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Time trends for tobacco and alcohol use in youth-rated films popular in Mexico and Argentina, from 2004-2012

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Abstract

Objective. To examine and compare overall prevalence and time trends in tobacco and alcohol portrayals and brand appearances in youth-rated US and nationally-produced films that were the most successful in Argentina and Mexico from 2004-2012. **Materials and methods.** Top-grossing nationally produced films from Argentina (n=73), Mexico (n=85) and the US (n=643) were content analyzed. Logistic regression was used to determine differences between Mexican, Argentine and US produced films. Linear regression models assessed significant cross-country differences in the mean number of tobacco and alcohol seconds. **Results.** Films from Mexico and Argentina were more likely than US films to contain tobacco, (OR=4.2; $p<0.001$) and (OR=7.2; $p<0.001$). Alcohol was present in 93% of Argentine, 83% in Mexican and 83% US films. **Conclusions.** Smoking and alcohol were highly prevalent in nationally produced films. They may have a significant impact and should be targeted by policies to reduce youth exposure to portrayals of risk behaviors.

Keywords: communications media; global health; motion pictures; youth; tobacco; alcohol

Resumen

Objetivo. Este estudio evalúa la representación en el tiempo de contenidos de tabaco y alcohol en las películas para adolescentes más populares en Argentina y México de 2004 a 2012. **Material y métodos.** Se analizaron las películas localmente más taquilleras producidas en Argentina (n=73), México (n=85) y EE.UU. (n=643). Se realizaron modelos de regresión logística para determinar diferencias entre películas mexicanas, argentinas y norteamericanas en variables dicotómicas, y de regresión lineal para evaluar las diferencias significativas entre países para variables continuas. **Resultados.** Las películas mexicanas y argentinas muestran mayor contenido de tabaco en comparación con las norteamericanas (OR=4.2; $p<0.000$) y (OR=7.2; $p<0.000$, respectivamente). El alcohol estuvo presente en 93% de películas argentinas, y en 83% tanto de las mexicanas como de las norteamericanas. **Conclusión.** Los resultados observados muestran tendencias que pueden tener un impacto significativo en la exposición de conductas de riesgo en jóvenes, y por ello son relevantes en la política pública.

Palabras clave: medios de comunicación; salud global; películas; jóvenes; tabaco; alcohol

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Smoking and underage drinking are an important public health problem in Mexico and Argentina, as well as in the Latin American region more broadly.¹ The consumption of tobacco and alcohol among adolescents, 13 to 15 years old, is high. Currently 14.6% of Mexican² and 19.6% of Argentinean³ adolescents smokes, placing both countries in the highest tier amongst Latin American countries. Approximately 70% of Argentine adolescents⁴ and 42.9% of Mexicans⁵ have consumed alcohol. With a binge drinking^{*6} prevalence of 17.6 and 8.8% in Argentina and Mexico respectively.⁷

The US Surgeon General and the National Cancer Institute have concluded that exposure to tobacco use in movies causes adolescent smoking.^{8,9} This is based on consistent results from observational studies across a variety of cultural contexts in 13 different countries.⁹⁻¹⁹ Exposure to alcohol content in films has similarly been associated with adolescent alcohol use across countries.¹⁰⁻²⁴ Given the strength and consistency of these associations and their implications for health worldwide, it is important to monitor depictions of smoking and alcohol in the movies adolescents watch.

The 1998 Master Settlement Agreement (MSA) and the Smoke Free Movies campaign have specifically addressed movie smoking; however, alcohol portrayals in films have not been subject to similar advocacy efforts or policy changes. As a consequence, no changes over time in alcohol portrayals or alcohol brand appearances in US-produced films have been found since the MSA.²⁵⁻²⁷ Neither has there been a study of what has happened to tobacco or alcohol depictions in foreign films since the MSA. Monitoring tobacco in foreign films is needed to determine if the tobacco industry has shifted its promotional efforts through films to national film industries that do not have the same level of regulation and monitoring as in the US.²⁸

