Published in final edited form as:

Pediatrics. 2009 July ; 124(1): 135–143. doi:10.1542/peds.2007-3420.

Movie Character Smoking and Adolescent Smoking: Who Matters More, Good Guys or Bad Guys?

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Abstract

Objective—To assess the association between smoking onset and exposure to movie smoking according to character type.

Methods—A longitudinal, random-digit-dial telephone survey of 6522 US adolescents was performed with movie exposure assessed at 4 time points over 24 months. Adolescents were asked whether they had seen a random subsample of recently released movies, for which we identified smoking by major characters and type of portrayal (divided into negative, positive, and mixed/neutral categories). Multivariate hazard regression analysis was used to assess the independent effects of these exposures on the odds of trying smoking.

Results—By the 24-month follow-up survey, 15.9% of baseline never-smokers had tried smoking. Within the sample of movies, 3848 major characters were identified, of whom 69% were male. Smokers represented 22.8% of 518 negative characters, 13.7% of 2486 positive characters, and 21.1% of 844 mixed/neutral characters. Analysis of the crude relationship showed that episodes of negative character smoking exposure had the strongest influence on smoking initiation. However, because most characters were portrayed as positive, exposure to this category was greatest. When the full population effect of each exposure was modeled, each type of character smoking independently affected smoking onset. There was an interaction between negative character smoking and sensation-seeking with stronger response for adolescents lower in sensation-seeking.

Conclusions—Character smoking predicts adolescent smoking initiation regardless of character type, which demonstrates the importance of limiting exposure to all movie smoking. Negative character portrayals of smoking have stronger impact on low risk-taking adolescents, undercutting the argument that greater exposure is a marker for adolescent risk-taking behavior.

Keywords

adolescent smoking; media

WHAT'S KNOWN ON THIS SUBJECT: Smoking is commonly depicted in movies, and viewing smoking in movies has been linked to adolescent smoking attitudes and initiation

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Financial Disclosure: The authors have indicated they have no financial relationships relevant to this article to disclose.

in regional, national, and international samples. However, it is not clear how character presentation affects adolescents' responses to movie smoking depictions.

WHAT THIS STUDY ADDS: Character smoking predicts adolescent smoking initiation regardless of the character of the smoker, but negative portrayals of smoking have their greatest impact on adolescents low in risk-taking. These findings demonstrate the importance of limiting exposure to all movie smoking.

Smoking is commonly depicted in movies, and viewing smoking in movies has been linked to adolescent smoking attitudes and smoking initiation in regional,^{1–8} national,⁹ and international^{10–12} samples. A common question posed by artistic directors and researchers in media involves how contextual elements of the movie or movie character might affect adolescent responses to movie smoking. No studies have addressed these contextual elements as effect modifiers, but studies seem to agree that movie smoking is not realistic in certain respects. Smoking is depicted in the majority of movies^{13–21} but only 20% to 25% of movie characters smoke,^{18,19,22–24} rates that are similar to population rates of smoking. However, most content analyses concluded that the depiction of smoking in movies contrasts with reality in that smoking is rarely associated with negative health outcomes^{14–17} and smoking characters are more likely to be male, affluent, and powerful, compared with smokers in the United States.^{14,17,18,25} The current investigation had 3 aims, namely, to count major characters in a sample of popular contemporary movies released in 2000–2005 and to describe their smoking status and their character portrayal (whether they are positive, negative, or mixed character types), to estimate how much exposure adolescents have to each type of character smoking, and to determine the association between each of these exposures and smoking initiation in a longitudinal sample of US adolescents.

