



Original investigation

Movie Language Orientation, Gender, Movie Smoking Exposure, and Smoking Susceptibility among Youth in Mexico

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Abstract

Introduction: As a result of globalization, youth in Mexico may be exposed to US culture remotely. This remote intercultural contact may influence their movie language orientation and cigarette smoking. To examine how intercultural contact with U.S. culture influences the smoking behaviors of youth in Mexico, this study investigated the influence of English- and Spanish-language movie orientation on movie smoking exposure through US- and Mexico-produced movies. It also examined whether youth movie smoking exposure was associated with higher positive smoking-related expectancies and greater intentions to smoke cigarettes.

Methods: Participants were 7524 adolescent never smokers in Mexico (51% female, *Mean Age* = 12.39 years) who completed a school-based survey on movie language orientation, movie exposure (from which exposure to tobacco portrayals was estimated), smoking-related expectancies, and smoking susceptibility.

Results: Path and mediation analyses indicated that English-language movie orientation was associated with greater movie smoking exposure, leading to more positive smoking-related expectancies and greater youth smoking susceptibility.

Conclusion: Consistent with research on the influence of US culture on the smoking of Mexican-heritage youth in the United States, findings suggest that orientation toward English-language movies may put youth in Mexico at risk for smoking initiation. Findings extend existing research on intercultural contact and cigarette smoking with Hispanic youth in the United States to youth in Mexico. Implications for future research are discussed.

Implications: This study is one of the first to investigate the influence of remote intercultural contact with US culture on Mexican youth's smoking-related expectancies and susceptibility. This study investigated pathways by which youth's movie language orientation (English vs. Spanish)

exposed them to movie smoking through US- and Mexico-produced movies, thereby influencing their smoking-related cognitions. Findings provide initial empirical evidence of a significant association between US remote intercultural contact and smoking among youth in Mexico. An important next step is to investigate how this process unfolds longitudinally and to investigate additional ways youth may engage with US culture to affect their smoking behaviors.

Introduction

Cigarette smoking is high among youth in Mexico,¹ where about 43% of 13- and 15-year-olds have smoked cigarettes and 16% did so before the age of 10. Thus, adolescence is a critical period for smoking prevention in Mexico.

Consistent with research in Europe² and the United States,^{2,3} movie smoking exposure is associated with positive smoking attitudes and smoking initiation in Mexico.^{4,5} Moreover, among Hispanic adolescents in the United States, participation in the US culture is associated with increased risk of smoking.^{6,7}

Globalization facilitates remote transmission of culture,^{8,9} potentially influencing Mexican youth's behaviors, including smoking. This study investigated how Mexican youths' orientation toward English- and/or Spanish-language movies influences their exposures to smoking through US- and Mexico-produced movies, positive smoking-related expectancies, and smoking susceptibility (Figure 1).

Positive depictions of smoking in movies may signal to adolescents that smoking will make them "cool" and attractive.³ Adolescents who incorporate such messages into their self-image likely also have positive expectations about smoking.^{3,4} Studies in multiple countries²⁻⁵ have found positive associations among movie smoking exposure, positive expectancies about smoking, smoking susceptibility, and increased likelihood of smoking initiation.

Among Hispanic adolescents living in the United States, engagement with U.S. cultural practices and media (i.e., enjoying English-language movies) increases risk of smoking, whereas engagement with Hispanic cultural practices (i.e., enjoying Spanish-language movies) decreases their risk.^{6,7,10} However, less is known about how engagement with US culture influences youth smoking in Mexico, where opportunities for exposure to US media culture appear high.

Remote acculturation is a modern type of nonimmigrant, globalization-based intercultural contact.⁹ Globalization (i.e., the flow

of people, goods, and ideas across cultures),¹¹ including diffusion of and access to media, allows for intermittent or continuous intercultural contact across geographically distant cultures and can facilitate acculturation processes.^{8,9,12} Youth in Mexico may experience remote intercultural contact with US culture, which may influence their smoking behaviors by exposing them to movie smoking and influencing their smoking-related cognitions.

