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Abstract

The etiology of smoking behaviors involves the interplay among multiple systems at the cultural, familial, and personal levels, but few investigations have explored the effects of multiple environments on adolescent smoking behaviors. Survey data were collected from 658 parent-child dyads of Chinese adolescents aged between 14 and 17 years from Jiande, Zhejiang province in mainland China. Using data from multiple informants, the direct and indirect roles of socio-cultural influences, parenting strategies, smoking-specific parenting behaviors, and smoking-related cognitions on adolescent smoking behaviors were examined. Results indicated that smoking-related cultural values, extended family members smoking, and parental psychological control had direct effects on Chinese adolescents smoking behaviors. Smoking-related cultural values, parent smoking, and health-related values had indirect effects on adolescent smoking behaviors through smoking-related cognitions. Psychological control, frequency of communication about smoking, disapproval of adolescent smoking, and home rules against smoking indirectly influenced adolescent smoking behaviors through smoking-related cognitions. A sub-analysis of 496 nonsmoking adolescents revealed similar pathways linking socio-cultural and parenting influences on adolescent intention to smoke. The findings from this study provide valuable information for the development of prevention and intervention programs targeting adolescent smoking.

Keywords: *socio-cultural influences, parenting practices, cognition, adolescent smoking*

SOCIO-CULTURAL INFLUENCES ON ADOLESCENT SMOKING IN MAINLAND CHINA:
THE MEDIATING ROLE OF SMOKING-RELATED COGNITIONS

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Dissertation

Submitted in partial fulfillment of the requirements for the degree of
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Socio-Cultural Influences on Adolescent Smoking in Mainland China: The Mediating Role of Smoking-Related Cognitions

According to the World Health Organization report on the Global Tobacco Epidemic (WHO, 2009), China is the world's largest consumer of cigarettes. One out of every three cigarettes consumed in the world today is consumed by Chinese citizens (Mackay & Erickson, 2002). While smoking rates in Western countries have been declining over the past 50 years, cigarette consumption in China has increased significantly in the recent years (Mackay & Erickson, 2002). Recent studies have reported that many Chinese children initiate smoking at early ages (between 10 and 15 years) and smoking rates vary between 28% to 43% for boys and 1% to 11% for girls (Unger, Yan, Chen, Jiang, Azen, & et al., 2001). Every day, about 80,000 Chinese adolescents become new smokers (Grenard, Guo, Jasuja, Unger, Chou, & et al., 2006) and smoking is becoming a serious public health concern (Unger, Yan, Chen, Jiang, Azen, & et al., 2001). According to Li, Mao, Stanton, and Zhao (2010), fifty million Chinese teenagers smoke, which account for 14.28% of China's total smokers. Given the current trends, it is projected that about 50 million Chinese will die prematurely due to tobacco related diseases by the year 2025 (Yang, Fan, Tan, Qi, Zhang, & et al., 1999).

Despite these astounding numbers, researchers have only just begun to explore questions about why and how children are initiated into smoking and what aspects of family, culture, and the environment propel young people to take up smoking at early ages (Jessor, Turbin, Costa, Dong, Zhang, & et al., 2003). Much of the empirical research on adolescent smoking has been done in the United States and other Western societies, whereas very limited research has been conducted with Chinese samples. The majority of research using Chinese samples has been descriptive in nature and has focused on describing smoking trends. Other researchers have

approached the study of smoking behaviors from a Western perspective and have paid limited attention to how the Chinese culture might normalize and promote smoking behaviors among its people. In China, even national legislation against selling cigarettes to minors has not been successful in limiting sales of cigarettes to adolescents. In 2006, China initiated its very first law to ban the sale of cigarettes to minors as an amendment to the Law on the Protection of Minors (The Chinese Ministry of Health, 2006). However, it only states that shops or individuals caught selling cigarettes to minors will be asked to “correct their mistakes” and receive “administrative punishments”, which means no actual punishment such as fines will be applied (The Chinese Ministry of Health, 2006). Therefore, it’s still not uncommon today that many Chinese retailers sell cigarettes to minors without verifying their ages (China Daily, 2012). Given the easy access to cigarettes and the acceptability of cigarette use within Chinese society, it is not surprising that smoking rates are high in China and that children begin to smoke at early ages. Hence, the purpose of this investigation is to examine the role of Chinese cultural values and norms together with other important socializing agents, including parents, peer, and mass media, on adolescent smoking behaviors. Findings from this study will help advance our understanding of the various social and cultural influences that play a role in smoking behaviors among Chinese youngsters. Ultimately, when we understand the role of the various influences we may be able to develop interventions to prevent smoking among Chinese adolescents.

Research Objectives

The overall objective is to build a testable multivariate model to better understand the role of Chinese culture, as well as important socialization processes, which impact Chinese adolescent smoking behaviors through individual smoking-related cognitions. This study will test hypotheses based on three themes (or theoretical perspectives) in the literature, including

Primary Socialization Theory and Social Learning Theory, the Parenting literature, and the Theory of Planned Behaviors. The five specific objectives of this study are:

1. To build and test the structural model which examines the influences of smoking-related cultural values, parent smoking, extended family members smoking, peer smoking, exposure to media smoking and health-related values on adolescent smoking, and to understand the relative importance of each predictor.
2. To build and test the structural model which examines the mediating effect of smoking-related cognitions in the link between social influences (i.e., culture, parents, extended family members, peers, media, health values,) and adolescent smoking behaviors.
3. To build and test the structural model which investigates how parenting practices, including both general parenting and smoking-specific parenting, influence adolescent smoking behaviors.
4. To build and test the structural model which examines the mediating effect of smoking-related cognitions in the link between parenting practices and adolescent smoking behaviors.
5. To analyze and compare the same pathways in the aforementioned objectives using nonsmoking adolescents as a subsample to predict their intention to smoke.

Literature Review

Chinese Culture of Smoking/Substance Use

Each culture has its own norms for substance use (Oetting, Donnermeyer, Trimble, & Beauvais, 1998), which not only sets the prevalence of substance use in that society but also the

context within which personal and social factors of substance use must be understood (Piko, Luszczynska, Gibbons, & Tekozel, 2005). In some cultures, some forms of substance use are culturally restricted, while others are tolerated or even sanctioned (Oetting et al., 1998). Tobacco is the substance of choice in China, and the normalization of the smoking culture has been further advanced through Chinese government's sanctions after the New China has been established in 1949 (Zhou, 2004). It's only until very recently that Chinese government has started to discourage smoking among its people by enforcing laws against public smoking (BBC news, 2011). In modern China, the majority of adult males (63%) smoke (Yang et al., 1997). Based on current smoking rates, this habit will continue to be a normative behavior, particularly among the male population in China (Unger, Yan, Shakib, Rohrbach, Chen, & et al., 2002). As Zhou (2004) stated in his book on the global history of smoking, "the modern history of China is entwined with the culture of smoking" (p.169). From pipe to cigarettes, smoking has become an inseparable part of the contemporary Chinese culture.

In the first half of the 20th century, China entered a period of transformation by embracing and promoting "modernization". People who aspired to look "modern" pursued anything Western, which resulted in a massive flow of Western goods into the Chinese market. For urban dwellers, smoking foreign cigarettes was viewed as a prestigious activity and these cigarettes were easy to carry, elegant to smoke, and fashionable to have. As cigarettes became more popular, China began to produce and promote its own brands with patriotic slogans as well as advertise using classic Chinese beauties and traditional Chinese New Year pictures. Mass production made cigarettes prices fairly inexpensive and affordable to everyone. Cigarette manufactures also offered enticing deals to market their brands, such as "try now and pay later" and "buy one and get one free" (p.166) (Zhou, 2004). In comparison to opium, which became a

symbol of China's weakness and family misfortune by the beginning of the 20th century, cigarette smoking is legal and it's available everywhere, including every street corner shop, tea house, cinema, theater and so on. Cigarettes soon became a mass consumer good in China, which was not only used by a few "modernizing elites", but also traditional peasants by the 1930s. As a Chinese journalist wrote in 1934: "many rural Chinese villages still don't know who in the world Sun Yat-sen is, but very few places don't know Ruby Queen cigarettes" (p.167) (Zhou, 2004).

Although the new Chinese government after 1949 worked hard to eliminate the "old habits" in Chinese society, it did little to discourage cigarette smoking and the tobacco industry. Between 1949 and 1979, the Chinese government issued no health warnings on smoking and did not conduct any anti-smoking campaigns. Most top Communist officials such as Mao Zedong and Deng Xiaoping were heavy smokers, sending the message that smoking cigarettes embodied power and prestige. The brand that one smoked was, and is still considered as a display of one's fortune and worth. In today's China, the mass media is filled with images of celebrities smoking both local and western cigarette brands. These depictions reinforce the image that smoking looks "cool" and, as a result, draw many young men and women to smoking. Smoking is considered a sign of masculinity, and many Chinese believe that "a man's life is not worthwhile if he does not smoke" (Zhou, 2004). Meanwhile, women who smoke are usually considered distasteful and improper. In addition, smoking is a sign of one's intellect; as a popular saying goes: "if what you write is rough, let smoke smooth it for you" (Zhou, 2004). A recent study by Ma and colleagues (2008) indicated that the prevailing myths and misconceptions about smoking in China are partially attributable to these culturally-rooted beliefs. Ma and others (2008) found that people in the study who believed that smoking was an important social and cultural tradition considered smoking a sign of individual freedom and hence not illegal. In addition, many participants

indicated that the health risks of smoking could be reduced and controlled by smoking better brands, and by smoking in moderate amounts.

Besides being a symbol of social status, smoking also plays an important role in a variety of social settings. China is a smoking-friendly environment, and tobacco is an important part of many social gatherings (Cheng, 1999). Offering a cigarette to a guest is considered a social courtesy, and accepting one when offered is considered to be polite (Zhou, 2004). People often light up a guest's cigarette during dinner time as an indication of hospitality and respect (Cheng, 1999). Cigarettes are also frequently used in exchange for a favor, to earn a promotion and so on. In fact, cigarettes are one of the most popular gift choices and favorable treats for male guests at weddings and other celebrations. Smoking is also a necessary part of doing business and networking. Many people are "social smokers" because smoking is an integral part of building and keeping social connections ("*Guanxi*") in China (Pan, 2004). Some people only smoke around their friends, supervisors, and business partners because they do not want to hurt others' "feelings" and "damage relationships" with these people. Therefore, just like the saying goes: "without a pack of cigarettes in China, one can barely move half an inch" (Zhou, 2004).

As in other Western countries, China has recently begun to establish laws against smoking in public places. For example, in 1994, Shanghai declared virtually all public indoor places smoke-free (Cheng, 1999). Despite the passage of these laws against smoking, the reality is that such laws are widely and blatantly ignored (Cheng, 1999). A new non-smoking campaign was launched in 2010 to ban smoking in public spaces, and this policy took effect in May 2011 (China Daily, 2010; BBC news, 2011). However, the smoking-ban policy was again loosely enforced, particularly in smaller cities. Smokers who ignored this policy received no punishment and business owners often resent this policy because many customers complain about it (BBC

news, 2011). The difficulty in banning smoking in China lies in the fact that smoking is deeply entrenched and promoted within the culture, and because of the country's heavy dependence on the manufacturing and sales of tobacco. In China, about 10% of the farmland grows tobacco. The state-run tobacco companies employ more than half a million factory workers, 10 million farm workers, and 13 million employees work in the retail sector. Tax revenue from tobacco industries is the largest source of revenue (over 10%) for the Chinese government (Cheng, 1999). In 2009, taxes from the tobacco industry reached over 500 billion Chinese Yuan (about 80 billion US dollars), which increased 12.2% from 2008 (Xinhua news, 2010). The Chinese government needs the money to achieve its goal of raising people's living standards, which, in turn, leads to the country's current dilemma—"wealth now or health later" (Cheng, 1999). This predicament, combined with a pro-tobacco culture, has significantly hindered the progress of tobacco control in China.

As for smoking behaviors among children and adolescents, there are laws against underage smoking and selling cigarettes to minors, but enforcement and publicizing of such laws are particularly weak. In addition, purchasing cigarettes for one's parents or relatives are normative behaviors in China. Therefore, private shops rarely check ages when selling cigarettes to a customer. In fact, a study by Unger, Yan, and others (2002) indicated that only 23% of the parents in their survey were aware of a law prohibiting the sales of cigarettes to children and adolescents. Another study has reported that only 13% of adolescents surveyed were unable to buy cigarettes in stores (Li, Mao, Stanton, & Zhao, 2010). Tobacco products are also fairly inexpensive in China, with the cheapest brands only costing one Chinese Yuan (about 15 US cents) per pack. In addition, private shops often allow their customers to purchase one or two cigarettes instead of a whole pack, particularly when the customers are short of money.

Therefore, children can afford to purchase cigarettes with their pocket money. With such easy access to cigarettes, and a pro-smoking culture in China, children and adolescents are at great risk for developing a smoking habit (Grenard et al., 2006). Although extensive literature on the etiology of adolescent smoking has been developed in Western cultures (Lazuras, Eiser, & Rodafinos, 2009), research on smoking behaviors among Chinese adolescents has only begun to emerge in China.

Wilcox (2003) suggests that when a non-random pattern of high smoking rates appears across communities (the whole nation in this case), then individual characteristics alone cannot fully account for the pattern of behaviors. In such cases, contextual-level variables (i.e., culture) should also be considered as part of the conceptual model for predictors of smoking behaviors (Wilcox, 2003). However, few studies have included how the pro-smoking cultural traditions and lax laws influence individual smoking behaviors in China. Research in this area is sorely needed to achieve a better understanding of smoking behaviors among Chinese teenagers.

Familial Influences on Adolescent Smoking

The etiology of smoking comprises a complex network of biological, social, and genetic factors, all of which independently and cumulatively play a role in determining smoking behaviors. Among these factors, the family unit is the most important predictor of adolescent smoking behaviors across all domains (Avenevoli & Merikangas, 2003). Research has shown that parents play a significant role in their children's growth and development, and can be particularly influential in the onset and escalation of problem behaviors such as smoking. A considerable body of literature has sought to answer the question: "how do parents affect adolescent smoking behaviors?" (Engels & Willemsen, 2004). Both cross-sectional and longitudinal data identifies several ways that parents influence adolescent smoking behaviors,

including the modeling effects of parents' own smoking behaviors, the way they raise their children (i.e. general parenting practices), and how they deal with smoking-related issues at home (i.e., antismoking socialization) (Engels & Willemsen, 2004; Harakeh, Scholte, Vermulst, de Vries, & Engels, 2010; Otten, Engels, & van den Eijnden, 2008). The following sections will discuss the three pathways by which parents influence adolescent smoking behaviors respectively.

Modeling. According to Social Learning Theory (Bandura, 1977), parents directly influence their children's behaviors by functioning as role models. A review of the extant body of work around parental smoking habits and adolescent smoking behaviors has led to inconsistent findings. Early studies have indicated a link between parent and child smoking behaviors. For example, a study by Bailey et al., (1993) showed that adolescents with one or more smoking parents were, through imitation and observation, more likely to smoke and to remain smokers for a longer period of time. In addition, families where parents smoked provided increased accessibility to cigarettes, thereby elevating the risk of adolescent smoking behavior (Kegler, McCormick, Crawford, Allen, Spigner & et al., 2002). Based on these findings and assumptions, parent smoking has been considered a significant predictor of adolescent smoking habits (Otten, Engels, & van den Eijnden, 2008). However, other researchers have contested these assumptions by asserting that parent smoking may not be the sole predictor of child and adolescent smoking behaviors (Conrad et al., 1992). A recent review by Avenevoli and Merikangas (2003) has also illustrated weak associations between parent tobacco use and child smoking behaviors. The authors concluded that when a significant relationship between the parent-child dyad was found, the effects were generally small in magnitude (i.e., correlation lower than .20 or odds ratios lower than 2.0) when compared to other risk factors, such as peer

smoking. According to these researchers, the effects of parent smoking behaviors did not appear to be as salient as the social/peer group variables. There was also lack of evidence for a dose-response association, which meant that adolescents with two smoking parents were at no greater risk for smoking when compared to those with only one smoking parent (Avenevoli & Merikangas, 2003).

Based on the inconsistent nature of these findings, it would be premature to discount parental influences on child smoking behaviors just because the direct link between both variables appears to be weak. Based on their review, Avenevoli and Merikangas (2003) proposed several possible explanations for the weak association between parent and adolescent smoking behaviors. Apart from methodological issues, such as the conceptualization of parent smoking and timing of assessment, the authors underscored the importance of possible moderators and mediators that may explain the link between parent and child smoking. One of the most important and often neglected moderator/mediators is parenting behaviors, including both general parenting behaviors and smoking-specific parenting practices.

General parenting. Parenting practices have been linked to a wide range of problem behaviors, such as delinquency and substance use (Engels & Willemsen, 2004). Two dimensions of general parenting practices that have been frequently examined in the literature on adolescent smoking include parental support and control (Harakeh et al., 2010). In general, low support and lax control tend to be linked with higher risk of adolescent substance use including cigarette smoking (Adalbjarnardottir & Hafsteinsson, 2001). The support dimension refers to parental affective and supportive behaviors, whereas the control dimension ranges from aspects of behavioral control, such as supervision and monitoring, to guilt inducing and psychological control (Maccoby & Martin, 1983).

According to Baumrind (1987), adolescents whose parents are warm and loving, but also exert moderate control over their children, are less likely to engage in problem behaviors. There is substantial empirical evidence supporting this link. Both cross-sectional and longitudinal studies conducted with U.S. (e.g., Chassin, Presson, Todd, Rose, & Sherman, 1998; Chassin, Presson, Rose, Sherman, Davis, & Gonzalez, 2005; Foshee & Bauman, 1992; Foster, Jones, Olson, Forehand, Gaffney, Zens, & Bau, 2007) and European samples (e.g., Harakeh, Scholte, Vermulst, de Vries, & Engels, 2004; Harakeh et al., 2010) have indicated that adolescents with supportive and affectionate parents are less likely to engage in smoking behaviors. Similarly, a considerable body of research has underscored the protective role of parental monitoring (or knowledge of child activities) in adolescent substance use including smoking. Researchers propose that parental supervision could reduce adolescent substance use through minimizing their children's involvement in risky situations as well as preventing their association with deviant peers (Li, Stanton, & Feigelman, 2000). Both cross-sectional and longitudinal studies have supported this hypothesis and indicated that higher levels of parental monitoring are associated with lower levels of adolescent smoking (e.g., Barnes & Farrell, 1992; Chassin et al., 2005; Chilcoat & Anthony, 1996; Li, Stanton, & Feigelman, 2000; Simons-Morton, Chen, Abroms, & Haynie, 2004). Research conducted in other cultures has also found a similar protective effect of parental monitoring (e.g., Dick, Viken, Purcell, Kaprio, Pulkkinen, & Rose, 2007; Harakeh, Scholte, Vermulst, de Vries, & Engels, 2004; Piko & Kovács, 2010). In studies where multiple parenting dimensions have been examined simultaneously, parental monitoring has been shown to have the strongest effect on adolescent smoking behaviors (Barnes & Farrell, 1992; Griffin, Botvin, Scheier, Diaz, & Miller, 2000). Although parental monitoring, as a type of parental control, serves as a protective factor for adolescent smoking, psychological control,

which consists of intrusive and manipulative discipline that suppresses emotional autonomy, is presumed to be a risk factor for increased adolescent smoking (Engels, Finkenauer, Kerr, & Stattin, 2005; Gray and Steinberg, 1999). Psychological control has been found to be linked with increased current and future smoking behaviors in adolescents in a number of studies (e.g., Barber, Olsen, & Shagle, 1994; Finkenauer, Engels, & Baumeister, 2005; Gray, & Steinberg, 1999; Harakeh, Scholte, Vermulst, De Vries, & Engels, 2004; Huver, Engels, Vermulst, & de Vries, 2007a).