Methods

Adolescent Survey

Between June and October 2003, a nationally representative sample of 6522 US adolescents, 10 to 14 years of age, was recruited through a random-digit dial telephone survey, with 3 follow-up surveys at 8-month intervals. Of the baseline survey participants, 5503 (84%) participated in the 8-month survey, 5019 (77%) in the 16-month survey, and 4574 (70%) in the 24-month survey. Demographic characteristics of the baseline sample mirrored those of the US adolescent population (as assessed by the US Census) with respect to age, gender, household income, and Census region. The recruitment and sampling procedures have been described in detail previously.⁹ Telephone surveys were conducted in English or Spanish by trained interviewers, with a computer-assisted telephone interview system developed by Westat (Rockville, MD), a national research organization. Parental consent and adolescent assent were obtained before respondents were interviewed in each survey wave. To protect confidentiality, adolescents indicated their answers to sensitive questions by pressing numbers on the telephone, rather than speaking aloud. All aspects of the survey were approved by the institutional review boards at Dartmouth Medical School and Westat. In addition to the movies viewed, other information was collected from the adolescents, including age, gender, race, parent education, school performance, involvement in extracurricular activities, personality characteristics (rebelliousness and sensation-seeking propensity), parent, sibling, and peer smoking, and adolescent-reported parenting practices.²⁶

Movie Selection

The movie sampling and survey techniques were conducted according to the Beach method, for which validity and reliability have been reported previously.²⁷ Movie titles queried in the adolescent survey were drawn from movie lists that included 532 popular contemporary movies

released as early as 1998 for the baseline survey. Pertinent movie character data were not available for ~200 movies released before 2000, because of changes in movie coding procedures; therefore, estimates of exposure to character movie smoking apply only as far back as 2000. Movie lists for follow-up surveys included box office hit movies released to theaters or DVD since the previous survey round (~150 titles for each survey).

At each survey, adolescents were queried regarding 50 movie titles selected randomly from that survey's movie list and stratified according to the Motion Picture Association of America (MPAA) ratings, so that the MPAA rating distribution for each individual list reflected that of the larger movie list (eg, 19% G/PG, 41% PG-13, and 40% R at baseline). Respondents were asked whether they had ever seen each movie on their unique list. Movies that had been seen previously by the adolescent were excluded subsequently; by 24 months, adolescents who had completed all 4 surveys had been asked about 200 movie titles.

Content Analysis

The Dartmouth Visual Media Laboratory employs 2 trained, experienced, movie coders, who counted the number of smoking episodes in each of the movies by using previously validated methods¹⁷ and have now analyzed >1300 movies. Coders first viewed each movie in its entirety to identify major characters, that is, those who play leading roles, who influence the development of the plot, or who are affected by the story (median: 6 major characters per movie [interquartile range: 5–8 major characters per movie]). In addition, coders rated character valence according to the following instructions: “What was the valence (positive/negative) of the overall portrayal of this character? This refers to how the character is portrayed to the viewer through the script, the way they play the role, and the actions and beliefs of the character. This should reflect how the character is intended to be portrayed to the viewer, not necessarily how the character is interpreted (by other characters). For instance, Harrison Ford in *The Fugitive* is portrayed to the viewer as a good character, although the other characters in the film suspect him of murder.” Coding categories were negative (a “bad” character), neutral (not positive or negative), positive (a “good” character), and mixed portrayal. Because few characters were coded as neutral, this category was combined with mixed for the analyses.

Coders viewed movies repeatedly to identify all episodes of character smoking, that is, handling or using tobacco in a scene. A smoking episode is based on a scene break or a major break in time and is not dependent on the scene's duration or how many times the tobacco product appears during the scene. For example, if a positive character and a negative character are smoking continuously during a 15-minute scene in a bar, then this counts as 2 episodes, 1 for the positive character and 1 for the negative character. Ten percent of the movies were selected randomly for coding by both coders, to assess reliability; the correlation between coders' assessments of total tobacco exposure time in the double-coded sample was 0.967. Agreement regarding character portrayal was less reliable ($\kappa = 0.60$), mainly because of disagreement in identifying characters as positive versus mixed/neutral. There was little disagreement in identifying characters as negative.

