

## LEAD ARTICLE

# Do Movie Stars Encourage Adolescents to Start Smoking? Evidence from California<sup>1</sup>

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**Background.** The purpose of this study was to examine the relationship between adolescents' favorite movie stars and their smoking status, controlling for variables associated with smoking initiation.

**Methods.** The 1996 California Tobacco Survey questioned 6,252 adolescents about their favorite stars, smoking history, exposure to smokers, rebelliousness, knowledge and attitudes regarding smoking, and cigarette advertising and promotion. The top 10 favorite stars were tested for differential preference between ever and never smokers, defined as those who had never puffed on a cigarette. Never smokers were categorized as susceptible or nonsusceptible to smoking.

**Results.** Favorite stars differed significantly among adolescent ever and never smokers. A majority of favorite stars of ever smokers smoked on and off screen compared to favorite stars of never smokers. In multivariate analyses, adolescent never smokers who preferred favorite stars of adolescent ever smokers were significantly more likely to be susceptible to smoking (OR = 1.35; 95% CI 1.12, 1.62), even after adjustment for known predictors of adolescent smoking and demographic variables. This effect was only slightly weaker than that of exposure to friends and family who smoke (OR = 1.45; 95% CI 1.13, 1.85).

**Conclusions.** This study provides preliminary evidence that stars who smoke on and off screen may encourage youth to smoke.

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**Key Words:** adolescent smoking; smoking initiation; susceptibility to smoking; smoking in movies.

## INTRODUCTION

Smoking continues to be a major health problem in the United States [1] and elsewhere in the world [2], and adolescent smoking initiation is increasing [3]. Over 90% of smoking initiation occurs during adolescence [1], and recent large-scale antismoking campaigns appear to have had little effect on the rate of adolescent initiation [3,4]. Although the Tobacco Institute claims that payment for specific brand placement in films ended in 1990 [5], the frequency of smoking in movies has dramatically increased since then [6], and the depiction of smoking in movies has been argued by some as a possible reason for increased smoking initiation among adolescents [6-9]. Smoking has been used in movies to help portray character image. Adolescents are avid moviegoers [7] and at a stage of life in which they are experimenting with their own image [10,11]. Thus, it is plausible that movies may be an important influence on adolescent experimentation with smoking.

Recent studies indicate that nearly 90% of movies and approximately 30% of all movie scenes contain at least one instance of cigarette smoking [6-8]. Cruz and Wallack [12] conducted a study in 1984, in which they coded smoking in a random sample of prime time TV programs and found that made-for-theater movies aired on television had the highest frequency of smoking acts per hour (1.62 versus 0.93 for the total sample for programs). Hazan and Glantz [8] examined smoking trends from 1960 to 1990 using 2 randomly selected movies each year from the top 20 movies in terms of gross box office dollars and found 41% of 5-min intervals showed tobacco use. In a related study, Terre et al. [7] coded

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the top-grossing 20 movies from 1977 to 1988 in 5-min intervals. Roughly 20% of the intervals contained smoking, although this varied a little by year. It has been reported that films in the 1970s and 1980s depicted tobacco use about once every 10 to 15 min [8], while movies in the 1990s showed tobacco use an average of every 3 to 5 min [6]. From 1994 to 1996, there apparently was a particularly high rate of movies that contained smoking scenes. Of 133 movies watched by adolescents in 1994 and 1995, 77% had scenes that depicted smoking [13]. In November 1996, the 10 top-grossing films all featured tobacco use, and 17 of 18 films in national distribution that were reviewed in a recent study featured tobacco use [14].

Some argue that adolescents who smoke may be attracted to more prosmoking media to meet otherwise unmet needs for positive self-esteem and identity [9]. Smoking in movies is pervasive, and celebrities, who are admired and emulated by adolescents, frequently smoke off screen while making public appearances [7,9]. In addition, a number of celebrities have endorsed cigarette and cigar smoking recently, including high-profile stars such as Arnold Schwarzenegger [15], Demi Moore [16], and Sharon Stone [17].

If the hypothesis that the portrayal of smoking in movies encourages adolescents to start smoking is true, then we would expect that adolescents who had started on the smoking uptake process would prefer movie stars who smoked as part of their screen persona. Therefore, we hypothesized that credible evidence of an effect of smoking in movies encouraging adolescents to smoke exists if (1) the favorite stars of adolescents who have smoked portray smoking in the movies more than the favorite stars of adolescent never smokers and (2) for adolescent never smokers, those who prefer a favorite star of adolescent ever smokers are more likely to be susceptible to smoking [18–23] than their peers.