In addition to investigating parental support and control as independent predictors of adolescent smoking, some researchers have explored the effect of parenting styles using support and control as two indices. There is accumulated evidence indicating that adolescents whose parents employ an authoritative parenting style are less likely to smoke comparing to those who had less authoritative parents, and this protective effect is significant both concurrently and longitudinally (Adalbjarnardottir, & Hafsteinsson, 2001; Adamczyk-Robinette, Fletcher, & Wright, 2002; Henriksen & Jackson, 1998; Jackson, Henriksen, Dickinson, & Levine, 1997). However, there is also some evidence suggesting that parenting styles have no unique effect on adolescent smoking behaviors above and beyond the main effects of individual parenting behaviors (i.e., support and control) (e.g., Huver, Engels, Vermulst, & de Vries, 2007a). Also, it has always been controversial regarding whether it's culturally appropriate to apply Baumrind's (1987) parenting styles to Chinese population (e.g., Chao, 1994, 2004). Therefore, the present study is focused on the two basic parenting dimensions—parental support and control, instead of their combined effect (i.e., parenting styles).

Research on parenting behaviors and adolescent smoking is relatively limited (Simons-Morton, Haynie, Crump, Eitel & Saylor, 2001), and has mostly been conducted in Western

countries (Li, Mao, Stanton, & Zhao, 2010). It appears that the link between parenting behaviors and adolescent smoking in countries outside of the Western world is not well explored (Guilamo et al., 2008). Therefore, it is important to investigate the link between parenting practices and adolescent smoking in other developing countries, such as China, where adolescent tobacco use has become a serious problem.

Smoking-specific parenting. Besides general parenting behaviors, it is important to understand smoking-specific parenting—how parents communicate and relay smoking related messages to their adolescents (also known as antismoking socialization messages). These socialization practices refer to explicit activities that parents undertake to discourage or prevent their children from smoking (Harakeh et al., 2010). Smoking-specific parenting may include a variety of practices, such as setting home rules against smoking, establishing a nonsmoking agreement with a child, warning children about the negative consequences of smoking, and discussing smoking-related issues on a regular basis (Engels & Willemsen 2004).

Communication about smoking-related issues is believed to be one of the most promising anti-smoking parenting practices (Jackson & Henriksen, 1997). However, research findings regarding the effect of parent-child communication about smoking are relatively mixed. While some studies have indicated a protective effect when parents discuss smoking-related issues with their children (e.g., Jackson 1997; Chassin et al., 1998), other research has suggested that parent-child communication about smoking is a strong risk factor for adolescent tobacco use (e.g., Harakeh et al., 2005). Frequency of such communication has been linked with higher rates of smoking, as well as lower levels of behavioral control (refusal to smoke) among adolescents (Engels & Willemsen, 2004; Huver, Engels, & de Vries, 2006). Researchers have proposed the timing of parent-child communication about smoking may be important in understanding the

discrepancy in research findings. According to Ennett et al., (2001), parents had a tendency to talk more about smoking after their children began experimenting with tobacco use.

Some researchers try to explain the inconsistency of findings by emphasizing the quantity and quality of communication about smoking behaviors. Harakeh et al. (2010) suggested that it is important to consider whether the communication about smoking is constructive, and to identify how the adolescent receives the discussion (positively or negatively). It may be that the quality of communication is of greater importance than the frequency of smoking-related discussions. Parents who discuss smoking-related issues in a constructive and respectful manner may be more effective in preventing their children from smoking (Harakeh, Scholte, de Vries, & Engels, 2005). Previous research has provided empirical evidence supporting this argument. For example, using a three-wave longitudinal sample of 614 Dutch adolescents, de Leeuw and colleagues (2008) found that a high quality of smoking-related communication was related to a lower likelihood of adolescent smoking, whereas communication frequency was associated with a higher likelihood of adolescent smoking. In another study, de Leeuw et al. (2010) explored the same issue using four-wave prospective data collected from 428 adolescents and found that the quality of smoking-related communication at Time 1 predicted adolescents' smoking at Time 2 rather than vice versa. In other words, adolescents were less likely to smoke in the follow-ups if their parents had communicated with them about smoking in a more positive manner at the earlier waves. In contrast, their analysis suggested that parents talked more often about smoking-related issues as a result of their child smoking, which suggests that adolescent smoking behaviors changed parents' parenting strategies when it comes to how frequently parents talk to their children about smoking. Some other studies have also shown that the quality of smoking-related communication protected adolescents from smoking, whereas the frequency of such communication increased the risk of

adolescent smoking (Harakeh et al., 2005, 2010; Otten, Engels, & van den Eijnden, 2008).

Therefore, quality of communication ought to be considered in research that seeks to understand the relationship between smoking-specific parenting behavior and adolescent tobacco use (Harakeh et al., 2010).

Another important smoking-specific parenting practice is to impose home rules against smoking. There are a number of ways in which home rules become effective in reducing adolescent smoking. First, by establishing home rules against smoking, adolescents get a strong message about the health hazards and social undesirability of cigarette smoking. Second, in homes where at least one parent smokes, home rules against smoking may send out an even more powerful message to adolescents that smoking jeopardizes one's health. Finally, a strict home rule against smoking may reduce adolescents' exposure to secondhand smoke and therefore stay less tolerant toward smoking (Fisher, Winickoff, Camargo, Colditz, & Frazier, 2007). However, research findings on the relationship between home rules and adolescent smoking are somewhat inconsistent. Some empirical evidence indicates that adolescents are less likely to smoke if their parents establish strict home rules against smoking at home (e.g., Andersen, Leroux, Bricker, Rajan, & Peterson, 2004; Ditte, Coraggio, & Herzog, 2008; Jackson & Henriksen 1997; Henriksen & Jackson, 1998). However, some other research studies, including some longitudinal ones, found no association between home rules and adolescent smoking (e.g., Den Exter Blokland, Hale, Meeus, & Engels, 2006; Harakeh et al., 2005; Huver, Engels, Vermulst, & de Vries, 2007b).

Finally, parental disapproval of smoking also has a protective effect against adolescent smoking (Kong, Camenga, & Krishnan-Sarin, 2012). Researchers suggest that parents who explicitly express their disapproval of adolescent smoking are less likely to have children who

smoke. Empirically, although limited, evidence has emerged from cross-sectional and longitudinal studies supporting the link between parental disapproval and adolescent smoking. For example, Sargent and Dalton (2001) conducted a three-wave cohort study of rural adolescents' smoking behaviors and the effect of their parents' disapproval of smoking. After controlling for all confounding variables, they found that adolescents perceived strong parental disapproval of their smoking were less than half as likely to become established smokers compared with those who perceived no strong parental disapproval. The same relation was found in the longitudinal analysis of baseline nonsmokers over three years. Similarly, some more recent studies also found a significant protective effect of parental disapproval for adolescent smoking (e.g., Carla Berg, Choi, Kaur, Nollen, & Ahluwalia, 2009; Kong, Camenga, & Krishnan-Sarin, 2012). Unfortunately, empirical research on smoking-specific parenting and adolescent smoking in China is generally nonexistent.

Interrelations between parent smoking, general parenting, & smoking-specific parenting. Apart from the independent effects of parent smoking status and smoking-specific parenting on adolescent tobacco use, researchers have also proposed possible interactions between these factors in affecting adolescent smoking behaviors. One assumption is that parents who smoke may perceive themselves as a poor source of antismoking education because of the inconsistency of their attitudes and actual behavior (Henriksen & Jackson, 1998). Parents in this situation may be less inclined to engage in smoking-specific parenting practices, and this may subsequently result in higher rates of adolescent smoking (Harakeh et al., 2010).

Not surprising, existing research indicates that nonsmoking parents are more involved and effective in nonsmoking socialization when compared to their smoking counterparts (Harakeh et al., 2005; Otten, Engels, & van den Eijnden, 2008). However, there is some evidence

that parents who smoke can employ specific strategies, such as warnings and strict rules against smoking, to dissuade their children from adopting such behaviors (Jackson & Henriksen, 1998). Given the evidence that a significant number of fathers in Chinese families are smokers (over 60% of adult males in China smoke), it is important to investigate how parent smoking status influences antismoking socialization and adolescent smoking behaviors.

There is also a possible relationship between general parenting and smoking-specific parenting. On a theoretical level, such a relationship is plausible, as parents who are more involved and responsive may be more likely to discuss smoking-related issues out of concern and care for their children. Furthermore, parents who control and monitor their children's activities in general are also more likely to employ nonsmoking rules and talk about smoking-related issues in the home (Harakeh et al., 2010). Darling and Cumsille (2003) suggested that general parenting serves as a very important context for the effectiveness of specific parenting practices, such as smoking-specific socialization, and contended that these two should be distinguished in research on adolescent smoking. Nevertheless, empirical studies that have examined both general and smoking-specific parenting practices are scarce. Among the few studies that focused on the link between general, and smoking-specific parenting, Harakeh and colleagues (2005, 2010) found that supportive parents were more likely to have high quality communication about smoking, and controlling parents were more likely to have frequent discussions with their children about smoking. Using longitudinal data from 382 adolescents, Chassin and colleagues (2005) found that authoritative parents were most likely to engage in smoking-related discussions, whereas authoritarian parents were most likely to use punishment to control or moderate adolescent smoking behaviors. However, they didn't find any significant mediating effect of smoking-related discussions or punishment. Using a sample of 4,351 Dutch adolescents aged between 13

and 15 years, Otten and colleagues (2008) also tested a model in which general parenting and parental smoking predicted smoking-specific parenting, which in turn predicted adolescent smoking. Their results revealed general parenting that incorporated strictness and involvement were positively associated with smoking-specific parenting, which was in turn negatively related to adolescent smoking. Presently, there does not seem to be a single study with Chinese samples that has examined both general and smoking-specific parenting practices concurrently.

Peer Influence on Adolescent Smoking

Adolescence is a period often characterized by increased focus and sensitivity to peer relationships (Paek & Gunther, 2007). Both Social Learning Theory (Bandura, 1977) and Primary Socialization Theory (Oetting & Donnermeyer, 1998) have identified the importance of peers in shaping adolescent belief systems, values, and behavior. Teenagers may easily succumb to peer-pressure and invitations by others to smoke. Furthermore, when adolescents befriend individuals who smoke, it may increase cigarette accessibility and promote the idea that smoking is a normative behavior. There is a common perception among adolescents that smoking will increase one's popularity and social standing (Simons-Morton, Haynie, Crump, Eitel & Saylor, 2001). Smoking experimentation and initiation is most likely to occur within the peer context. In these situations, teenagers will often exert their influence by sharing cigarettes, teaching one another how to smoke, and creating social situations where there is positive reinforcement for tobacco use (Unger & Chen, 1999; Unger, Rohrbach, Cruz, Baezconde-Garbanati, Howard, & et al., 2001). An adolescent's risk for smoking increases if s/he has a friend who smokes, and the risk is even higher if they have more than one friend who smoke (Hoffman, Monge, Chou, & Valente, 2007).

Empirically, peer influence on adolescent smoking has been well documented in literature spanning over the past three decades. Peer smoking is considered one of the most important risk factors of adolescent smoking (see Kobus, 2003 for a review; Hoffman, Sussman, Unger, & Valente, 2006). Several cross-sectional studies have identified significant correlations between peer smoking and adolescent tobacco use, and recent longitudinal studies have also confirmed that adolescents are at higher risk for smoking when their friends smoke (Alexander, Piazza, Mekos, & Valente, 2001; Gunther, Bolt, Borzekowski, Liebhart, & Dillard, 2006). An increase in the level of smoking by adolescents has been associated with regular encouragement and approval of smoking by peers. In this situation, the message received by a teenager is that smoking is cool, enjoyable, and will promote popularity among his or her peer group (Kobus, 2003). Peer influence on adolescent smoking has been reported internationally in countries ranging from Australia (Webster, Hunter, & Keats, 1994), to Canada (O'Loughlin, Paradis, Renaud, & Gomez, 1998), Denmark (de Vries, Engels, Kremers, Wetzels, & Mudde, 2003), Germany (De Vries et al., 2003), Finland (De Vries et al., 2003), Iceland (Thorlindsson and Vilhjalmsson, 1991), Israel (Meijer et al., 1996), Italy (Effuso, Barra, Del Castello, Gaeta, & Gaeta, 2002), the Netherlands (De Vries et al., 2003), New Zealand (Fergusson, Lynskey, & Horwood, 1995), Spain (De Vries et al., 2003), and the United Kingdom (De Vries et al., 2003). Similar research has recently begun to emerge in China, where greater emphasis has been placed on understanding the role of peer influences on adolescent smoking within the unique cultural context.

Theoretically, the term “peer” refers to multiple levels of influence, ranging from best friends, as the most proximate social circle, to anonymous crowds in the larger social context (Bearman, 2002). Peer influence operates at both the proximal (close friends) as well as distal

levels (general peers), and the magnitude of such influence depends on the different levels of peers. It's important to recognize the roles of both proximal and distal influences, because different peer groups often play dissimilar roles in shaping adolescent health attitudes and behaviors (Bearman, 2002). For example, peer pressure may be more appropriate in explaining the influence of close friends, whereas perceived prevalence of smoking among peers represents the influence from distal peers (Paek & Gunther, 2007). Unfortunately, research on adolescent smoking often treats peer relationships as a one-dimensional construct, and rarely assesses the role of close friends, peer networks, and general peer group simultaneously (Kobus, 2003). The very limited research involving close friends and general peer group influence suggests that close friends' smoking may be more influential than the general peer group. For example, researchers Ali and Dwyer (2009) used a U.S. nationally representative longitudinal sample (i.e., Add Health) to assert that an increase in smoking rates among close friends by 10% increased the likelihood of adolescent smoking by 5%, whereas the same increase of smoking rates among classmates only increased the likelihood of adolescent smoking by 3%. Another study using Add Health data found that if the adolescent had "one or two friends who smoked," this factor had the strongest influence on adolescent smoking [odds ratio (OR) = 2.00], compared to "members of peer networks who smoked" (OR = 1.91) and "the prevalence of smoking in school" (OR = 1.73) (Alexander et al., 2001). These findings demonstrate that all levels of peer interaction have a significant influence on adolescent smoking, and that these differential impacts should be examined separately (Kobus, 2003).

Media Influence on Adolescent Smoking

In addition to parents and peers, media also serves as an important social influence on adolescent smoking behaviors (Tickle, Hull, Sargent, Dalton, & Heatherton, 2006; Villanti,

Boulay, & Juon, 2010). According to Social Learning Theory (Bandura, 1977), people tend to model the behaviors of those they find attractive, and view as role models. Exposure to media images of smoking can alter perceptions and attitudes towards smoking, and shape subsequent behaviors. Although parents and peers play an influential role in adolescent smoking, movie stars and other entertainers serve as attractive models for teenagers (Hines, Saris, & Throckmorton-Belzer, 2000). Recently, smoking scenes in film and television have become important topics in research on adolescent smoking, and it is proposed that the recent rise of adolescent smoking may be partially attributable to tobacco marketing through smoking imagery in films, etc. (McCool, Cameron, & Petrie, 2001). Other media formats, such as tobacco advertising and promotions, have also helped influence adolescent smoking. However, tobacco marketing on television and in film has become less common in China since the government's first anti-tobacco advertisement law was implemented in 1992, and explicit advertisements for tobacco products are almost non-existing (Chen, Stanton, Fang, Li, Lin, & et al., 2006). Whereas mass media advertisements of tobacco products are extremely rare in China due to the law, smoking scenes in film and TV programs are overwhelming because of the lax censor process (The Wall Street Journal, 2011). In addition, although there is abundant research revealing the negative effect of exposure to smoking scenes in film and television on adolescent smoking in Western cultures, the similar mechanism has not been well explored in Chinese adolescents. Hence, the present study will focus on the influence of smoking scenes in film and television, rather than mass media advertisements to the general population.

In a review of 40 studies on smoking scenes in movies, Charlesworth et al. (2005) pointed out that smoking scenes in movies decreased from the 1950s to 1990s and increased rapidly afterwards. In 2002, smoking scenes in movies were as prevalent as in the 1950s, and

leading actors smoked in 60% of popular movies from 2002 and 2003. In these movies, smoking scenes were rarely associated with severe health outcomes. Studies using focus groups reported that adolescents perceiving smoking images as a reflection of everyday life, and viewed the activity as a common and acceptable way to relieve stress. Exposure to smoking scenes in popular films did not deter adolescents from smoking; in fact, many adolescents reported a nonchalant attitude toward smoking scenes in movies. Many found smoking to be desirable, while similarly acknowledging the health risks associated with smoking (Charlesworth & Glantz, 2005). Likewise, experimental studies have reported that exposure to smoking in film made nonsmokers more tolerant and accepting of smoking (Charlesworth & Glantz, 2005).

Recently, a U.S. National Cancer Institute (2008) report indicated that there is a causal relationship between exposure to media smoking and adolescent smoking. Similar studies have confirmed a significant association between media exposure and teenage tobacco use (Sargent & Hanewinkel, 2009). Cross-sectional studies have established a significant link between exposure to smoking in movies and adolescent smoking, with a dose-response effect. For example, Sargent and colleagues (2001) conducted a cross-sectional study with 4,919 school-aged children between 9 to 15 years old to examine the effects of seeing smoking in movies on “first time casual smoking.” They found a significant association between adolescents’ initiation to smoke and their exposure to smoking on film. This association remained significant even after controlling for demographics, parent, sibling, and friend smoking. The odds ratios for initiation into smoking for those adolescents in the higher quartiles of exposure to movie smoking, compared to adolescents whose exposure was moderate, and the lowest quartiles were 1.7, 2.4, and 2.7 respectively. These odds ratios remained unchanged after controlling for parenting styles and personality traits (Sargent, Beach, Dalton, Mott, Tickle, & et al., 2001). These results were

replicated by other studies with national representative samples of adolescents (e.g., Sargent, Beach, Adachi-Mejia, Gibson, Titus-Ernstoff, & et al., 2005), laboratory studies using control groups (e.g., Hines, Saris, & Throckmorton-Belzer, 2000; Shmueli, Prochaska, & Glantz, 2009), and studies using international samples (e.g., Goldberg, 2003; Sargent & Hanewinkel, 2009).

A number of longitudinal studies have also confirmed that media exposure is a strong predictor of smoking among adolescents. For instance, Distefan, Pierce, and Gilpin (2004) analyzed the impact of adolescent ‘favorite movie stars in smoking scenes’ and subsequent smoking behavior using a longitudinal sample of California adolescents. One-third of non-smokers nominated a star who smoked on-screen, which independently predicted a later risk of smoking (odds ratio [OR] = 1.36). Similarly, Dalton and colleagues (2003, 2009) found that adolescents at the highest quartile of exposure to smoking scenes were more than twice as likely to start smoking, and become established smokers, at the subsequent follow up time than those who were in the lowest quartile (Dalton, Beach, Adachi-Mejia, Longacre, Matzkin, & et al., 2009; Dalton, Sargent, Beach, Titus-Ernstoff, Gibson, & et al., 2003). Studies have shown that 30% to 50% of smoking initiation among adolescents was attributed to film exposure, and the effect of mass media had been especially strong for adolescents who were otherwise at a lower risk for smoking (i.e., those whose parents do not smoke, and individuals who have less of a sensation seeking predisposition) (Dalton, Beach, Adachi-Mejia, Longacre, Matzkin, & et al., 2009; Titus-Ernstoff, Dalton, Adachi-Mejia, Longacre, & Beach, 2008). Despite the relatively abundant data addressing media influence on adolescent smoking in Western cultures (especially the United States), little is known about the impact of mass media on Chinese adolescent smoking behaviors.

Mediating Role of Smoking-Related Cognitions

In addition to the direct influences of parents, peers, and mass media, researchers have begun to explore the underlying mechanisms that link these factors to adolescent smoking behaviors (Tickle, Hull, Sargent, Dalton, & Heatherton, 2006). Findings from sizeable youth tobacco surveys have indicated that the most influential psychosocial predictors of adolescent smoking include proximal cognitive factors, such as adolescent attitudes and knowledge of smoking, behavioral control to resist smoking, and adolescent intention to smoke (e.g., Ford, Diamond, Kelder, Sterling, & McAlister, 2009).