This study examined and compared overall content and time trends in tobacco and alcohol portrayals and brand appearances in the most successful US and nationally-produced films in Argentina and Mexico from 2004 to 2012. These are two of the largest film industries in Spanish-speaking Latin America, and their films are often successful in other countries in the region. In order to inform the development of policies that limit movie content that promotes risk behaviors, this study focused on films that were rated for youth under national rating systems. We hypothesized that

tobacco depictions and brand appearances would be significantly less common in Hollywood films because of limits to product placement in the US, whereas there would be few differences in the prevalence of alcohol depictions and brands across countries of production. Also, we expected that trends would be stable over time for these outcomes, except for tobacco portrayals in US films, which prior research had found to decline for films released between 2002 and 2009.²⁵

Materials and methods

Film selection and coding

The sampling frame included films released in Argentina and Mexico between 2004 and 2012 and listed by the Argentinean National Institute of Cinema and Visual Arts (INCAA) and Mexican Institute of Cinematography (IMCINE) amongst the top 100 revenue-grossing films for the year released. Rating data for each film under the Mexican or Argentine rating systems were also obtained from INCAA and the National Chamber of the Film and Video Industry (Canacine). In Argentina, movies are rated by a governmental Evaluation Committee that the INCAA coordinates. In Mexico, the Radio, Television and Cinematography Office (RTC) from the government's Interior Ministry is responsible of the evaluation and rating of all the movies showed in a Mexican territory. Previous studies suggest that Latin American rating systems are more liberal in their treatment of sexual content, drug use, and violence in comparison with the US rating system.²⁵

A separate category of youth-rated films was created for analytic purposes. In Mexico, the youth category included ratings from AA (less than 7 years) to B15 (for 15 years and older). For Argentina, the ratings of ATP (all audiences) and 13 (for 13 years or older) were considered to be youth-rated. Within the entire sampling frame, youth-rated films comprised 93% of the Mexican-produced films, 89% of the Argentine-produced films, and 82% of the US-produced films.

Movies were coded following validated methods²⁶ used for a range of studies.^{14,29-32} In brief, each movie was content coded for tobacco and alcohol use by a trained coder who first viewed the movie in its entirety to identify movie themes and character; then, the coders viewed the movie a second time to identify the timing and duration of all occurrences of smoking or drinking. Brand appearances of tobacco or alcohol were also identified. The total seconds in which tobacco products, tobacco packaging, and smoke known to emanate from lighted tobacco products appeared on screen were

* We assessed binge drinking by asking if he or she had ever drunk more than 4 or 5 drinks in a row, with the quantity used depending on gender of the student.

timed. Alcohol appearances were assessed by timing on-screen alcohol use or situations where alcohol is present and there is real or implied use of an alcoholic beverage by one or more characters, including purchases and occasions when alcoholic beverages were clearly in the possession of a character. Empty alcoholic beverage containers and those displayed but not implied as being consumed were not timed as alcohol use. All alcohol use and implied use was timed in seconds from the moment the alcohol appeared on screen. Study protocols were approved by NIH-certified human subjects research boards in Argentina (i.e., *Centro de Educación Médica e Investigaciones Clínicas*) and Mexico (*Instituto Nacional de Salud Pública*).

To evaluate inter-rater reliability for the US films, a random sample of 10% of movies was coded by two coders yielding kappa of 0.97 for tobacco time depictions, and 0.76 for alcohol time depictions. For tobacco brands, Pearson's correlations for counts of the number of brand appearances were high (0.98 for tobacco brands, 0.99 for alcohol brands). These statistics represent the overall reliability for all movies coded by the Dartmouth Media Research Laboratory (DMRL) in the US. Due to the smaller sample size of Mexican and Argentine films (n=92 and 85, respectively), 20% were double coded, yielding Cohen's kappa's of 0.71 for tobacco, and 0.74 for alcohol in Mexico; and 0.84 for tobacco, and 0.76 for alcohol in Argentina. For brand counts, correlation coefficients were 0.93 for tobacco and 0.94 for alcohol in Mexico and 0.69 for tobacco and 0.54 for alcohol in Argentina.