Girls' and boys' smoking can be affected differentially by social influences.^{6,13} Many Mexican families socialize their adolescents according to distinct gender roles, with smoking more acceptable among boys than among girls.¹⁴ As Mexican youth experience acculturation and are exposed to smoking imagery in media, girls may experience greater shifts in smoking-related expectancies and susceptibility compared to boys.¹⁴ Accordingly, research with US Hispanic adolescents suggests that girls' smoking is more strongly affected by US cultural practices than boys' smoking.^{6,13} Less is known about whether and how remote acculturation differentially influences the smoking behaviors of boys and girls in Mexico.

The Current Study

In our conceptual model (Figure 1), orientation toward English- and Spanish-language movies influences exposure to smoking in US- and Mexico-produced movies. Higher movie smoking exposure, in turn, promotes smoking-related expectancies, leading to susceptibility to smoking. We included movie smoking exposure in US- and Mexico-produced movies because youth who are oriented toward English-language movies are more likely to consume US-produced media compared to youth who are oriented toward Spanish-language media.^{10,15} Greater exposure to US media also increases youth's risk of smoking^{7,10,15}—however, it is unclear whether this is due to the media content or to youth's propensity to engage in risk behaviors

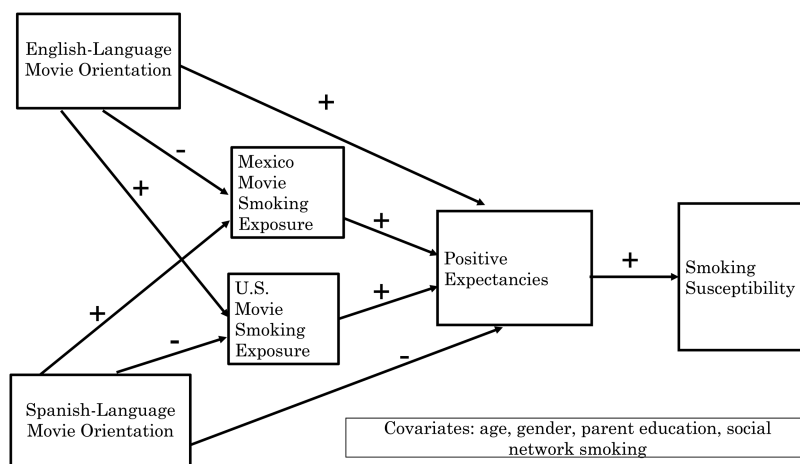


Figure 1. Hypothesized structural model showing all expected relationships and their predicted valence.

that are associated with media from the United States or other foreign countries.⁸ We distinguish between US- and Mexico-produced movies because a lower percentage of US-produced movies include tobacco imagery compared to Mexico-produced movies¹⁶; however, US-produced movies are more popular than Mexico-produced movies, and, therefore, adolescents are more likely to watch US-produced movies.¹⁷⁻¹⁹ Therefore, adolescents are likely to be exposed to more smoking impressions through US-produced movies compared to Mexico-produced movies.¹⁷⁻¹⁹ Understanding the links between movie language orientation and estimated exposures to smoking imagery via US- and Mexico-produced movies can provide a more nuanced understanding of the process by which orientation for English- and Spanish-language movies influences youth smoking. We also investigated the degree to which movie smoking exposure and smoking related-positive expectancies mediated the relationships from English- and Spanish-language movie orientation to youth smoking susceptibility. Identifying mediating pathways from English- and Spanish-language movie orientation to smoking susceptibility is important because it can provide information about areas for prevention and intervention efforts. We tested the following hypotheses:

1. Orientation toward English-language movies would be associated with more positive expectancies about smoking, leading to greater smoking susceptibility.
2. Orientation toward Spanish-language movies would relate to lower positive smoking-related expectancies leading to lower smoking susceptibility.
3. English-language movie orientation would be associated with lower Mexico-produced and higher US-produced movie smoking exposure. Greater movie smoking exposure through US- and Mexico-produced movies would then be associated with more positive smoking-related expectancies which, in turn, would relate to greater smoking susceptibility.
4. Spanish-language movie orientation would be associated with greater exposure to movie smoking in Mexican movies and with lower US movie smoking exposure. Exposure to movie smoking through US- and Mexico-produced movies would then relate to more positive expectancies, which, in turn, would be associated with greater susceptibility to smoking.
5. Gender differences: Based on the assertion that in traditional Mexican culture it is more acceptable for boys to smoke than girls, we expected the links from English- and Spanish-language movie orientation to positive smoking-related expectancies to be stronger for girls than boys.