Movie Character Smoking Exposure

By combining adolescents' survey reports of movies viewed and character smoking within each movie from the content analysis, exposure to positive, negative, and neutral/mixed smoking was quantified for each adolescent at each wave. Exposure to character smoking differed according to character type by a factor of 2, with more exposure to positive character smoking; therefore, responses to exposure were assessed by using crude and scaled measures. For examination of the crude relationship, exposure was plotted against the probability of smoking, with exposure measured as the number of episodes of character smoking. This emphasized the difference in the strength of association at an episode-by-episode level, as illustrated by

different slopes for the dose-response curves (Fig 1). From a population standpoint, however, it is important to model and to compare the effects of the full exposure, taking into consideration the fact that adolescents see more positive character smoking. Therefore, for the regression analyses, the continuous measures of exposure for each of the 3 character smoking types were scaled so that the 5th percentile of exposure was 0 and the 95th percentile was 1, as described below. This allowed modeling of the effect of the full exposure dose according to character type. Thus, this crude analysis emphasized the impact of character type for each additional smoking episode of exposure on adolescent smoking risk, whereas the multivariate analysis emphasized the impact of character type for the full population exposure dose.

Covariates

The assessment of covariates and their reliabilities were described previously.⁹ To compare effects, covariates were also rescaled to range from 0 to 1. For dichotomous variables (eg, age, gender, race, parent education, and parent/friend/sibling smoking), no rescaling was necessary. For ordered categorical variables (eg, school performance), the lowest category was recoded as 0 and the highest as 1, with intermediate levels evenly spaced between those values. The continuous covariates rebelliousness, sensation-seeking, maternal responsiveness, maternal demandingness, and extracurricular involvement were first scaled so that the 5th percentile was 0 and the 95th percentile was 1. To minimize outlier effects, any exposure below the 5th percentile was set to 0 and any exposure above the 95th percentile to 1; in addition, highly skewed variables (character smoking and rebelliousness) were square root-transformed. The square root transformation had no practical effect on the interpretation of the odds ratios because the variables were all in the range of 0 to 1 (the square root of 0 is 0 and the square root of 1 is 1).

Statistical Methods

We used a hazard analysis to determine the association between time-varying exposure to movie character smoking and time to smoking initiation. Onset of smoking was ascertained at the 8-month, 16-month, and 24-month surveys. An incident case was defined as an adolescent who became a smoker from the pool of those who were not smokers at the previous survey. The multivariate association between exposure to smoking in movies and the hazard of smoking onset at each time point was assessed by using discrete time hazard regression analysis to estimate hazard ratios for event occurrence,^{28–30} which are interpreted like odds ratios. Participants were censored (excluded) from further analysis after they tried smoking. Participants who never became smokers were censored at the final time interval, and participants who dropped out were censored at their last survey. Censoring was assumed to be independent of the hazard of smoking initiation, conditional on covariates included in the model.³¹

For the crude analysis shown in Fig 1, generalized additive logistic hazard models were fitted to study the dose-response curve for each character portrayal exposure variable (raw) and hazard of smoking initiation. The time-varying exposure measures represented new exposures that took place between assessments; this new exposure predicted initiation in the subsequent 8 months. Multivariate, linear, logistic hazard models were then fit by using the square root-transformed and scaled exposure measures.

We used 3 approaches to entering positive, negative, and mixed/neutral character smoking into the multivariate models. First, each exposure variable was entered separately in 3 multivariate models; for example, positive character smoking exposure was in the model with all of the covariates listed below but without other character smoking variables. For simplicity, the adjusted odds of smoking initiation are reported for these 3 separate multivariate regression analyses without the covariate effects being shown. Second, all 3 character portrayal smoking

variables were entered in the same multivariate model (referred to as simultaneous), again with the covariates. Finally, interaction effects between covariates and each of the character portrayal movie smoking variables were assessed. On the basis of previous results,³² a negative interaction between sensation-seeking and exposure to movie smoking was anticipated; however, there was no a priori hypothesis regarding how character portrayal would affect the interaction.

