Effects of antismoking messages from media on adolescent smoking: The roles of family, school, and culture

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Abstract:

Considering the context of family, school, and culture, this paper examines the effectiveness of antismoking messages from public media in influencing adolescents' smoking intention. Specifically, it proposes a model of the impact of antismoking messages on teen smoking intentions, in which media and its interactions with family and school serve as antecedents, adolescents' perceived personal attractiveness and social attractiveness as mediators, and the country-level power distance as the moderator. Utilizing representative data from teenagers in 23 countries, the findings suggest that media exerts a significant impact on adolescents' smoking-related personal attractiveness and social attractiveness, which in turn, affect their smoking intention. In addition, the effectiveness of media is contingent upon the channels of family and school in such a way that the impact of media on adolescents becomes stronger if family and school also deliver antismoking messages. Furthermore, power distance across different countries provides an important context for the individual-level effects. Antismoking messages from media channels are influential in low-power distance countries but not in high-power distance countries; however, family and school channels have a stronger moderating effect in high- vs. low-power distance countries.

Keywords: smoking | media | school | family | personal attractiveness | social attractiveness | power distance

Article:

1. Introduction

The statistics on the harms of tobacco are irrefutable. About 60% of adult smokers start smoking by age 14, with 90% beginning by the end of the teen years (Yang & Schaninger, 2010), which is why some US states propose raising the legal smoking age to 21 (McGaughy, 2017). A more recent report by World Health Organization (2014) further points out that six million people die from tobacco use each year, five million of which are first-hand smokers. In addition, by 2030, the predicted death toll from cigarettes alone will rise to eight million per year. Of high importance is the fact that 80% of the world's smokers live in middle- to low-income countries (World Health Organization, 2014). Even worse, most citizens in those countries do not really

understand the impact of smoking on their long-term health. For instance, a survey from China reveals that only 38% of smokers realize that smoking causes heart disease, and only 27% know that smoking could lead to strokes (World Health Organization, 2012). On top of these findings, Centers for Disease Control and Prevention (2014) shows that from 2011 to 2014, the use of tobacco products remained constant among high school students.

To curtail teen smoking, marketers have run myriad antismoking campaigns in the public media. An average child spends 28 h watching TV each week (Herr, 2015) and gets exposed to >3000 ads per day through television, on billboards, and in magazines (Goodman, 1999); however, the effectiveness of these antismoking messages is in question. While some scholars find that public media is an effective channel in influencing teens' perceived image of smokers (Pechmann & Ratneshwar, 1994) and their smoking intention (Pechmann, Levine, Loughlin, & Leslie, 2005), others report that antismoking messages in the media are ineffective (Hill, 1999; Murray, Prokhorov, & Harty, 1994). Still others show a contrasting effect of media on teen smoking. For example, delivering antismoking messages to the wrong audience on TV (e.g., antismoking messages designed for parents were mistakenly delivered to teens) may boost, rather than curtail teenagers' tobacco use (Wakefield et al., 2006). A more recent study by Villanti, Boulay, and Juon (2011) shows that exposure to anti-tobacco messaging may even increase adolescent smoking.

Three possible reasons may aid in understanding these inconsistent findings in the literature. First, public media often send mixed signals about whether smoking is attractive or not. For example, while an antismoking campaign is ongoing, conflicting information may arise from actors featured on TV or in movies indicating tobacco use as cool. As evidence, Cullen et al. (2011) report that 40% of TV shows contain at least one scene with tobacco, and of those scenes, 89% involve cigarettes. Such frequent portrayal of smoking makes the roles of other socialization agents, as well as the socio-cultural contexts one resides in, important to tobacco health.

Children are not living in a vacuum. Mass media, family, and school have long been viewed as major socialization agents of child development and consumption-related outcomes (Moschis, 1987). Through daily interactions with their children, parents may strengthen, mitigate, or even twist children's interpretation of the messages delivered through media.

Similarly, school can be another very important socialization agent to influence adolescents' smoking behavior (Villanti et al., 2011). Although the influence of family and school as socialization agents has been examined by prior research, studies primarily focus on exposure to family and peers who smoked (Evans, Farkas, Gilpin, Berry, & Pierce, 1995), number of friends who smoke (Villanti et al., 2011), and peer pressure to smoke (Urberg, Shyu, & Liang, 1990). Little research has examined the socialization role of family and school from the perspective of how *antismoking messages delivered by family* (e.g., family discussions about the harmful effects of smoking) or *antismoking messages delivered by school* (e.g., antismoking education from school) affect teen smoking. Among the rare exceptions, Yu et al. (2015) show that antismoking education from school decreases adolescents' smoking intention, whereas family discussions about the harmful effects of smoking are not associated with adolescents' smoking intention. Furthermore, to the best of our knowledge, little research has examined the moderating

role of antismoking messages delivered by family or school on the effectiveness of antismoking messages from media.

Second, research shows that an independent variable sometimes does not exert direct effects on a dependent variable, but there may be an indirect effect through mediators (Zhao, Lynch, & Chen, 2010). For example, studies show that parenting strategies do not have a direct effect on adolescents' smoking behavior, but have an indirect effect through influencing their self-esteem (Yang & Schaninger, 2010). This indirect effect is especially relevant to the current research given that the effect of public media cannot be obtained overnight. Antismoking messages from the media need to take time to gradually shape adolescents' personal views about smoking and perceived social norms associated with smokers, which in turn, alters their smoking intention and behavior. Adolescence is a critical stage to form attitudes about what is wrong and what is right, and such attitudes drive behavior (Hertel & Mermelstein, 2012). Therefore, understanding the role of mechanisms that may influence how adolescents view smoking and smokers adds depth to the current research on teen smoking.

Finally, cultural background plays an important role in influencing teenagers' responsiveness to antismoking messages delivered by various channels (c.f., Yang & Wang, 2015). Research shows that the effectiveness of socialization from different communication channels is inherently a cultural process (Laroche, Yang, Kim, & Richard, 2007), and teenagers from different countries respond to social influence in distinct ways (Yang & Laroche, 2011). For example, in the context of drinking-and-driving warnings, Perea and Slater (1999) report that media campaigns containing an expert, such as the Surgeon General, are more effective in high power-distance countries, while media campaigns without the Surgeon General are more effective in low power-distance countries. Still, more research is needed to clarify the cultural differences in the factors and patterns that determine an adolescent's responsiveness to antismoking messages delivered from different socialization channels.