Methods

Sample and Procedures

Data came from a large national, school-based survey on media, movie smoking exposure, and cigarette smoking among early adolescents in Mexico. We added two questions to an existing survey about adolescents' movie language orientation, and we restricted our analyses to never smokers. The overall sample consisted of 10 123 middle school students from the three largest cities in Mexico (Mexico City, Guadalajara, and Monterrey). Because of concerns regarding the temporal ordering of movie smoking exposures and smoking outcomes, we excluded ever-smokers ($N = 2599$) based on students' responses to two questions: "Have you ever tried cigarette smoking, even one or two puffs?" and "During the past 30 days, on how many days did you smoke?"

This resulted in a final analytic sample of 7524 never-smokers. The final analytic sample was 51% female, and the mean age was 12.39 years ($SD = .57$, range 11–16).

We selected schools using multistage stratified random sampling. All public middle schools within each city were included in the sampling frame. They were categorized into six strata according to (1) high and low levels of socioeconomic marginalization for the census tract where the school was located and (2) three levels of the density of tobacco retail outlets around the schools, with tertile cutpoints determined for each city separately. Within each of these six strata, three or four schools were randomly selected with selection probability proportional to the number of students in each school, reaching a total of 20 schools per city. When a school declined to participate, we randomly selected another school within the same stratum. This resulted in a total of 60 participating schools. Data were gathered in February and March 2015. Students completed paper-and-pencil surveys at the students' schools, and each adolescent received a pencil as a token of appreciation. Prior to students' participation, parents provided passive informed consent for their adolescents, and adolescents provided active assent on the day of the survey. The study protocol was approved by the Institutional Review Board of the Instituto Nacional de Salud Publica (INSP) in Mexico and each participating school district's office for ensuring the health and safety of students. The procedures are described in detail elsewhere.²⁰

Measures

Movie Language Orientation was assessed with two questions from the short form of the Revised Acculturation Rating Scale for Mexican Americans-II (ARSMA-II).¹⁵ The ARSMA-II assesses orientation toward US and Mexican culture. Students were asked to rate on a scale ranging from 1 (Totally Agree) to 5 (Totally Disagree) the degree to which they enjoyed watching movies in English (i.e., "I enjoy watching movies in English") and Spanish (i.e., "I enjoy watching movies in Spanish"). We reverse-coded these two questions for ease of interpretation. Higher scores represent greater English- or Spanish-language movie orientation.

Movie Smoking Exposure was assessed with the Beach method.²¹ Because it is not possible to ask every respondent about all movies, this method involves analysis of tobacco content in a large sample of popular movies, but with each participating adolescent reporting whether they have seen each movie in a randomly selected subsample of 50 movies. The sampling frame included movies released in Mexico between 2010 and 2014 and listed by the Mexican Institute of Cinematography (IMCINE) among the top 100 revenue-grossing movies for the year of release. Movies were considered for inclusion if they were produced in Mexico ($n = 91$) or the United States ($n = 775$). A team of two trained coders in Mexico coded the Mexican movies and the Dartmouth Research Library (DMRL)-coded US movies. Each coder watched each movie at least twice and coded all tobacco use and imagery in detail, including a count of all tobacco depictions and the amount of time tobacco imagery was shown on screen. To determine interrater reliability, a small subsample of movies was double-coded for each country (20% in Mexico and 10% in the United States), indicating high reliability (Cohen's $\kappa = .71$ for Mexico-produced and Cohen's $\kappa = .97$ for US-produced movies) for seconds of screen-time exposure to tobacco imagery, which is the measure used here.

Positive Smoking-Related Expectancies were assessed with five questions³ (e.g., "I think I would enjoy smoking" and "I think

smoking would make me look older"). Response options ranged from 1 (*Completely agree*) to 5 (*Completely disagree*). We reverse-coded and averaged these questions such that higher scores represent more positive expectancies ($\alpha = .88$).

Smoking Susceptibility, a consistent predictor of smoking among nonsmoking youth, was assessed with two questions ("Do you think you will smoke a cigarette in the next twelve months?" and "Would you smoke a cigarette if one of your best friends offered you one?"). Response options ranged from 1 (*Definitely Not*) to 4 (*Definitely Yes*). Higher scores represent higher susceptibility ($\alpha = .73$).