Results

Description of Movie Character Smoking

Within the sample of 532 movies from 2000–2005, 3848 major characters were identified, 69.3% of whom were male (Table 1). There was a large predominance of positively portrayed characters (64.6%; $n = 2486$), with 518 characters (13.4%) portrayed as negative and 844 (21.9%) portrayed as mixed or neutral. Overall, character smoking prevalence was 16.5%, with a higher prevalence among negative (22.8%) and mixed/neutral (21.1%) characters, compared with positive characters (13.7%).

Table 2 shows character portrayal according to race/ethnicity, with the exclusion of 215 characters (5.6%) that could not be identified according to race (including 184 nonhuman characters such as animals, aliens, or robots). The predominant race of movie characters was white, with 13.9% of major characters being black and only 3.2% Hispanic. Character portrayal varied according to race, with negative portrayals being more prevalent among Arab/Middle Eastern characters (26.7%), Asian characters (22%), and Hispanic characters (17.6%) and least prevalent among black characters (7.1%; $P < .001$). Overall, smoking was portrayed by 18.3% of all white characters, 14.3% of black characters, 20.8% of Hispanic characters, and 11.8% of American Indian/Alaskan characters ($P < .001$).

Movie Character Smoking Exposure and Smoking Initiation

The rate of smoking initiation by 24 months among baseline never-smokers in this adolescent sample was 15.9%. The prevalence of trying smoking was significantly higher among older adolescents, those with less-educated parents, those who performed less well in school, those who had a parent, sibling, or friend who smoked, those above the median for rebelliousness or sensation-seeking, those who had less-responsive and demanding mothers, and those who were less involved in extracurricular activities (data not shown).

Figure 1 shows the crude effect (fitted with generalized additive logistic hazard models) of exposure to movie smoking according to character portrayal, graphed as the number of episodes of exposure. All types of character smoking (positive, negative, and neutral/mixed) had positive direct relationships with adolescent smoking, but negative character smoking exposure had the strongest influence, as evidenced by a steeper trend. Also illustrated in Fig 1 are the differences in total doses. Although the relationships with the probability of adolescent smoking were weaker for mixed/neutral and positive character smoking, the total exposure effect was almost as great as the total effect of negative character smoking, because of greater exposure to mixed/neutral and positive character smoking. One concern was that overall adolescent exposure to negative character smoking would be highly correlated with exposure to positive character smoking, on the basis of the recognition that smoking clusters within movies. The correlations between the 3 character smoking exposure variables ranged from 0.50 to 0.55 (data not shown) and, although moderate, were not strong enough to preclude finding unique effects of each character type on adolescent smoking initiation.

Table 3 shows the estimated effects of the full range of movie character exposures, presented as multivariate hazard odds ratios with 95% confidence intervals, for the character smoking

variables considered separately, simultaneously, and with interactions of character type and sensation-seeking. When variables were considered separately, full-range exposure to each type of character smoking increased the odds of initiating smoking by ~2. When variables were considered simultaneously, the effects were very similar in magnitude, with exposure to each character type increasing the hazard of initiating smoking (controlling for the other 2 types) by a factor of ~1.4. In fact, a likelihood ratio test with 2 degrees of freedom confirmed that the 3 effects were not significantly different ($\chi^2 = 0.05$; $P = .97$). This suggests that a simple sum of all 3 movie character smoking exposure variables would adequately and parsimoniously capture the effect of movie smoking. Covariate effects in all models were quite similar; significant positive effects included parent, sibling, and peer smoking, age, poor school performance, parenting style, extracurricular activity participation, rebelliousness, and sensation-seeking (all $P < .001$), with odds ratios ranging from 1.5 to 2.8. Table 3 also shows results for the hazard model that included interactions of character type with sensation-seeking. Preliminary analyses revealed that only the interaction with negative character smoking was significant ($P < .05$); therefore, interaction effects for positive and mixed character smoking were dropped in favor of the effect of the simple sum of positive and mixed character smoking exposures. The interaction was significant ($P < .05$), which indicated that low (5th percentile) sensation-seeking teens were most vulnerable to negative character smoking (odds ratio: 2.55), compared with average (50th percentile; odds ratio: 1.69) or high (95th percentile; odds ratio: 0.94) sensation-seeking teens.