Extending previous research, the present study aims to examine the effectiveness of the media channel in a multi-country context, while treating family and school as individual-level moderators. Specifically, this research proposes a model of antismoking messages (see Fig. 1), in which public media, and interactions with family and school, serve as antecedents, adolescent smoking-related attitudes (i.e., personal attractiveness and social attractiveness) as mediators, and power distance as a nation-level moderator. Previous research shows that the effectiveness of media increases as interpersonal communication is stimulated (Flay & Sobelji, 1983; Rogers & Storey, 1987). Because teenagers spend most of the day at school and with families, school and family are expected to enhance the effectiveness of media, if they also deliver antismoking messages.
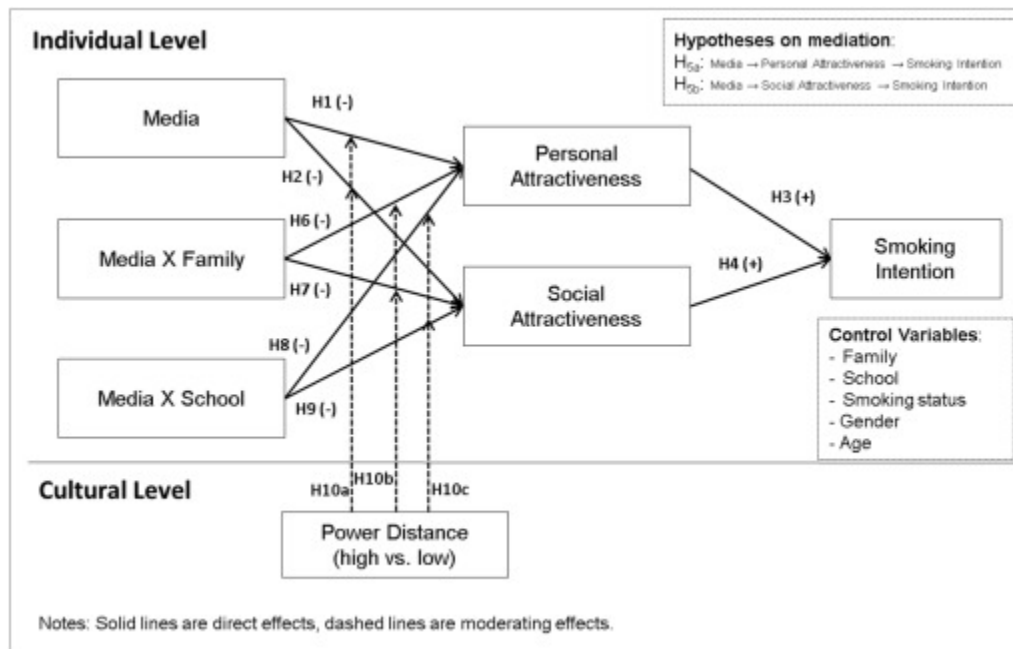
Fig. 1. Multi-level model of the effect of media channel on smoking.

Personal attractiveness and social attractiveness serve as mediators in the proposed model of this paper. Adolescence is a time when self-identities are fostered and developed (Arnett, 2000; Erikson, 1968). At this internally precarious time, media (Caplow & Merton, 1991; Singer & Singer, 2001), school (Benezra, 1995; Moschis, 1987), and family (Yang & Schaninger, 2010) play important roles in determining children's identity formation. *Perceived smoking-related personal attractiveness* refers to the extent to which smoking is associated with positive personal traits, such as intelligence and success (Akers & Jensen, 2006; Wiium, Aarø, & Hetland, 2009), whereas *perceived smoking-related social attractiveness* is reflected by the degree to which smokers are perceived as popular or unpopular among peers (c.f., Akers & Jensen, 2006; Wang, Yang, & Bhattacharjee, 2011; Wiium et al., 2009). Given that common value structures drive the formation of social groups (Muuss, 1988), smoking-related personal and social attractiveness are expected to affect adolescent smoking, but in the meantime to be affected by antismoking messages from public media.

In addition to these individual-level effects, this research also investigates the moderating role of an important cultural-level variable—power distance—in these individual-level effects. The examination of this relationship is an important extension to prior research, as previous cross-country studies in this domain (e.g., Meyers, Toumbourou, Catalano, Arthur, & Hawkins, 2004; Piko, Luszczynska, Gibbons, & Teközel, 2005) have mainly centered on the overall differences across nations without a deeper understanding about what key cultural dimension accounts for observed differences. According to Hofstede, Hofstede, and Minkov (1991), culture has multiple dimensions, including power distance, collectivism/individualism, masculinity/femininity, and uncertainty avoidance. Power distance is the focus of this study because this cultural dimension directly relates to the effectiveness of family and school channels. Family and school are authorities for teenagers (Hofstede et al., 1991). For the messages from these hierarchical sources to be effective, the person must respect the lines of authority (Hui, Lee, & Rousseau, 2004), which is a function of power distance. Compared to

power distance, other cultural dimensions are more distal in their influence on antismoking messages delivered by diverse channels. Although previous literature on smoking has not documented the moderating role of power distance, a study by Perea and Slater (1999) on drinking-and-driving warnings shows that media campaigns containing an expert are effective for adolescents from high power-distance countries, but not effective for those from low power-distance countries.

Next, hypotheses are developed for the proposed model. As discussed earlier, previous research is inconclusive about the effectiveness of antismoking advertising messages; therefore, the following section first develops hypotheses on the effectiveness of antismoking messages in the media, followed by the moderating roles of family and school. The paper then develops hypotheses on how power distance at the country level places a boundary condition for these individual-level effects. The proposed model is tested utilizing representative samples gathered from 23 countries. The paper concludes with a discussion about theoretical contributions and managerial implications.