According to the Theory of Planned Behavior (TPB; Ajzen, 1985), cognitive components, such as attitudes and social norms, determine individual intentions and are associated with subsequent behaviors. A central factor of TPB is the individual's intention to perform a given behavior, which is determined by three cognitive antecedents: attitude toward the behavior, subjective norm, and perceived behavioral control. Attitude toward the behavior refers to the degree to which an individual has a favorable or unfavorable evaluation of the behavior. Subjective norm refers to the perceived social pressure to perform or not perform such behavior. Perceived behavioral control refers to the perceived ease or difficulty in performing the behavior (Ajzen, 1985). TPB has been applied to research on various behaviors, such as dieting, and also relates to adolescent smoking behaviors. de Vires and colleagues (1995) found intention to smoke to be a significant predictor of adolescent future smoking. Whereas, smoking-related cognitions, including attitudes, subjective norm, and behavioral control indirectly impact smoking behaviors through intentions. Generally, a positive attitude and favorable perception of smoking as a social norm, paired with low levels of self-control, are related to an increased risk for adolescent smoking (Harakeh et al., 2004). Although research using smoking-related cognitions to predict intention to smoke and, in turn, smoking behaviors has accumulated

evidence for the validity of TPB, there is an argument that distal social influences, such as parental and peer influences, should be included as antecedents of these proximal cognitive factors (e.g., Petraitis, Flay, & Miller, 1995).

Parental influences, smoking-related cognitions, and adolescent smoking behaviors

Biddle, Bank, and Marlin (1980) hypothesized that children internalize family norms, values, and lifestyles, and these factors in turn impact their drug use. Primary Socialization Theory proposes that cultural norms (including norms for substance use), along with attitudes, beliefs, and behaviors, are transmitted through interactions with primary socialization sources, including family, peers, and school (Oetting et al., 1998). Compared to their peer group and educational institution, parents are undoubtedly the most important and enduring source of socio-cultural influence that may shape adolescent smoking-related cognitions and behaviors (Avenevoli & Merikangas, 2003). As previously mentioned, the literature has shown a relatively weak influential connection between parent smoking and adolescent smoking behaviors, particularly when compared to sibling and peer smoking. It's proposed that by smoking parents "model" their values rather than behaviors, and it's the internalization of such values and norms that subsequently influences adolescent smoking behaviors (Bricker, Peterson, Sarason, Anderson, & Rajan, 2007). There is some evidence that parent belief systems about substance abuse may strongly influence child substance abuse (Bogenschneider, Wu, Rafaelli, & Tsay, 1998). Considering the sizeable smoking population in China (350 million), many adolescents will have parents (particularly fathers) who are long-time smokers. Adults with this habit will often model their tobacco-related values through their own smoking behaviors, and the transmission of such values from parent to child can start very early, and last a lifetime (Bricker et al., 2007). Thus, it is crucial to understand how this long-lasting value transmitting process

impacts Chinese adolescents' smoking-related cognitions, and, consequently, their own smoking behaviors.

Parents transmit values and beliefs not only through their own behaviors, but also through their parenting practices. Researchers argue that parental influence on long-term values, beliefs, and attitudes through parenting practices remains relatively stable from childhood to adolescence, and even adulthood (Avenevoli & Merikangas, 2003). Although current research has indicated a fairly consistent association between parenting practices and adolescent drug use, the effect size again is relatively small in magnitude (Dick, Viken, Purcell, Kaprio, Pulkkinen, & et al., 2007), which suggests possible mediating mechanisms may exist. Empirically, very few studies have examined the impact of general parenting practices and smoking-specific parenting on adolescent smoking-related cognitions, and, in turn, their intention and actual smoking behaviors. Harakeh et al. (2004) investigated the link between general parenting and adolescent smoking using smoking-related cognitions as mediators. They found that two parental factors—quality of parent-child relationship and parental knowledge of their children's activities had a significant impact on adolescents' smoking-related cognitions. Positive parent-child relationships, and better parental knowledge, were linked with higher efficacy to refuse smoking, negative attitudes, and subjective norms toward smoking, which, in turn, limited adolescent smoking behaviors. Huver et al. (2006) found similar mediating effects of smoking-related cognitions, but they used antismoking parenting practices (e.g., parental reactions to adolescent smoking, house rules, and communication about smoking) instead of general parenting. They concluded that smoking-specific cognitions, at least partially, mediated the effects of smoking-specific parenting on adolescent lifetime smoking status. Obviously, more research is needed to further validate this mediating mechanism. Based on these findings, it's reasonable to examine the mediating role of

smoking-related cognitions in the link between parental influence and adolescent smoking behaviors. To my knowledge, this mediation mechanism has not been tested among Chinese adolescent populations.

Peer influences, smoking-related cognitions, and adolescent smoking behaviors

Peers can also indirectly influence adolescent smoking behavior by changing their attitude toward and perceived norm regarding smoking. In fact, many researchers revealed that adolescents' perceived peer norms (usually measured by perceived prevalence of peer smoking) might also influence adolescent smoking (Paek & Gunther, 2007). According to Cognitive Development Theory (CDT; Inhelder & Piaget, 1958), the actual environmental influence is not as important as adolescents' perception or understanding of the environment, and such perception is what actually influences corresponding behaviors. In the case of peer smoking, the normative peer influence only occurs when an adolescent perceives smoking as normative and desirable behavior among his or her peer group, and subsequently alters their behavior to conform to this perceived norm. Moreover, such normative influences have an impact on adolescent behavior regardless of whether it reflects 'actual smoking status' among peers, and whether there is actual "pressure" to smoke from peers (Unger, Rohrbach, & et al., 2001). Prior research shows that adolescents often overestimate the prevalence of peers who smoke, and such teenagers are, in turn, more likely to try smoking and become regular smokers as a result of their perceptions (Tickle et al., 2006). This perception of peer smoking is often a stronger predictor for adolescent smoking than the actual peer smoking rates (Gunther, Bolt, Borzekowski, Liebhart, & Dillard, 2006). Perceived norms about smoking can exist within one's tight-knit circle of friends, and also for the larger peer group (Gunther et al., 2006). Therefore, it's important to

examine the indirect influence of peer smoking on adolescent smoking behaviors through the alteration of attitudes and beliefs about smoking.

Media influences, smoking-related cognitions, and adolescent smoking behaviors

In relation to media influence in adolescent smoking, current research has also begun to explore the potential mediating variables through which media can affect adolescent smoking behaviors. Smoking-related cognitions, such as attitude and perceived norms, are proposed as important mediators (Heatherton & Sargent, 2009). Smoking scenes in film and television can lead a child to misinterpret smoking as a “healthy and acceptable norm” based on their exposure to these media forms. Research shows 87% of top box office films contain smoking imagery, and a sizeable majority of leading characters in these films smoke (Tickle et al., 2006). This unrealistic reflection can make smoking look enticing to the general population of viewers. For example, using a focus group of New Zealand adolescents, McCool, Cameron, and Petrie (2001) found that adolescents perceived an unrealistically high prevalence of smoking among peers and they regarded such prevalence as an accurate reflection of reality. As previously discussed, adolescent perception of norms is more important than actual smoking prevalence in shaping their smoking behaviors. Misrepresented norms in film and television may influence adolescents by decreasing prohibition about smoking and their ability to resist peer pressure, which, in turn, increases their risk for smoking (Tickle et al., 2006). Smoking scenes in movies and on television can also lead to positive expectations and attitudes toward smoking, by portraying smokers as attractive, wealthy, and successful individuals. For example, young smokers are often portrayed as sexier, tougher, and more street-smart than their non-smoking counterparts (Dalton, Tickle, Sargent, Beach, Ahrens, & et al., 2002), and smoking is usually described as an enjoyable, relaxing, and sociable experience (Tickle et al., 2006). The more adolescents endorse these

values and beliefs, the more likely they are to try smoking. Several studies have investigated the mediating role of cognitions (attitudes and expectancies) relating to media and adolescent smoking (Heatherton & Sargent, 2009). For example, Ticker et al. (2006) examined the role of positive expectancies, identification as a smoker, and normative beliefs in the relation to movie smoking and adolescent smoking in a longitudinal sample. Researchers found that the first two cognitive factors served as important mediators between movie exposure and adolescent smoking behaviors in the cross-sectional model. Further, positive expectancies served as a mediator between movie exposure, and smoking initiation for baseline nonsmokers in the longitudinal model. Based on both theoretical and empirical evidence, it is important to include smoking-related cognitions in models examining adolescent smoking behaviors.

Current Research on Adolescent Smoking in China

Although empirical research on adolescent smoking has been relatively well established in Western societies, especially the United States, smoking among Chinese adolescents has only begun to receive serious attention (Grenard et al., 2006). There has been an increase in empirical research reporting a high prevalence and early initiation of adolescent smoking in China. This contributes to the basic understanding of the adolescent smoking epidemic in China, and highlights the urgent need for further exploration of this topic. Hesketh, Ding, and Tomkins (2001) surveyed a large sample of adolescents aged 13 to 19 years in Zhejiang province in China, and found that 25.7% boys and 5.4% girls were ever smokers. Of the ever smokers, 41.9% had smoked before 10 years of age, and 7.9% before 5 years of age. Similarly, Unger, Yan, and others (2001) surveyed 6,994 seventh- to ninth-graders in the rural and urban areas of Wuhan, China and found that 47% boys and 18% girls had smoked in their lifetime and 16% boys and 4% girls had smoked during the past 30 days. They also found that the prevalence of smoking

increased significantly with age, and that it was higher among rural boys and urban girls (Unger, Yan, & et al., 2001). Using data from a sizeable longitudinal survey of 7th to 9th graders in Wuhan, China, Chen and colleagues (2001) calculated the hazard of smoking initiation and found a pattern similar to what has been observed in the Western countries. For boys, the hazard of smoking initiation was low (<2%) before 7 years of age, and then increased rapidly after age 10, and finally peaked at 14 to 15 years of age. The hazard for girls was extremely low until 12 years of age, and then increased afterwards (Chen, Li, Unger, Gong, Johnson, & Guo, 2001).

Recently, a large-scale longitudinal study called the “China Seven Cities Study” (CSCS) was initiated by a consortium of American and Chinese researchers in 2001 in order to gain a better understanding of smoking and other related health practices, along with their outcomes, in China. The goal was to develop effective prevention and intervention programs at the community level by assessing the behaviors and needs of urban populations. Seven cities from four geographically distinct regions including northeast, centre, southwest, and coastal were chosen to obtain a nationally representative sample. Baseline data collected in 2002 showed fairly high smoking rates among adolescents across the seven cities: 27% of middle school students, 38% of academic high school students, and 54% of vocational high school students have ever tried smoking, whereas 9% of middle school students, 8% of academic high school students, and 26% of vocational high school students have smoked in the past month. In addition, male students were more than twice as likely to smoke than female students, regardless of school types (Anderson, Palmer, Chou, Pang, & et al., 2006). The aforementioned studies provided valuable data on the prevalence of adolescent smoking in China, which laid the groundwork for further exploration of the predictors for adolescent smoking.

A small body of work has recently emerged regarding the main determinants of adolescent smoking in China. As mentioned before, gender and age are important predictors of adolescent smoking, with boys and older adolescents being more likely to smoke (e.g., Lam, Chung, Betson, Wong, & Hedley, 1998; Li, Fang, & Stanton, 1999; Peters, Hedley, Lam, Betson, & Wong, 1997). Some research has indicated larger gender differences in smoking prevalence among Chinese adolescents compared to the U.S. (Zhu, Liu, Shelton, Liu, & Giovino, 1996). Similar to findings from studies conducted in Western societies, empirical evidence shows that parental smoking behavior is associated with adolescent smoking (e.g., Hesketh, Ding, & Tomkins, 2001; Hu & Tsai, 2000; Lam et al., 1998). A number of studies have found peer smoking to be an important risk factor (e.g., Peters et al., 1997; Unger, Yan, & et al., 2001; Zhang, Wang, Zhao, & Vartiainen, 2000), and also the strongest predictor of adolescent smoking (e.g., Ma, Unger, Chou, Sun, Palmer, & et al., 2008; Peters et al., 1997; Zhang et al., 2000). A variety of other psychosocial factors, such as stress, anxiety, hostility, depressive symptoms, poor academic performance, teacher smoking, antismoking atmosphere at school, smoking-related knowledge and attitudes have also been linked to adolescent smoking behaviors (Lam, Ho, Lai, Mak, & et al., 2005; Li, Fang, & Stanton, 1996; Liu, 2003; Unger, Li, Johnson, Gong, Chen, & et al., 2001; Weiss, Palme, Chou, Mouttapa, & Johnson, 2008; Wen, Chen, Muscat, Qian, Lu, & et al., 2007).

Limitations of Prior Research

A number of limitations are worth noting with regard to the literature on Chinese adolescent smoking. First, the unique Chinese culture of smoking has not been taken into consideration as a potential determinant of adolescent smoking in the literature. In a culture that accepts and normalizes smoking, adolescents may have a more positive attitude toward smoking

and believe it to be a desirable social behavior. This, in turn, may contribute to the fact that Chinese youth are more likely to develop a smoking habit. Meanwhile, the theories about smoking behaviors developed in Western cultures may not be applicable to the Chinese culture. For example, stress has been linked with increased smoking behaviors in numerous Western studies, but such relationship was not replicated in several Chinese studies among male adolescents. For example, Booker and colleagues (2007) examined the association between stressful life events and adolescent smoking in China using a longitudinal sample of 7th and 8th graders, and they found no significant association between stressful life events and male adolescent smoking. Similarly, Unger, Li, & et al. (2001) also found no such association between stress and smoking in males. The authors explained the findings in light of the unique smoking culture in China, which views male smoking as common and acceptable. Therefore, it is important to understand how culture plays a role in adolescent smoking, especially for male adolescents in China.

Second, many research studies are not theory-driven, and have not employed theoretical frameworks to explore possible predictors and mechanisms behind adolescent smoking in China (Grenard et al., 2006). Instead, they depended heavily on their data to find whatever factors are correlated with adolescent smoking behaviors. When theoretical models with multiple predictors are employed, only direct relationships between predictors and adolescent smoking are examined (Grenard et al., 2006). Studies using mediational models have indicated that smoking-related cognitions, such as attitudes and perceived norms, mediate the relationship between other social influences (e.g., peer and parent smoking) and actual adolescent smoking behaviors. However, very few studies have gone beyond the direct links to look at the mechanisms (e.g., smoking-related cognitions) through which these factors exert their influences on adolescent smoking

behaviors (e.g., Chen, Stanton, Fang, Li, Lin, & et al., 2006; Guo, Johnson, Unger, Lee, Xie, & et al., 2007; Lai, Ho, & Lam, 2004).

Third, although researchers have suggested that family, particularly parents, play an important role in adolescent problem behaviors, few studies have examined the role of parents beyond their own smoking behaviors (Shakib, Zheng, Johnson, Chen, Sun, & et al., 2005). As mentioned before, from comparing direct behavioral influences, researchers have contended that parents are more likely to exert their influence through values and norms (Flay, Hu, Siddiqui, Day, Hedeker & et al., 1994). Further, parental influences and long-term values, beliefs, and norms tend to remain stable over time (Avenevoli & Merikangas, 2003). However, almost no empirical research has examined the intergenerational transmission of smoking-related values and beliefs, and how this transmission of values helps shape adolescent smoking behaviors. Chinese adolescents have a high probability of living with fathers who smoke, and who may support smoking as a normative behavior. Therefore, it's important to investigate how these cultural norms and values about smoking are passed down from parents to children in China.

Compared to research in Western cultures, there is surprisingly limited information about the impact of parenting behaviors on adolescent smoking behaviors (Guilamo-Ramos, Bouris, Dittus, & Jaccard, 2008). There is some evidence showing that positive family relationships protect against adolescent smoking. Trinidad et al. (2003) examined the impact of family harmony on adolescent smoking and drinking using data from a large study of adolescents in Wuhan, China. They found that family harmony was significantly predictive of less tobacco and alcohol use (Trinidad, Chou, Unger, Johnson, & Li, 2003). Shakib et al. (2005) examined the relationship between various family characteristics and adolescent smoking in a sample of 3,629 seventh graders in Wuhan, China, and found a significant protective effect of positive family

relationships against smoking for both male and female adolescents. However, it is not clear whether parenting practices, such as support and monitoring, influence adolescent smoking behaviors as those found within Western societies. In the “China Seven Cities Study” by Grenard and colleagues (2006), the authors found a significant association between poor parental monitoring and adolescent smoking at the one-year follow-up. Obviously, more research is needed to examine the relationship between parenting practices and adolescent smoking in China.

Finally, almost no research has explored the impact of media on adolescent smoking in Chinese society. One study by Chen et al. (2006) examined the impact of pro-tobacco advertisements on adolescent smoking using a longitudinal sample of 7th- to 11th-graders in Beijing, China, and found no significant association between exposure to such advertisements and adolescent smoking behaviors (Chen, Stanton, Fang, Li, Lin, & et al., 2006). This non-significant finding may be a result of China’s ban on tobacco advertisements in the mass media in 1992. As previously reviewed, exposure to smoking in film is a confirmed predictor of adolescent smoking in the U.S., and several other Western countries. However, the influence of smoking imagery in film and television has not been explored among Chinese adolescents.

Given the factors and issues discussed in the review of the literature, the following hypotheses emerged as important for this study to better understand the socio-cultural influences on adolescent smoking behaviors in Chinese society.

Hypotheses

Hypothesis1: *Direct effect of social influences on adolescent smoking behaviors.*

Smoking-related cultural values, parent smoking, extended family smoking, exposure to media smoking, peer/environmental smoking, and health-related values will be associated with

adolescent smoking behaviors. The model will be tested with the whole sample, as well as separately for boys and girls to examine the similarity and differences in the models by gender.

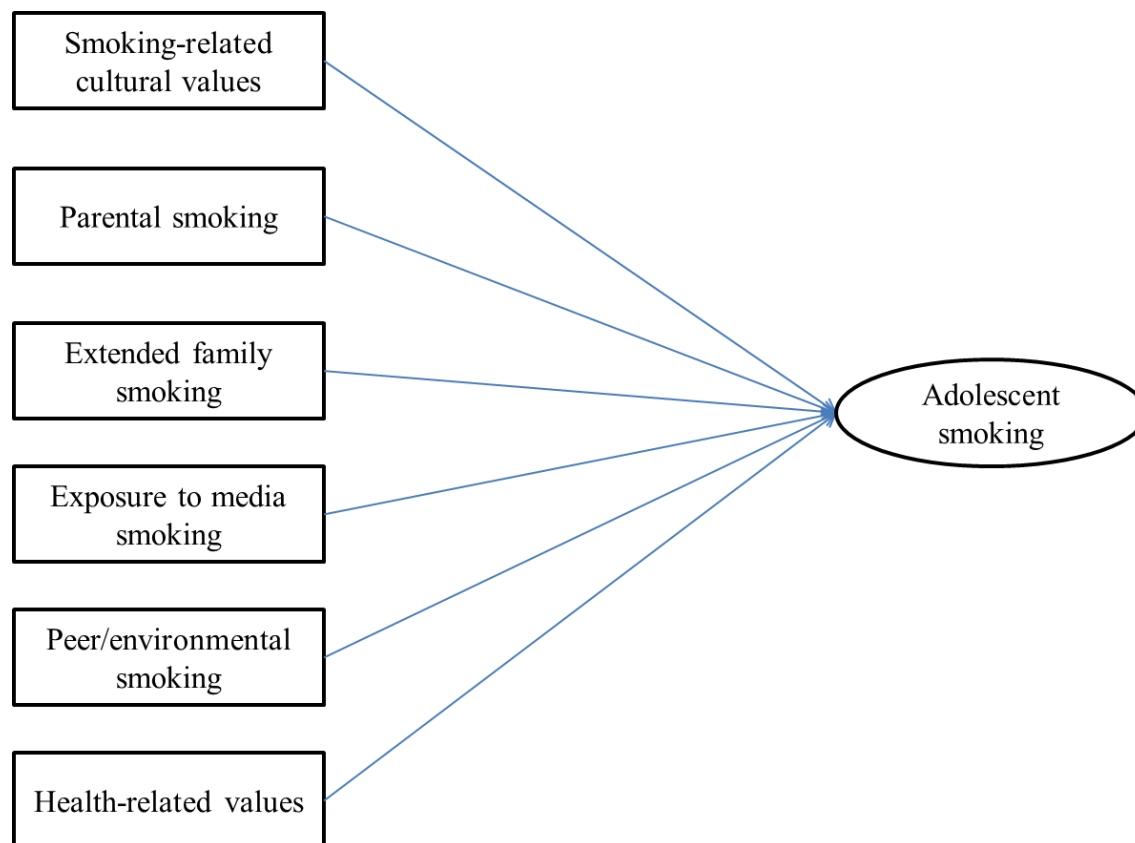


Figure 1. Model of Social Influences on Adolescent Smoking

Hypothesis 2: Mediating effect of smoking-related cognitions on adolescent smoking behaviors (in social influences model). Smoking-related cognitions, including attitude, subjective norm, and perceived behavioral control, will partially mediate the effects of social influences on adolescent smoking. The model will be tested with the whole sample as well as separately for boys and girls.