Discussion

This study demonstrates that all depictions of smoking affect adolescent smoking initiation, regardless of whether the character is positive, negative, or somewhere in between. The study shows that the dose-response relationship varies according to character portrayal, with adolescents responding more strongly to each episode of negative character smoking than to mixed/neutral and positive character smoking. This suggests that elimination of 100 episodes of negative character smoking from the top box office hits each year would have a larger impact on youth smoking than elimination of 100 episodes of positive character smoking. However, because there are many more positive movie character smokers, adolescents have greater exposure to this type of movie smoking. Therefore, the net effects of positive and negative character smoking exposures on the population are approximately the same.

In addition, there is an interaction between negative character smoking and sensation-seeking propensity, such that adolescents lower in sensation-seeking are more sensitive to negative character smoking portrayals than are their higher sensation-seeking counterparts. This interaction replicates and extends previous work that did not distinguish character smoking and focused on the initiation of established smoking (>100 lifetime cigarettes).³³ These findings show that exposure to some aspects of movie smoking has a stronger influence on adolescents at low risk with respect to sensation-seeking.⁵ Although both interactions deserve further exploration and replication, the finding that lower-risk adolescents are more responsive to movie smoking undercuts the argument that movie smoking is simply a marker for general risk or propensity for deviant behavior.

With respect to character smoking as it is portrayed in popular contemporary movies, these findings support previous research demonstrating that movie characters who smoke are most likely white and male,^{14,17,18,25} which shows that movies represent smoking prevalence inaccurately according to race and gender. For example, Hispanic populations have among the lowest rates of smoking in the United States³⁴ but Hispanic movie characters are more likely to smoke; in contrast, actual smoking prevalence among American Indian/Alaskan Native adults is >33%³⁴ in the United States but is less than one half of that in movies. Far from

presenting reality, as movie industry artists and spokespersons suggest, movies present a biased representation of smoking.

To our knowledge, this is the first study to assess whether a movie character trait beyond smoking status affects responses among adolescents. Although a study by Distefan et al⁶ found that girls (but not boys) with favorite actors or actresses who smoked were 80% more likely to initiate smoking than were those whose favorite actor had not been portrayed as a smoker, the authors did not examine contextual elements of smoking portrayals. We did not find an interaction between character type and gender in this study. The difference might be attributable to the way in which exposure was captured; we used a method that assessed movie smoking exposure at a broader level than favorite actor, by asking about movie titles.

As with any study, there are several limitations. Actual movie smoking exposure might have been underestimated, because the cumulative smoking exposure was based on the sample frame of movies each adolescent reported actually seeing (50 movies per survey wave), derived from only the top 100 movies each year. In 2006 alone, >600 movies were released in the United States.³⁵ Of those films, 176 grossed more than \$500 000 at the box office; of those, 116 (66%) contain smoking imagery.¹³ We know of no other estimates of the prevalence of smoking within the remaining releases. Furthermore, youths often watch movies repeatedly, and a single viewing was assumed for the exposure assessment. Our estimates in this study were based only on whether the character portrayal included smoking and did not include duration, intensity, or salience of smoking, which may influence smoking uptake. Because we have not yet investigated potential mechanisms for this association or other factors, such as movie genre or the context of character smoking, further analyses are warranted, such as experimental studies in which the exposure and dose can be controlled. Exposure to other media, such as television or music videos, was not captured in this study, and these media also may include significant character smoking that could be influential to youths. Information on adolescent smoking was provided through self-report, as was information on parent, sibling, and peer smoking, and thus was subject to misreporting. Finally, although we controlled for a variety of other factors that are known to affect youth smoking, there may be an unmeasured confounder that accounts for some of the movie effect.

