

## Trends in U.S. Movie Tobacco Portrayal since 1950: An Historical Analysis

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### Abstract:

**Objective:** Portrayal of tobacco use in films has been causally linked to youth smoking initiation. However, findings regarding trends in portrayal in U.S. films since 1950 are inconsistent, potentially due to differences in sampling densities, inter-coder reliabilities, and time periods covered. The present study was designed to overcome these inconsistencies with a common sampling frame and methodology.

**Methods:** A half sample of the 30 top grossing U.S. films per year from 1950 to 2006 (N = 855) was coded in 5-minute segments for total tobacco-related content and main character tobacco use. Film tobacco trends were identified using linear regression and compared to national per capita cigarette consumption and historically significant tobacco control events.

**Results:** Tobacco content declined considerably since 1950. Total tobacco-related content peaked around 1961, while the decline in portrayal of main character use was already underway in 1950. Cigarette consumption peaked around 1966 with a trend that closely paralleled total tobacco content and that coincided with major tobacco control events.

**Conclusion:** This study, which had high reliability, dense sampling, and covered a long time period, indicates that tobacco content has declined in top-ranked U.S. movies since 1950 with a trend in total tobacco content that closely paralleled the drop in per capita cigarette consumption and the increase in significant tobacco control efforts. Despite the inability to draw causal conclusions, tobacco portrayal in films may serve as barometer of societal support for the habit and thus efforts should continue to limit exposure to such content.

## Trends in U.S. Movie Tobacco Portrayal since 1950: An Historical Analysis

Tobacco use is responsible for over 430,000 deaths a year in the U.S. and remains a major source of preventable morbidity and mortality across the world.[1] It is estimated that in the 21<sup>st</sup> century, tobacco use could result in as many as 1 billion deaths worldwide.[2] Despite efforts to reduce adolescent tobacco use in the U.S., a recent study shows that nearly half (46%) of 12<sup>th</sup> graders have tried cigarette smoking and 22% have smoked at least one cigarette in the past 30 days.[3] An important influence on youth smoking is exposure to smoking and tobacco-related content in popular feature length films.[4-5] Adolescents are heavy movie watchers,[6] who imitate the smoking of their favorite movie actors.[7-9] Longitudinal studies have also found that early adolescents, ages 10-14,[10] and children, ages 9-12,[11] exposed to movie smoking were much more likely to start the behavior. Furthermore, a review by Charlesworth et al.[12] found strong evidence that movie smoking promotes youth smoking initiation and a meta-analysis by Wellman et al.[13] that controlled for a wide range of confounding variables found that exposure to pro-tobacco media and marketing, including tobacco portrayal in films, more than doubled the odds of youth becoming tobacco users. Additionally, a 2008 National Cancer Institute report concluded that the link between movie tobacco exposure and youth smoking initiation is causal.[14]

Given the important role of films in youth culture, reliable and valid assessments of trends in movie tobacco use should inform smoking prevention efforts. Indeed, tobacco portrayal in U.S. made films is particularly critical because these movies are popular in both the U.S and the world. In 2007, North American box office sales were \$9.7 billion and foreign ticket sales from major studios were estimated at \$9.4 billion.[15] Thus, if tobacco content in popular films were on the increase, this would be a serious source of concern for tobacco control efforts.

Research on time trends in tobacco portrayal in films has produced seemingly contradictory results (see Table 1). Our review of this literature includes publications indexed in a variety of search engines using the

search terms *smoking, tobacco, movies, and films*. Studies were included if they reported on tobacco portrayal trends in (a) top-selling U. S. films that (b) covered all film ratings and types (not sub-groups) and that (c) spanned more than five years of time since 1950. As seen in Table 1, three studies found increasing trends in tobacco portrayal (Section A), six reported no change (Section B), and four studies had decreasing trends (Section C) for various time periods from 1950 to 2008.

The inconsistent tobacco trends in Table 1 may be attributable to differences in time periods covered, the density and sales rank of films sampled per year, and either weak or no inter-coder reliability reported. The three studies that reported an increase in tobacco content tended to have small samples (5 or fewer films per year) taken from a relatively narrow (top 20) sales range with no evidence of reliability.[16-18] The six studies that reported no overall trend either covered a small time period (11 or fewer years)[19-22] or had small sample sizes (between 62 [23] and 110 films [19] or weak [20,23] or no reported reliability.[19][21-22][24] The four studies that reported declines had large dense samples with strong reliability. However, they only covered the period from 1990-2007.