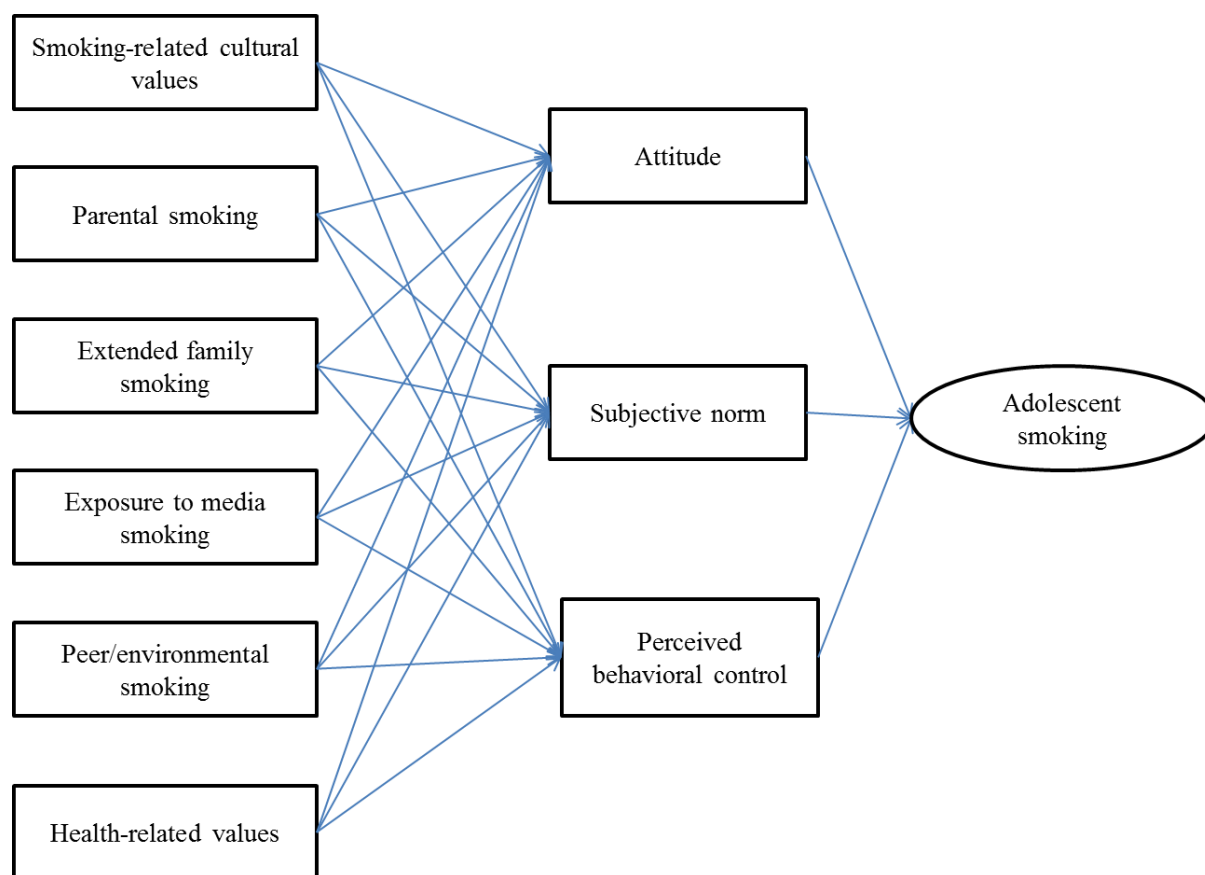


Figure 2. Mediation Model of Social Influences on Adolescent Smoking through Cognitions

Hypothesis 3: Direct effect of parenting behaviors on adolescent smoking behaviors.

Both general parenting behaviors (i.e., parental support, psychological control, and knowledge) and smoking-specific parenting (i.e., home rules, frequency of communication about smoking, quality of communication about smoking and disapproval of adolescent smoking) will be related to adolescent smoking behaviors. Parental support, parental knowledge of child activities, home rules, quality of communication about smoking and disapproval of adolescent smoking will be negatively associated with adolescent smoking, whereas parental psychological control and frequency of communication about smoking will be positively associated with adolescent

smoking. Both parent and adolescent report of parenting practices will be used. The model will be tested with the whole sample as well as separately for boys and girls.

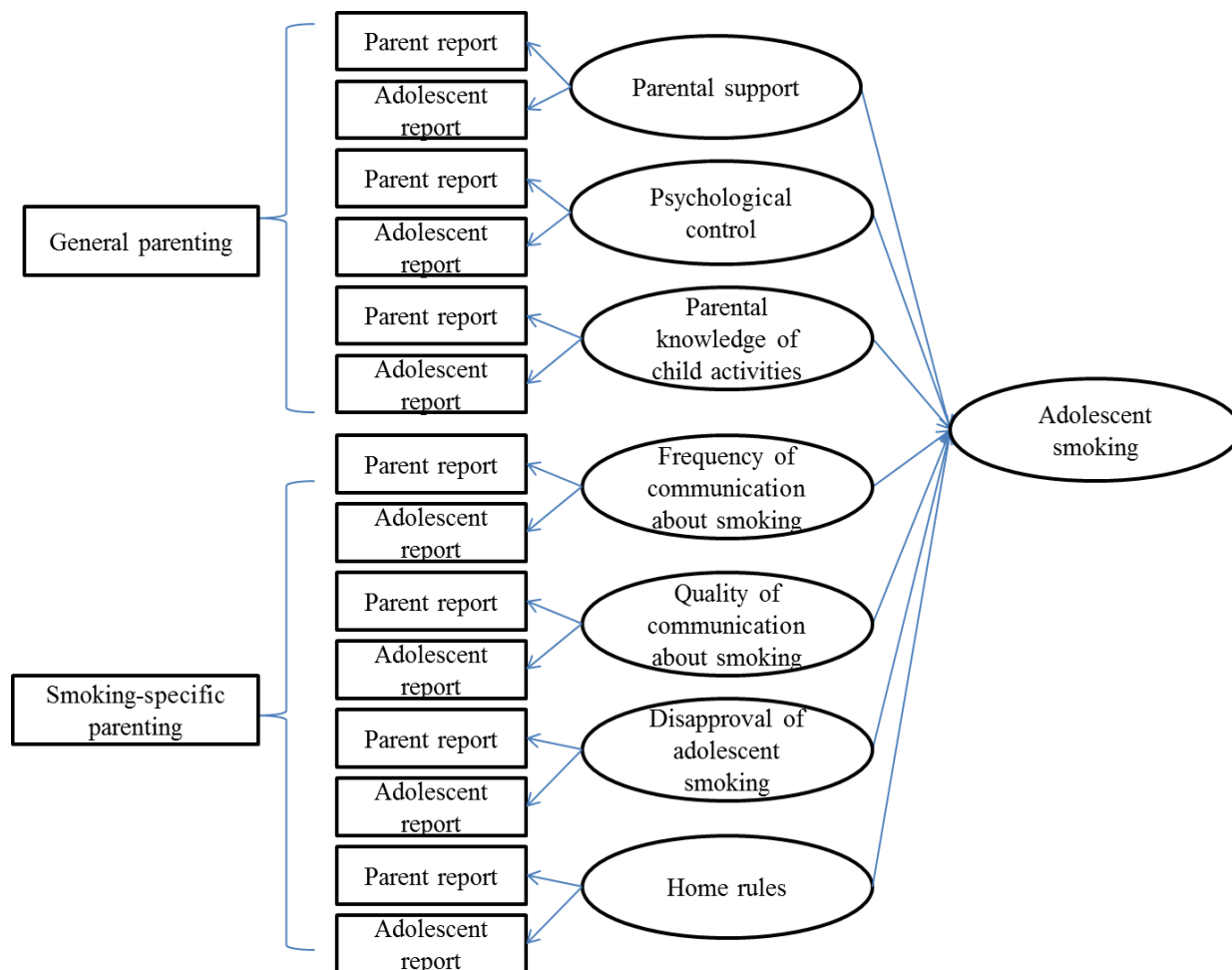


Figure 3. Influences of parenting practices on Adolescent Smoking

Hypothesis 4: Mediating effect of smoking-related cognitions on adolescent smoking behaviors (in parenting model). Smoking-related cognitions, including attitude, subjective norm, and perceived behavioral control, will partially mediate the effects of both general parenting behaviors (i.e., parental support, psychological control, and knowledge) and smoking-specific parenting (i.e., home rules, frequency of communication about smoking, quality of

communication about smoking and disapproval of adolescent smoking) on adolescent smoking behaviors. The model will be tested with the whole sample as well as separately for boys and girls.

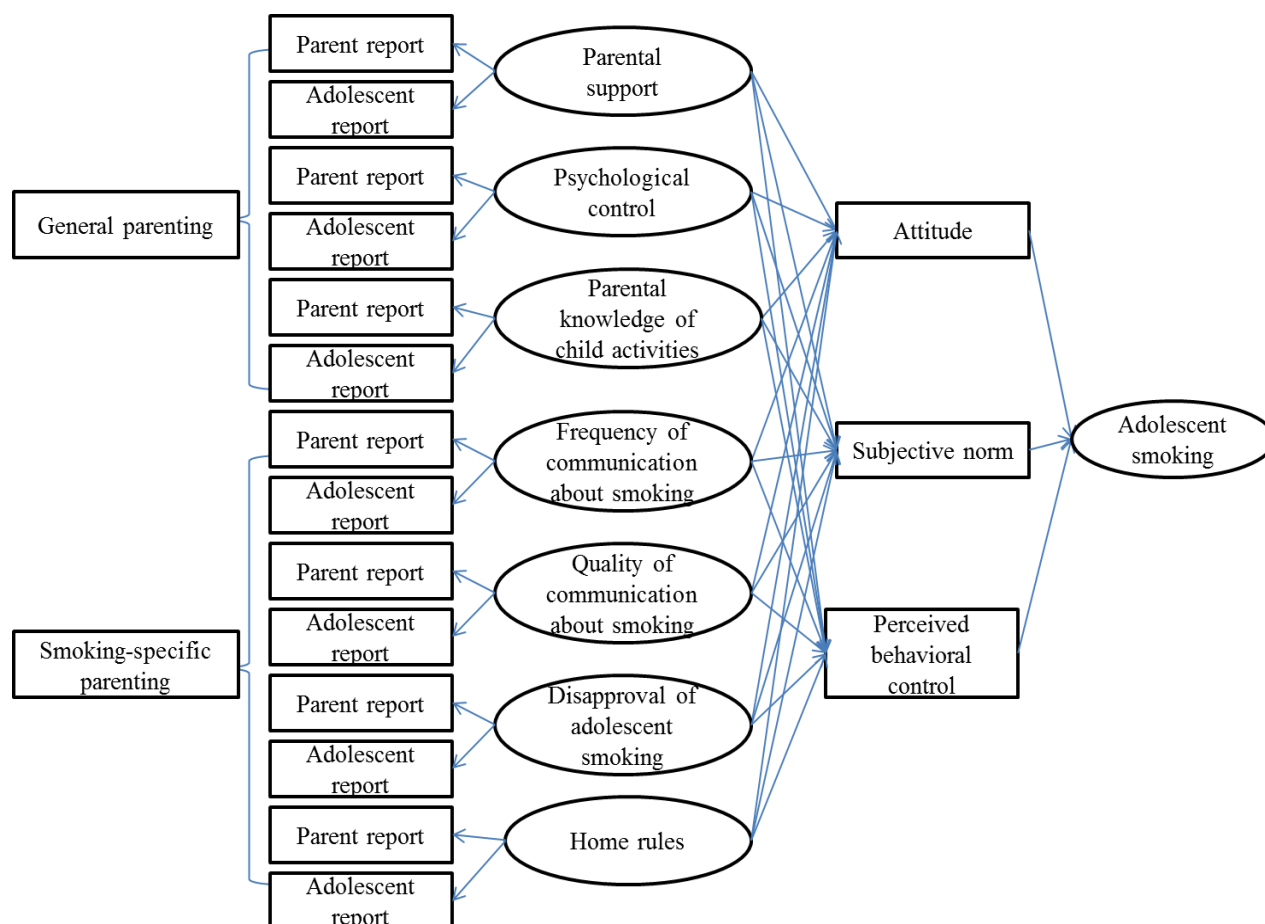


Figure 4. Mediation Model of Parenting Practices on Adolescent Smoking through Cognitions

Hypothesis 5: Nonsmoking adolescents and intention to smoke. The mechanisms stated in Hypotheses 1, 2, 3, and 4 will work in the same way in predicting nonsmoking adolescents' intention to smoke in the future. The same models as illustrated in Figure 1, 2, and 3 will be tested using the whole sample of nonsmoking adolescents as well as separately for boys

and girls, using “intention to smoke” as dependent variable instead of “adolescent smoking behaviors”.

Method

Sample

Chinese adolescents between the ages 14 to 17 years (10th to 12th grade) were recruited from three high schools in Jiande, China. Jiande is a middle-size city in the southeastern part of China with a population of 510,000—385,000 residing in the rural areas and 125,000 in the urban areas. It's one of the 3 county-level cities under the jurisdiction of Hangzhou, Zhejiang Province. The average income for a rural resident is about 8,900RMB (US\$1,353) per year and for an urban resident it is about 21,000 RMB (US\$3,191) per year (Jiande News, 2010). This research site was chosen because most research conducted in China involves only large cities such as Beijing and Shanghai, while the middle-size cities that are more common in existence received less research attention. In addition, the southeastern part of China is one of the most developed areas since it's one of the earliest parts opened up to the Western world. It is an ideal research site to examine how the fast changing socioeconomic environment together with the traditional cultural values impact adolescent behaviors in the most common middle-size city settings in China.

There were five major high schools (including three vocational high schools) in the urban areas of Jiande. Each regular high school had three grades (10th, 11th, and 12th) and each grade included 12-15 sections with around 50 students in each section. The total number of students for the two regular high schools was around 4,000. The three vocational high schools also had three grades (10th, 11th, and 12th). One of them had a bigger student population, including 10-12 sections in each grade with around 50 students in each section. The other two had fewer sections (between 3 and 5) in each grade with around 50 students in each section. Therefore, the total number of students from the three vocational high schools was around 2,000. Out of the three

grades of 6,000 students in total, the 11th grade was selected as the sampling frame for this study, which included around 2,000 students. The particular grade was chosen because in China, the 10th grade marks a stressful transitional period for many adolescents - from less demanding middle school to “no play, just study” high school. The 12th grade is also stressful for many Chinese adolescents as they have to prepare for the college entrance exams. Hence, the sample was selected from 11th grade classrooms alone.¹

One out of the two regular high schools and two out of the three vocational high schools were randomly selected and invited to participate so that we had comparable sizes of students from each type of high school, and all three high schools that were contacted had agreed to participate. All students for whom parental consents were obtained were asked to complete the self-report online survey on the computers in their school labs during their computer training class. Students whose parents did not give consent or who themselves did not give their assent to participate were instructed to practice their computer skills (e.g., Word or Excel) during the same class session. The online survey was anonymous and each student who finished the survey was given a random 8-digit number as their ID number to match with their parents’ survey. After finishing the online survey, all adolescents who participated were asked to put down the ID number that they had been assigned on the envelope which contained the parental survey for their father/ mother to complete. These parental surveys were sent home and completed surveys from parents were brought back by the adolescents in sealed envelopes and were collected by the researcher.

¹ The schools did not provide sociodemographic information on their 11th grade students (in the sampling frame) which could have aided in comparing the sociodemographic status of the adolescents who completed the survey versus those in the total sampling frame.

This study was designed as a cross-sectional survey and the power analysis conducted indicated the sample size of 500 is adequate for tests of the proposed model (Schumacker & Lomax, 2004).

There were 1,223 (participate rate about 61.1%) adolescents who completed the online survey, and 854 parents who completed the take-home survey. Because anonymous survey was used, it's impossible to compare the demographics of those adolescents who completed the survey versus those who didn't participate. As for parents, a good number of parents were working in bigger cities for a better salary and only came home on monthly basis, so these parents were not available to participate in the parental survey and resulted in a considerable loss in the parental sample. Also, because this study required both parental and adolescent reports, the cases where only parents completed the survey ($n = 196$) could not be used either. Thus, the final sample size was reduced to 658 adolescents with matching parent-adolescent data.

Two hundred and seventy (41%) boys participated in the study. Three hundred and sixty-four (55.3%) fathers and 294 (44.7%) mothers completed the parental survey. Three hundred and eighty eight (59%) were only children. 585 (89%) families were intact families with both biological parents. Most families were double-earner families: 596 (90.6%) fathers had either full-time (61.6%) or part-time (29.0%) jobs; 530 (80.5%) mothers had either full-time (49.5%) or part-time (31.0%) jobs. These families were considered as middle class, with an average monthly income of \$470-\$626.

Table 1

Demographics

	N	Mean	SD
Family Income	658	3.80 (3,001-4,000 CNY/month)	1.52
Father Education	658	3.37 (Completed Middle School)	.84
Mother Education	658	3.04 (Completed Middle School)	.89
Father Age	658	45.75	4.55
Mother Age	658	43.02	4.35
Child Age	658	16.57	.56

Note. 3,001-4,000rmb/month is about \$470-\$626.

Of the 658 adolescents who completed the survey, 24.6% reported that they had smoked at least once during their lifetime and 7.8% reported that they had smoked at least once during the past 30 days. Boys in this sample reported significantly higher smoking rates than girls: 42.2% boys and 12.4% girls reported that they had smoked in their lifetime; 12.2% boys and 4.6% girls reported that they had smoked in the last month. Table 2 summarizes the means and standard deviations for these variables as well as the *t*-test results comparing boys' and girls' smoking behaviors.

As for parent smoking behaviors, 67.6% adolescents reported that their fathers were smokers and 45.6% of fathers smoked every day. Comparatively, adolescents reported that only 1.4% mothers were smokers and almost none of them smoked on a daily basis. Two hundred and eleven adolescents (32.1%) reported that neither of their parents smoked, 7 (1.1%) adolescents reported that both parents were smokers, 438 (66.6%) adolescents reported that their fathers smoked whereas their mothers were nonsmokers, 2 (.3%) adolescents reported that their mothers

were smokers whereas their fathers were nonsmokers. Parents smoking status was not related to adolescent smoking status (i.e., whether adolescents had ever smoked in their life time).