Analysis

Analyses were conducted using STATA version 12. Films that were popular and received a youth rating in both Mexico and Argentina were analyzed. Logistic regression was used to determine differences between Mexican, Argentine and US produced films (US films as reference group) in the prevalence of: 1) any tobacco content; 2) any alcohol content; 3) any tobacco brand; 4) any alcohol brands. To assess linear time trends, data were analyzed separately by country of production, and logistic models regressed these same film content variables on year of film release. For the subsample of films with tobacco or alcohol content, linear regression was used to evaluate significant cross-country differences in the mean number of tobacco and alcohol seconds, using US films as the reference group. As a sensitivity analysis, the aforementioned analyses were re-run, including all coded US films that were popular and rated for youth in either Argentina or Mexico. Similar results were obtained.

Results

Sample

Out of the 100 top-grossing films each year that were popular in Mexico and Argentina from 2004 to 2012, 908 films produced in the US, 85 in Argentina, and 92 in Mexico, were considered for inclusion. Films were excluded if they were given an adult rating under the national rating systems (nine from Argentina, six from Mexico, and 132 from the US) or if they were not available (three films from Argentina and one from Mexico). Of US-produced films, 133 were also excluded because they were not popular in the US and therefore not previously coded by the DMRL. The final sample included 73 Argentine films, 85 Mexican films, and 643 US films (figure 1).

Tobacco

Throughout the study period, 67 (79%) Mexican produced, 63 (86%) Argentine produced, and 301 (47%) US produced films contained tobacco (table I). The percentage of US-produced films that contained tobacco was lower than nationally-produced Mexican (OR=4.2; $p<0.000$) and Argentine films (OR=7.2; $p<0.000$). Tobacco brands appeared in 25% of Mexican, 12% of Argentine, and 5% of US films, with significant differences in appearances between US and both Mexican films (OR=6.3; $p<0.000$) and Argentine films (OR=2.7; $p<0.031$). Among films that contained tobacco, the mean seconds of tobacco portrayals were 149.3, 199.8, and 112.2 for movies produced in Mexico, Argentina and the US, respectively. These differences were only significant between US and Argentine films ($\beta=87.5$; $p<0.002$).

Figure 2a shows the prevalence over time of films with any smoking for Mexican, Argentine, and US-produced films. This prevalence declined significantly in Mexican-produced films (from 100% in 2004 to 60% in 2012, $p<0.001$) and US-produced films (from 71 to 44%, $p<0.001$). For Argentine-produced films, no significant trend was found. Over the study period, there were no statistically significant linear trends in prevalence of tobacco brand appearances for films produced in Mexico and Argentina, although tobacco brand appearances significantly declined in US films (OR=0.81; $p<0.012$) (figure 3a).

Alcohol

As showed in figure 2b, the prevalence of Argentine films that depicted alcohol was 93%, higher (OR=2.79, $p=0.038$) than the 83% of US films that contained alcohol.



FIGURE I. MOVIES ANALYTIC SAMPLE SELECTION FROM ARGENTINA, MEXICO, AND USA TOP GROSSING FILMS 2004-2012

Table I
TOBACCO AND ALCOHOL CONTENTS IN POPULAR MOVIES IN MEXICO AND ARGENTINA, BY COUNTRY OF PRODUCTION. 2004-2012

Risk Behaviour	Mexico films N=85 (A, AA, B, B15) n (%)	Argentina films N=73 (ATP, 13) n (%)	US films N=648 n (%)	US vs Mexico OR (CI)	US vs Argentina OR (CI)
% Tobacco	67 (79)	63 (86)	301 (47)	4.2 (2.4-7.1) [§]	7.2 (3.6-14.2) [§]
% Alcohol	71 (83)	68 (93)	532 (83)	1.06 (0.6-1.9)	2.8 (1.1-7.2)*
Tobacco brands	21 (25)	9 (12)	32 (5)	6.3 (3.4-11.5) [§]	2.7 (1.2-5.9)*
Alcohol Brands	40 (47)	20 (27)	269 (42)	1.2 (.78-1.9)	.52 (0.31-0.89)*
	n (mean)	n (mean)	n (mean)	B (se)	B (se)
Seconds Tobacco	67 (149.31)	63 (199.8)	301 (112.2)	37 (25.3)	87.5 (27.5) [‡]
Seconds Alcohol	71 (281.6)	68 (281)	532 (218.2)	63.4 (29.7)*	62.8 (31.06)*