Our review indicates that no study with a wide time frame, sufficiently dense sample, and high reliability has been published to justify conclusions about long-term tobacco portrayal trends in films. The present study was designed to fill this gap by sampling a broad range of films (top-30 grossing films per year) that were sampled densely (15 films per year) and that covered a longer time period (1950-2006) than previous studies.

In designing this content analysis, we relied on theories of media influence, such as Bandura's social cognitive theory of mass communication, [25] which suggests that media portrayal of tobacco use can influence viewers by any of several routes. The most influential mechanism is by providing models of the behavior. Such models show viewers how to use the product and to the extent that the behavior is explicitly shown (without maleffects), encourage imitation. In addition, portrayal of any cues linked to smoking (brand logos, smoke

filled rooms, ash trays with lit cigarettes) could also serve as prompts to the audience that can reinstate motives to smoke or remind users of their habit. Finally, media representations can cultivate a picture of the world that informs users, either correctly or incorrectly, about the acceptance and prevalence of tobacco use in society (26). Hence, we assessed both the explicit modeling of the behavior as well as all tobacco related cues in films. The most inclusive measure of portrayal was the overall presence of any tobacco-related content, including characters smoking or the presence of cigars, ashtrays or tobacco billboards. A second measure focused on the actual use of tobacco by main characters, such as purchasing, handling or smoking a cigarette, cigar or pipe.

To determine how closely media portrayal reflected usage and acceptance of tobacco in the culture, our analysis also examined long-term trends in adult per capita cigarette consumption and major landmarks in tobacco control efforts since 1950. Given the causal role of tobacco portrayal in youth initiation (14), we would expect historical trends in tobacco portrayal to parallel per capita consumption. However, tobacco control efforts should influence consumption and could potentially affect movie portrayal trends as well. Hence, it was not feasible to test for a causal relation between films and population consumption. However, these comparisons provided an opportunity to determine how well trends in film portrayal of tobacco reflect actual cigarette consumption trends. To the degree they run in parallel, films could serve as a barometer of societal trends in cigarette consumption and thereby provide viewers with a picture of cultural acceptance of smoking.

<b>Table 1. Major Movie Tobacco Trend Publications' Description</b>							
<b>Authors</b>	<b>Year</b>	<b>Movie Trend</b>	<b>Years covered</b>	<b>Films sampled</b>	<b>Sample size</b>	<b>Density of sampling</b>	<b>Reliability Level Met</b>
<b>A) Tobacco movie portrayal has increased</b>							
Stockwell, T.F., Glantz, S.A.	1997	Up 1990-1996	1960-1990 1990-1996	Top 20	35 films added to Hazan et al. 1994	5 per year	Not reported
Kacirk, K., Glantz, S.A.	2001	Down 1960-1989, up 1990-2000	1960-1997 1998-2000	Top 20	15 films added to Hazan, 1994 and Stockwell & Glantz., 1997, Teti & Glantz, 1998	5 per year	Not reported
Glantz, S.A., Kacirk, K.W., McCulloch, C.	2004	Same in 2002 as 1950, up 1990's until 2002	1950-2002	20 top 20 films 1950-1959, 5 from 2001- 2002	25 films added to Kacirk & Glantz 2001	Avg. 2 films per year 1950- 1959 & 5 from 2001-2002	Not reported
<b>B) Tobacco movie portrayal has not changed</b>							
Hazan, A.R., Lipton, H.L., Glantz, S.A.	1994	No change 1960-1990	1960-1990	Top 20	62 films	2 films per year 1960- 1990	Comparison ratio .92
Everett, S.A., Schnuth, R.L., Tribble, J.L.	1998	No change 1985-1995	1985-1995	Top 10	110 films	10 per year	Not reported
Dalton, M.A., Tickle, J.T., Sargent, J.D., et al.	2002	No change 1988-1997	1988-1997	Top 25	250 films	25 per year	At least 70% agreement
The American Lung Association of Sacramento- Emigrant Trails	2004	Same in 1994-98 and 2003	1994-2003	Top 50	500 films	50 per year	Not reported
Polansky, J.R. Glantz, S.	2007	No change 1999-2006	1999-2006	Nearly all available films per year ≥\$500,000 in sales	1261	Nearly all major films	Not reported
Titus, K., Polansky, J.R., Glantz, S.	2009	No change 1991-2007	1991-2008	Top ranked films	1769	Between 50 & 150 per year	Not reported