## METHODS

Between July and December 1996, we interviewed a random sample of adolescents as part of the ongoing California Tobacco Surveys (CTS). The methodology for these surveys has been previously published [24]. The CTS uses a random-digit-dialed computer-assisted telephone methodology to interview adults in California households and, with permission, all adolescents in the household 12 through 17 years of age. From 71,989 households, 8,778 adolescents were identified for the study sample and the response rate obtained was 71.2%. This corresponded to a final sample of 6,252 adolescents.

The sample consisted of approximately equal percentages of adolescents of each year of age from 12 to 17. Overall, 51.1% were male. Approximately 54.8% were non-Hispanic whites, 25.2% were Hispanics, 9.3% were

Asian/Pacific Islanders, 7.0% were African-Americans, and 3.4% reported themselves as another ethnic classification. Surveys were administered in English and Spanish. As described elsewhere [4], survey results were weighted [25] to be representative of the population of California by gender, age, race or ethnicity, region, and education.

### *Measures of Adolescent Smoking*

To be classified as a never smoker, the adolescent had to answer “no” to the following two questions: (1) “Have you ever smoked a cigarette?” and (2) “Have you ever tried or experimented with cigarette smoking, even a few puffs?” All others were classified as ever smokers. Susceptibility to smoking is defined among never smokers as a lack of a firm commitment not to smoke. To be classified as a nonsusceptible never smoker, the adolescent must have answered “definitely not” to the following three questions: (1) “Do you think in the future you might experiment with cigarettes?” (2) “If one of your best friends were to offer you a cigarette, would you smoke it?” and (3) “At any time in the next year do you think you will smoke a cigarette?” All other never smokers were classified as susceptible to smoking.

### *Variables Associated with Adolescent Smoking*

Previously [4], we have confirmed associations with smoking [26–37] for perceived school performance and the following indices, which range from 3 to 5 items: exposure to smokers among peers and family, attitudes toward smokers, perceived safety of experimenting with cigarettes, rebelliousness characteristics, and receptivity to cigarette advertising and promotions. Survey items, coding, and reliability of the indices (Cronbach's  $\alpha$ ) are provided in the Appendix.

### *Measures of Favorite Actors and Actresses*

Each survey respondent was asked to respond to the following open-ended statements: (1) “Name your two favorite male actors” and (2) “Name your two favorite female actresses.” A total of 22.2% of respondents gave two responses to both questions, a further 64.0% gave a response to at least one question, and 13.8% did not name either a favorite actor or a favorite actress. Using each response as an independent observation, we ranked the top 10 favorite actors and actresses of adolescents in California. We then compared the proportions of never smokers who named each actor and actress in the top 10 with those of ever smokers and identified the movie stars who were differentially preferred by either group.

### Film Review and Star Smoking Status

Films [38] released from 1994 to 1996 that featured the actors and actresses who were found to be differentially preferred by ever and never smokers were reviewed by one of us (J.D.) and the smoking status of the character portrayed by the movie star was noted. These films were available at video rental stores, so they were considered to be representative of films likely to have been seen during the 3-year period prior to the survey. Further, the individual smoking status of the movie star was assessed from print coverage of their public persona and private lives, whenever feasible.

### Statistics

All statistics from survey data were weighted to represent the California population in 1996 according to age, sex, race or ethnicity, region, and education. We derived variance estimates and 95% confidence intervals (CIs) using the jackknife procedure [39] contained in the WesVar PC program [40]. For selected comparisons of subgroups, we performed a modified two-tailed  $\chi^2$  test based on the jackknife technique [41], with a *P* value of 0.01 or below considered statistically significant.

Logistic regression using data from never smokers was performed to identify variables associated with susceptibility to smoking. The following variables were included in this analysis: demographics, perceived school performance, liking school, family or peer smoking, attitudes toward smokers, perceived benefits of smoking, perceived safety of experimenting with cigarettes, rebelliousness, receptivity to cigarette advertising and promotions, and favorite star preferred by ever smokers. Two-way interactions between choice of favorite star preferred by ever smokers and age, gender, and rebelliousness were also examined in logistic regression including all the above-mentioned independent variables; we detected no statistically significant interaction. Adolescents who did not name a favorite star (*n* = 814), of whom 568 were never smokers, were excluded from logistic regression and analyzed separately.