2. Theoretical development

2.1. Effect of media channel

Public media include both visual images (e.g., television), and verbal communication (e.g., magazines and newspapers) (Moschis, 1987). Antismoking messages conveyed through public media are expect to negatively affect adolescents' perceived smoking-related personal attractiveness. Media is an important channel for information (Davis & Baron, 1981) and a primary source for social influences (Benezra, 1995; Moschis, 1987). Cultivation Theory (O'Guinn & Shrum, 1997) postulates that an increase in media consumption may help consumers form a perception of the reality. According to O'Guinn and Shrum (1997), the more individuals get exposed to a viewpoint via media (e.g., "Smoking is wrong"), the more they will accept that view as a principle of life. This outcome is especially true for adolescents as they proceed toward adulthood (c.f., Griffin, 2012). The forgoing discussion suggests that greater levels of exposure to antismoking messages increase the likelihood of associating negative connotations with smoking.

> **H1.** Antismoking messages from media negatively influence adolescents' perceived smoking-related personal attractiveness.

Antismoking messages conveyed through public media are likely to negatively affect adolescents' perceived smoking-related social attractiveness. In many cases, substance use, such as smoking, is perceived by teenagers as a pathway to accomplish some developmental needs, especially a sense of acceptance and belonging to desirable (from their perspective) peer groups (Bateson, 1991). Along this line, Pavis, Cunningham-Burley, and Amos (1997) report that a common reason for teenagers to smoke is to be more sociable or become part of the group. Given that viewing television exposes people to distorted versions of reality (O'Guinn & Shrum, 1997), the more they watch television the more they will come to view reality as similar to one portrayed on television. Therefore, smoking behaviors on TV programs tend to serve as the role

models and set up norms for young people to follow, especially when such behaviors are exhibited by their favorite stars.

> **H2.** Antismoking messages from media negatively influence adolescents' perceived smoking-related social attractiveness.

2.2. Effect of personal and social attractiveness on smoking intention

The proposed model further posits that perceived personal and social attractiveness of others who smoke are positively associated with an adolescent's smoking intent. Self-identity becomes paramount at adolescence (Yang & Schaninger, 2010). Behaviors in adolescents lead to self-image concerns due to attributes attached to the behavior (Gibbons & Gerrard, 1995). If attributes associated with the self are viewed more favorably (i.e., "I am attractive when I smoke"), the behavior is likely to continue (Hertel & Mermelstein, 2012). Consistent with this logic, recent research has shown that definitions of a questionable behavior (e.g., music piracy) as positive ("Music pirating is wise") can lead to greater likelihood to engage in music piracy (Wang et al., 2011).

> **H3.** Perceived smoking-related personal attractiveness positively influences smoking intention.

In the literature on interpersonal influence, Bearden, Netemeyer, and Teel (1989) argue that the more a person likes or admires the reference group, the more that person attempts to enhance their self-image in the opinions of the group through acquisition of its members' behaviors and opinions. Such motives are not due to external forces; rather, they are from the internal motivation to follow the implicit norms and values of the reference group. Consequently, when adolescents attach positive concepts to those who smoke (i.e., "Smokers are popular"), they will be more likely to engage in the behavior.

> **H4.** Perceived smoking-related social attractiveness positively influences smoking intention.

Hypotheses 1–4 also suggest that perceived smoking-related personal and social attractiveness are likely to mediate the effect of antismoking messages delivered by media. In other words, public media gradually shapes adolescents' personal views about smoking and the social norms associated with smokers, which in turn, affect their likelihood to smoke. Notably, this reasoning is consistent with the fact that television programming provides consumers with information used in constructing their mental representations of the material world, and perceptions of what they watch on television are often used to frame and situate consumer behavior (O'Guinn & Shrum, 1997).

> **H5.** (a) Perceived smoking-related personal attractiveness, and (b) perceived smoking-related social attractiveness mediate the effect of media channel on smoking intention.

2.3. Moderating effect of family channel on media channel

The proposed model posits an interaction between family and media channels in such a way that the negative impact of media on teens' smoking-related personal attractiveness is enhanced when antismoking messages from the family channel are present. Adolescence is a critical stage in self-identity formation, and parents and family members play significant roles in the development of smoking-related attitudes and definitions (Yang & Schaninger, 2010). As mentioned earlier in the paper, media sometimes portray inconsistent images about smoking. These mixed messages may give adolescents a "smoking is good" connotation for cigarettes. Family and parents are important in helping kids understand what they see on television, in public, as well as understand what is true and what advertisers are trying to do in commercials. Because of this, Tobacco Free Kids launched parent-oriented advertisements and web sites to educate parents on how to change their parental behaviors to reduce teen smoking. Marketers have also used advertising to encourage parents to communicate with their teenagers about the harmful effects of tobacco use as a way to prevent teens from engaging in early tobacco use (Yang, Schaninger, & Laroche, 2013). Antismoking messages from parents include open discussions with children about the harms of tobacco, and/or holding negative attitudes toward their children's smoking behavior, which are expected to strengthen the effect of antismoking campaigns from public media on adolescents' definition of smoking behavior.

> **H6.** Family channel interacts with media channel such that the effect of antismoking messages from media on adolescents' perceived smoking-related personal attractiveness becomes stronger when family also delivers antismoking messages.

Similar effects are expected to influence adolescents' perceived smoking-related social attractiveness. At adolescence, children tend to have a great amount of stress due to changes in physical, psychological, and social situations (Yang & Schaninger, 2010). Some of the physical changes include those in body size, voice, breasts, and body hair. These changes have been associated with depression, emotional disorders, and lower self-esteem (Simmons, Carlton-Ford, & Blyth, 1987), which are major drivers of teen smoking and substance use (Audrain-McGovern et al., 2004; Leary, 1999). Moving up to a new school can break up relationships with peers, decrease peer support, and allow for less attention from teachers due to a larger student body size. Additionally, larger volumes of homework and greater demands from parents for mature behaviors add extra burden to these already disruptive social changes (Yang & Schaninger, 2010). Smoking is often viewed by teenagers as "functional" in fulfilling needs for acceptance and fitting in (Baumrind, 1987). In such situations, adolescents may find it easier to adopt the misconception that "Smoking can make me popular." Yet, family and parents play a major role in correcting such misconceptions and at the same time, protecting, delaying, or reducing the effect of psychological stressors on children during adolescence (Yang & Schaninger, 2010). Consistent with this argument, a more recent study shows that family can serve as a buffering force to reduce adolescents' susceptibility to negative influence from peers (Yang et al., 2013). In addition, when adolescents and family experience messages via media channels together, there exists an opportunity to facilitate children's understanding and reinforce learning (Huston, 1992).