C) Tobacco movie portrayal has decreased

Mekemson, C., Glik, D., Titus, K., et al.	2004	Modest downward trend 1991-2000	1991-2000	Top 50	497 films	50 per year	Kappa>0.85
Worth, K.A., Dal Cin, S., Sargent, J.D.	2006	Down adolescent and adult characters 1996- 2004	1996-2004	Top 100	900 films	100 per year	Inter-rater 99.6% agreement
Worth, K.A., Tanski, S., Sargent, J.D.	2006	Down tobacco occurrences 1996-2004	1996-2004	Top 100	900 films	100 per year	Inter-rater correlation=.99
Sargent, J.D., Heatheron,T.F,	2009	Down 1990-2007	1990-2007	Top 25	450 films	25 per year	Inter-rater correlation .96

## **METHODS**

### **Film Selection**

This study is part of a larger project to identify trends in media portrayal of health risks (see YouthMediaRisk.org). This study identified the 30 highest grossing films based on U. S. box-office sales for each year from 1950 to 2006 as compiled by Variety magazine. These represent about 50% of the total box office sales as estimated for recent years (2001-2006) for which reliable data were available. Starting with either rank 1 or 2, films from every other sales rank (15 per year for a total of 855) were selected for coding with the starting rank being randomly selected using a computer generated random number process. In cases where films were not available for purchase (about 5% of films), the next ranking film was substituted.

### **Film Coding**

Twenty-four undergraduate students participated in the coding process. Training involved mastering an extensive codebook with rules for assigning codes to film content (see [www.YouthMediaRisk.org](http://www.YouthMediaRisk.org) for greater detail about the coding instrument). A set of about 21 hours of diverse film content was used for training purposes. Coders were required to exhibit a high level of reliability before completing training. We used Krippendorff's alpha formula ( $K\alpha$ ) [27] to assess reliability. This formula controls for chance agreement and can be used for multiple coders employing either nominal (yes vs. no) or rating scale codes. A value of .70 was used as the minimum acceptable level for any content category.

### **Measures**

Films were coded in five-minute segments. Thus, a two-hour movie would have 24 segments. Three codes were assigned to each 5-minute segment.

*Total tobacco Content.* Segments that contained tobacco use by any background, minor, or main characters including non-human and all animated characters, or the appearance of any tobacco-related content, including smoking ads, logos, references, or paraphernalia were coded as 1 (versus 0;  $K\alpha \geq 0.78$ ). About 86% of films were identified with such content. The mean percentage of segments per film with total tobacco content was 31.6.

*Main Character Tobacco Use.* While tobacco use by all major and minor characters was captured by the total tobacco measure, we also examined the portrayal of tobacco use by a maximum of 8 main characters. This measure captured the actors that were most central to the plot and likely to have the greatest impact on the audience, including non-human and all animated main characters. Characters were identified using Halliwell's film guide,[28] as well as the movie packaging and the Internet Movie Database ([www.imdb.com](http://www.imdb.com)), which often contains pictures of the actors. About half of the films had 7 or fewer main characters. If a segment had a main character using tobacco, the segment was coded as 1 (vs. 0;  $K\alpha \geq 0.82$ ). The mean percentage of segments per film with a main character using tobacco was 16.3. About 69% of films contained at least one main character using tobacco.

Because we assessed any main character use during a 5-minute segment, it was possible that we could overlook multiple occasions of tobacco use within a segment. Hence, we also assessed the intensity of tobacco portrayal per segment using a 5 point scale ( $K\alpha \geq 0.81$ ) (0=No tobacco or related content; 1=had tobacco or related content; 2=tobacco product present but not consumed; 3=One character consuming tobacco or smoking; 4=2-3 characters consuming or smoking tobacco; 5=More than 3 characters consuming or smoking tobacco). However, because this measure was highly related to total tobacco content ( $r=.83$ ,  $p<.001$ ) and exhibited a very similar time trend, it is not discussed further.