This research supports policy-relevant messages directed at the movie industry. Movie directors and actors should understand that simply depicting a smoker as negative does not preclude an effect on adolescent behavior; in fact, it may enhance that effect. Furthermore, an adult rating for smoking could have a large impact on youth exposure, because previous studies showed that youth-rated movies account for ~60% of movie smoking exposure and teen viewership rates for R-rated movies are low. In addition, the MPAA may need to adjust its 2007 statement, “Now, all smoking will be considered and depictions that glamorize smoking or movies that feature pervasive smoking outside of an historic or other mitigating context may receive a higher rating.”³⁶ The present research suggests that all smoking images (not just glamorous ones) have impact. A recent publication reported that, 1 year later, this MPAA policy had not been implemented in any meaningful way.³⁷ We hope that the current research findings lead to more-substantial changes regarding smoking in movies.

Conclusions

Character smoking viewed in movies is associated with smoking uptake among adolescents, regardless of whether the characters are “good guys” or “bad guys.” Because smoking occurs in almost all movies, parents should limit movie viewing and specifically should restrict access to R-rated movies, which tend to contain more smoking.³⁸ Parents also need to be aware that adolescents whom they may consider to be at low risk for smoking (because they seem low in sensation-seeking) may be affected much more strongly by movie smoking. When youths do

view movies and other media containing smoking, we suggest that parents should talk with their children and adolescents about smoking in the movies, in an effort to ameliorate any influence toward pro-smoking attitudes or smoking uptake.

Acknowledgments

This work was supported in part by the National Cancer Institute (grant CA077026).

We are indebted to our content coders, Elaina Bergamini, Daniel Nassau, and Balavinder Rakhra, for their careful work and to Caitlyn Stanton and Cynthia Patch for their help in preparing this manuscript.

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Abbreviation

MPAA

Motion Picture Association of America

FIGURE 1.

Crude effect of exposure to movie smoking, according to character type, on probability of smoking. Curves represent results from generalized additive logistic hazard models, with exposure to character smoking modeled as the number of episodes of exposure.

TABLE 1
Movie Character Smoking, According to Character Type and Gender, in 532 Popular Contemporary Movies Released in 2000–2005

	Positive		Negative		Mixed/Neutral		All	
	N (%)	Smokers, %	N (%)	Smokers, %	N (%)	Smokers, %	N (%)	Smokers, %
Male	1613 (64.9)	15.8	438 (84.6)	24.2	617 (73.1)	21.1	2668 (69.3)	18.4
Female	873 (35.1)	9.7	80 (15.4)	15	227 (26.9)	21.1	1180 (30.7)	12.3
Total	2486	13.7	518	22.8	844	21.1	3848	16.5

Results exclude 15 characters for which gender could not be coded.

Distribution of Characters According to Race and Portrayal Type in 532 Top Box Office Hits Released in 2000–2005 and Smoking Prevalence According to Race

Character Race/Ethnicity	N (%)	Smokers, %		Character Descriptor Category, %		
		Movie Characters	US Population	Positive	Negative	Mixed/Neutral
White	2843 (73.9)	18.3	21.9	63.6	14	22.5
Black	533 (13.9)	14.3	21.5	69.2	7.1	23.6
Hispanic	125 (3.2)	20.8	16.2	58.4	17.6	24
Asian/Pacific Islander	100 (2.6)	6	13.3	59	22	19
American Indian/Alaskan	17 (0.4)	11.8	21	70.6	11.8	17.6
Arab/Middle Eastern	15 (0.4)	6.7	Not Avail	60	26.7	13.3
Cannot code	215 (5.6)	2.3		73	15.3	11.6
Total sample	3848 (100)	16.5	20.9	64.6	13.5	21.9