* $p < 0.05$

[‡] $p < 0.010$

[§] $p < 0.0000$

No significant difference was observed in Mexican films compared to US films. The percentage of films with alcohol brands in Mexican films (47%) and US films (42%) was not significantly different. However, the percentage of Argentine films with alcohol brands (27%) was significantly lower than for US films (OR=0.52; $p=0.019$) (table I). Among films that contained alcohol, US-produced films contained an average of 218.2 seconds of alcohol use, compared to 281 seconds for both Mexican films and Argentine films, which were marginally lower ($p=0.033$, $p=0.044$) respectively (table I).

The prevalence of films with alcohol or alcohol brands did not change significantly over time for Mexican, Argentine, or US produced films (figure 3b).

Discussion

This is the first study that address this tobacco and alcohol depictions in movies in Latin American countries. This study found that tobacco depictions and brand appearances were significantly higher in Argentinian and Mexican films compared to US films, where product

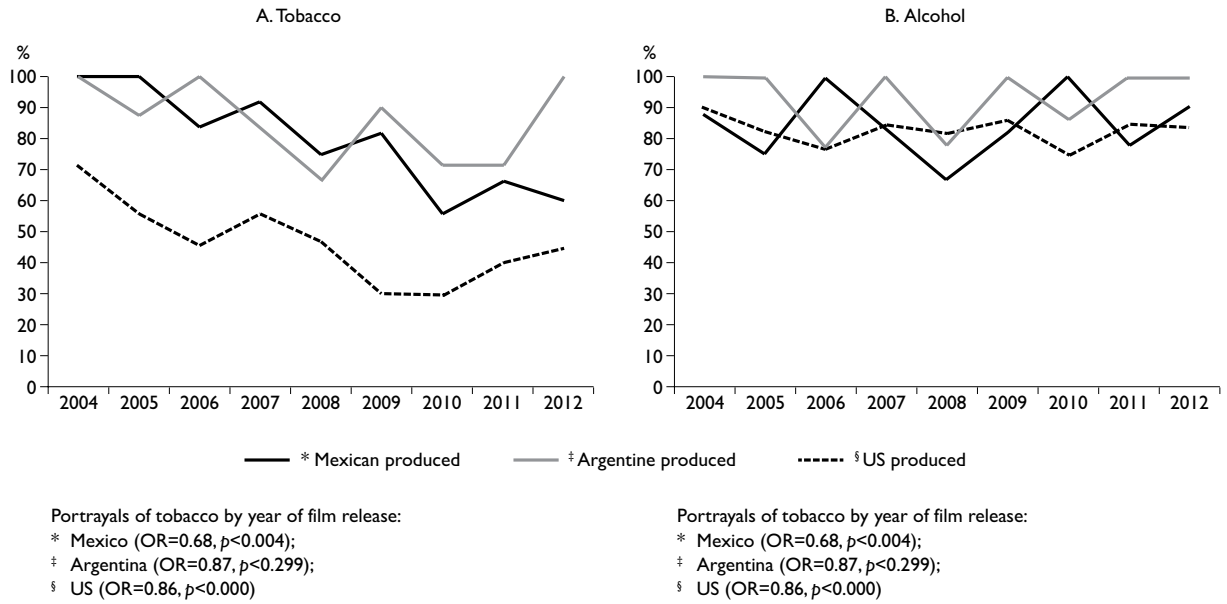


FIGURE 2. PREVALENCE OF YOUTH-RATED FILMS CONTAINING TOBACCO AND ALCOHOL BY COUNTRY. 2004-2012

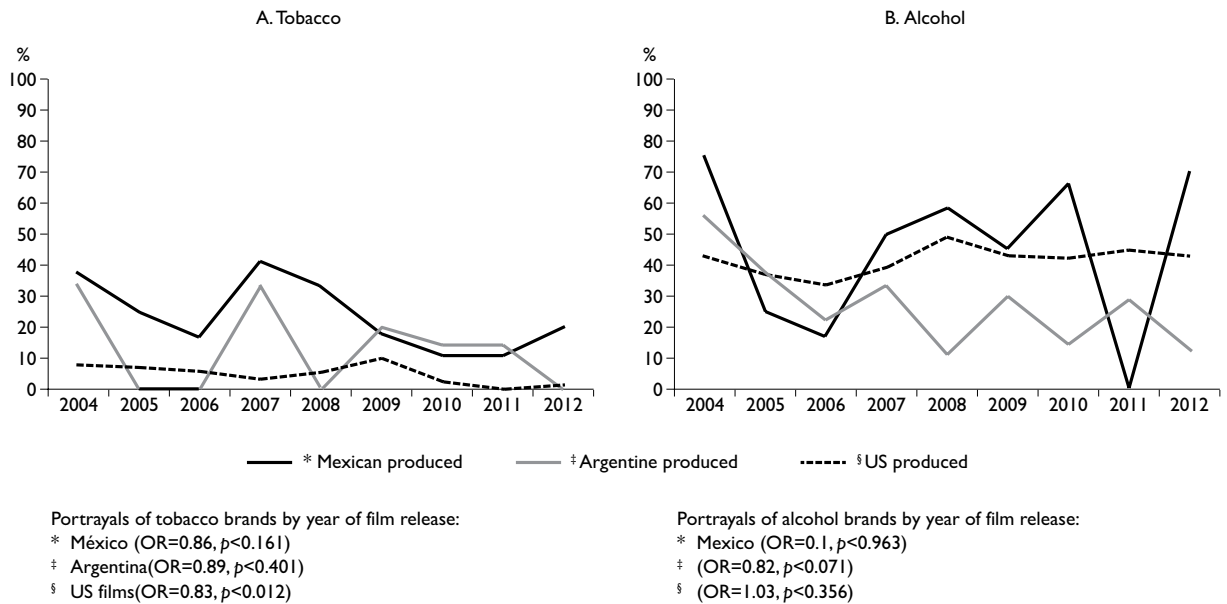


FIGURE 3. PREVALENCE OF YOUTH-RATED FILMS WITH TOBACCO AND ALCOHOL BRAND APPEARANCES BY COUNTRY. 2004-2012

Table II
COMPARISON OF RATING AND PRODUCT PLACEMENT LEGISLATION IN ARGENTINA, MEXICO AND USA

	Rating system considers..		The "adult-only" rating is determined by the presence of...		Product placement prohibition for...	
	...Alcohol	...Tobacco	...Alcohol	...Tobacco	...Alcohol	...Tobacco
Argentina	NO* NO ³³ (2002)	NO* NO ³³ (2002)	NO* NO ³³ (2002)	NO* NO ³³ (2002)	NO	NO