## RESULTS

### Characteristics of the Study Population

Approximately 36.0% of the sample of adolescents had smoked cigarettes prior to the survey and this rate increased with age from 11.1% for age 12 years to 56.6% for age 17 years. The rate of smoking was not significantly different for males and females (36 and 32%, respectively). Regarding race/ethnicity, 32.7% of whites had smoked. A slightly higher proportion (37.5%) of Hispanics reported using cigarettes. A lower proportion of African-Americans (29.7%) and Asians/Pacific Islanders (26.2%) reported using cigarettes. Of the 4,078

**TABLE 1A**

Top 10 Favorite Actors and Actresses of Adolescent Males,  
CTS 1996 (*N* = 3,199)

	<i>N</i>	% <sup>a</sup>
Actresses		
1. Pamela Anderson Lee	410	13.8
2. Sandra Bullock	295	9.7
3. Michelle Pfeiffer	225	6.9
4. Demi Moore	217	6.9
5. Cindy Crawford	161	5.5
6. Sharon Stone	156	5.5
7. Julia Roberts	107	3.2
8. Jenny McCarthy	102	3.1
9. Alicia Silverstone	84	2.6
10. Halle Berry	77	2.2
Actors		
1. Arnold Schwarzenegger	517	16.9
2. Jim Carrey	510	16.6
3. Jean Claude Van Damme	292	10.2
4. Sylvester Stallone	260	9.1
5. Mel Gibson	264	7.6
6. Tom Cruise	227	6.8
7. Steven Segal	186	6.1
8. Will Smith	173	5.4
9. Tom Hanks	139	4.4
10. Wesley Snipes	101	2.9

<sup>a</sup> All percentages are weighted, adjusted for sampling design and nonresponse. Percentages do not add up to 100% because each star named was counted as an independent observation.

**TABLE 1B**

Top 10 Favorite Actors and Actresses of Adolescent Females,  
CTS 1996 (*N* = 3,053)

	<i>N</i>	% <sup>a</sup>
Actress		
1. Sandra Bullock	320	10.1
2. Julia Roberts	280	8.9
3. Michelle Pfeiffer	216	7.1
4. Demi Moore	194	6.3
5. Winona Ryder	174	5.6
6. Clare Danes	180	5.4
7. Alicia Silverstone	149	4.8
8. Drew Barrymore	124	3.7
9. Whitney Houston	77	2.8
10. Sharon Stone	58	2.1
Actors		
1. Brad Pitt	596	19.5
2. Tom Cruise	501	16.0
3. Leonardo DiCaprio	259	7.5
4. Keanu Reeves	215	7.3
5. Mel Gibson	199	6.2
6. Jim Carrey	172	5.6
7. Will Smith	151	5.2
8. Tom Hanks	146	4.8
9. Jonathan Taylor-Thomas	145	4.8
10. Denzel Washington	113	3.6

<sup>a</sup> All percentages are weighted, adjusted for sampling design and nonresponse. Percentages do not add up to 100% because each star named was counted as an independent observation.

adolescents who had never smoked, 41.8% were classified as susceptible to smoking.

### *Favorite Stars*

The top 10 favorite actresses and actors chosen by female and male adolescents are presented in Table 1. Approximately half of the top 10 favorite actresses and half the top 10 favorite actors were identical for both females and males (Sandra Bullock, Michelle Pfeiffer, Demi Moore, Sharon Stone, Julia Roberts, Alicia Silverstone, Jim Carrey, Mel Gibson, Tom Cruise, Will Smith, and Tom Hanks). Top 10 favorite actors named only by males (Arnold Schwarzenegger, Jean Claude Van Damme, Sylvester Stallone, Steven Segal, and Wesley Snipes) can be characterized as playing action heroes in the movies in which they star, whereas most of the top 10 favorite actors named only by females (Brad Pitt, Leonardo DiCaprio, Keanu Reeves, Jonathan Taylor-Thomas, and Denzel Washington) can be characterized as romantic idols. Most of the top 10 favorite actresses named only by females (Winona Ryder, Clare Danes, Drew Barrymore, and Whitney Houston) have starred in more films than the top 10 favorite actresses named only by males (Pamela Anderson Lee, Cindy Crawford, Jenny McCarthy, and Halle Berry).

### *Favorite Stars Preferred Differentially by Ever and Never Smokers*

Of the top 10 favorite stars, those who were preferred differentially ( $P < 0.01$ ) by adolescent never smokers and ever smokers are presented in Table 2. Younger

females, 12–14 years of age, were more likely to name Jonathan Taylor-Thomas and less likely to have smoked, so that the popularity of Jonathan Taylor-Thomas may be considered an artifact of age. Favorite actresses of female never smokers and favorite actors of male ever smokers varied widely, so that no particular favorites were named differentially by never smokers and ever smokers.

### *Smoking Status of Favorite Stars On and Off Screen*

The smoking statuses of the characters in films released from 1994 to 1996 are presented in Tables 3 and 4 for favorite stars of adolescent ever smokers and never smokers, respectively. In the films reviewed, five of the six (83.3%) favorite stars of ever smokers had smoked as film characters in 14 of 32 (43.8%) films, compared to two of the four (50.0%) favorite stars of never smokers who had smoked in 2 of 17 (11.8%) films.