Annual U. S. per capita cigarette consumption was used to provide an historical picture of tobacco use. Data were taken from tobacco consumption reports by the Centers for Disease Control and Prevention and the Census Bureau.[29-31]

### **Data Analysis**

The coding unit was the 5-minute movie segment. However, to control for film length, we calculated the percentage of each film's segments that contained total tobacco content or main character tobacco use. To identify trends in annual tobacco portrayal, we calculated both the arithmetic and geometric mean of each measure for the 15 films per year. These scores were then plotted by year to assess trends. Although the 15 film scores per year tended to be skewed, there was little difference in annual trends between using the arithmetic or geometric mean. Hence, we present results for arithmetic means (N=57).

Because the trends in portrayal were adequately described by linear and quadratic terms, we used ordinary least squares regression to identify trends over the 57-year period. We also tested for the presence of autocorrelation in each series. No autocorrelation was found in either film measure of tobacco content. However, autocorrelation was observed in U.S. cigarette consumption and was controlled in the analyses of this outcome.

### **RESULTS**

There was a decline in total tobacco content ( $r^2 = 0.820$ ,  $p < 0.001$ ) described by a downward linear ( $b = -0.348$ , 95% CI = 0.045, 0.652,  $p = 0.025$ ) and quadratic trend ( $b = -0.016$ , 95% CI = -0.021, -0.011,  $p < 0.001$ ). The model's best fitting trend started at 38.9% in 1950, reached a maximum of 40.8% in 1961 and dropped to 7.9% in 2006 (fig 1a). There was little change in the trend from 1950 to 1970; but beginning in 1971, it dropped at an increasing rate. The percentage of films with main characters using tobacco also declined ( $r^2 = 0.711$ ,  $p < 0.001$ ) described by a

significant downward quadratic trend ( $b=-0.005$ , 95% CI=-0.009-0.000,  $p=0.027$ ). The main character model's best fitting trend began at a maximum of 23.3% in 1950 and dropped to a minimum of 4.5% in 2006 (fig 1b).

U.S. adult cigarette consumption also decreased ( $r^2=0.991$ ,  $p<0.001$ ) with a model described by a significant downward linear ( $b=-15.089$ , 95% CI=-7.057, -23.121,  $p<0.001$ ) and quadratic trend ( $b=-0.342$ , 95% CI=-0.572, -0.112,  $p=0.004$ ) (fig 1c). This trend started at 3,677 cigarettes per capita in 1950, reaching a maximum of 4,096 in 1966, and then declining to 1,338 in 2006. To compare trends in film portrayal and cigarette consumption, we plotted standardized predicted values for all three curves (fig 2). It is evident that total tobacco content more closely paralleled U.S. consumption. However, tobacco film content peaked somewhat earlier than consumption (1961 vs. 1966). On the other hand, main character portrayal simply declined over the time period. Also shown in the figure are major milestones in tobacco control efforts. It is clear that since at least 1964, tobacco control efforts have increased in tandem with declining cigarette consumption and tobacco movie portrayal.

## **DISCUSSION**

The U. S. National Cancer Institute concluded that the link between exposure to the use of tobacco in films and youth smoking initiation was causal; [14] therefore identifying trends in tobacco content in top-grossing films is important for tobacco control efforts. This study was designed to clarify the inconsistent results in the literature by examining films over a long time period (1950-2006) with a dense sample covering a wide range of top-grossing films. It also maintained a high standard of reliability and examined tobacco content with portrayal measures that should be linked to smoking initiation and subsequent reinforcement of the habit. Consistent

with the studies identified in Table 1 that also employed rigorous methods (section C), we found a strong decline in total tobacco portrayal that began in 1961 and a decline that was already underway in 1950 for tobacco use by main characters.

It is important to note that the inconsistent results in the literature have sometimes led reviewers to differing conclusions regarding trends in tobacco content in films. For example, Charlesworth et al. [12] found a downward trend from the 1950's that then increased in the 1990s. But for the post-1990 period, this review relied on Glantz et al.'s [18] study which had small samples rather than relying on the Mekemson et al. [32] study, which sampled more films and found a modest downward trend for smoking content. In contrast, a 2009 World Health Organization report [33] concluded that tobacco portrayal in films for the period 1999-2006 exhibited no change. However, this report relied heavily on the methodologically weak study, (Polansky & Glantz, 2007) [22](see table 1 section B) in drawing this conclusion and it is a very short period in which to find a trend. Future reviews of this literature should devote greater attention to the methodological strengths and weaknesses of the research.