Gender was self-reported and dummy-coded as 1 = *female* and 0 = *male*.

Age was self-reported and response options ranged from 1 (*11 years or less*) to 6 (*16 years or more*).

Social Network Smoking was assessed with five questions. Youth reported whether their mother, father, and any of their siblings smoked cigarettes (0 = *No* or 1 = *Yes*, for each). Youth also reported the frequency with which they had seen their teachers smoke cigarettes in the past 30 days. Response options were 0 (*Never*), 2

(*Sometimes*), 3 (*Almost Daily*), and 4 (*I Don't Know*). We recoded this question to 0 (*Never*) and 1 (*At least sometimes*) due to its skewed distribution. Adolescents also reported how many of their best friends smoked. Response options ranged from 0 (*0 out of 5 friends*) to 5 (*5 out of 5 friends*).

Socioeconomic Status (SES) was assessed in terms of parental education. Students reported the educational level of their mother and father. Response options were 0 (*Did Not Attend School*), 1 (*Did Not Complete Elementary School*), 2 (*Completed Elementary School*), 3 (*Did Not Complete Middle School*), 4 (*Completed Middle School*), 5 (*Did Not Complete High School*), 6 (*Completed High School*), 8 (*Attended University*), 9 (*Don't Know*), and 10 (*Don't Have A Mother/Father*). The following response options were treated as missing values: 9 (*Don't Know*) and 10 (*Don't Have A Mother/Father*). Higher scores indicate higher SES.

Analytic Plan

We conducted descriptive analyses with SPSS version 22.0.²² We tested gender differences using *t* tests for continuous variables and

Table 1. Descriptive Characteristics for Overall Sample, Girls and Boys^a

Variables	Overall Sample		Girls		Boys		<i>p</i>
	(N = 7,524)		(n = 3834)		(n = 3667)		
	<i>n</i> (%) or M (SE)		<i>n</i> (%) or M (SE)		<i>n</i> (%) or M (SE)		
Age	12.39	(.57)	12.36	(0.55)	12.42	(.59)	b
English-Language movie orientation	2.84	(1.42)	2.82	(1.39)	2.85	(1.45)	
Spanish-Language movie orientation	4.24	(1.14)	4.25	(4.25)	4.23	(1.18)	
Movie Smoking exposure total	1.84	(1.67)	1.75	(1.64)	1.93	(1.70)	c
Movie Smoking exposure mexico	0.34	(.48)	0.34	(0.48)	.33	(.49)	
Movie Smoking exposure USA	1.49	(1.41)	1.40	(1.38)	1.59	(1.43)	c
Positive Smoking-related expectancies	1.64	(.81)	1.59	(0.77)	1.69	(.85)	c
Smoking susceptibility	1.24	(.48)	1.24	(0.48)	1.23	(.48)	
Friend smoking	2017	(26.9)	1013	(26.5)	996	(27.3)	
Teacher smoking	1264	(16.8)	605	(15.8)	657	(18.0)	b
Mother smoking	1149	(15.3)	603	(15.7)	542	(14.8)	
Father smoking	2433	(32.3)	1258	(32.9)	1169	(31.9)	
Sibling smoking	864	(11.5)	480	(12.5)	384	(10.5)	b
Mother education							c
Did not attend school	244	(3.2)	89	(2.3)	151	(4.1)	
Did not complete elementary school	455	(6.0)	232	(6.1)	220	(6.0)	
Completed elementary school	640	(8.5)	351	(9.2)	286	(7.8)	
Did not complete middle school	676	(9.0)	362	(9.4)	313	(8.5)	
Completed middle school	1988	(26.4)	1086	(28.3)	899	(24.5)	
Did not complete high school	774	(10.3)	375	(9.8)	399	(10.9)	
Completed high school	1001	(13.3)	503	(13.1)	495	(13.5)	
Attended university	823	(10.9)	406	(10.6)	415	(11.3)	
Don't know/no mother	826	(10.9)	391	(10.2)	434	(11.8)	
Father education							c
Did not attend school	254	(3.4)	82	(2.1)	172	(4.7)	
Did not complete elementary school	451	(6.0)	210	(5.5)	239	(6.5)	
Completed elementary school	508	(6.8)	257	(6.7)	248	(6.8)	
Did not complete middle school	678	(9.0)	362	(9.4)	312	(8.5)	
Completed middle school	1746	(23.2)	941	(24.5)	800	(21.8)	
Did not complete high school	768	(10.2)	371	(9.7)	396	(10.8)	
Completed high school	924	(12.3)	505	(13.2)	418	(11.4)	
Attended university	883	(11.7)	434	(11.3)	445	(12.1)	
Don't know/no father	1206	(15.9)	621	(16.2)	579	(15.8)	

^a23 cases had missing on gender variable.