Also shown is the private life smoking status of the favorite stars preferred differentially by adolescent never smokers and ever smokers. Five of the six favorite stars (83.3%) of ever smokers openly admitted smoking cigars and/or cigarettes in previously published interviews (Drew Barrymore, Demi Moore, Julia Roberts, Sharon Stone) or had been reported smoking in public (Brad Pitt); this compared with only one of the four stars (25.0%) preferred by never smokers (Arnold Schwarzenegger).

### *Susceptibility to Smoking and Favorite Stars*

Adolescent never smokers who named a favorite star ( $n = 3,510$ ) were categorized dichotomously by choice

**TABLE 2**

Favorite Actors and Actresses Preferred Differentially by Smoking Status of Adolescent Males and Females, CTS 1996

	Never smokers		Ever smokers		<i>P</i> value
	<i>N</i>	% <sup>a</sup>	<i>N</i>	% <sup>a</sup>	
Females	<i>N</i> = 2,038		<i>N</i> = 1,015		
Favorite stars of ever smokers					
Julia Roberts	155	7.0	125	12.7	<0.00001
Demi Moore	97	4.6	97	10.0	<0.00001
Drew Barrymore	48	2.1	76	7.2	<0.00001
Sharon Stone	24	1.4	34	3.5	0.0043
Brad Pitt	322	15.6	274	27.8	<0.00001
Favorite stars of never smokers					
Jim Carrey	130	6.5	42	3.9	0.0095
Jonathan Taylor-Thomas	119	5.8	26	2.7	0.0002
Males	<i>N</i> = 2,040		<i>N</i> = 1,159		
Favorite stars of ever smokers					
Pamela Anderson Lee	224	12.0	186	16.8	0.0031
Demi Moore	125	6.0	92	8.5	0.0092
Sharon Stone	79	4.3	77	7.6	0.0027
Favorite stars of never smokers					
Arnold Schwarzenegger	356	18.2	161	14.5	0.0098
Jim Carrey	377	18.7	133	13.1	0.0004

<sup>a</sup> All percentages are weighted, adjusted for sampling design and nonresponse. Percentages do not add up to 100% because each star named was counted as an independent observation.

TABLE 3

Favorite Stars in 1996 of Male and Female Adolescents Who Have Initiated Smoking

Favorite stars of adolescent ever smokers	Respondent		Private life smoking status	Films 1994–1996	Film Rating	Smoking status of character
	Males	Females				
Pamela Anderson Lee	X		Questionable [42–44]	Barb Wire Best of Pamela Anderson Naked Souls	R Not Rated R	Held unlit cigarette Smokes Doesn't smoke
Drew Barrymore		X	Smokes, has made several quit attempts [45,46]	Baywatch: Forbidden Paradise Everyone Says I Love You	R R	Doesn't smoke Doesn't smoke
Demi Moore		X	Smokes [16]	Batman Forever Boys on the Side Mad Love Bad Girls Striptease The Scarlet Letter The Juror A Few Good Men Now and Then Disclosure	PG-13 PG-13 PG-13 R R R R R PG-13 R	Smokes Smokes Smokes Smokes Doesn't smoke Doesn't smoke Smokes Doesn't smoke Smokes Doesn't smoke
Brad Pitt		X	Smokes [47]	Seven Twelve Monkeys Interview with a Vampire Legends of the Fall	R R R R	Doesn't smoke Doesn't smoke Doesn't smoke Smokes
Julia Roberts		X	Smokes [48]	Everyone Says I Love You Michael Collins Mary Reilly Something to Talk About I Love Trouble Ready to Wear (Pret-a-Porter)	R R R R R R	Doesn't smoke Doesn't smoke Doesn't smoke Doesn't smoke Doesn't smoke Doesn't smoke
Sharon Stone	X	X	Smokes [17]	Diabolique Last Dance Casino The Quick and the Dead The Specialist Intersection	R R R R R R	Smokes Doesn't smoke Smokes Smokes Smokes Smokes

of favorite star into a group of 928 who preferred a favorite star of adolescent ever smokers (Table 2) versus all others. In multivariate analysis (Table 5), a higher proportion of never smokers who chose a favorite star of ever smokers (38.8%) were susceptible to smoking compared with others (30.5%). After controlling for other factors, including receptivity to cigarette advertising and promotion and exposure to smokers among friends and family, these never smokers were more likely to be susceptible to smoking (OR = 1.35, 95% CI 1.12, 1.62;  $P < 0.01$ ) than those whose favorite star was not preferred by ever smokers. A higher likelihood of susceptibility was also seen among younger adolescents, among Hispanics compared with non-Hispanic whites, and among adolescents exposed to friends and family who smoke compared with those not exposed to smoking by friends or family.