The trend in total tobacco content appeared to closely match U.S. adult cigarette consumption over the 57-year study period. Consumption began to decline in the 1960s as tobacco-control efforts were increasing. These included but are not limited to the 1964 U.S. Surgeon General's report documenting the dangers of smoking and the elimination of television ads for cigarettes (1971) and others (fig 2) [34].

The simultaneous trends in tobacco portrayal in films and adult smoking can be explained in at least three ways. The drop in tobacco portrayal could have contributed to the drop in adult cigarette consumption. This would be consistent with studies showing that youth exposure to tobacco content in films predicts subsequent initiation of smoking. This causal path would

require several years to show up in adult consumption trends, and indeed we found that total tobacco peaked 5 years before consumption began to decline. In addition, portrayal of main character smoking began to decline in 1950. On the other hand, the accelerating decline in cigarette consumption could have influenced scriptwriters and directors to include fewer tobacco-related cues and less smoking behavior in their films. This would be most consistent with film trends after 1966 when consumption began to consistently decline. Finally, the increasing tobacco-control efforts beginning in the 1960s may have influenced both trends. For example, increasing tobacco control efforts may have made the social climate less accepting of tobacco use thereby reducing both cigarette consumption and tobacco movie portrayal. The 1950 report in JAMA may also have helped begin the process of raising concerns about tobacco, an effect that began to register in main character portrayal.

Our historical analysis cannot distinguish these alternatives. However, given the remarkable similarity in the patterns of total tobacco and consumption trends, it is safe to conclude that trends in tobacco portrayal in films have served as a barometer of societal acceptance (or lack thereof) of tobacco use since 1950. However it is also important to note that while movie representation may be a barometer of smoking trends in society, it has not necessarily accurately reflected specific demographic smoking trends. For example, Hispanic movie characters have been found to smoke more than surveys suggest they do in real life. [35] Despite these forms of inaccuracy, it is quite likely that successive cohorts of young people have been influenced by the declining popularity of smoking whether it is in films or real life. Additionally, adult smokers have been exposed to fewer cues that might elicit craving or elicit the desire to smoke. Thus, whether or not tobacco portrayal in films has directly led to reductions in adult smoking, it has likely served as an important indicator of the normative

climate surrounding smoking, and this may have influenced the decline in tobacco use since the 1960s.

There are some limitations in this study. This study's use of 5-minute segments for analyzing tobacco content may have been less sensitive than a continuous measure of tobacco instances. Nevertheless, the trend we observed in total tobacco portrayal would have been very similar if we had also reported an intensity measure capturing all instances of smoking in a segment. Furthermore, the trends we have observed since 1990 are consistent with those reported in studies that used continuous measures,[36], 1991 [32], and 1996 [37][38] (Table 1 C). Hence, there does not appear to be a lack of sensitivity for detecting important trends in on-screen portrayal. This study's observed downward trends in tobacco portrayal represent top-30 box office sales and may not generalize to less popular films. However, for the most recent years of the study the top 30 films account for a sizeable 50% of total domestic box office gross sales. [39-40] Future studies should examine cult films, internet based movie content, and less popular films that may nevertheless appeal to young potential smokers.

### **Policy Implications**

In May 2007, the Motion Picture Association of America (MPAA) announced that “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” (page1).[41] However, a 2008 report concluded that this effort had only produced minimal change in film ratings in its first year.[42] A subsequent 2009 report said the MPAA did not raise the rating of any theater-released films because of tobacco content.[43] Thus, more seriously weighing movies with tobacco content or giving them all a restricted (R) rating is worth

considering. A complementary strategy could involve showing anti-smoking ads before films that contain smoking.[44-45]

Although this study finds a decline in tobacco portrayal in top-grossing films since 1950, tobacco portrayal in films remains problematic, and tobacco control efforts should continue working to limit harm from tobacco related content portrayed in films.