^b*P* < .05.

^c*P* < .01.

chi-square tests for categorical variables. We used Mplus Version 7.3²³ to estimate path analysis models using full-information maximum likelihood estimation, which is superior to other missing data techniques (e.g., listwise and pairwise deletion) in terms of model estimation, bias, and efficiency, and it produces results that are approximately equivalent to multiple imputation techniques.²⁴ For all models, we evaluated overall fit using the comparative fit index (CFI \geq .95), the root mean square error of approximation (RMSEA \leq .05),²⁵ and the chi-square test of model fit ($\chi^2 > .05$). We report but did not consider the *p* value of the χ^2 test because a large sample size tends to inflate the χ^2 value, making it difficult to achieve a non-significant χ^2 statistic (Little et al., 2002). We conducted mediation analyses with the Mplus command (MODEL = INDIRECT) which calculates confidence intervals and assumes that mediation occurs if the confidence interval does not include zero.²³ We tested for gender differences by comparing an unconstrained model against a constrained model with the likelihood ratio test to evaluate the null hypothesis of equivalent findings across genders.

Results

Table 1 displays descriptive statistics for all variables. Table 2 shows bivariate correlations among all variables.

Path Analysis

The structural model (Figure 1) provided good model fit ($\chi^2 = 61.77$, *df* = 4, *P* < .001; CFI = .981; RMSEA = .044, 90% confidence interval [.035, .054]); eight of nine path values were statistically significant and seven of eight path values were in the expected direction (Supplementary Figure 2). Orientation toward English-language movies was associated with higher movie smoking exposure from both US- ($\beta = .09$, *P* < .001) and Mexico-produced ($\beta = .05$, *P* < .001) movies as well as with higher levels of positive smoking-related expectancies ($\beta = .06$, *P* < .001). Orientation toward Spanish-language movies, conversely, was associated with lower movie smoking exposure in the United States ($\beta = -.03$, *P* < .05) but not Mexican ($\beta = -.02$, *P* = .73) movies. Spanish-language movie orientation was associated with lower

positive smoking-related expectancies ($\beta = -.02$, *P* < .05). Movie smoking exposure predicted more positive smoking-related expectancies independent of country of movie production ($\beta = .08$, *P* < .001 for US movies; and $\beta = .04$, *P* < .05, for Mexican movies). Positive expectancies predicted higher smoking susceptibility ($\beta = .36$, *P* < .001).

Mediation Analyses

We conducted mediation analyses to determine whether the paths from English- and Spanish-language movie orientation to smoking susceptibility were mediated by movie smoking exposure and positive expectancies. We also investigated whether positive expectancies mediated the links from English- and Spanish-language movie orientation to smoking susceptibility. Results indicated that the pathway from higher English-language movie orientation to higher smoking susceptibility was mediated by higher movie smoking exposure from US movies and the subsequent path through higher positive expectancies ($\beta = .003$, *P* < .001, 95% CI [.002, .004]). Finally, higher positive expectancies also mediated the link from higher English-language movie orientation to higher smoking susceptibility ($\beta = .02$, *P* < .001, 95% CI [.014, .030]).

Multigroup Path Analysis: Gender as a Moderator

Next, we examined gender as a moderator. First, we reestimated the fit of our model on the overall sample while constraining all the paths to equality between boys and girls. As shown in Table 3 (Test 1), the fully constrained model provided good fit to the data ($\chi^2 = 204.641$, *df* = 59, *P* < .001; CFI = .955; RMSEA = .026, 90% CI [.022, .030]). Next, we released all the equality constraints on the structural paths between and boys and girls (Table 3, Test 2), which resulted in significant chi-square change ($\Delta\chi^2 = 80.11$, $\Delta df = 41$, *P* < .001). This finding indicates that the strength of the estimates associated with the structural pathways in our theoretical model (Figure 1) varies by gender. We then examined which paths varied by gender by systematically removing the gender equality constraint on each individual path and examining whether this resulted in significant model fit improvement. Table 3 illustrates the results of this process.