> **H7.** Family channel interacts with media channel such that the effect of antismoking messages from media on adolescents' perceived smoking-related social attractiveness becomes stronger when family also delivers antismoking messages.

2.4. Moderating effect of school channel on media channel

An interaction is expected to exist between media and school in such a way that school education on antismoking can enhance the effect of antismoking messages delivered by media. As stated earlier, adolescence is crucial for children to develop correct values and attitudes, including those related to smoking. At this critical time, daily interactions with faculty, staff, and other students exert significant effect on their psychological development. Such influences work through role modeling (Kandel, 1996), and shaping norms favorable to substance use (Ennett & Bauman, 1991). Also, school serves as an important channel to verify the trustworthiness of media information, and is often charged with the task of helping adolescents prepare for adulthood (Campbell, 1969). Another effective way is through instructions on the harms of behaviors that are bad for their health. When school and the media work in conjunction, undesirable adolescent behaviors can be reduced (Flynn et al., 1992). As these channels work together with one another to convey to adolescents an appropriate image of a smoker, beliefs about smoking and nonsmoking should become more salient (c.f., Higgins & Bargh, 1987). Therefore, the combination of antismoking messages from media and school lessons on the harms of tobacco is likely to enhance the effectiveness of the media channel.

> **H8.** School channel interacts with media channel such that the effect of antismoking advertisements from media on adolescents' perceived smoking-related personal attractiveness becomes stronger when school also delivers antismoking messages.

Similar to the effect of family channel, school guidance can be an effective teaching aide in correcting adolescents' connotation of "smoking makes people popular" received from the media. Adolescents spend most of their day at school. As a result, school is paramount for social influence. Open discussions about the harms of tobacco at school send a clear message to students about this community's attitude toward smoking, and create a social environment that facilitates the acceptance of antismoking messages delivered by public media. Such discussions increase the likelihood of consistency between antismoking messages adolescents receive from media and what is taught at school, enhancing the effectiveness of antismoking messages from the media channel. Consistent with this reasoning, Gramsick and Donald (1980) show that individuals' obedience of the law is highly correlated with their perception of significant others' behaviors and attitudes toward the law. The perception that significant others in a community accept or reject certain behavior such as shoplifting or drug use determines the effectiveness of the threat of formal sanctions specified in the law (Anderson, Chiricos, & Waldo, 1977).

> **H9.** School channel interacts with media channel such that the effect of antismoking advertisements from media on adolescents' perceived smoking-related social attractiveness becomes stronger when school also delivers antismoking messages.

2.5. Country-level moderator: power distance

The proposed effects at the individual level (i.e., within-country effects) are further anticipated to be moderated by country-level power distance (i.e., between-country effects). Specifically, media channels are expected to be more effective in low power distance cultures than in high power distance cultures; however, the moderating effects of family and school should be stronger

in high power distance cultures than in low power distance cultures. The proposed effects are not obvious, as is evidenced by the mixed results documented in previous studies on cultural difference in the effectiveness of the persuasion from family, school, and media channels. For instance, Chan, Prendergast, Grønhøj, and Bech-Larsen (2010) demonstrate that in Denmark, a low power distance country, communication channels from parents are stronger than media in the context of healthy dieting choices. However, Perea and Slater (1999) show that drinking-and-driving warnings delivered by an authority are effective for teenagers in high power distance countries, but not effective for those in low power distance countries.

According to Hofstede (1984), power distance in a culture refers to the extent to which residents not only expect, but also accept the unequal distribution of power throughout society. Both the parent-child relationship and the teacher/administrator-student relationship can be described as egalitarian in low power distance cultures, but hierarchical in high power distance cultures (Triandis, 1995). Such a contrast can be explained by the difference in socialization goals across high- and low- power distance countries. Specifically, the socialization goals of the high power distance countries are to train youngsters to get along with others (i.e., group harmony), to conform to authority (i.e., parents and teachers), and to be well-behaved, while those of a low power distance society put emphasis on independence, autonomy, assertiveness, and individuality (Triandis, 1995).

The differences in socialization goals across these two types of countries have important implications on the decision styles of the youth and how they react to different communication channels. Adolescents in low power distance cultures are expected to decide for themselves on a variety of issues, ranging from consumer choices affecting physical appearance, to life decisions such as the choice of a boyfriend/girlfriend, marriage, and career. They are encouraged to initiate conversation and disagree publically with superiors (Yang, Kim, Laroche, & Lee, 2014). They are also expected to be responsible for any adverse consequences arising from these decisions. In other words, they are literally "free" to be influenced by media because they are supposed to be independent decision-makers for all these issues (Yang & Laroche, 2011).

Alternatively, adolescents in high power distance cultures experience a contrasting situation. In high power distance cultures, children are expected to obey and conform (Hofstede, 1984). They are not encouraged to make decisions regarding life events. Choosing a mate or career path without the prior approval from parents is inappropriate (Dien, 1999). Parents are their protectors, having the responsibility to govern, teach, and discipline them and have the final say in their life decisions. As a consequence, parents, not the children themselves, are normally the first person to be blamed when their children fail in their life or careers (Ho, 1986). Additionally, children in high power distance cultures are expected to maintain restraint in the face of temptation (Yang & Laroche, 2011). Perhaps because of this expectation, parents in high power distance cultures anticipate their children to become independent earlier in areas such as task-oriented caretaking activities and academic work, but later in areas such as social and self-initiated tasks (Feldman & Quatman, 1988; Feldman & Rosenthal, 1990). Forced compliance is socially accepted and self-sacrifice in life decisions is expected from a filial person (Dien, 1999). In such an environment, adolescents are less likely to allow the media to influence decisions and attitudes that will be disapproved of by their parents or other authority figures, such as teachers.

Society grants the power for parents and teachers to provide guidance to their offspring and punish their children for any conducts parents deem to be inappropriate.

H10a. The effectiveness of antismoking messages delivered by media is stronger for low power distance countries than for high power distance countries.