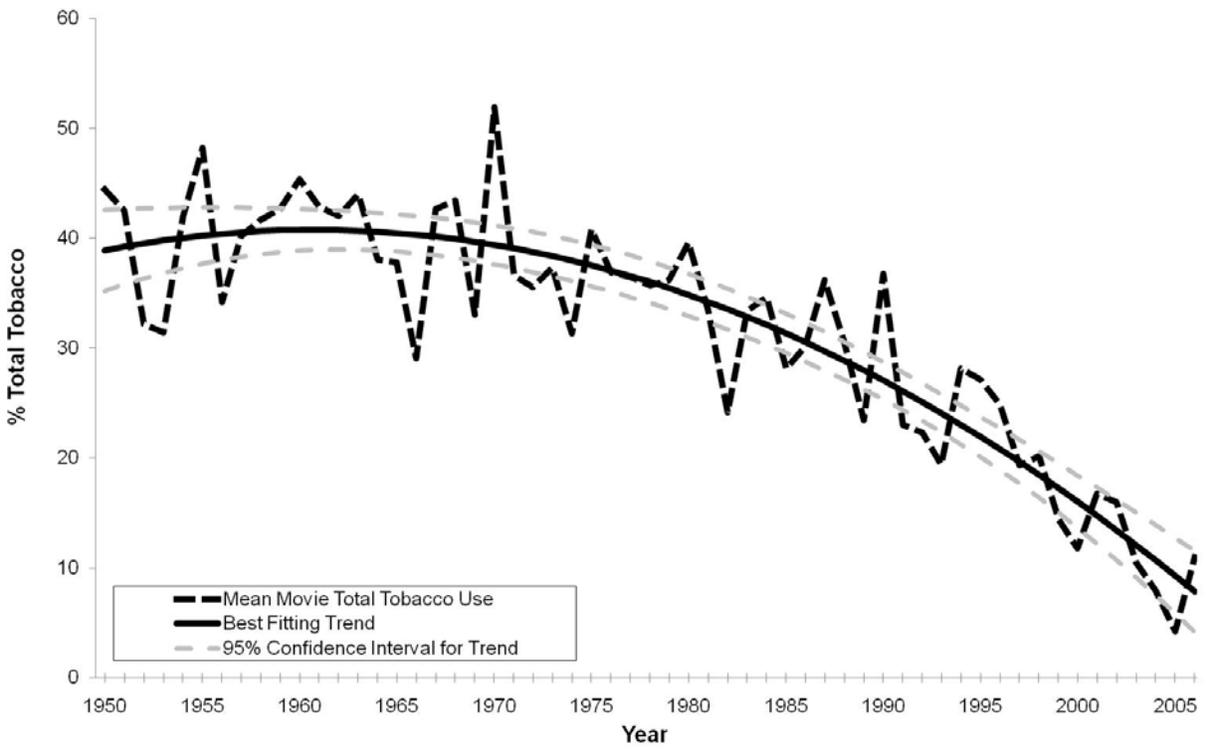
What this paper adds.

Because exposure to the portrayal of tobacco use in movies has been causally linked to smoking initiation in young people, identifying tobacco content trends in movies is important for future tobacco control efforts.

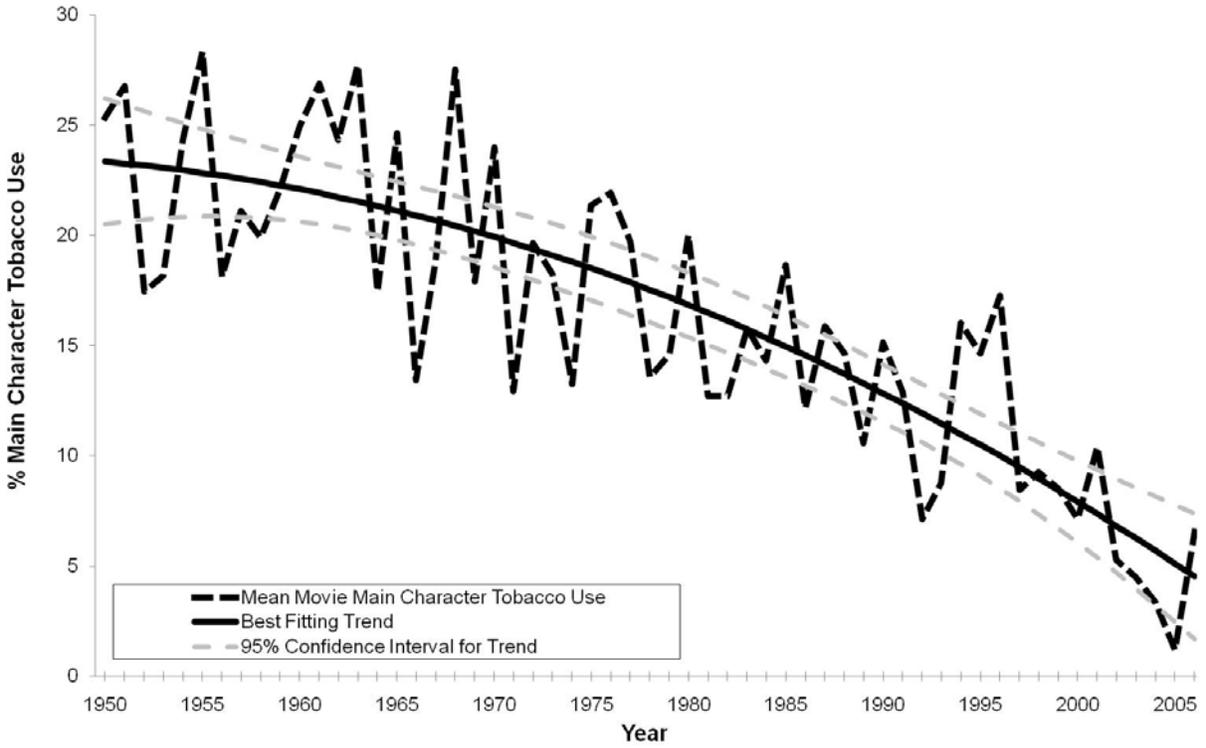
Unlike other studies that covered fewer years and had less certain inter-coder reliability, this study analyzed and found downward trends in tobacco use by main characters in films since 1950 and by total tobacco content in films since 1961.