Table 2. Bivariate Correlations Between Study Variables^a

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Age	1													
2 English-Language Movie Orientation	-.00	1												
3 Spanish-Language Movie Orientation	-.03 ^b	.09 ^c	1											
4 Movie Smoking Exposure Mexico	.02 ^b	.05 ^c	-.02	1										
5 Movie Smoking Exposure USA	.04 ^c	.10 ^c	-.03 ^b	.36 ^c	1									
6 Positive Smoking Related Expectancies	.06 ^c	.07 ^c	-.04 ^c	.09 ^c	.13 ^c	1								
7 Smoking Susceptibility	.05 ^c	.02 ^b	-.02	.11 ^c	.12 ^c	.38 ^c	1							
8 Friend Smoking	.06 ^c	.02	.00	.08 ^c	.11 ^c	.17 ^b	.26 ^c	1						
9 Teacher Smoking	.01	.05 ^c	-.02	.03 ^b	.08 ^c	.08 ^c	.09 ^c	.09 ^c	1					
10 Mother Smoking	.02	.02 ^b	-.01	.05 ^c	.05 ^c	.11	.09 ^c	.07 ^c	.03 ^b	1				
11 Father Smoking	.02	-.03 ^b	-.01	.03 ^b	.03 ^b	.09 ^c	.08 ^b	.09 ^c	.02	.24 ^c	1			
12 Sibling Smoking	.03 ^c	.00	-.02	.04 ^c	.05 ^c	.11 ^c	.13 ^c	.09 ^c	.03 ^c	.14 ^c	.12 ^c	1		
13 Mother Education	-.10 ^c	.04 ^c	.08 ^c	-.04 ^c	.02	-.18 ^c	-.09 ^c	-.07 ^c	-.02	-.01	-.05 ^c	-.07 ^c	1	
14 Father Education	-.08 ^c	.05 ^c	.09 ^c	-.03 ^b	-.00	-.18 ^c	-.10 ^c	-.07 ^c	.03 ^b	-.00	-.10 ^c	-.08 ^c	.63 ^c	1

^aCategorical variables: friend smoking, teacher smoking, mother smoking, father smoking, sibling smoking, mother education, father education

^b*p* < .05.

^c*p* < .01.

Table 3. Goodness-of-Fit Indices for the Multigroup Model by Gender

Model	χ^2	df	RMSEA	CFI	$\Delta \chi^2$	Δdf	Sig. $\Delta \chi^2$
Test 1: Fully invariant by gender	204.64	59	.026	.955			
Test 2: Gender constraints released on all the structural paths	124.55	18	.040	.967	80.105	41	< .001
Test 3: Gender constraint released on English-language movie orientation -- > U.S. movie smoking exposure	203.84	58	.026	.955	0.82	1	ns
Test 4: Gender constraint released on English-language movie orientation -- > Mexico movie smoking exposure	204.32	58	.026	.955	0.321	1	ns
Test 5: Gender constraint released on Spanish-language movie orientation -- > U.S. movie smoking exposure	204.21	58	.026	.955	0.43	1	ns
Test 6: Gender constraint released on Spanish-language movie orientation -- > U.S. movie smoking exposure	204.23	58	.026	.955	0.41		ns
Test 7: Gender constraint released on English-language movie orientation -- > Positive expectancies	203.01	58	.026	.956	1.63	1	ns
Test 8: Gender constraint released on Spanish-language movie orientation -- > Positive expectancies	204.60	58	.026	.955	0.04		ns
Test 9: Gender constraint released on U.S. movie smoking exposure -- > Positive Expectancies	203.57	58	.026	.955	1.07	1	ns
Test 10: Gender constraint released on Mexico movie smoking exposure -- > Positive Expectancies	200.72	58	.026	.956	3.93	1	< .05
Test 11: Gender constraint released on positive expectancies -- > smoking susceptibility	178.08	58	.023	.963	26.57	1	< .001
Test 12: Gender constraint released on positive expectancies and Mexico movie smoking exposure -- > positive expectancies and positive expectancies -- > smoking susceptibility	174.15	57	.023	.964	30.49	2	< .001