A subsequent analysis was performed with another measure of star preference with susceptibility to smoking among adolescent never smokers as the dependent variable. This analysis contained all the independent

predictors of the analysis shown in Table 5, except that the variable for choice of favorite star consisted of three separate categories: (1) those who named only stars preferred by never smokers, (2) those who named at least 1 star preferred by ever smokers, and (3) those who named stars that were neither named more often by ever smokers than never smokers nor vice versa (reference group). Naming a star preferred by ever smokers was again significantly associated with being susceptible to smoking (OR = 1.36; 95% CI 1.12, 1.66;  $P < 0.01$ ). There was no association of susceptibility to smoking with naming only stars preferred by never smokers (OR = 1.02, 95% CI 0.90, 1.24;  $P = 0.93$ ).

A further multivariate analysis was conducted to identify adolescent never smokers who were susceptible to smoking. This analysis contained all the independent predictors of the analysis shown in Table 5, except for choice of favorite star. Instead, it included an independent variable for adolescents who named any actor among the top 10 favorites versus another actor and any actress among the top 10 favorites versus another

TABLE 4

Favorite Stars in 1996 of Male and Female Adolescents Who Have Never Smoked

Favorite stars of adolescents who have never smoked	Respondent		Private life smoking status	Films 1994–1996	Film rating	Smoking status of character
	Males	Females				
Jim Carrey	X		Doesn't smoke	The Cable Guy	PG-13	Doesn't smoke
				Ace Ventura: When Nature Calls	PG-13	Doesn't smoke
				Batman Forever	PG-13	Doesn't smoke
				The Mask	PG-13	Smokes
				Ace Ventura: Pet Detective	PG-13	Doesn't smoke
Michelle Pfeiffer	X		Doesn't smoke, quit in 1992 [49]	Dumb and Dumber	PG	Doesn't smoke
				One Fine Day	PG	Doesn't smoke
				Up Close and Personal	R	Doesn't smoke
				Dangerous Minds	R	Doesn't smoke
				Wolf	R	Doesn't smoke
Arnold Schwarzenegger	X		Smokes [15]	Jingle All the Way	PG	Doesn't smoke
				Eraser	R	Doesn't smoke
				Junior	PG	Doesn't smoke
				True Lies	R	Smokes
				Adventures of Pinocchio	G	Doesn't smoke
Jonathan Taylor-Thomas		X	Doesn't smoke [50]	Tom and Huck	PG	Doesn't smoke
				Man of the House	PG	Doesn't smoke

actress. Naming any of the top 10 actresses or actors was not associated with being susceptible to smoking.

A total of 814 of the 6,252 (13.8%) adolescents did not name any favorite actor or actress. In a multivariate analysis of the full sample, with the dependent variable of naming any favorite star versus not naming a star, non-Hispanic whites, those who perceived prosmoking messages in cigarette advertisements, those who reported no negative attitudes toward smokers, those who were exposed to family and/or friends who smoke, and those who reported two of the four rebelliousness characteristics were significantly more likely to name a favorite star. There were no significant differences in susceptibility to smoking or initiation among adolescents who named any favorite star versus those who did not name a star.

Logistic regression of all never smokers ( $n = 4,078$ ), including those who did not name any favorite actor or actress, was conducted with susceptibility to smoking as the dependent variable. Results were similar to those presented in Table 5. Adolescents who had named a favorite star preferred by ever smokers were more likely to be susceptible to smoking (OR = 1.30, 95% CI 1.07, 1.57;  $P < 0.01$ ).

## DISCUSSION

Adolescent never smokers were significantly more likely to be susceptible to smoking if they preferred favorite stars of adolescent ever smokers even after adjustment for known predictors of adolescent smoking and demographic variables. The fact that choice of favorite star is associated with susceptibility to smoking

suggests that stars may be important role models for youth smoking behavior.

Among adolescents who never puffed on a cigarette, cognitive susceptibility to smoking is a highly significant predictor of smoking initiation [19–23,28]. In our previous work [19,21,22,28] and in studies conducted by others [20,21], susceptibility to smoking was a stronger predictor of initiation than all other predictors, including exposure to family members and friends who smoke cigarettes.