Table 2
Adolescent and Parental Smoking Behaviors

	Whole Sample (N=658)	Boys (n=270)	Girls (n=388)	<i>t</i> -Test & p value
Adolescent Lifetime Smoking: Mean(SD)	1.50(1.12)	1.83(1.32)	1.26(.89)	<i>t</i> =6.62, <i>p</i><.001
1. none at all, not even a puff	75.4%	57.8%	87.6%	
2. 1 or 2 puffs but not a whole cigarette	14.1%	24.1%	7.2%	
3. 1 to 5 whole cigarettes	3.6%	7.0%	1.3%	
3. 6 to 20 whole cigarettes	2.1%	3.7%	1.0%	
5. 21 to 100 whole cigarettes	1.7%	3.0%	1.0%	
6. over 100 whole cigarettes	3.0%	4.4%	2.1%	
Adolescent 30-Day Smoking: Mean(SD)	1.15(.57)	1.23(.67)	1.10(.47)	<i>t</i> =3.03, <i>p</i><.001
1. didn't smoke, not even a puff	92.2%	87.8%	95.4%	
2. smoked only once	2.1%	3.7%	1.0%	
3. smoked a few times, but not every day	3.6%	5.9%	2.1%	
4. smoked almost every day	2.0%	2.6%	1.5%	
Adolescent Smoking Frequency: Mean(SD)	1.20(.67)	1.37(.84)	1.09(.49)	<i>t</i> =5.33, <i>p</i><.001
1. never	88.1%	77.8%	95.4%	
2. a few times a year	7.6%	14.8%	2.6%	
3. at least once or twice a month	1.4%	2.2%	0.8%	
4. at least once or twice a week	1.5%	3.3%	0.3%	
5. everyday	1.4%	1.9%	1.0%	
Adolescent Smoking Quantity: Mean(SD)	1.12(.49)	1.21(.58)	1.06(.39)	<i>t</i> =4.09, <i>p</i><.001
1. does not smoke	91.5%	84.1%	96.6%	
2. less than 1 cigarette per day	6.2%	12.2%	2.1%	
3. one to five cigarettes per day	1.5%	2.6%	0.8%	
4. about half pack per day	0.3%	0.7%	0%	
5. about one pack per day	0.2%	0%	0.3%	
6. about 1 and ½ packs per day	0.3%	0.4%	0.3%	
7. about 2 packs or more per day	0%	0%	0%	
Father Smoking Frequency: Mean(SD)	3.35(1.72)	3.23(1.73)	3.44(1.71)	<i>t</i> =-1.51, <i>p</i>>.05
Father Smoking Quantity: Mean(SD)	2.80(1.65)	2.74(1.64)	2.84(1.66)	<i>t</i> =-.73, <i>p</i>>.05
Mother Smoking Frequency: Mean(SD)	1.03(.27)	1.05(.37)	1.02(.18)	<i>t</i> =1.36, <i>p</i>>.05
Mother Smoking Quantity: Mean(SD)	1.02(.17)	1.03(.20)	1.01(.13)	<i>t</i> =.93, <i>p</i>>.05

Measures

This research utilized information from both adolescents and their parents. Adolescents completed questions on their smoking behaviors, smoking-related cultural values, parent smoking, extended family members smoking, peer/environmental smoking, exposure to media smoking, health-related values, perceived parenting practices and smoking-specific parenting of each parent, smoking-related cognitions including attitudes, subjective norms, perceived behavioral control, and intention to smoke. Demographic information such as age, SES, parental education, and income, was also obtained from adolescents' reports. Parents completed the same set of questions on their smoking-related cultural values, smoking behaviors, general parenting practices, smoking-specific parenting, and smoking-related cognitions. For the parenting measures, all questions are the same as those for adolescents except the stems were different.

Factorial validity of constructs was examined using Confirmatory Factor Analysis (CFA) using Principal Component extraction followed by Varimax Rotation in SPSS 17.0. Criteria included primary factor loading of .30 or higher and a difference greater than .20 between primary and secondary loadings (Kerlinger, 1986). Inter-item consistency of measures was assessed by Cronbach's alpha.

Adolescent smoking behaviors. According to Wills and Cleary (1997), self-reported adolescent smoking behaviors have been significantly related to biochemical indicators of smoking. Adolescent smoking was measured using four questions. First, adolescents were asked whether they had ever smoked in their life time. They were asked to respond on a 6-point Likert scale "1-none at all, not even a puff" to "6-over100 whole cigarettes". Second, adolescents were asked how many days they had smoked over the past 30 days on a 4-point Likert scale "1-didn't

smoke, not even a puff” to “4-smoked almost every day”. Third, adolescents were asked about how often they smoked (frequency: “1-never”, “2-a few times a year”, “3-at least once or twice a month”, “4-at least once or twice a week”, “5-every day”). Fourth, adolescents were asked about how much they smoked in the past 30 days (intensity: “1-does not smoke”, “2-less than 1 cigarette per day”, “3-one to five cigarettes per day”, “4-about half pack per day”, “5-about one pack per day”, “6-about 1 and ½ packs per day”, “7-about 2 packs or more per day”).

Intention to smoke (IS). Intention to smoke was measured by 3 items including “Do you think you will smoke a cigarette at any time next year/in five years/in your lifetime?” (Meshack, Hu, Pallonen, McAlister, & Gottlieb, 2004). Each item was assessed on a four-point Likert scale ranging from 1 “definitely no” to 4 “definitely yes” and the average score of these three items were calculated to form the scale score, with a higher score indicating stronger intention to smoke. Factor analysis showed that all three items loaded on one factor with loadings ranging from .85 to .94. The standardized Cronbach’s alpha was .85, indicating good reliability. The mean of intention to smoke for the whole sample was 1.43 (SD=.69).

Social Influences. Smoking-related cultural values, parent smoking, extended family members smoking, peer/environmental smoking, exposure to media smoking, health-related values were assessed and included served as measures of social influences.

Smoking-related cultural values (SRCV). There are no established scales on Chinese cultural values regarding smoking. Hence, a smoking-related cultural values scale was developed based on Zhou’s (2004) and Ma, Hoang, et al.’s (2008) qualitative work on the subject. Example items include: “smoking is a symbol of power and prestige”, “the brand that one smokes is a display of one’s wealth and worth”, and “smoking is a display of masculinity for men” (see Appendix 1 for the whole scale). Both adolescents and their parents responded to the items on a

four-point scale, ranging from “1-strongly disagree” to “4-strongly agree”. Items were averaged to calculate the scale score, with a higher score indicating higher endorsement of Chinese cultural values regarding smoking. Factor analysis indicated that 11 out of 12 items loaded on one factor with loadings ranging from .54 to .72. One item (i.e., “Smoking is not appropriate for women.”) had a loading less than .30 and was eliminated from the measure. The standardized Cronbach’s alpha was .85, indicating good reliability. The mean of social influences for the whole sample was 1.97 (SD=.43).

Parent smoking behaviors (PSB). Adolescents also reported on how often and how much their father and mother smoke respectively, using the third and fourth questions for adolescent smoking behaviors with the only exception that “I” was changed to either “my father” or “my mother”. Correlations between these two questions were .82 and .94 for father’s and mother’s smoking behaviors respectively. These two items were standardized and averaged to generate the composite scores of smoking behaviors for adolescents’ father and mother. For the purpose of this study, the average of father’s and mother’s smoking behaviors was used as a unified indicator for parental smoking behaviors.

Extended family smoking behaviors (EFS). Due to the close family ties and intergenerational relationships existing in China, other family members’ (i.e., grandparents, uncles and aunts, cousins, and other relatives) smoking behaviors were also measured by an index comprised of 7 “yes/no” questions. Example include: “does your paternal grandfather smoke?” and “does any of your uncles smoke?” The total score of these 7 items was used as an index for extended family smoking behaviors. The mean of extended family smoking for the whole sample was 2.95 (SD=1.27).

Peer/environmental smoking (PES). Peer/environmental smoking was measured by five questions asking adolescents about how often they saw people smoking in public places such as Karaoke and game stations, using a five-point Likert scale in which “1-never”, “2-rarely”, “3-sometimes”, “4-often”, and “5-always”. The average score of adolescents’ responses to these five questions was calculated to form the scale score, with a higher score indicating a higher exposure to peer/environmental smoking. Factor analysis showed that all five items loaded for this one factor with loadings ranging from .70 to .87. The standardized Cronbach’s alpha was .85, indicating good reliability. The mean of peer/environmental smoking for the whole sample was 3.88 (SD=.83).

Exposure to media smoking (EMS). Exposure to smoking scenes on mass media was measured using a 5-item scale based on Gunther et al.’s (2006) work. Adolescents were asked to indicate how often they have seen images of people smoking on televisions, movies, internet, billboards, and magazines on a five-point Likert scale in which “1-never”, “2-rarely”, “3-sometimes”, “4-often”, and “5-always”. The average score of adolescents’ responses to these five questions was calculated to form the scale score, with a higher score indicating a higher exposure to media smoking. Factor analysis showed that all five items loaded for this one factor with loadings ranging from .74 to .82. The standardized Cronbach’s alpha was .84, indicating good reliability. The mean of exposure to media smoking for the whole sample was 3.18 (SD=.81).

Health-related values (HRV). Health-related value was measured by a 6-item scale from Gehardt, van der Doef, and Paul’s (2001) study. Adolescents were asked to report their own values on a four-point scale, ranging from “1-strongly disagree” to “4-strongly agree”. The average score of these items were used to calculate the scale score, with a higher total score on

this scale indicating that participants place higher value on their physical health. Factor analysis showed that all 6 items loaded for this scale with loadings ranging from .80 to .89. The standardized Cronbach's alpha was .92, indicating good reliability. The mean of health-related values for the whole sample was 3.06 (SD=.59).

General parenting behaviors. Two aspects of parents' general parenting behaviors were measured in this study: parental control and support. Because adolescents' perceptions of parenting practices may differ from parents' own reports, both adolescents and parents were asked to report on parents' parenting practices in this study.

Parental Control (PC). Two aspects of parental control were conceptualized and operationalized: psychological control and parental knowledge of youth activities. Psychological control was assessed using 9 items adapted from the Child's Report of Parental Behavior Inventory (CRPBI; Schludermann & Schludermann, 1977). Example items include "My father/mother always wants to change my thoughts" and "My father/mother would like to be able to tell me what do to all the time". Adolescents/parents responded to the questions on a four-point scale ranging from "1-strongly disagree" to "4-strongly agree". A higher average score of these items indicates higher parental psychological control. Factor analysis showed that all items loaded for this factor except one item (i.e., "My father/mother says if I really cared for him/her, I would not do things that cause him/her to worry").

Factor loadings ranged from .51 to .68 for adolescents report of their fathers' psychological control, .56 to .73 for adolescents report of their mothers' psychological control, and .42 to .61 for parents' self-reports on psychological control. The standardized Cronbach's alpha was .77, .79 and .66 respectively, indicating moderate to good reliability. The mean of

psychological control was 2.24 (SD=.44) for adolescent report of their fathers, 2.40 (SD=.46) for adolescent report of their mothers, and 2.32 (SD=.34) for parent self-report.

Parental knowledge of child activities (KCA). Parental knowledge of youth activities was assessed using 5 items adapted from a scale developed by Fletcher, Darling, Steinberg, and Dornbusch (1995). Examples of items included: My mother/father knows... “where I go at night”, and “where I am after school”. Adolescents/parents responded to these questions on a four-point scale ranging from “1-strongly disagree” to “4-strongly agree”, with a higher average score indicating better parental knowledge of adolescent activities.

Factor loadings ranged from .66 to .82 on adolescent reports on fathers’ parental knowledge, .68 to .84 for adolescent report on their mothers’ parental knowledge, and .65 to .78 for parents’ self-report on parental knowledge. The standardized Cronbach’s alpha was .83, .88 and .80 respectively, indicating good reliability. The mean of parental knowledge of child activities was 2.58 (SD=.54) for adolescent report of their fathers, 2.70 (SD=.57) for adolescent report of their mothers, and 2.79 (SD=.42) for parent self-report.

Parental Support (PS). Parental support was assessed using an 8-item subscale from the Child's Report of Parental Behavior Inventory (CRPBI; Schludermann & Schludermann, 1977). Example items included: My mother/father is a person who... “gives me a lot of care and attention” and “makes me feel important”. In accordance with parental control scales, Adolescents/parents responded to these questions on a four-point scale ranging from “1-strongly disagree” to “4-strongly agree” with a higher average score indicating higher parental support. Factor loadings ranged from .57 to .79 for adolescent reports on fathers’ parental support, .60 to .73 for adolescent reports on mothers’ parental support, and .39 to .70 for parents’ self-reports on parental support. The standardized Cronbach’s alpha was .83, .85 and .74 respectively,

indicating good reliability. The mean of parental support was 2.80 (SD=.47) for adolescent report of their fathers, 2.91 (SD=.48) for adolescent report of their mothers, and 2.94 (SD=.35) for parent self-report.

Smoking-specific parenting behaviors. Smoking-specific parenting was conceptualized and operationalized as a four-dimensional construct: nonsmoking home rules, frequency and quality of parent-child communication about smoking, and parental disapproval of adolescent smoking. Adolescents and parents reported on the questions.

Home rules (HR). House rules were assessed using 8 items from the Engels and Willemsen's (2004) study. Questions included items such as the existence of rules about adolescent and adult smoking at home. Examples included: "I am allowed to smoke at home" and "It's a rule that someone who wants to smoke, smoke outside home". Participants responded to the questions on a four-point scale ranging from "1-strongly disagree" to "4-strongly agree". A higher score indicated stricter house rules about smoking.

Factor analysis indicated that 6 out of 8 items loaded for this factor. Two items that "It's a rule that someone who wants to smoke, smokes outside home" and "It's a rule that someone who wants to smoke, does not smoke in the presence of children" did not have satisfactory factor loadings and were eliminated. Factor loadings ranged from .36 to .80 for adolescent reports and .37 to .74 for parents' self-reports. The standardized Cronbach's alpha was .79 and .75 respectively, indicating good reliability. The mean of house rules was 2.89 (SD=.44) for adolescent reports and 2.90 (SD=.54) for parent reports.

Frequency of communication about smoking (FC). Frequency of parent-child communication about smoking was assessed using 8 items drawn from Ennett et al.'s (2001)

study. Adolescents reported on how often their fathers or mothers talk about smoking-related issues with them during the past 12 months. Examples of such communication include: “talk to you about the bad things about smoking” and “talk to you about how they would discipline you if you used tobacco”. Adolescents reported on the items on a five-point Likert scale ranging from “1-never” to “5-always”.

Factor loadings ranged from .77 to .86 for adolescent reports on fathers, .78 to .89 for adolescent reports on mothers, and .74 to .86 for parents’ self-report. Cronbach’s alpha was .93, .95 and .92 respectively, indicating good reliability. The mean of frequency of communication about smoking was 2.77 (SD=1.22) for adolescent report of their fathers, 2.97 (SD=1.27) for adolescent report of their mothers, and 2.942 (SD=1.09) for parent self-report.

Quality of communication about smoking (QC). Quality of parent-child communication about smoking was assessed by 6 items adapted from Harakeh et al.’s (2010) study. Adolescents reported on the quality of communication about smoking with their parents on a four-point scale ranging from “1-strongly disagree” to “4-strongly agree”. Example items include: “My father/mother and I are interested in each other’s opinion on smoking” and “Whenever my father/mother discusses smoking I feel s/he understands me”.

Factor analysis indicated that all items loaded with the exception of one item (i.e., “whenever s/he and I discuss smoking, I have the feeling that s/he is dishonest or unreasonable.”). Factor loadings ranged from .61 to .81 for adolescent reports on fathers, .67 to .81 for adolescent reports on mothers, and .61 to .76 for parents’ self-report. The standardized Cronbach’s alpha was .76, .80 and .73 respectively, indicating good reliability. The mean of quality of communication about smoking was 2.52 (SD=.58) for adolescents reports of fathers, 2.58 (SD=.62) for adolescents reports of mothers, and 2.59 (SD=.48) for parent self-reports.

Parental disapproval of adolescent smoking (DAS). Parental disapproval of adolescent smoking was measured by 5 items from Engels and Willemsen (2004). Items included “my father/mother would punish me/ be very angry/ be very disappointed/ consider it very annoying/ discuss it with me, if I smoke”. Adolescents responded to these items on a four-point scale ranging from “1-strongly disagree” to “4-strongly agree”. Factor loadings ranged from .59 to .91 for adolescents reports of fathers, .40 to .65 for adolescents reports of mothers, and .38 to .83 for parents’ self-reports. The standardized Cronbach’s alpha was .85, .88 and .77 respectively, indicating good reliability. The mean of parental disapproval of adolescent smoking was 2.99 (SD=.64) for adolescent reports of fathers, 3.11 (SD=.66) for adolescent reports of mothers, and 2.92 (SD=.48) for parents self-reports.

Smoking-related cognitions. Smoking-related cognitions was conceptualized and operationalized as a three-dimensional construct: attitude toward smoking, subjective norm, and perceived behavioral control.

Attitude toward smoking (AS). Adolescents’ attitude toward smoking was measured by a 17-item scale adopted from Chen et al.’s (2006) study. Adolescents were asked to indicate how much they agreed or disagreed with the statements about smoking on a four-point scale ranging from “1-strongly disagree” to “4-strongly agree”. Example items included: “Smoking is interesting”, “Smoking looks cool”, and “Smoking is not good for health”. Factor analysis indicated that all 17 items loaded with loadings ranging from .39 to .82. The standardized Cronbach’s alpha was .92, indicating good reliability. The mean of attitude toward smoking was 1.69 (SD=.49).

Subjective norm (SN). Adolescents' subjective norms of smoking was assessed by 3 items asking about whether adolescents perceived that significant others (e.g., parents and friends) would approve their smoking. Example items include: "My father thinks I should smoke" and "My best friends think I should smoke". Responses were rated on a four-point scale ranging from "1-strongly disagree" to "4-strongly agree", with a higher score indicating stronger normative beliefs about smoking. Factor loadings ranged from .84 to .94. The standardized Cronbach's alpha was .87, indicating good reliability. The mean of subjective norm was 1.31 (SD=.50).

Perceived behavioral control (BC). Perceived behavioral control to resist smoking was measured by 4 items adapted from Lazuras et al.'s (2009) study. Adolescents responded to questions such as "I can refuse it when my friends want me to smoke" and "I can refuse it when offered a cigarette", on a four-point scale ranging from "1-strongly disagree" to "4-strongly agree", with a higher score indicated greater behavioral control to resist smoking. Factor loadings ranged from .67 to .91. The standardized Cronbach's alpha was .86, indicating good reliability. The mean of perceived behavioral control was 2.04 (SD=.82).

Results

To test hypotheses stated earlier, I began with data entry and data cleaning in SPSS 17.0 followed by examining the data for missingness. Data was checked for whether it was randomly missing or non-random missing and the characteristics of the sample for whom data was missing and for those where it was not. Because there was minimal missing data (<1%), mean substitution was used to complete the dataset. All measures were checked for validity and reliability and scales were created as mentioned in the previous section.

The normality of data was examined using Skewness and Kurtosis tests. The Skewness and Kurtosis statistics for each variable used in the structural model are provided in Table 3. The values of these tests for most variables were within the reasonable range, which were 3 for Skewness and 10 for Kurtosis in order to perform Structural Equation Modeling (Kline, 2005). The Skewness and Kurtosis were relatively high for a few variables including parent smoking behaviors and adolescent smoking behaviors. About half of the fathers in this study were daily smokers and some of them smoked heavily, which resulted in a high peak (high Kurtosis) with a long tail (positive Skewness) of the distribution of parent smoking behaviors. Similarly, the majority of adolescents were nonsmokers whereas a few of them were heavy smokers, which led to a high peak (high Kurtosis) with long tail (positive Skewness) of the distribution of adolescent smoking behaviors.