H10b. The moderating role of family on the effectiveness of antismoking messages delivered by media is stronger for high power distance countries than for low power distance countries.

H10c. The moderating role of school on the effectiveness of antismoking messages delivered by media is stronger for high power distance countries than for low power distance countries.

Table 1. Descriptive statistics of the countries.

Country	Sample size	Mean age (SD)	Proportion males %	Power distance score
Argentina	4902	12.1 (1.1)	48	49
Bangladesh	3108	13.8 (1.4)	52	80
Costa Rica	3724	12.1 (1.6)	–	35
Czech Republic	3728	13.7 (1.02)	52.7	57
Guatemala	5512	13.9 (1.39)	49.2	58
Iran	1989	14.4 (1.57)	58.8	64
Kenya	11,047	14.3 (1.5)	49.3	95
Panama	3505	13.01 (1.98)	48.1	64
Peru	11,573	13.07 (1.75)	52.4	80
Saudi Arabia	3807	14.2 (1.48)	49.6	60
South Korea	6041	–	54.2	61
Uruguay	3418	14.03 (1.34)	44.9	70
Vietnam	15,603	–	46.3	70
Jamaica	1837	14.01 (1.29)	46.4	45
Brazil	12,185	14.4 (1.26)	46.4	69
China	9340	14.1 (1.45)	49.5	80
India	12,081	13.99 (0.79)	58	77
Mexico	31,510	11.9 (0.94)	47.3	81
Egypt	4169	13.5 (1.3)	54.3	80
Ghana	9947	14.1 (1.77)	51.2	77
Kuwait	3920	14.4 (1.44)	43.9	80
Lebanon	3307	14.03 (1.31)	42.7	80
Thailand	19,839	13.87 (1.31)	51.4	64

3. Method

3.1. Sample and procedure

The proposed model was tested using the Global Youth Tobacco Survey (GYTS) data from 23 countries collected by CDC in 2007–2008. The GYTS was a school-based survey that collected data from students, both smokers and non-smokers, aged 11–17 years. The primary purpose of the GYTS data was to enhance the capacity of countries to design, implement, and evaluate

tobacco control and prevention programs. Survey instruments were translated and back-translated to ensure consistency and promote functional equivalence of items across countries.

In each country, the respondents were recruited by local research organizations through personal interviews using a stratified, multistage sample design with schools selected proportional to enrollment size to ensure the sample was representative of the country's high-school student population. Classes were selected randomly within chosen schools. A total of 186,092 responses were collected from 23 countries, with 30.1% smokers and 67.6% nonsmokers (2.2% missing this information). Mean age of respondents was 13.5 years old, and 44.7% were female. Table 1 shows the descriptive statistics.

3.2. Measures

All variables, including the dependent variable smoking intention, were extracted from the GYTS survey. Item scores were standardized prior to data analysis to account for different scales and metrics.

3.2.1. Independent variables

Media channel was gauged by two items (0 = never; 1 = sometimes; 2 = a lot): (1) During the past 30 days (one month), how many antismoking media messages (e.g., television, radio, billboards, posters, newspapers, magazines, movies, drama) have you seen? and (2) When you go to sports events, fairs, concerts, eids, poojas, or social gatherings, how often do you see antismoking messages? *Family channel* was measured by one item: Has anyone in your family discussed the harmful effects of smoking with you? (0 = no; 1 = yes). *School channel* was assessed by two items (0 = no; 1 = yes): (1) During this school year, were you taught in any of your classes about the dangers of smoking? and (2) During this school year, did you discuss in any of your classes the reasons why people your age smoke? These two items were averaged to reflect the influence from school. Following Raudenbush and Bryk's (2002) suggestion, standardized scores of these three channels were used to create the interaction terms in order to ensure numerical stability and avoid model misspecification.

3.2.2. Mediators

Personal attractiveness was assessed by two items (1 = less attractive; 2 = no difference from non-smokers; 3 = more attractive): (1) Do you think smoking makes boys look more or less attractive? and (2) Do you think smoking makes girls look more or less attractive? *Social attractiveness* was measured by two items (1 = less friends; 2 = no difference from non-smokers; 3 = more friends): (1) Do you think boys who smoke have more or less friends? and (2) Do you think girls who smoke have more or less friends?

3.2.3. Dependent variable

The dependent variable *smoking intention* was measured by two items (1 = definitely not; 2 = probably not; 3 = probably yes; 4 = definitely yes): (1) At any time during the next

12 months, do you think you will smoke a cigarette? and (2) Do you think you will be smoking cigarettes 5 years from now?

3.2.4. Country-level moderator

The *power distance* index was drawn from Hofstede's website. The 23 countries were classified as low- and high- power distance according to a median split of the national power distance scores.

3.2.5. Covariates

Age, gender (0 = Male; 1 = Female), smoking status (0 = Non-smoker; 1 = Smoker), and the main effects of family channel and school channel were included as control variables in the model.

3.3. Analysis and results

Given that the data follow a nested structure (i.e., respondents nested to country), multilevel Structural Equation Modeling (SEM) was used for the data analysis using MPlus 5.2 software. For missing values, MPlus uses information from both the WITHIN and BETWEEN portions of the model when adjusting the maximum likelihood calculations to account for the missing data, whereas observations with missing on observed exogenous variables are excluded from the analysis.

To ensure that the proposed model applied to all the countries, exploratory analyses on the multi-item constructs (i.e., media, social attractiveness, personal attractiveness, and smoking intention) were conducted, first for the combined data and then for each of the 23 countries. Factor analysis on the combined sample yielded four distinct factors as expected, which jointly explained 75.05% of the variance in the data. Subsequent analyses on each country also confirmed the factor structure and the reliability of the measures.

Convergent and discriminant validity of these multi-item factors were then assessed by means of multilevel SEM. Evidence of the former relates to the extent to which items correlate strongly with other items used to measure the same construct, while the latter refers to the degree to which measures of different constructs are unique from each other (Churchill Jr, 1979). According to Fornell and Larcker (1981), convergent validity is established if the average variance extracted for each factor accounts for 0.50 or more of the total variance. As shown in Table 2, the results confirmed convergent validity of these factors extracted from the data, with the average variance extracted for the factors were all above the 0.50 cut-off value, except for media. Moreover, Anderson and Gerbing (1988) note that convergent validity is demonstrated by statistically significant path coefficients. In this study, all coefficients were significant at the $p < .05$ level.