As shown in Supplementary Figure 2, orientation toward English-language movies was associated with more US movie smoking exposure ($\beta = .10, P < .001$) and Mexico movie smoking exposure ($\beta = .06, P < .001$) in boys and girls. Orientation toward English-language movies was also associated with more positive smoking-related expectancies for boys and girls ($\beta = .06, P < .001$). Orientation toward Spanish-language movies related with less smoking exposure in US movies for both boys and girls ($\beta = -.03, P < .05$). Moreover, orientation toward Spanish-language movies related to lower positive smoking-related expectancies for boys and girls ($\beta = -.02, P < .05$). While movie smoking exposure in Mexico-produced movies related to more positive smoking-related expectancies in boys ($\beta = .06, P < .001$) but not girls, movie smoking exposure in US-produced movies related to more positive related expectancies in boys and girls ($\beta = .08, P < .001$). Positive smoking related expectancies related with more smoking susceptibility in boys ($\beta = .19, P < .001$) and girls ($\beta = .39, P < .001$), but this relationship was stronger for girls.

As shown in Test 12, gender did not moderate any of the mediation effects. Positive expectancies mediated the relationship from higher English-language movie orientation to higher smoking susceptibility among boys ($\beta = .02, P < .001, 95\% \text{ CI } [.012, .026]$) and girls ($\beta = .025, P < .05, 95\% \text{ CI } [.016, .034]$). The link from higher English-language movie orientation to higher smoking susceptibility was mediated by higher US movie smoking exposure, which then linked with higher positive expectancies for boys ($\beta = .002, P < .001, 95\% \text{ CI } [.001, .003]$) and girls ($\beta = .003, P < .001, 95\% \text{ CI } [.002, .004]$).

Discussion

This study examined how engagement with US and Mexican culture through movies influences smoking-related expectancies and susceptibility among Mexican youth.^{7,19} Consistent with research on acculturation and smoking among US Hispanic youth,⁶ higher orientation toward English-language movies was associated with greater

smoking susceptibility and higher orientation toward Spanish-language movies was associated with lower smoking susceptibility (but this effect was relatively small).

We identified three pathways by which movie language orientation may impact smoking susceptibility. First, as hypothesized, orientation toward English-language movies related to stronger positive expectancies about smoking and higher smoking susceptibility. Orientation toward Spanish-language movies was associated with lower positive smoking-related expectancies and lower smoking susceptibility. These results are consistent with studies of Hispanic youth in the United States, where participation in US cultural practices was related to greater risk for cigarette smoking⁶ and participation in Hispanic cultural practices with lower risk for cigarette smoking.²⁶ This study provides initial empirical evidence of how remote acculturation may similarly influence smoking behaviors of youth in Mexico. These findings suggest that it may not be the media content per se that influences Mexican's youth smoking-related cognitions and susceptibility, but another process such as youth's attraction to behaviors and media from the United States or other countries and their propensity to engage in behaviors that youth may perceive to be popular in the United States or other countries.

A third path went, as hypothesized, from orientation toward English-language movies to higher US movie smoking exposure to more positive expectancies to greater smoking susceptibility. These findings are consistent with previous studies among US Hispanic youth.^{14,15} While this study focused on movie language orientation and movie smoking exposure, future research on remote intercultural contact among youth in Mexico also could assess youth's engagement with and participation in other United States and Mexico-produced media and products, such as music, TV programs, sports, food, and Internet sites.^{9,12} This would provide a richer understanding of Mexican youth's engagement with US and Mexican culture. This could provide a fuller understanding of remote acculturation and a variety of behaviors among youth in Mexico and other countries that consume international media and cultural products.