As children develop into adults, they individualize by “trying on” behaviors they observe in real life. To the extent that smoking behavior is modeled by adult role models, these figures could serve as causal agents in the adoption of smoking by children. Some social scientists argue that popular films should be considered as important as parents and teachers as models of values, beliefs, and behaviors [7,10,11,51,52]. We argue that film stars have the potential to be much more powerful role models than parents and teachers because of the high visibility of their behavior on and off screen and their larger-than-life status. The smoking behavior of a celebrity role model has the potential to affect millions. Only 13.8% of the adolescents in our sample did not name any favorite actor or actress, which indicates that the majority of adolescents pay attention to stars.

We found differences in favorite stars among smoking and nonsmoking adolescents, despite only looking at the top 10 favorite actors and actresses. Male ever smokers named actresses who smoked both on and off screen and who tended to play the sexy “bad girl” roles

in movies (murderer, mistress, prostitute, mafia wife, etc.) such as Pamela Anderson Lee, Demi Moore, and Sharon Stone. Both Demi Moore and Sharon Stone have smoked cigarettes and cigars off screen. Though Demi Moore smoked in only two of the six reviewed films in which she starred, Sharon Stone smoked in five of the six reviewed films in which she starred. Males who never smoked favored Michelle Pfeiffer, who recently has not smoked on or off screen and has played a high school teacher, a journalist, and a working mother (*Dangerous Minds*, *Up Close and Personal*, *One Fine Day*, respectively). Not only does she not smoke on screen in these films, there is very little smoking in these films at all.

A qualification should be noted in the assessment of the private life smoking status of the favorite stars of adolescent ever smokers and never smokers. Pamela Anderson Lee denied ever smoking a cigarette in an interview [42], yet has appeared in photos [43,44] with both lit and unlit cigarettes in her mouth and has smoked in a video that is supposedly biographical (*Best of Pamela Anderson*).

Male adolescent never smokers named Jim Carrey significantly more often than did male ever smokers. Comedian Jim Carrey has never been reported as smoking off camera and smoked in only one of the films reviewed (*The Mask*). Male adolescent never smokers also named Arnold Schwarzenegger as their favorite actor significantly more often than did male ever smokers. Although Arnold Schwarzenegger has frequently smoked cigars in public, he has also appeared on the covers of many muscle and fitness magazines and has also worked on the President's Council on Physical Fitness and Sports. Schwarzenegger smoked in only one of the films reviewed (*True Lies*). Available via video rental, the film follows a 30-s public service announcement encouraging youth to be physically active.

Female adolescent ever smokers named Brad Pitt as their favorite actor significantly more often than did female never smokers. Brad Pitt smoked often in the recent film *Sleepers*, and once in *Legends of the Fall*, and he has also been reported to smoke in his private life. In contrast, female adolescent never smokers named teen idol Jonathan Taylor-Thomas significantly more often than did female adolescent ever smokers. He did not smoke in any film reviewed and no report was found of him smoking off screen.

Female adolescent ever smokers favored Julia Roberts, Demi Moore, Sharon Stone, and Drew Barrymore significantly more often than did female adolescent never smokers. These actresses have tended to portray glamorous and sexy characters on screen and smoked in many roles of the films reviewed. All of them smoke in their private lives.

A possible explanation of the finding that a majority of actors and actresses who are smokers in their private

lives also smoke in their movies is that they feel comfortable smoking to express a particular mood or emotion. Conversely, nonsmoking actors and actresses may rarely smoke in movies because they would feel uncomfortable and be unconvincing. To reconcile this proposed explanation with the recent dramatic increase in the frequency of smoking in movies [6] and the increase in the number of main characters who smoke [6], the proportion of movie actors who smoke in their private lives would have had to increase at about the same rate as the increase in smoking in movies, which seems unlikely. While actors and actresses may have a choice about whether they smoke in a role, they may also feel pressured to smoke in a film if smoking has become a more popular and acceptable behavior to portray on screen. Philip Morris documents that have recently been made available to the public confirm that tobacco brand placement has occurred since 1988, when tobacco companies claimed to end the practice in films [5,53,54]. These agreements do not include manufacturers of cigars and smokeless tobacco. Recently cigar companies have been successful in placing their products into films [54].

Because the present study was cross-sectional and not specifically designed to address this issue, we could not establish that smoking in films leads adolescents to smoke. Although our results are consistent with the speculated association of movie actors and actresses with adolescent smoking, it is not possible from our data to ascertain whether movie exposure somehow causes these behaviors. Some evidence supports the idea that the causal order is reversed and that adolescent ever smokers gravitate to idols and activities that are associated with smoking. Favorite movie stars may provide culturally normative behavior models that are emulated or may then be used to justify subsequent risky behaviors. Perhaps simultaneously, an adolescent may become embedded in a social system that also reinforces smoking, and he or she is then expected to remain current with the subgroup's preferred imagery.