Discriminant validity is established if the average variance extracted is larger than the squared correlation coefficients between factors (Fornell & Larcker, 1981). Results in Table 2 showed that this criterion was met across all pairs of factors. Furthermore, results from LaGrange Multiplier (LM) tests indicated no significant cross-loadings for measurement items

with non-hypothesized constructs thus providing additional evidence to support the discriminant validity of these constructs.

Table 2. Tests* for convergent and discriminant validity.

Construct	Media	Personal attractiveness	Social attractiveness	Smoking intention
Media	0.495			
Personal attractiveness	0.019	0.502		
Social attractiveness	0.017	0.089	0.546	
Smoking intention	0.009	0.055	0.028	0.869

* The diagonal entries show Fornell and Larcker's (1981) index of the average variance extracted by the construct. Entries below the diagonal represent squared correlation coefficients. Family and school are not part of this validity test, as they are not latent factors.

3.3.1. Testing the effect of media channel on smoking intention (H_1 through H_5)

Monte Carlo Integration was used to analyze the multi-level SEM model. The model fits the data well (CFI = 0.94, RMSEA = 0.064). An examination of the control variables revealed that age and gender had no effects on personal attractiveness or social attractiveness, whereas only age had a positive effect on smoking intention ($b = 0.026$, $p < .05$), indicating that older students had a higher level of smoking tendency. Smoking status was significantly related to personal attractiveness ($b = 0.199$, $p < .001$), social attractiveness ($b = 0.198$, $p < .001$), and smoking intention ($b = 0.484$, $p < .001$). These results indicated that smokers tend to believe smoking makes them attractive and popular, and that they would continue smoking in the future. As for the main effects of family and school, family channel had significant influences on both personal attractiveness ($b = -0.071$, $p < .001$) and social attractiveness ($b = -0.033$, $p < .05$), but no direct effect on smoking intention ($p > .15$), whereas school had a significant effect on both personal attractiveness ($b = -0.050$, $p < .05$) and smoking intention ($b = -0.022$, $p < .05$), but no effect on social attractiveness ($p > .40$).

Table 3. Results of the multi-level SEM.

Causal paths in the antismoking channel model	Coefficients	Results
Media → personal attractiveness	−0.116**	H1 was supported
Media →social attractiveness	−0.106*	H2 was supported
Media → smoking intention	−0.000	
Media × family → personal attractiveness	−0.002	*H6 was not supported*
Media × family → social attractiveness	−0.026***	H7 was supported
Media × family → smoking intention	−0.004	
Media × school → personal attractiveness	−0.005	*H8 was not supported*
Media × school →social attractiveness	−0.008	*H9 was not supported*
Media × school → smoking intention	0.003	
Personal attractiveness → smoking intention	0.102***	H_3 was supported
Social attractiveness → smoking intention	0.095*	H_4 was supported
Variance explained for smoking intention	13.2% (27.0% if control variables were included)	

Note: ***, $p < .001$; **, $p < .01$; *, $p < .05$.
All the coefficients associated with the italicized statements (e.g., "H6 was not supported") were not statistically significant (p <.05).

The proposed model suggests that antismoking messages from media negatively influence adolescents' perceived smoking-related personal attractiveness (H_1) and perceived smoking-related social attractiveness (H_2). As shown in Table 3, the results showed that media was negatively associated with both personal attractiveness ($b = -0.116$, $p < .01$) and social attractiveness ($b = -0.106$, $p < .05$), supporting H_1 and H_2 respectively.

H_3 specifies the positive effect of personal attractiveness on smoking intention. Consistent with H_3, personal attractiveness was significantly associated with smoking intention ($b = 0.102$, $p < .001$). H_4 depicts the positive effect of social attractiveness on smoking intention. Supporting H_4, the link from social attractiveness to smoking intention was significant and in the hypothesized direction ($b = 0.095$, $p < .05$).

H_5 depicts the mediating role of perceived smoking-related personal attractiveness (H_{5a}), and perceived smoking-related social attractiveness (H_{5b}) in the effect of media channel on smoking intention. As shown in Table 3, the results showed an indirect path from media to smoking intention through personal attractiveness (media $\rightarrow$ personal attractiveness: $b = -0.116$, $p < .01$; personal attractiveness $\rightarrow$ smoking intention: $b = 0.102$, $p < .001$), as well as an indirect path through social attractiveness (media $\rightarrow$ social attractiveness: $b = -0.106$, $p < .05$; social attractiveness $\rightarrow$ smoking intention: $b = 0.095$, $p < .05$). Follow-up tests using the "INDIRECT" module in the MPlus software showed that these two indirect paths were statistically significant and in the hypothesized direction (personal attractiveness: $t = -2.37$, $p < .05$; social attractiveness: $t = 2.29$, $p < .05$). These results lent support for both H_{5a} and H_{5b}. Furthermore, when the two mediators were present, the direct effect of media on smoking intention was not significant ($p > .25$), suggesting that personal attractiveness and social attractiveness fully mediated the effect of media channel on smoking intention.

3.3.2. Testing the moderating effects of family and school on the effectiveness of media (H_6 through H_9)

Family discussions about the harmful effects of smoking were expected to strengthen the effectiveness of antismoking messages delivered through media channel. A negative main effect of media channel suggests negative coefficients in the interaction between family and media on both personal attractiveness (H_6) and social attractiveness (H_7). H_6 was not supported, because the media × family interaction was not significantly related to personal attractiveness ($p > .20$). Consistent with H_7, the interplay of family and media negatively affected social attractiveness ($b = -0.026$, $p < .001$).

In H_8 and H_9, it was expected that antismoking education from school strengthens the effect of antismoking messages from the media channel on personal attractiveness (H_8) and social attractiveness (H_9). Neither of these two hypotheses was supported because the media × school interaction was not significantly related to personal attractiveness or social attractiveness (p's $> .25$). A plausible explanation is that there are many schools in the cross-national data, with different cultural orientations. The effects of school may cancel out due to the heterogeneity associated with the large sample from different countries.