Consistent with our hypothesis that orientation toward Spanish-language movies would lead to lower movie smoking exposure in US-produced movies, orientation toward Spanish-language movies was associated with lower exposure to smoking in US movies, possibly protecting youth from susceptibility to cigarette smoking.^{4,7} Surprisingly, greater orientation toward Spanish-language movies was not associated with smoking exposure through Mexico-produced movies. We expected Spanish-language movies to relate to more movie-smoking exposure because Mexico-produced movies portray more smoking and are more likely to include adult content than US-produced movies.²⁷ However, because many US-produced movies, especially those with more child-friendly content, get dubbed into Spanish,¹⁸ asking youth about their language orientation for movies may not adequately capture exposure to Mexico-produced movies. Future studies on the influence of remote acculturation could ask youth about the degree to which they prefer movies made in specific countries. Future studies could also assess other transnational and national cultural influences, such as TV shows. Additionally, youth who are more strongly oriented toward Spanish-language movies might watch fewer movies, regardless of their media language orientation.

Interestingly, greater orientation toward English-language movies was associated with higher movie smoking exposure through Mexico-produced movies. We expected that youth who preferred English-language movies would be less likely to watch Mexico-produced movies (which are likely to be in the Spanish language) and would also have lower movie-smoking exposure through Mexico-produced movies. One possibility for this unexpected finding is that youth who enjoy watching movies in English may not have access to English-language, US-produced movies (because movies tend to get dubbed into Spanish).¹⁸ It is possible that youth who prefer English-language movies are more likely to watch more movies overall. Alternatively, it is possible that adolescents who prefer English-language movies watch more US-produced movies and because US-produced movies tend to have less adult content, these adolescents may be more attuned to notice movie-smoking in Mexico-produced movies compared to youth who prefer Spanish-language movies which tend to have more adult content. Future research on remote intercultural contact should attempt to replicate these findings and clarify the reasons why greater orientation toward English-language movies is associated with greater (not lower) movie-smoking exposure in US-produced movies. This would provide insights for developing programs to reduce movie smoking exposure and youth smoking in Mexico.

Consistent with the notion that in Mexican culture smoking is more acceptable among boys than among girls, boys reported more positive smoking-related expectancies than girls, possibly putting boys at greater smoking risk. Boys also reported more movie smoking exposure through U.S.-produced movies, which may further place boys at higher smoking risk compared to girls. Surprisingly, we did not find any gender differences in the links from English-language movie orientation to positive smoking-related expectancies and smoking susceptibility. This is surprising because among US Hispanic youth, the link from US cultural orientation to cigarette smoking has been stronger for girls,⁶ and researchers have proposed that compared to boys, girls may experience greater shifts in smoking-related cognitions as a result of engaging with US culture. Movie smoking exposure in Mexico-produced movies was associated with higher positive smoking-related expectancies in boys but not in girls. Higher positive smoking-related expectancies, however, were more

strongly associated with smoking susceptibility in girls than boys. However, given the nascent research on remote intercultural contact among youth in Mexico, more corroborative research is needed.

Limitations

Although this study is innovative in its focus on remote intercultural contact among youth in Mexico and makes important contributions to the literatures on globalization-based acculturation and movie smoking exposure, there are some limitations. The cross-sectional design precludes causal inferences. However, acculturation theory suggests that English-language movie orientation would precede US movie smoking exposure.²⁸ Longitudinal studies are needed to confirm the temporal sequence. Although we used items from a well-established acculturation measure developed for US Mexican-origin youth,¹⁵ our measure of movie language orientation may not fully capture youth's engagement with US and Mexican culture. Findings in our urban youth may not generalize to rural youth; however, three-fourth of Mexicans live in urban areas, and our data were collected from the three largest cities.

Conclusion and Implications for Preventive Interventions

Youth who enjoy watching movies in English appear to have greater exposure to smoking in US- and Mexico-produced movies, which may promote more positive smoking-related expectancies and susceptibility. A next step is to investigate how this process unfolds longitudinally. Our results indicate that movie smoking exposure from both US- and Mexico-produced movies may increase Mexican adolescents' smoking risk. Efforts to prevent youth smoking in Mexico could follow World Health Organization recommendations to give movies with smoking an adult rating, thereby reducing youth exposure to smoking imagery.²⁹ Adolescents with a strong orientation to English-language movies might be especially susceptible to movie smoking exposure. Interventions might be especially beneficial for these adolescents. A next step in Mexican youth smoking prevention research is to clarify the reasons why English-language movie orientation is associated with higher movie smoking exposure. This understanding would provide insights into ways to prevent smoking in Mexican adolescents with high English-language movie orientation.

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Declaration of Interests

None declared.

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