The weakness of any study measuring favorite actors and actresses is the diversity of responses. We recognize that favorite movie stars may vary widely by the age of the respondent and that examining responses by age group and race/ethnicity would have been desirable. However, because of the number of possible responses and the wide variability in actors and actresses that were named, the cell sample sizes were too small to test for significant differences in smoking status in these groups. Another limitation of the present study is that our smoking measure considered lifetime cigarette use, so we did not assess relationships between favorite stars and amount of cigarette smoking and were unable to differentiate current from prior smoking behaviors. The selection of the overall top 10 favorite stars for this analysis may have been biased toward preferences of

TABLE 5

Logistic Regression Predicting Susceptibility to Smoking among Adolescent Never Smokers Who Named at Least One Favorite Star, CTS 1996

	Susceptible to smoking (N = 3,510)			
	N	% <sup>a</sup>	OR <sup>a</sup>	95% CI <sup>a</sup>
Age group				
12–14	2,174	36.1	1.00	—
15–17	1,336	27.5	0.53	(0.45, 0.63)**
Race/ethnicity				
Non-Hispanic white	1,912	27.6	1.00	—
Hispanic	855	41.0	1.65	(1.33, 2.05)**
African American	285	28.2	1.07	(0.80, 1.44)
Asian/other	458	33.2	1.32	(1.00, 1.75)
Exposure to smokers				
Not exposed to friends or family who smoke	744	26.2	1.00	—
Exposed to family who smoke but not friends	342	28.6	0.84	(0.54, 1.29)
Exposed to friends who smoke but not family	1,534	32.5	1.30	(1.15, 1.63)
Exposed to both friends and family who smoke	890	40.3	1.45	(1.13, 1.85)**
Favorite movie star				
Other star	2,582	30.5	1.00	—
Favorite star is preferred by adolescent ever smokers	928	38.8	1.35	(1.12, 1.62)**

<sup>a</sup>Weighted percentages, adjusted for sampling design and nonresponse. Weighted odds ratios, adjusted for gender, attitudes toward smokers, health consequences of smoking, receptivity to cigarette advertising and promotions, expected utilities of smoking, rebelliousness, liking school, school performance, and all the other variables in the table. CI, confidence interval.

\*\*  $P < 0.01$ .

never smokers, since approximately 65% of the full sample were self-reported never smokers. However, the top 10 lists were checked to ensure that the top 5 actors and actresses of never smokers and top 5 actors and actresses of ever smokers were included.

The list of movies reviewed is not exhaustive and represents only the most popular films during the 3-year period prior to the survey. Video rentals make adult-rated films much more readily available for viewing by adolescents than they would be if only shown at theaters. However, many youth are adept at circumventing theater restrictions [55]. The films listed were viewed only for the smoking status of the character played by the favorite star. Other characteristics of the film, such as frequency of smoking, rebelliousness, and sexuality of the character played by the favorite star, were not coded. A coding instrument and appropriate methodology are currently in development for conducting a content analysis that would include this information.

We conclude that there is a relationship between adolescents' choice of favorite movie actors and actresses and their smoking status. Favorite movie stars may provide normative behavior models that are emulated or used to justify subsequent smoking. Alternatively, adolescent smokers may gravitate to media and activities that include more smoking. Either way, the recent increase in the portrayal of smoking in the movies is alarming, particularly as it has been associated with a large increase in smoking among adolescents [6]. The tobacco industry denies using promotional monies to

obtain more frequent placement of smoking in movies [5,53,54], although this would indicate a clear departure from past practices.

Legislators [56,57] and public health officials [13,58] have expressed concern about the potential effects on consumers, particularly children and adolescents, of tobacco use in film. Our results suggest that caution by film stars about the smoking behaviors they portray both on and off screen may be warranted. For example, Pierce Brosnan, the new James Bond figure, refused to smoke in *Golden Eye* because of his concern of the possible impact on children [59]. Regrettably, he has not given up cigar smoking in his private life [60] and has smoked in other James Bond films [61]. Because actors and actresses may not always be in a position to refuse to smoke on screen, we also support the following policy options regarding smoking in films.

At a minimum, the association between smoking in films and smoking behavior presented in this article should strengthen the call for the provision of anti-smoking advertisements in theaters [6,62]. Every film that has numerous scenes depicting inappropriate smoking should be preceded by one such commercial. Additionally, we call on the entertainment industry to adopt a voluntary code of ethics relating to the use of smoking in films that includes incorporating descriptions about tobacco use in the movie rating system and the end of compensation from tobacco companies for product placement in the movies.