The decline in movie tobacco portrayal coincided with declines in tobacco consumption and an increase in major tobacco control efforts.

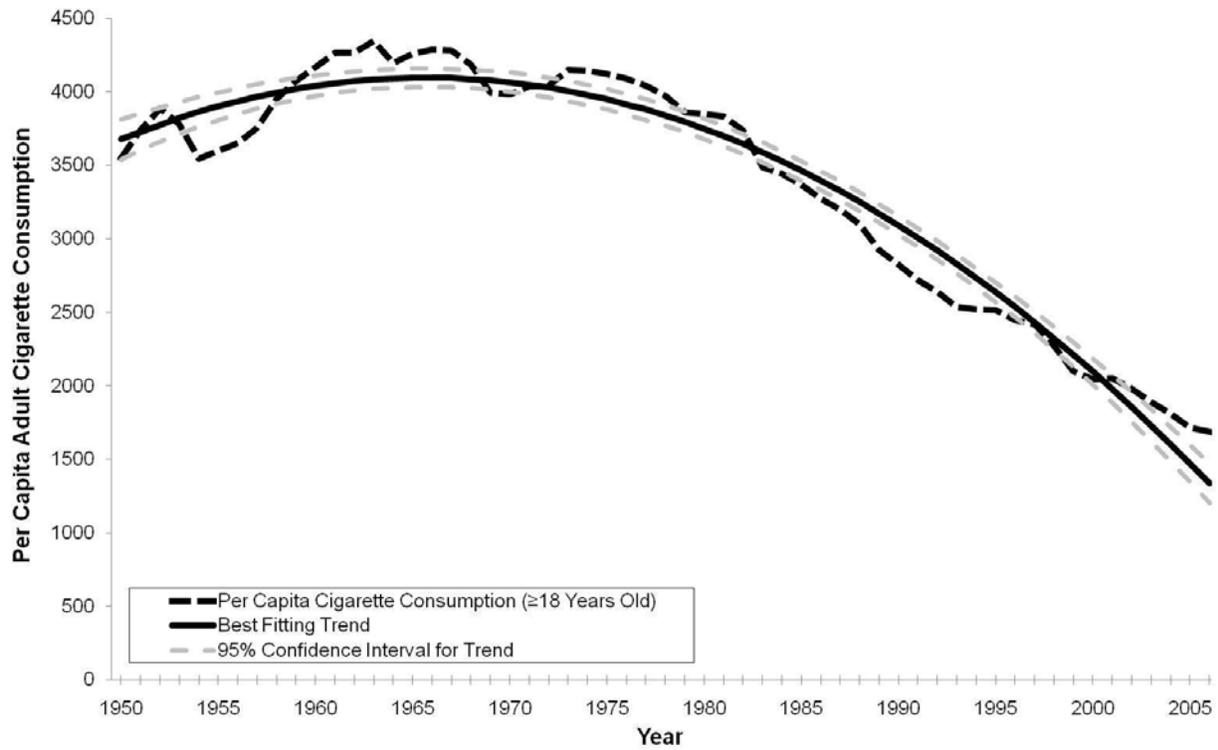
Despite this study's evidence that movie tobacco portrayal has declined since 1950, tobacco control policy should continue to promote strategies that minimize harm from portrayal of tobacco use in movies.