US population smoking rates were based on 2005 data.³⁴

TABLE 3
Results of Multivariate Hazard Odds Models

Variable	Hazard Odds Ratio for Smoking Onset (95% Confidence Interval)			
	Crude	Separate Multivariate Models	Simultaneous Character Variables Entered Together	Interaction Model
Character type				
Mixed ^a	4.09 (3.26–5.14)	1.91 (1.49–2.44)	1.39 (1.04–1.85)	
Negative ^a	4.38 (3.50–5.47)	1.90 (1.47–2.45)	1.46 (1.07–1.98)	2.55 (1.50–4.32)
Positive ^a	4.42 (3.42–5.71)	2.02 (1.52–2.67)	1.39 (0.99–1.96)	
Common effect ^a				1.39 (1.16–1.66)
Negative × sensation-seeking ^b				0.37 (0.17–0.81)
Female (reference: male)	0.87 (0.75–1.00)	c	1.08 (0.92–1.26)	1.08 (0.92–1.27)
Race/ethnicity (reference: white)				
Black	1.25 (1.01–1.54)	c	0.99 (0.78–1.25)	0.99 (0.78–1.25)
Hispanic	1.15 (0.95–1.38)	c	1.13 (0.91–1.41)	1.13 (0.92–1.41)
Other nonwhite	1.20 (0.94–1.52)	c	1.16 (0.88–1.51)	1.15 (0.88–1.50)
Either parent smokes	2.18 (1.89–2.52)	c	1.53 (1.30–1.80)	1.52 (1.29–1.79)
Friends smoke	5.08 (4.39–5.88)	c	2.39 (2.02–2.84)	2.39 (2.01–2.83)
Siblings smoke	2.60 (2.20–3.08)	c	1.60 (1.33–1.94)	1.60 (1.33–1.93)
Age ^d	4.46 (3.58–5.54)	c	1.89 (1.46–2.45)	1.88 (1.45–2.43)
Low parent education ^e	1.84 (1.49–2.27)	c	1.09 (0.85–1.40)	1.09 (0.85–1.40)
Poor school performance ^e	4.59 (3.60–5.84)	c	1.68 (1.27–2.22)	1.68 (1.27–2.22)
Rebelliousness ^a	6.30 (5.14–7.74)	c	1.83 (1.40–2.38)	1.83 (1.40–2.37)
Poor parenting style ^e	7.09 (5.56–9.04)	c	1.77 (1.33–2.35)	1.76 (1.32–2.34)
Sensation-seeking ^a	9.84 (7.81–12.41)	c	2.77 (2.08–3.70)	3.01 (2.24–4.05)
Few extracurricular activities ^e	3.07 (2.36–3.99)	c	1.75 (1.31–2.34)	1.75 (1.31–2.34)
Observation interval				
Second (compared with first)		c	0.79 (0.66–0.95)	0.79 (0.66–0.95)
Third (compared with first)		c	0.69 (0.57–0.84)	0.69 (0.57–0.85)

^aModels indicate the effect of going from the 5th to the 95th percentile for this variable.

^bThe negative character smoking estimate for this model represents the effect for low sensation-seekers. The effect estimate for high sensation-seekers was $0.37 \times 2.55 = 0.94$ (the estimate was not statistically different from 1.0). The odds ratio for median (50th percentile) sensation-seeking was 1.69.

^cThree separate models were used in this column; for clarity, no covariates are listed, so covariate effects could not be listed; however, they were quite similar to those in the other models.

^dModels indicate the effect of going from 10 to 14 years of age at baseline.

^eModels compare the highest and lowest scores for these ordinal variables and, in the case of parenting style, going from the 95th to the 5th percentile for maternal responsiveness and demandingness.