**APPENDIX: PREDICTORS OF ADOLESCENT SMOKING***School*

We analyzed how respondents thought they were performing at school and if they liked school using responses to the question "How do you do in school? Would you say . . . much better than average, better than average, average, or below average?" The first two and last two responses were grouped to create a two-level indicator of self-perceived school performance (Above average and Average/below average). Adolescents were also asked, "How much do you like school? Would you say . . . a lot, some, very little, or not at all?" The first two and the last two categories were grouped to create a two-level indicator of self-perceived school performance (A lot/some and Very little/not at all).

*Exposure to Smokers*

Exposure to family and best friends who smoke was assessed by responses to the following questions: "Do any of your parents, step-parents, or guardians now smoke cigarettes?", "Do you have any older brothers or sisters who smoke cigarettes?", "Of your best friends who are male, how many of them smoke?", and "Of your best friends who are female, how many of them smoke?" Responses were grouped into two categories (None, Any) to create a four-level variable of exposure to smokers (0 = no exposure among family or best friends, 1 = exposure among best friends only, 2 = exposure among family only, 3 = exposure among both best friends and family).

*Attitudes toward Smokers*

Adolescents' responses to the following statements (Agree, Disagree) were used to assess their personal attitudes toward smokers: "I strongly dislike being around people who are smoking", "Seeing someone smoking turns me off", "I personally don't mind being around people who are smoking."

*Perceived Benefits of Smoking*

Do you believe . . . (yes/no responses)

1. Smoking can help people when they are bored?
2. Cigarette smoking helps people relax?
3. Cigarette smoking helps reduce stress?
4. Smoking helps people feel more comfortable at parties and in other social situations?
5. Smoking helps people keep their weight down?

This variable resulted in four levels (0, 1, 2, 3). The reliability index of this scale was 0.67 (Cronbach's  $\alpha$ ).

*Perceived Safety of Experimenting with Cigarettes*

1. Do you believe it's safe to smoke for only a year or two?

2. Do you believe there is any harm in having an occasional cigarette?

3. Do you believe there is any harm in having an occasional cigar?

4. If I started to smoke regularly, I could stop smoking anytime I wanted.

Each question was used as a dichotomous independent variable (yes/no responses).

*Rebelliousness Characteristics*

Responses to the following statements (Agree, Disagree) were used to create an index of adolescent rebelliousness:

1. I get a kick out of doing things every now and then that are a little risky or dangerous.
2. My family looks for things to nag me about.
3. I have a lot of arguments with my family.
4. If anyone upsets me I usually try to get revenge.
5. I don't mind getting into trouble telling lies if it helps my friends.
6. I don't mind lying to keep my friends out of trouble with the authorities.

This variable resulted in a four-level measure of rebelliousness (0, 1, 2, 3+). The reliability index of this scale was 0.61 (Cronbach's  $\alpha$ ).

*Receptivity to Cigarette Advertising*

Responses to the following questions were used to assess adolescent recall of their favorite cigarette advertisement: "Think back to the cigarette advertisements you have recently seen on billboards or in magazines. What brand of cigarettes was advertised the most?" and "What is the name of the cigarette brand of your favorite cigarette advertisement?" If a brand was named, the adolescent was considered to have a favorite cigarette advertisement. All adolescents were asked to name a favorite cigarette ad regardless of smoking status. We then asked if they recognized a specific message about cigarette smoking being promoted in the ad with the question, would you say that these advertisements promoted . . . (yes/no responses)

1. Smoking as an enjoyable experience?
2. Smoking helping people to relax?
3. Smoking helping to feel comfortable in social situations?
4. Smoking helping people to stay thin?
5. Smoking helping to reduce stress?
6. Smoking helping people when they are bored?
7. The idea that all the "in" crowd are smokers (yes/no responses)

This index variable resulted in five levels (0, 1, 2, 3, 4+). The first level included adolescents who could not remember a cigarette advertisement (score = 0). The reliability index of this scale was 0.83 (Cronbach's  $\alpha$ ).

### *Receptivity to Cigarette Promotions*

1. Some tobacco companies offer promotional items, such as clothing and bags, which have the company brand name or logo on them and which the public can buy or receive for free. In the past 12 months have you exchanged coupons for an item with a tobacco brand name or logo on it?

2. . . . received as a gift or for free, any item with a tobacco brand name or logo on it?

3. . . . purchased any item with a tobacco brand name or logo on it?

4. Do you think you would ever use a tobacco industry promotional item such as a tee shirt?

This index variable resulted in four levels (0, 1, 2, 3+). The first level included adolescents who did not own and would not use a tobacco industry promotional item (score = 0). The reliability index of this scale was 0.60 (Cronbach's  $\alpha$ ).

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