Table 3 also summarizes Pearson bivariate correlations among variables included in the structural models as well as means and standard deviations of each measure for the whole sample. An examination of the intercorrelations indicated low to moderate correlations among independent variables as well as between independent variables and mediators, which indicated low multicollinearity.

Structural Equation Modeling techniques in AMOS 16.0 were used to test the models proposed in this study. For the models with only direct effects, the overall model fit were evaluated using the chi-square goodness-of-fit test, the comparative fit index (CFI; Bentler, 1990), the root-mean-square error of approximation (RMSEA; Steiger, 1990). Good model fit is indicated by a nonsignificant chi-square value, CFI values larger than .95, and RMSEA values less than .05 (Hoyle, 1995). The significance of each individual path was indicated by the path coefficient with a p-value smaller than .05, with a larger coefficient indicating a stronger relationship.

For the mediation models, overall model fit was evaluated in the same way as mentioned above. In addition, bootstrapping methods were employed in the Structural Equation Modeling (SEM) procedure to estimate the indirect effects. Mediation effect is often referred to as indirect effects, where the effect of the independent variable X on the dependent variable Y goes through a mediator M. The mediation effect is usually defined as the reduction in the regression coefficient of X on Y, when controlling for the effect of M (Baron & Kenny, 1986). A number of methods for testing the statistical significance of mediation effect have been proposed in the past decades and the most commonly employed is the four-step strategy with Sobel test (Sobel, 1982) described by Baron and Kenny (1986). However, many authors have argued that these earlier procedures for testing mediation effects such as Baron and Kenny's (1986) lack statistical power (MacKinnon et al., 2002) and thus recommended use of bootstrapping method on the grounds that it has higher power while maintaining reasonable control over Type I error (Preacher & Hayes, 2008).

Bootstrapping is a nonparametric resampling procedure that does not impose the assumption of normality of the sampling distribution (Preacher & Hayes, 2008). It involves

repeatedly sampling from the original dataset and estimating the indirect effect in each resampled dataset. This resampling process is repeated thousands of times to generate an empirical approximation of the sampling distribution of the indirect effect and to compute the confidence intervals for the indirect effect. The confidence intervals are then used to examine the significance of indirect effect—if confidence intervals do not include zero, then there is a significant indirect effect. As suggested by Preacher and Hayes (2008), bootstrapping methods are most appropriate for structural models with multiple mediators just as in this study. In this study, indirect effects were estimated by requesting 1,000 bootstrapping replicates in the Structural Equation Modeling.

The following section reports the results of the primary analyses in the order of the hypotheses proposed in the earlier section.

Table 3
Intercorrelations among all Variables Included in the Conceptual SEM Model

Measures	Mean (SD)	S	K	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1.SRCV	1.97 (.43)	-.096	.394	-																		
2.PSB	0.00(.71)	4.417	40.696	.09*	-																	
3.EFS	2.95(1.27)	-.169	-.157	.17**	.22**	-																
4.EMS	3.18(.81)	-.245	.629	.01	.01	.07	-															
5.PES	3.88 (.83)	-.985	1.414	.01	.07	.16**	.50**	-														
6.HRV	3.06(.59)	-.583	1.653	-.12**	.03	-.05	.12**	.15**	-													
7.PS	2.85(.43)	-.241	1.411	-.08*	-.06	-.04	.02	.09*	.33**	-												
8.PC	2.32(.39)	-.198	1.756	.13**	.03	.08*	.04	.06	.03	.01	-											
9.KCA	2.64(.50)	-.312	1.525	-.08*	-.04	.01	-.04	.05	.20**	.54**	.15**	-										
10.FC	2.87(1.20)	.036	-1.066	-.15**	-.08*	-.02	.05	.05	.24**	.31**	.07	.27**	-									
11. QC	2.55(.55)	-.292	1.134	-.04	-.01	-.01	.04	.08*	.22**	.44**	-.01	.34**	.38**	-								
12. DAS	3.05(.61)	-.608	1.047	-.14**	-.04	-.02	.11**	.14**	.23**	.29**	.12**	.23**	.27**	.23**	-							
13.HR	2.90(.54)	.119	.049	-.34**	-.18**	-.23**	-.02	-.02	.14**	.13**	-.08*	.06	.12**	-.06	.00	-						
14.AS	1.69(.49)	.039	-1.074	.47**	.09*	-.07	.01	-.09*	-.30**	-.27**	.12**	-.16**	-.07	-.14**	-.30**	-.26**	-					
15.SN	1.31(.50)	1.663	2.835	.32**	.13**	.09*	.02	-.03	-.15**	-.12**	.15**	-.11**	-.01	.02	-.26**	-.32**	.51**	-				
16.BC	2.40(.82)	.586	-.211	.11**	.05	.09*	.03	.02	.01	-.01	.15**	.04	-.04	.09*	.01	-.19**	.12**	.24**	-			
17.LS	1.50(1.12)	2.750	7.214	.27**	.10**	.13**	-.00	.05	-.05	-.05	.12**	-.05	-.02	.00	-.10**	-.09*	.30**	.28**	.12**	-		
18.30S	1.15(.57)	3.822	13.884	.20**	.11**	.11**	-.04	.01	-.03	-.03	.10**	.02	.01	.03	-.05	-.03	.24**	.21**	.08**	.76**	-	
19.SF	1.20(.67)	4.023	17.073	.22**	.11**	.14**	-.04	.00	-.04	-.02	.13**	.00	.02	.01	-.09*	-.05	.22**	.28**	.07	.78**	.80**	-
20.SQ	1.12(.49)	5.734	42.305	.17**	.14**	.11**	-.03	-.02	-.02	-.04	.12**	.01	.01	.02	-.07	-.02	.22**	.21**	.01	.69**	.75**	.87**

Note. S = Skewness. K = Kurtosis. SRCV = smoking related cultural values; PSB = parent smoking behaviors. EFS = extended family smoking behaviors. EMS = exposure to media smoking. PES = peer/environmental smoking. HRV = health related values. PS = parental support. PC = psychological control. KCA = knowledge of child activities. FC = frequency of communication about smoking. QC = quality of communication about smoking. DAS = disapproval of adolescent smoking. HR = home rules against smoking. AS = attitude toward smoking. SN = subjective norm. BC = behaviors control. LS = lifetime smoking. 30S = 30 day smoking. SF = smoking frequency. SQ = smoking quantity.

*p < .05. **p < .01.

Gender Differences

Before testing the primary hypotheses, gender differences in variables used in the proposed structural models were examined considering the significant discrepancy in smoking behaviors in Chinese boys and girls (e.g., Unger, Yan, Chen, Jiang, Azen, & et al., 2001). Table 4 provides a summary of the means and standard deviations for the variables for boys and girls respectively and the *t*-test results comparing boys and girls regarding each variable. Results indicate no significant gender difference in social influences variables but significant gender differences in other variables including parenting, smoking-related cognitions and intention to smoke. More specifically, boys reported higher parental psychological control, more frequent communication about smoking, more positive attitude toward smoking, higher subjective norm, greater perceived behavioral control and stronger intention to smoke than girls did, whereas girls reported better parental knowledge of child activities and stronger parental disapproval against their smoking behaviors than boys did. In addition, boys reported higher lifetime smoking, 30-day smoking, smoking frequency and quantity than girls did as indicated in the demographic section (Table 3).

Table 4

Gender Differences in Main Constructs

Measures	Boys		Girls		<i>t</i> -Test & <i>p</i> value
	Mean	SD	Mean	SD	
1.SRCV	2.00	.49	1.95	.39	$t(489) = 1.331, p = \text{ns.}$
2.PSB	.00	.70	.00	.71	$t(656) = 0, p = \text{ns.}$
3.EFS	2.92	1.42	2.97	1.16	$t(501) = -.448, p = \text{ns.}$
4.EMS	3.23	.88	3.14	.76	$t(523) = 1.269, p = \text{ns.}$
5.PES	3.87	.87	3.90	.79	$t(656) = -.423, p = \text{ns.}$
6.HRV	3.04	.57	3.07	.60	$t(656) = -.654, p = \text{ns.}$
7.PS	2.84	.42	2.86	.43	$t(656) = -.647, p = \text{ns.}$
8.PC	2.39	.40	2.27	.38	$t(656) = 3.915, p < .001.$
9.KCA	2.58	.53	2.68	.48	$t(656) = -2.487, p < .05.$
10.FC	3.11	1.05	2.70	1.27	$t(637) = 4.521, p < .001.$
11. QC	2.53	.53	2.56	.55	$t(656) = -.799, p = \text{ns.}$
12. DAS	2.97	.60	3.110	.61	$t(656) = -2.925, p < .01.$
13.HR	2.88	.55	2.91	.54	$t(656) = -.803, p = \text{ns.}$
14.AS	1.81	.50	1.61	.47	$t(656) = 5.287, p < .001.$
15.SN	1.52	.59	1.16	.37	$t(416) = 8.815, p < .001.$
16.BC	2.18	.79	1.94	.82	$t(656) = 3.782, p < .001.$
17.IS	1.74	.78	1.22	.51	$t(430) = 9.740, p < .001.$

Note. SRCV = smoking related cultural values; PSB = parent smoking behaviors. EFS = extended family smoking behaviors. EMS = exposure to media smoking. PES = peer/environmental smoking. HRV = health related values. PS = parental support. PC = psychological control. KCA = knowledge of child activities. FC = frequency of communication about smoking. QC = quality of communication about smoking. DAS = disapproval of adolescent smoking. HR = home rules against smoking. AS = attitude toward smoking. SN = subjective norm. BC = behaviors control. IS = intention to smoke.

Given the significant gender differences in multiple variables involved in the proposed models, all models were tested for gender differences as proposed in the hypotheses section. Group analysis in SEM was used to compare the unconstrained model (which allows the paths to vary freely between boys and girls) to the constrained model (which holds the paths to be equal

between boys and girls). The results showed that the unconstrained model was *not* significantly different (indicated by nonsignificant chi-square change, GFI change smaller than .01 and critical ratios for differences below 1.96) from the constrained model for all models. Hence, the following section only reports the results from the models tested for the whole sample.

Hypothesis 1: *Social influences model—direct effects: smoking-related cultural values, parent smoking, extended family smoking, exposure to media smoking, peer/environmental smoking, and health-related values will be associated with adolescent smoking behaviors.*

The hypothesis was tested using Structural Equation Modeling (SEM) in AMOS 16.0. Four items on adolescent smoking behaviors were used as indicators for the latent variable “adolescent smoking” (endogenous construct). Independent constructs included smoking-related cultural values, composite score of parent smoking, extended family smoking, peer/environmental smoking, exposure to media smoking and health-related values (exogenous constructs). Adolescent age was entered as a control variable in the model.

The base model indicated the following fit: $\chi^2(29, N = 658) = 102.35, p < .001$. The CFI, GFI and AGFI values were .97, .97 and .94 respectively, and RMSEA was .06. The RMSEA value was higher than the acceptable (< than .05) and hence the modification indices were examined to ascertain strains on the model (error terms were only covaried if they made theoretical sense). Modification indices indicated that two indicators of adolescent smoking behaviors (i.e., lifetime smoking and 30-day smoking) were straining the model and needed to be co-varied. This step significantly improved model fit: $\chi^2(28, N = 658) = 58.50, p < .01$; $\Delta \chi^2(1) = 43.85, p < .05$. The CFI, GFI and AGFI values for the improved model were .99, .98 and .96 respectively, and RMSEA was .04.

Kline (2005) indicated that the χ^2 index is sensitive to sample size. In studies where the sample size is large, it's suggested that normed χ^2 (NC) be calculated (Kline, 2005). The ratio of chi-square to degrees of freedom ratio was 2.09 (NC). This is in line with acceptable values.

An examination of the standardized path coefficients revealed that smoking-related cultural values and extended family smoking had a significant impact on adolescent smoking behaviors (see standardized coefficients in Figure 5).

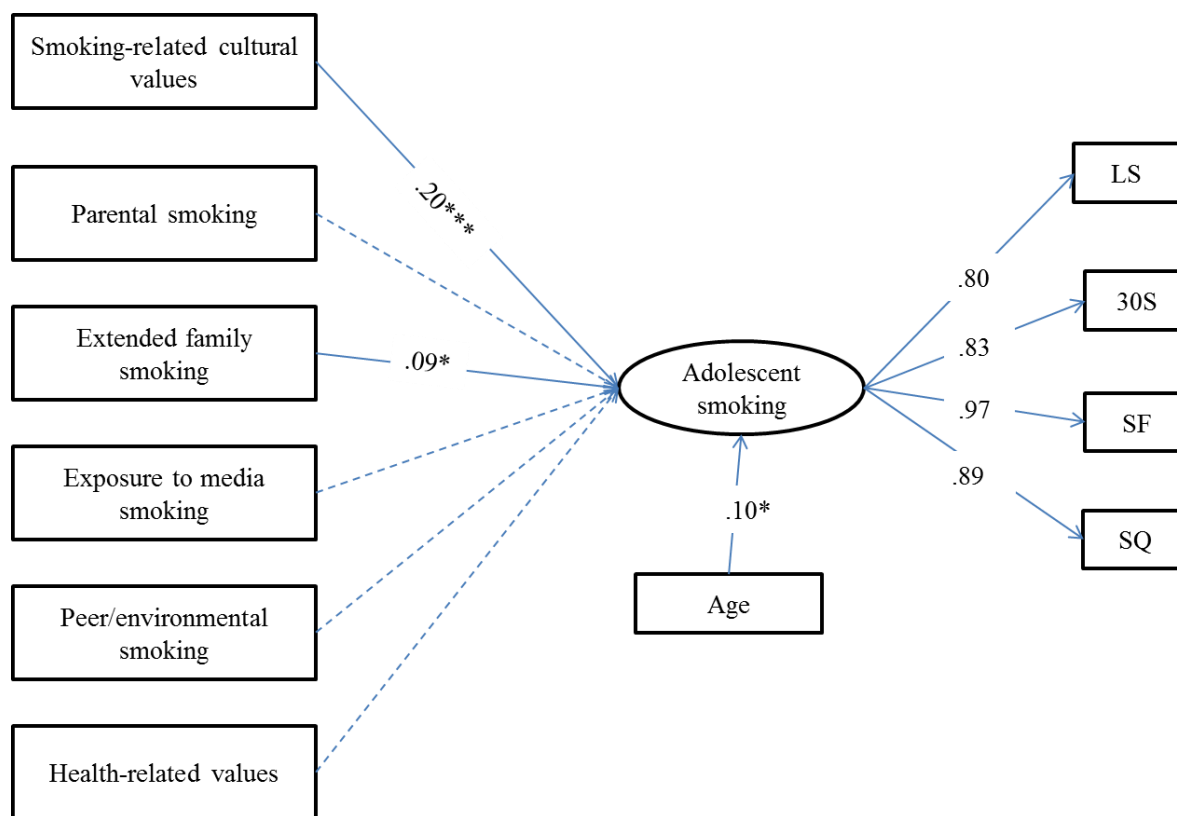


Figure 5. Social Influences on Adolescent Smoking-Direct Effects

Note. Solid lines indicate significant pathways. Dash lines indicate insignificant pathways. Standardized coefficients are reported only for significant paths. LS = lifetime smoking. 30S = 30 day smoking. SF = smoking frequency. SQ = smoking quantity.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 2. Social influences model—indirect effects: smoking-related cognitions,

including attitudes, subjective norms, and perceived behavioral control, will partially mediate the effects of social influences on adolescent smoking.

The hypothesis was tested using Structural Equation Modeling (SEM) techniques. As indicated in Figure 2, six social influences variables were included as exogenous variables; smoking-related cognitions and adolescent smoking behaviors were used as endogenous variables. Adolescent age was entered as a control variable. Following the suggestion by Preacher and Hayes (2008), among competing mediators (i.e., three smoking-related cognitions) within a structural model, residual variances of these variables were allowed to freely correlate to improve overall model fit.

The base model indicated the following fit: $\chi^2(45, N = 658) = 141.86, p < .001$. The CFI, GFI and AGFI values were .97, .97 and .93 respectively, and RMSEA was .06. The RMSEA value was higher than the acceptable (< than .05) and hence the modification indices were examined to ascertain strains on the model (error terms were only covaried if they made theoretical sense).

Modification indices indicated that two indicators of adolescent smoking behaviors (i.e., lifetime smoking and 30-day smoking) were straining the model and needed to be covaried. This step significantly improved model fit: $\chi^2(44, N = 658) = 97.83, p < .001$; $\Delta \chi^2(1) = 44.03, p < .05$. The CFI, GFI and AGFI values for the improved model were .98, .98 and .95 respectively, and RMSEA was .04. The chi-square to degrees of freedom ratio was 2.22 in line with acceptable values. Based on the squared multiple correlation coefficients, 12% of the variance in adolescent smoking behaviors was accounted for by this model.

To overcome the shortcomings of traditional methods for testing mediation effects (Baron & Kenny, 1986), 1,000 bootstrap replications were conducted to obtain bias-corrected bootstrap confidence intervals (Preacher & Hayes, 2008; Shrout & Bolger, 2002). The 95% Confidence Intervals (CI) of the indirect effects were used to determine the significance of the indirect effects (i.e., if the CI did not include zero, the indirect effect was considered statistically significant at the .05 level).

The unstandardized and standardized path estimates and the standardized 95% confidence intervals for indirect effects from the SEM with bootstrapping are presented in Table 5. The standardized coefficients for significant paths in the mediation model are presented in Figure 6.

Results from the bootstrap analysis indicated that smoking-related cognitions significantly mediated the effects of smoking-related cultural values, parental smoking behaviors and health-related values on adolescent smoking behaviors.

Table 5

Unstandardized and Standardized Bootstrapping Path Estimates for Structural Model of Social Influences on Adolescent Smoking-Indirect Effects

Effect	β (β)	SE	95%CI(Standardized)
Direct			
SRCV → smoking	.195(.095)	.097(.045)	[.001, .174]*
EFS → smoking	.068(.097)	.025(.034)	[.025, .160]**
Indirect			
SRCV → SR cognitions → smoking	.204(.100)	.051(.023)	[.060, .153]**
PSB → SR cognitions → smoking	.034(.027)	.014(.010)	[.010, .051]**
EFS → SR cognitions → smoking	.000(.000)	.007(.010)	[-.019, .020]
EMS → SR cognitions → smoking	.017(.015)	.013(.011)	[-.005, .040]
PES → SR cognitions → smoking	-.020(-.019)	.014(.012)	[-.046, .001]
HRV → SR cognitions → smoking	-.071(-.047)	.025(.016)	[-.079, -.018]**

Note. SRCV = smoking related cultural values; PSB = parent smoking behaviors. EFS = extended family smoking behaviors. EMS = exposure to media smoking. PES = peer/environmental smoking. HRV = health related values. SR cognitions = Smoking related cognitions.

* $p < .05$. ** $p < .01$.