**Figure 1a** Percent of Five Minute Movie Segments with Total Tobacco Content Per Film by Year, 1950-2006

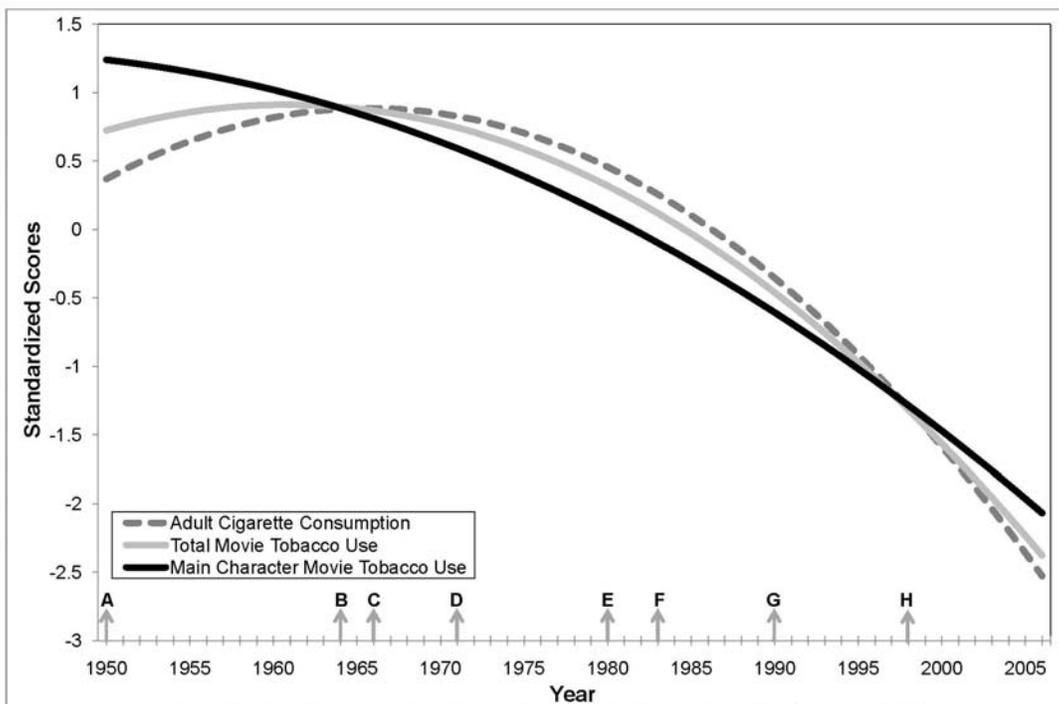


**Figure 1b** Percent of Five Minute Movie Segments with a Main Character Using Tobacco Content Per Film by Year, 1950-2006



**Figure 1c** U.S. Adult Per Capita Cigarette Consumption, 1950-2006

Sources: CDC. Total and per capita adult yearly consumption of manufactured cigarettes and percentage changes in per capita consumption. 2004; CDC. Smoking and Tobacco Use: Data and Statistics: Tables, Charts, and Graphs: Consumption Data: 2006.



**Figure 2** Best Fitting Standardized Trends in U.S. Movie Total Tobacco, Main Character Tobacco Use, and U.S. Adult Cigarette Consumption with Major Tobacco Control Events, 1950-2006.

Major Tobacco Control Events are: A. 1950 JAMA Study Linking Smoking and Cancer; B. 1964 1st Surgeon General's Report Warning of Dangers of Smoking; C. 1966 Cigarette Packs Carry Label Warning About Smoking; D. 1971 Cigarette Advertising Broadcast Ban; E. 1980 British Medical Journal Article About the Dangers of Secondhand Smoke; F. 1983 Federal Cigarette Tax Doubles; G. 1990 Smoking Banned on Domestic flights < 6 Hours Long; H. 1998 Master Settlement Agreement Between Large U.S. Tobacco Companies and States

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