3.3.3. Testing the moderating effect of power distance (H_{10a}, H_{10b}, H_{10c})

H_{10a}, H_{10b}, H_{10c} specifies that the effectiveness of antismoking messages delivered by media is stronger for low power distance countries than for high power distance countries (H_{10a}), whereas the moderating role of family (H_{10b}) and school (H_{10b}) is stronger for high power distance countries than for low power distance countries. The full latent model (see Fig. 1) was specified separately for the high- and the low- power distance countries and treated as the baseline for subsequent cross-cultural comparison analyses. The preliminary results of the baseline-model comparisons seemed to be in line with H_{10a}, H_{10b}, H_{10c}. This conclusion, however, might be misleading since it was unclear if the participants in low power distance countries and those in high power distance countries perceived the indicators in the same way. If there is no sufficient evidence to support the measures' invariance, conclusions drawn from these scales are not trustworthy (Steenkamp & Baumgartner, 1998). Therefore, invariance tests were conducted to examine the equivalence of the measurement model across the high power distance and low power distance samples before testing the hypothesized moderating effects of culture on the effectiveness of communication channel.

Following Byrne's (1994) approach, measurement-level constraints (i.e., configurable invariance, metric invariance, factor covariance invariance, and error variance invariance) were first introduced to test the equality across the high- and low- power distance models simultaneously. After the measures' invariance was established, the structural level constraints (i.e., causal path invariance) were then imposed to test H_{10a}, H_{10b}, H_{10c}. The results indicated that the proposed model had at least the same factor patterns, factor structure, and factor covariances across the high- and low- power distance samples.

Consistent with H_{10a}, the results of the invariance test showed that the estimate of the "media $\rightarrow$ social attractiveness" link in the low power distance model was significantly higher than that in the high power distance model ($b_{\text{Low Power Distance}} = -0.108$ vs. $b_{\text{High Power Distance}} = -0.040$, $\chi^2 = 5.86$, $p < .05$), as was the estimate of the "media $\rightarrow$ personal attractiveness" link ($b_{\text{Low Power Distance}} = -0.150$ vs. $b_{\text{High Power Distance}} = -0.005$, $\chi^2 = 7.40$, $p < .01$). Also, invariance tests indicated that the negative links from the media $\times$ family interaction to social attractiveness was stronger for high power distance countries than low power distance countries ($b_{\text{High Power Distance}} = -0.051$ vs. $b_{\text{Low Power Distance}} = -0.001$, $\chi^2 = 19.01$, $p < .001$), lending support for H_{10b}. The effect of the media $\times$ school interaction on social attractiveness was also found to be stronger for high power distance countries than low power distance countries ($b_{\text{High Power Distance}} = -0.022$ vs. $b_{\text{Low Power Distance}} = -0.002$) and the difference was marginally significant ($\chi^2 = 2.83$, $p < .10$), lending support for H_{10c}. Although not hypothesized, the multi-group analysis also showed that the effect of personal attractiveness on smoking was stronger for low power distance countries than for high power distance countries ($b_{\text{Low Power Distance}} = 0.080$ vs. $b_{\text{High Power Distance}} = 0.128$, $\chi^2 = 2.79$, $p < .10$), whereas the effect of social attractiveness on smoking intention was in an opposite pattern ($b_{\text{High Power Distance}} = 0.113$ vs. $b_{\text{Low Power Distance}} = 0.056$, $\chi^2 = 3.56$, $p < .06$). These results (see Table 4) are consistent with our reasoning about the differences in socialization goals across high- and low- power distance countries.

To test the earlier argument that other cultural dimensions are more distal in influencing antismoking message channels than power distance, power distance was replaced with other

cultural dimensions (i.e., collectivism/individualism, uncertainty avoidance, and masculinity/femininity) in the analysis. The results showed that, consistent with our argument, none of these cultural dimensions moderated the effect of media/family on any of the downstream variables in the hypothesized model.

Table 4. Antismoking channel for low- and high power-distance countries.

Causal paths in the antismoking channel model	Low power-distance countries	High power-distance countries	Chi-square (p-value)	Results
Media → personal attractiveness	−0.150**	−0.005	7.40 (0.007)	H_{10a} was supported
Media → social attractiveness	−0.108*	−0.040	5.86 (0.02)	
Media → smoking intention	0.011	0.006	0.002 (0.96)	
Family * media → personal attractiveness	0.006	−0.013	2.77 (0.096)	
Family * media → social attractiveness	−0.001	−0.051***	19.01 (0.00)	H_{10b} was supported
Family * media → smoking intention	−0.014	0.006	3.02 (0.08)	
School * media → personal attractiveness	−0.001	−0.004	1.03 (0.31)	
School * media → social attractiveness	−0.002	−0.022*	2.83 (0.09)	H_{10c} was supported
School * media → smoking intention	0.001	−0.003	1.13 (0.29)	
Personal attractiveness → smoking intention	0.128***	0.080***	2.69 (0.10)	
Social attractiveness → smoking intention	0.056*	0.113**	3.56 (0.059)	

Note: ***, $p < .001$; **, $p < .01$; *, $p < .05$.
Shaded areas indicated significant difference between the pair of causal paths related to H_{10a}, H_{10b}, H_{10c}.

4. Discussion

This research examines the effectiveness of antismoking messages from the media on teen smoking in the context of family, school, and culture. Specifically, it proposes that media significantly impacts adolescents' smoking-related personal attractiveness and social attractiveness, which in turn affects their smoking intention. In addition, the effectiveness of media is contingent upon the channels of family and school in such a way that the impact of media on adolescents becomes stronger if family and school also deliver antismoking messages. Furthermore, power distance across different countries provides an important context for the individual-level effects.

Consistent with the proposed conceptual model, the results from 23 countries indicate that antismoking messages from media are indeed effective in influencing teenagers' personal attractiveness and social attractiveness. These two types of perceived attractiveness associated with smoking behavior are precursors of teen smoking intention, and fully mediate the effect of media channel. Importantly, family and school also play a significant role in this socialization process. Specifically, the effectiveness of public media is enhanced when congruent messages (antismoking in this case) are also delivered by family and/or school. Another important finding is that the cultural context in which one resides sets a boundary condition for these effects. For low power distance countries, where family and school relationships are more egalitarian, antismoking messages conveyed through media channels are more influential. In fact, as shown in the first section of Table 4, the effects of media on personal attractiveness and social

attractiveness were significant only in low power distance countries, but not in high power distance countries. Conversely, the moderating role of family and school is weaker in low power distance countries than in high power distance countries.

