Below average
Sensation seeking (6-item index; range: 0–18; Cronbach's $\alpha = .69$)	I like to do scary things. I get bored being with the same friends all the time. I would like to try drinking alcohol or beer. I like to do dangerous things. I often think there is nothing to do. I like to listen to loud music.	Not like me Sort of like me A lot like me Just like me
Rebelliousness (7-item index; range: 0–21; Cronbach's $\alpha = .73$)	I get in trouble in school. I argue a lot with other kids. I do things my parents wouldn't want me to do. I do what my teachers tell me to do. I sometimes take things that don't belong to me. I argue with my teachers. I like to break the rules.	Not like me Sort of like me A lot like me Just like me
Self-esteem (8-item index; range: 0–24; Cronbach's $\alpha = .74$)	I will be successful when I grow up. I wish I was someone else. I like myself the way I am. I am happy with how I look. I wish I was better looking. I worry that other kids don't like me. I feel tired all the time. I often feel sad.	Not like me Sort of like me A lot like me Just like me
Maternal support (4-item index; range: 0–12; Cronbach's $\alpha = .77$)	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. She wants to hear about my problems.	Not like her Sort of like her A lot like her Just like her
Maternal control (4-item index; range: 0–12; Cronbach's $\alpha = .60$)	She has rules that I must follow. 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.	Not like her Sort of like her A lot like her Just like her
Parental disapproval of smoking	If you were smoking cigarettes and your mother knew about it, what would she say? If you were smoking cigarettes and your father knew about it, what would he say?	She (he) would tell me to stop She (He) would not tell me to stop Don't know Don't have a mother (father) or stepmother (stepfather)

Reprinted from Sargent et al.⁹

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A Prospective Study**

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Pediatrics 2004;114;149-156

DOI: 10.1542/peds.114.1.149

This information is current as of January 30, 2006

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