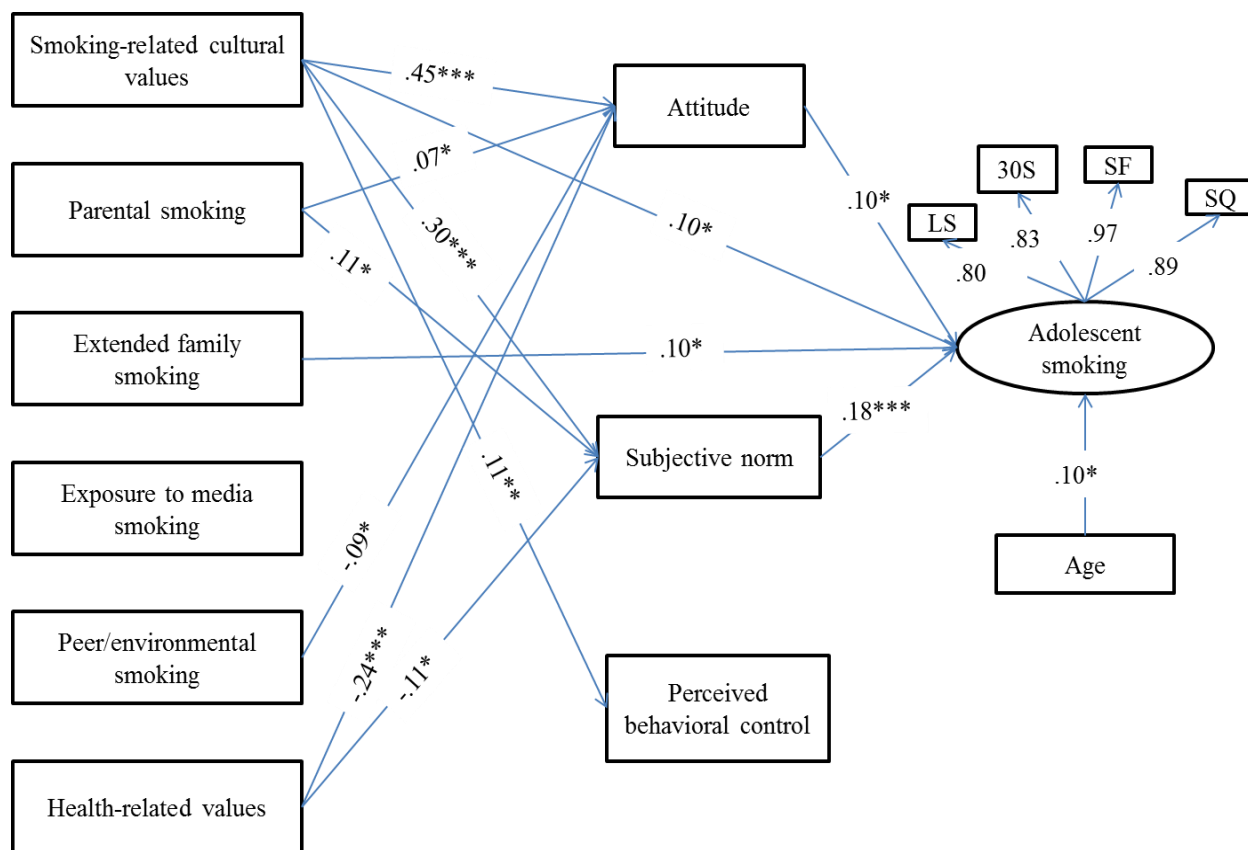


Figure 6. Social Influences on Adolescent Smoking-Indirect Effects

Note. Solid lines indicate significant pathways. Standardized coefficients are reported only for significant paths. LS = lifetime smoking. 30S = 30 day smoking. SF = smoking frequency. SQ = smoking quantity.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 3. Parenting model-direct effects: both general parenting behaviors (i.e., parental support, psychological control, and knowledge) and smoking-specific parenting behaviors (i.e., home rules, frequency of communication about smoking, quality of communication about smoking and disapproval of adolescent smoking) will be related to adolescent smoking behaviors.

The hypothesis was tested using Structural Equation Modeling (SEM) techniques (Figure 3). Parent and adolescent reports of general parenting behaviors and smoking-specific parenting

behaviors were used as manifest indicators of each parenting construct. Adolescent age was entered as a control variable.

The base model indicated the following fit: $\chi^2(124, N = 658) = 407.20, p < .001$. The CFI, GFI and AGFI values were .92, .94 and .90 respectively, and RMSEA was .06. The CFI value was lower than acceptable ($>.95$) and the RMSEA value was higher than the acceptable ($< .05$). Hence, the modification indices were examined to ascertain strains on the model (error terms were only covaried if they made theoretical sense).

Modification indices indicated that two pairs of error terms of the parenting indicators (i.e., parent report of parental support and knowledge of child activities; parent report of frequency of communication about smoking and disapproval of adolescent smoking) and two indicators of adolescent smoking behaviors (i.e., lifetime smoking and 30-day smoking) were straining the model and needed to be co-varied. This step significantly improved model fit: $\chi^2(121, N = 658) = 266.45, p < .001$; $\Delta \chi^2(3) = 140.75, p < .05$. The CFI, GFI and AGFI values for the improved model were .96, .96 and .94 respectively, and RMSEA was .04. The chi-square to degrees of freedom ratio was 2.20 and in line with acceptable values. Based on the squared multiple correlation coefficients, 7% of the variance in adolescent smoking behaviors was accounted for by this model.

An examination of the standardized path coefficients revealed that only parental psychological control had a significant impact on adolescent smoking behaviors (see standardized coefficients in Figure 7).

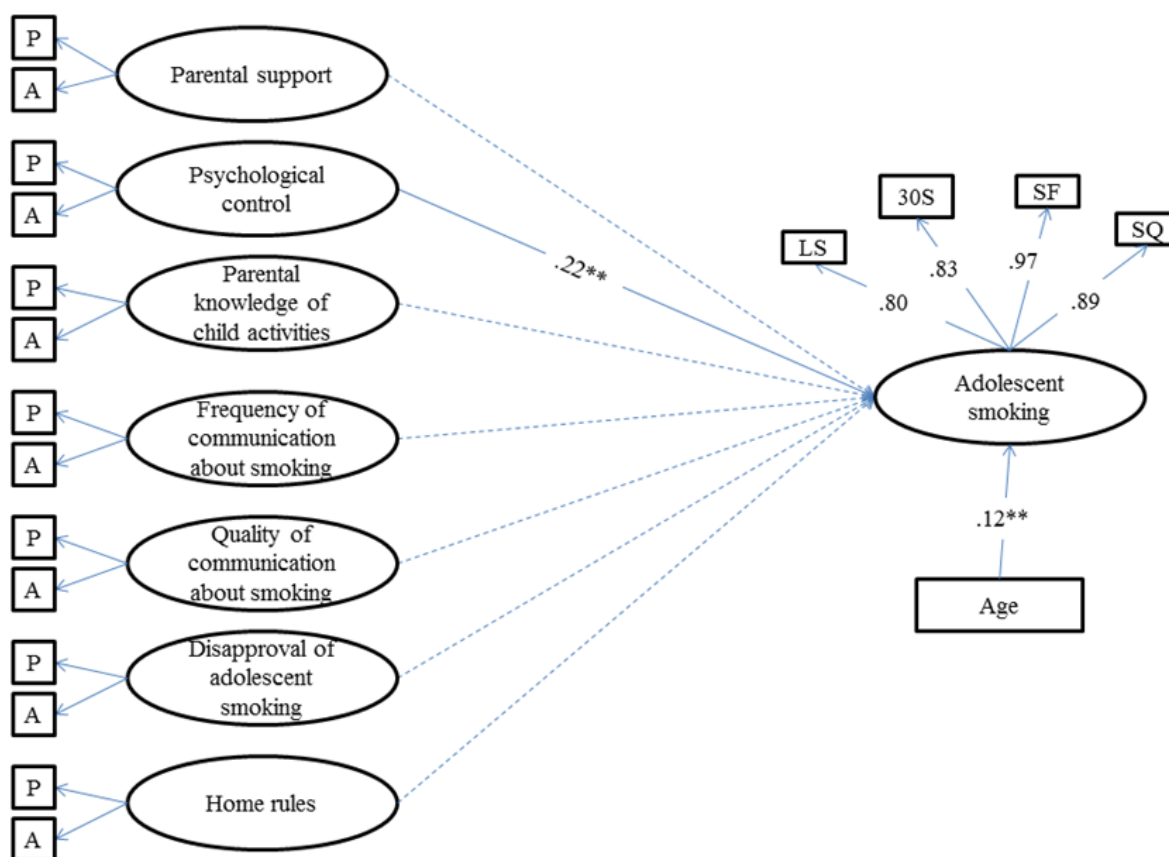


Figure 7. Parenting Influences on Adolescent Smoking-Direct Effects

Note. Solid lines indicate significant pathways. Dash lines indicate nonsignificant pathways. Standardized coefficients are reported only for significant paths. P = parental report, A = adolescent report. LS = lifetime smoking. 30S = 30 day smoking. SF = smoking frequency. SQ = smoking quantity.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 4. Parenting model-indirect effect: smoking-related cognitions, including attitudes, subjective norms, and perceived behavioral control, will partially mediate the effects of both general parenting behaviors (i.e., parental support, psychological control, and knowledge) and smoking-specific parenting (i.e., home rules, frequency of communication about smoking,

quality of communication about smoking and disapproval of adolescent smoking) on adolescent smoking behaviors.

Adolescent age was entered as a control variable. Following the suggestion by Preacher and Hayes (2008), about model testing in situations where there are competing mediators (i.e., three smoking-related cognitions) within a structural model, residual variances of these variables were allowed to freely correlate to improve overall model fit.

The base model indicated the following fit: $\chi^2(163, N = 658) = 475.34, p < .001$. The CFI, GFI and AGFI values were .93, .94 and .90 respectively, and RMSEA was .05. The CFI value was lower than acceptable ($>.95$) and the RMSEA value was higher than the acceptable ($<.05$). Hence, the modification indices were examined to ascertain strains on the model (error terms were only covaried if they made theoretical sense).

Modification indices indicated that error terms of two parenting indicators (i.e., parent report of parental support and knowledge of child activities) and two indicators of adolescent smoking behaviors (i.e., lifetime smoking and 30-day smoking) were straining the model and needed to be co-varied. This step significantly improved model fit: $\chi^2(161, N = 658) = 361.62, p < .001$; $\Delta \chi^2(2) = 113.72, p < .05$. The CFI, GFI and AGFI values for the improved model were .95, .95 and .92 respectively, and RMSEA was .04. The chi-square to degrees of freedom ratio was 2.25 and in line with acceptable values. Based on the squared multiple correlation coefficients, 11% of the variance in adolescent smoking behaviors was accounted for by this model.

The indirect effects were further tested with 1,000 bootstrap replicates to obtain bias-corrected bootstrap confidence intervals (Preacher & Hayes, 2008; Shrout & Bolger, 2002). The

95% Confidence Intervals (CI) for the mean indirect effect were used to determine the significance of the indirect effect.

The unstandardized and standardized path estimates and the standardized 95% confidence intervals for indirect effects from the SEM with bootstrapping are indicated in Table 6. Standardized coefficients for significant paths in the mediation model are indicated in Figure 8.

Table 6

Unstandardized and Standardized Bootstrapping Path Estimates for Structural Model of Parenting Influences on Adolescent Smoking-Indirect Effects

Effect	β (β)	SE	95%CI(Standardized)
Direct			
PC → smoking	.188(.116)	.087(.044)	[-.040, .067]
Indirect			
PS → SR cognitions → smoking	.002 (.002)	.051(.026)	[-.040, .067]
PC → SR cognitions → smoking	.109(.067)	.014(.023)	[.031, .127]**
KCA → SR cognitions → smoking	-.029(-.030)	.022(.021)	[-.079, .005]
FC → SR cognitions → smoking	.019(.046)	.011(.022)	[.015, .110]**
QC → SR cognitions → smoking	.004(.004)	.019(.019)	[-.032, .044]
DAS → SR cognitions → smoking	-.119(-.129)	.051(.038)	[-.219, -.067]**
HR → SR cognitions → smoking	-.098(-.099)	.032(.025)	[-.153, -.057]**

Note. PS = parental support. PC = psychological control. KCA = knowledge of child activities. FC = frequency of communication about smoking. QC = quality of communication about smoking. DAS = disapproval of adolescent smoking. HR = home rules against smoking. SR cognitions = Smoking related cognitions.

* $p < .05$. ** $p < .01$.

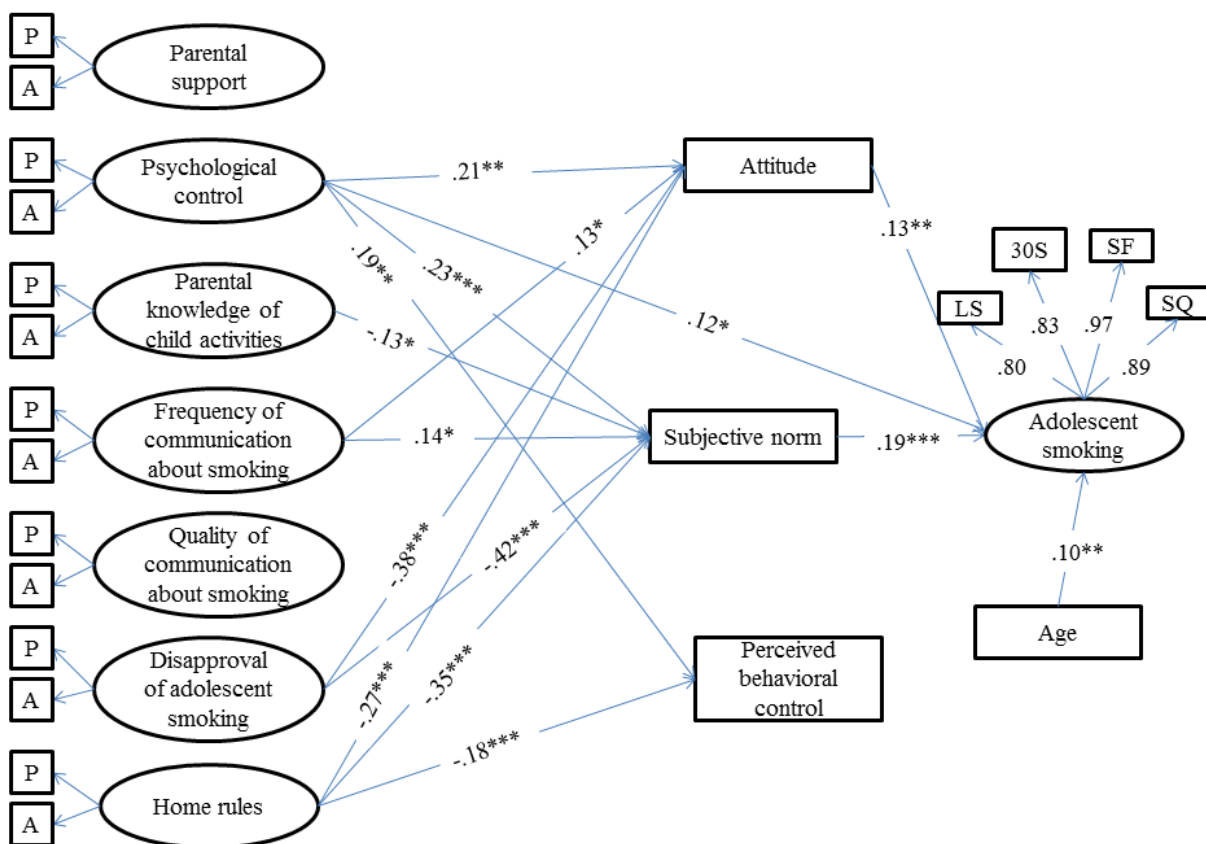


Figure 8. Parenting Influences on Adolescent Smoking-Indirect Effects

Note. Solid lines indicate significant pathways. Dash lines indicate nonsignificant pathways. Standardized coefficients are reported only for significant paths. P = parental report, A = adolescent report. 30S = 30 day smoking. SF = smoking frequency. SQ = smoking quantity. * $p < .05$. ** $p < .01$. *** $p < .001$.

Results indicated that smoking-related cognitions significantly mediated the effects of parental psychological control, frequency of communications about smoking, parental disapproval of adolescent smoking and home rules about smoking on adolescent smoking behaviors.

Intention to Smoke

A subsample of nonsmoking adolescents ($n = 496$) was extracted from the whole sample ($N = 658$) based on the question “Have you ever smoked in your lifetime?” and those who answered “never” were included in the subsample. The same structural models tested in Hypotheses 1, 2, 3, and 4 were used to predict these nonsmoking adolescents’ intention to smoke. The same analytical procedures were followed, except the dependent (endogenous) variable in the following models was “*intention to smoke*” instead of “*adolescent smoking behaviors*”.

Hypothesis 5a. *Social influences model—direct effects: smoking-related cultural values, parent smoking, extended family smoking, exposure to media smoking, peer/environmental smoking and health-related values will be associated with adolescent intention to smoke.*

The base model indicated an adequate fit: $\chi^2(6, N = 496) = 6.32, p > .05$. The CFI, GFI and AGFI values were .99, .99 and .98 respectively, and RMSEA was .01. Based on the squared multiple correlation coefficients, 7% of the variance in adolescent intention to smoke was accounted for by this model. An examination of the standardized path coefficients revealed that smoking-related cultural values, exposure to media smoking and health-related values had significant impacts on adolescent smoking behaviors (see standardized coefficients in Figure 9).

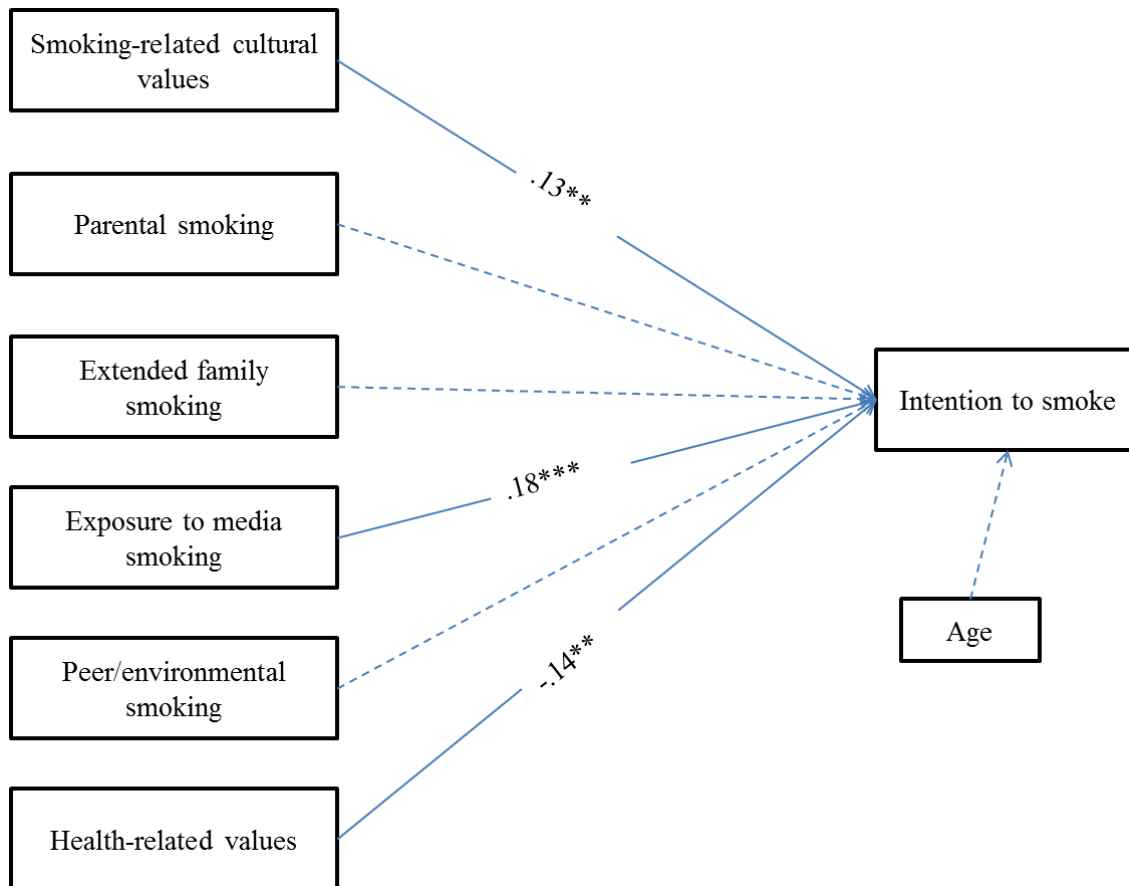


Figure 9. Social Influences on Adolescent Intention to Smoke-Direct Effects

Note. Solid lines indicate significant pathways. Dash lines indicate nonsignificant pathways. Standardized coefficients are reported only for significant paths.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 5b. *Social influences model—indirect effects: smoking-related cognitions, including attitude, subjective norm, and perceived behavioral control, will partially mediate the effects of social influences on adolescent intention to smoke.*

The base model indicated an adequate fit: $\chi^2(12, N = 496) = 10.79, p > .05$. The CFI, GFI and AGFI values were 1.00, .99 and .98 respectively, and RMSEA was .00. Based on the squared multiple correlation coefficients, 22% of the variance in adolescent intention to smoke

was accounted for by this model.