4.1. Theoretical contributions

Previous research paints a mixed picture on the effectiveness of socialization agents. For example, researchers are not in agreement with regards to the effectiveness of public media in conveying antismoking messages to adolescents. Although some researchers support its effectiveness as a communication channel (Pechmann et al., 2005; Pechmann & Ratneshwar, 1994), other researchers find the opposite evidence (Hill, 1999; Murray et al., 1994; Villanti et al., 2011; Wakefield et al., 2006). To shed light on this debate, this research investigates this topic in the context of family, school, and culture. The multi-national data in this study show that the effectiveness of antismoking messages delivered through media may not be as simple as researchers would expect. In particular, media may not exert much effect on teen smoking in high power distance countries. In addition, other socialization agents, especially family and school, can set boundary conditions for the effectiveness of antismoking media messages. These boundary conditions are especially salient in high power distance countries. The key mechanism underlying the effects are adolescents' perceived personal attractiveness and social attractiveness related to smoking.

This research also enriches current understanding about the role that family plays when children reach adolescence. Previous studies are indecisive about the effect of family on adolescents' behavior. Some researchers find that parental influence is still important after children move to adolescence (Peters, 1989; Shim, 1996; Yang & Schaninger, 2010; Yang & Wang, 2015), whereas other researchers argue that parents do not have influence anymore and peers become the primary socialization agent at this stage (McNeal, 1991; Youniss & Smollar, 1990; Yu et al., 2015). Adding clarification to the previous literature, the findings of this paper suggest that parents still have significant impact on teen smoking attitudes (in the forms of personal and social attractiveness) and behavior. More importantly, family as a communication channel can strengthen the effectiveness of the media channel. Similarly, this research shows that the combination of media and school has the ability to influence the formation of social attractiveness among adolescents, an important finding that has received little attention in the literature thus far. These findings are important because scant research has examined the interactive effects of socialization agents on adolescent smoking.

Finally, this research contributes to the communication literature by investigating the important boundary condition that power distance of a culture sets for the effectiveness of communication channels. The existing cross-cultural studies on tobacco use (e.g., Meyers et al., 2004; Piko et al., 2005) have mainly focused on national differences in teen smoking, without knowing about what key cultural dimension accounts for such differences. Extending this research domain, the current study reveals that power distance is the key cultural dimension to aid in understanding the mixed findings related to the effectiveness of the media channel. In particular, the effect of media is stronger in low power distance countries than in high power distance countries; by contrast, family and school can strengthen the effects of media in high power distance countries to a greater extent than in low power distance countries.

4.2. Practical implications

These findings are meaningful in the efforts to prevent and deter the spread of adolescent tobacco use. First, media is still effective in influencing adolescents' perceived smoking-related personal attractiveness and social attractiveness. Armed with this information, social marketing campaigns should continue to focus on creating representations of smokers that adolescents would perceive as unattractive and unpopular. Public policy makers should consider tougher restrictions on movie makers, advertisers and marketers so that the characters featured in their programs do not make tobacco use look cool. Moreover, combining antismoking messages from multiple channels (media with family, media with school) appears to strengthen the effectiveness of public media. Therefore, it is imperative that the media, family, and school channels work together to deliver antismoking messages that create a consistent persona of a smoker that is not conducive to the identity that an adolescent wants to pursue.

Also, the findings support a different orientation in intervention strategies than those that mainly focus on children/teens themselves. In particular, marketing campaigns should focus on encouraging parents of teens to develop positive relationships and open discussions with their teens on the harmful effects of tobacco use. Similarly, marketers should also target high schools, with a focus on establishing the negative aspects of smoking, such as losing support of parents and friends, 'messing up your life,' and 'making yourself look stupid'.

The findings are also useful for international marketers. In countries where power distance is low, campaigns should be more media focused. The results of messages through the media about the harms of tobacco will be more effective when low power distance is the norm, providing a greater return on the social marketing investment. Conversely, in high power distance countries, budgets should be allocated more on family or school policies that can cohesively work to bolster messages from the media. Communication from these sources will be received as authoritative and the results will be more impactful. Families and schools should also work in conjunction with one another so that consistent, strong messages are delivered to youth about the harmful health effects of tobacco.

4.3. Limitations and future research

This study has some key limitations of note. First, with respect to school, this study focused mainly on the formal channel, while informal channels at school were not examined. Future researchers may find research fruitful that examines how informal communication channels among classmates and peers may interact with other channels (e.g., media and family) to affect teen smoking. Second, the survey was not accompanied by any common antismoking campaign across different countries at the time of data collection. Future researchers may want to conduct the survey in a period during which an antismoking campaign is running across several countries to examine how the effectiveness of that campaign is affected by the interactive effects of different channels proposed in this paper.

Furthermore, although this research is among the first to examine the role of teachers in influencing teen smoking, more research is needed to understand how teachers may influence the

effectiveness of antismoking advertising. For example, some teachers are smokers themselves. How will teachers' smoking behavior and attitudes interact with antismoking messages from the school affect teen smoking? How does school-teacher congruency in smoking-related images affect the effectiveness of antismoking messages from public media?

Another fruitful direction for future researchers is to examine how visual graphics affect teen smoking. Recently, countries worldwide started to put more stringent rules on cigarette packaging. Thus far, 43 countries have placed graphic visual warning labels on tobacco packages which can induce emotional arousals (e.g., fear, disgust, shame, and remorse) associated with smoking (Andrews, Netemeyer, Kees, & Burton, 2014; Wakefield, Loken, & Hornik, 2010). Future studies can investigate the potential interactions among multiple channels of communication—including media, family, school, and graphic visual labels—on curtailing adolescent smoking or encouraging smoking cessation. Examining how pro-smoking campaigns interact with antismoking campaigns to affect teen smoking in different countries may also be a fruitful line of research.

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