Mexico	The legislation only mentions "addictions" referring to narcotics or psychotropic drugs	The legislation only mentions "addictions" referring to narcotics or psychotropic drugs	The legislation only mentions "addictions" referring to narcotics or psychotropic drugs	The legislation only mentions "addictions" referring to narcotics or psychotropic drugs	NO	YES ³⁴ (2008)
USA	NO ³⁵ (2010) Only referred as "drug use"	NO ³⁵ (2010) Only referred as "drug use"	NO ³⁵ (2010) Only referred as "drug use"	NO ³⁵ (2010) Only referred as "drug use"	NO	YES ³⁶ (1998)

* There's no clear law about the classification system in Argentina. The *Comisión Asesora de Exhibiciones Cinematográficas* (CAEC) is the organism in charge of the classification of movies

placement deals are prohibited and where there is a large-scale public health campaign to reduce smoking in movies. This study also showed an overall decline in tobacco portrayals in youth-rated Mexican films during the nine years of study. This may be attributed, in part, to the 2008 General Law for the Tobacco Control, which banned tobacco advertising, promotion, and sponsorship in media, including cinema. However, the time from production to exhibition is often many years, and many movies analyzed in this study would have already been in production before the implementation of the law. Other factors, like comprehensive smoke-free policies implemented in 2008 in Mexico, may have also reduced smoking portrayals by decreasing the social acceptability of smoking. In Argentina, legislation prohibits tobacco advertising but does not include movies; this might explain why tobacco depictions remain unchanged over time in that country (table II).

A prior analysis of the top-grossing movies in the US demonstrated that, in 2011, the number of tobacco incidents per movie rose 7% from 2010 to 2011.³⁷ This trend was paralleled in youth-rated Argentine films released in 2011 and 2012, which also showed evidence of increasing tobacco use (figure 2a). This underlines the importance of continued monitoring of films and continued pressure through public health advocacy to keep smoking out of movies aimed at youth.

In contrast to tobacco, the vast majority of films in each country contained alcohol depictions, and alcohol brand placements were present in almost half of Mexican and US-produced movies and a quarter (27%) of Argentine movies. As found in prior research,^{38,39} there was no evidence of any downward trends.²⁶ In

Argentina, selling or promoting alcoholic beverages to minors is prohibited,³⁸ but alcohol advertising is pervasive, and adolescents do not have difficulties obtaining alcoholic beverages.⁴⁰ In Mexico there are no restrictions for promoting alcohol through films, with films legally financed by tequila and beer companies.⁴¹ Given alcohol's significant contribution to the public health burden around the world, whether through its impact on adolescent mortality or longer-term health and social outcomes,⁴² alcohol marketing and brand placement in movies should face stronger restrictions.

Mexican and Argentine rating systems assign youth ratings for many films that receive adult ratings in the US (i.e. R-rated), which increases youth exposure to movie smoking²⁵ and other risk behaviors, such as extreme violence.^{43,44} Thus, ratings boards could impact youth behaviors by tightening up movie ratings systems to give adult ratings for smoking, violence and depictions that promote these behaviors among adolescents. Indeed, the WHO recommends this strategy for reducing youth exposure to smoking in movies.⁴⁵

This study is limited by a number of issues, including the relatively small sample of Mexican and Argentinean films, especially when examined by year. However, US-produced films dominate film markets in Mexico and Argentina, as nationally-produced films comprised about 8% of the top grossing films in our sampling frames. Hence, our analytic sample is representative of popular movies in each country, although the lower sample size for nationally-produced films may have resulted in limited power for statistical tests, particularly for assessments of change over time. Furthermore, rating systems across countries

were not completely comparable. Around 5% of US-produced movies were rated differently in Mexico and Argentina. However, the results were similar whether we analyzed US films rated for youth in both Mexico and Argentina or if we analyzed US movies rated for youth in either Mexico or Argentina. Finally, we did not conduct a detailed assessment of the context of use or the impact of exposure on youth. Nevertheless, prior research that assessed tobacco and alcohol portrayals using methods employed our study consistently find that exposure predicts later tobacco and alcohol use. Future research should determine whether exposure to this imagery through nationally-produced films has a more significant impact, perhaps because of cultural similarities between film characters and youth who live in the countries where these films are produced.⁴⁶

Conclusions

In summary, tobacco depictions and brand placements in films are much higher in Argentinian and Mexican films compared to US films, where product placement deals are prohibited, and where there is a large-scale public health campaign aimed at smoking in movies. However, the strengthening of the tobacco control environment in Mexico, product of the 2008 General Law for the Tobacco Control, may have promoted a reduction in film tobacco use by specifically prohibiting the product placement. Alcohol use was depicted in almost all movies and brand portrayals were prevalent, regardless of the country of film production, which may result, at least in part, from allowing alcohol industry product placement.

The data obtained by this study allows seeing the prevalence of tobacco and alcohol depictions in three countries with different legal frameworks. The results strengths the position that countries should consider WHO-FCTC recommended policies to prohibit tobacco use in films that receive government subsidies, prohibit brand imagery in films, and assignment of adult ratings for films that contain tobacco.⁴¹ Because both tobacco and alcohol producers promote their products through films, similar policies should be considered for alcohol. The potential impact of these policies can be significant. Reducing the exposure of underage teenagers to risk conducts can lower the initiation rate and, in a longer period, the incidence of this conducts in the population.

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Declaration of conflict of interests. The authors declare that they have no conflict of interests.

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