The indirect effects were further tested with 1,000 bootstrap replicates to obtain bias-corrected bootstrap confidence intervals (Preacher & Hayes, 2008; Shrout & Bolger, 2002). The 95% Confidence Intervals (CI) for the mean indirect effects were used to determine the significance of the indirect effect. The unstandardized and standardized path estimates and the standardized 95% confidence intervals for indirect effects from the SEM with bootstrapping are indicated in Table 7. The standardized coefficients for significant paths in the mediation model are presented in Figure 10.

Results showed that smoking-related cognitions significantly mediated the effects of smoking-related cultural values, parental smoking behaviors and health-related values on adolescent smoking behaviors.

Table 7

Unstandardized and Standardized Bootstrapping Path Estimates for Structural Model of Social Influences on Adolescent Intention to Smoke-Indirect Effects

Effect	β (β)	SE	95%CI(Standardized)
Direct			
SRCV → intention to smoke	.031(.028)	.054(.048)	[-.073, .115]
EMS → intention to smoke	.084(.144)	.026(.042)	[.060, .223]**
HRV → intention to smoke	-.045(-.057)	.032(.041)	[-.140, .020]
Indirect			
SRCV → SR cognitions → intention to smoke	.121(.109)	.031(.028)	[.058, .166]**
PSB → SR cognitions → intention to smoke	.032(.046)	.014(.018)	[.010, .085]*
EFS → SR cognitions → intention to smoke	.001(.004)	.007(.021)	[-.036, .048]
EMS → SR cognitions → intention to smoke	.013(.022)	.015(.026)	[-.028, .075]
PES → SR cognitions → intention to smoke	-.015(-.027)	.013(.022)	[-.073, .017]
HRV → SR cognitions → intention to smoke	-.065(-.082)	.020(.025)	[-.143,-.043]**

Note: SRCV = smoking related cultural values; PSB = parent smoking behaviors. EFS = extended family smoking behaviors. EMS = exposure to media smoking. PES = peer/environmental smoking. HRV = health related values. SR cognitions = Smoking related cognitions.

* $p < .05$. ** $p < .01$.

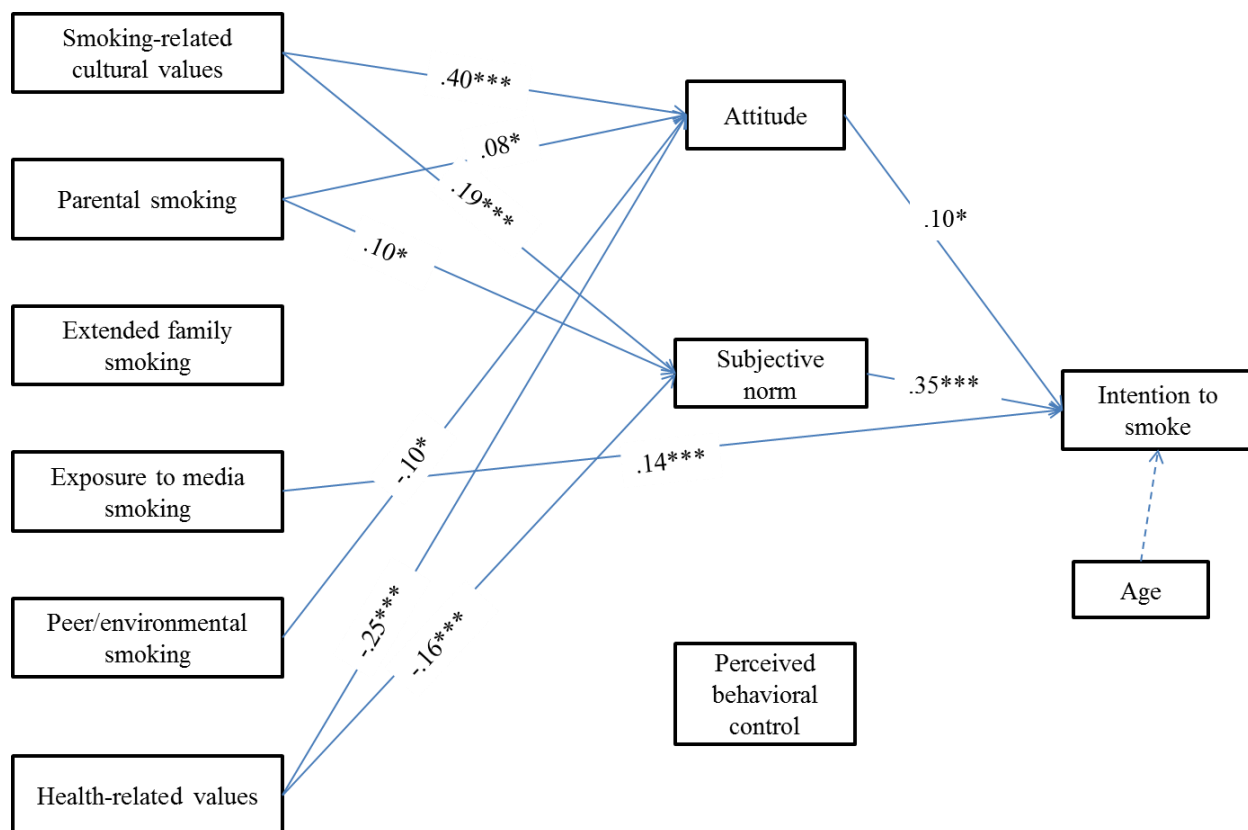


Figure 10. Social Influences on Adolescent Intention to Smoke-Indirect Effects

Note. Solid lines indicate significant pathways. Dash lines indicate nonsignificant pathways. Standardized coefficients are reported only for significant paths.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 5c. Parenting model-direct effects: both general parenting behaviors (i.e., parental support, psychological control, and knowledge) and smoking-specific parenting (i.e., home rules, frequency of communication about smoking, quality of communication about smoking and disapproval of adolescent smoking) will be related to adolescent intention to smoke.

The base model indicated the following fit: $\chi^2(77, N = 496) = 269.25, p < .001$. The CFI, GFI and AGFI values were .83, .93 and .88 respectively, and RMSEA was .07. The CFI value was lower than acceptable ($>.95$) and the RMSEA value was higher than the acceptable ($<$

than .05). Hence, the modification indices were examined to ascertain strains on the model (error terms were only covaried if they made theoretical sense).

Modification indices indicated that five pairs of error terms of the parenting indicators (i.e., parent report of parental support and knowledge of child activities, parent report of parental support and frequency of communication about smoking, parent report of parental support and disapproval of adolescent smoking, parent report of frequency of communication about smoking and quality of communication about smoking, and parent report of frequency of communication about smoking and disapproval of adolescent smoking) were straining the model and should be co-varied. This step significantly improved model fit: $\chi^2(72, N = 496) = 144.34, p < .001$; $\Delta \chi^2(5) = 124.91, p < .05$. The CFI, GFI and AGFI values for the improved model were .94, .96 and .93 respectively, and RMSEA was .04. The chi-square to degrees of freedom ratio was 2.00 and in line with acceptable values. Based on the squared multiple correlation coefficients, 8.0% of the variance in adolescent intention to smoke was accounted for by this model.

An examination of the standardized path coefficients revealed that only parental disapproval of adolescent smoking and home rules about smoking had a significant impact on adolescent intention to smoke (see standardized coefficients in Figure 11).

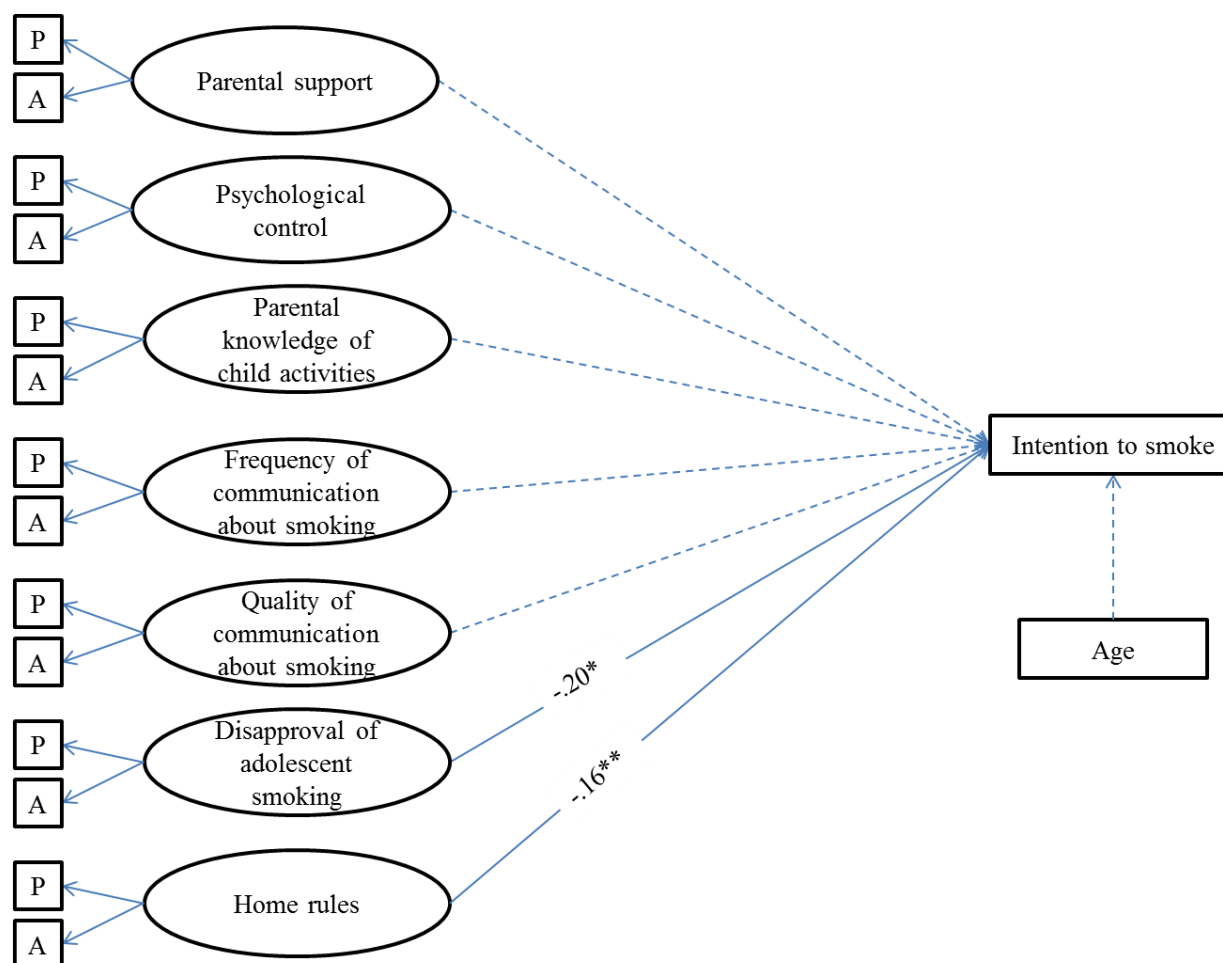


Figure 11. Parenting Influences on Adolescent Intention to Smoke-Direct Effects

Note. Solid lines indicate significant pathways. Dash lines indicate nonsignificant pathways. Standardized coefficients are reported only for significant paths. P = parental report, A = adolescent report.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 5d. Parenting model-indirect effects: smoking-related cognitions, including attitude, subjective norm, and perceived behavioral control, will partially mediate the effects of both general parenting behaviors (i.e., parental support, psychological control, and knowledge) and smoking-specific parenting (i.e., home rules, frequency of communication about smoking,

quality of communication about smoking and disapproval of adolescent smoking) on adolescent intention to smoke.

The base model indicated the following fit: $\chi^2(106, N = 496) = 296.57, p < .001$. The CFI, GFI and AGFI values were .88, .94 and .88 respectively, and RMSEA was .06. The CFI value was lower than acceptable ($>.95$) and the RMSEA value was higher than the acceptable ($<.05$) and hence the modification indices were examined to ascertain strains on the model (error terms were only covaried if they made theoretical sense).

Modification indices indicated that five pairs of error terms of the indicators for parenting behaviors (i.e., parent report of parental support and knowledge of child activities, parent report of parental support and frequency of communication about smoking, parent report of frequency of communication about smoking and quality of communication about smoking, and parent report of frequency of communication about smoking and disapproval of adolescent smoking) were straining the model and should be co-varied. This step significantly improved model fit: $\chi^2(102, N = 496) = 183.26, p < .001$; $\Delta \chi^2(4) = 113.31, p < .05$. The CFI, GFI and AGFI values for the improved model were .95, .96 and .93 respectively, and RMSEA was .04. The chi-square to degrees of freedom ratio was 1.80 and in line with acceptable values. Based on the squared multiple correlation coefficients, 20% of the variance in adolescent intention to smoke was accounted for by this model.

The indirect effects were further tested with 1,000 bootstrap replicates to obtain bias-corrected bootstrap confidence intervals (Preacher & Hayes, 2008; Shrout & Bolger, 2002). The 95% Confidence Intervals (CI) for the mean indirect effects were used to determine the significance of the indirect effect. The unstandardized and standardized path estimates and the

standardized 95% confidence intervals for indirect effects from the SEM with bootstrapping are indicated in Table 8. The standardized coefficients for significant paths in the mediation model are shown in Figure 12.

Table 8

Unstandardized and Standardized Bootstrapping Path Estimates for Structural Model of Parenting Influences on Adolescent Intention to Smoke-Indirect Effects

Effect	β (β)	SE	95%CI(Standardized)
Direct			
DAS → intention to smoke	-.068(-.071)	.058(.055)	[-.133, -.018]
HR → intention to smoke	.001(.001)	.056(.058)	[-.057, .057]*
Indirect			
PS → SR cognitions → intention to smoke	.027 (.023)	.052(.044)	[-.014, .073]
PC → SR cognitions → intention to smoke	.181(.103)	.066(.033)	[.073, .139]**
KCA → SR cognitions → intention to smoke	-.043(-.048)	.032(.033)	[-.083, -.019]**
FC → SR cognitions → intention to smoke	.024(.067)	.013(.032)	[.039, .105]**
QC → SR cognitions → intention to smoke	.018(.022)	.022(.026)	[-.003, .048]
DAS → SR cognitions → intention to smoke	-.189(-.197)	.070(.052)	[-.255, -.152]**
HR → SR cognitions → intention to smoke	-.135(-.140)	.049(.038)	[-.181, -.106]**

Note. PS = parental support. PC = psychological control. KCA = knowledge of child activities. FC = frequency of communication about smoking. QC = quality of communication about smoking. DAS = disapproval of adolescent smoking. HR = home rules against smoking. SR cognitions = Smoking related cognitions. * $p < .05$. ** $p < .01$. *** $p < .001$.

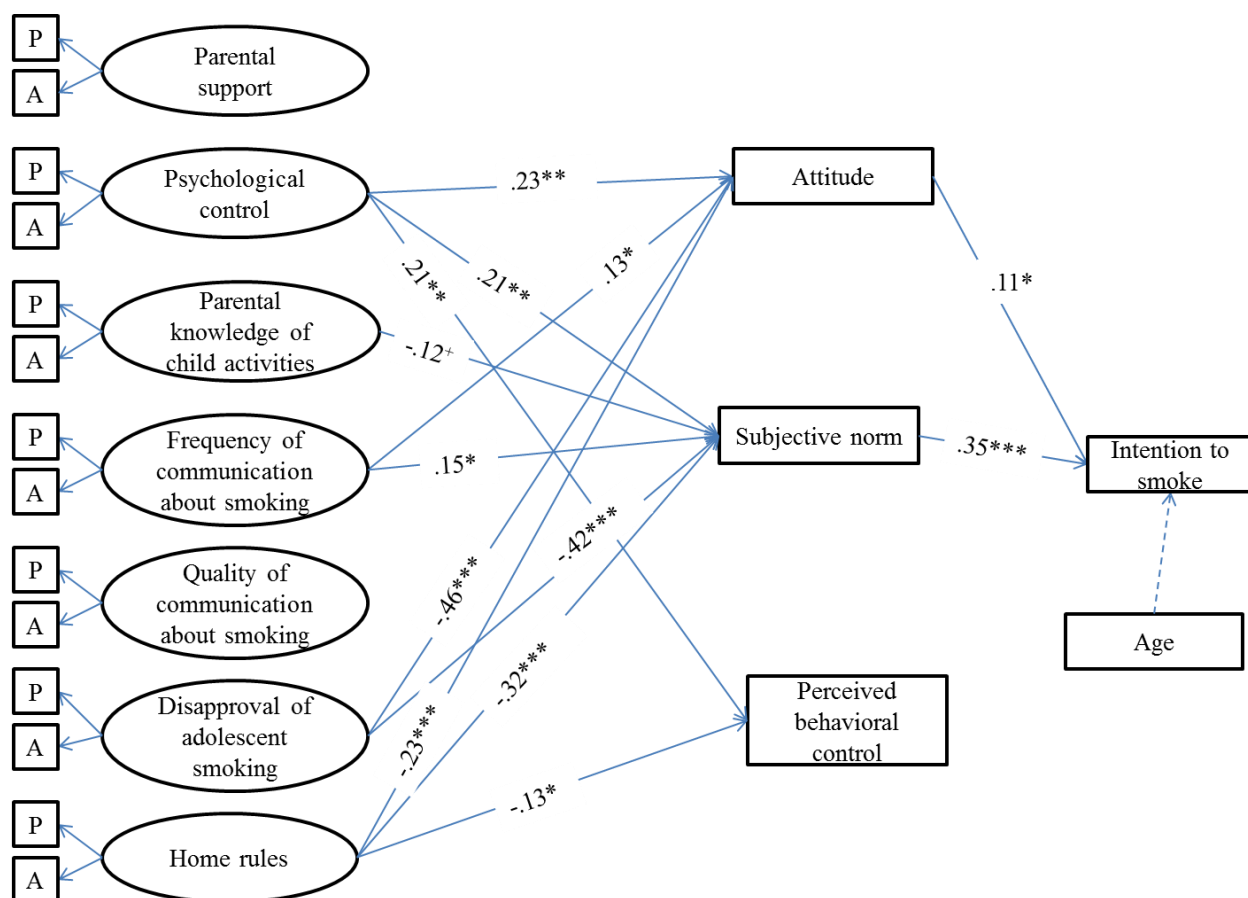


Figure 12. Parenting Influences on Adolescent Intention to Smoke-Indirect Effects

Note. Solid lines indicate significant pathways. Dash lines indicate nonsignificant pathways. Standardized coefficients are reported only for significant paths. P = parental report, A = adolescent report.

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Results indicated that smoking-related cognitions significantly mediated the effects of parental psychological control, parental knowledge of child activities, frequency of communications about smoking, parental disapproval of adolescent smoking and home rules against smoking on intention to smoke.

Discussion

The etiology of smoking behaviors involves the interplay between multiple systems at the cultural, familial, and personal levels. However, systematic investigations on the precursors of smoking behaviors among Chinese adolescents are relatively limited. The current study investigated how these systems work simultaneously in shaping Chinese adolescents' smoking behaviors, by testing structural models that link the cultural-, familial- and personal-level variables to adolescents' smoking behaviors as well as their intention to smoke. In addition to the direct links, this study also attempts to uncover the underlying mechanisms by which various socio-cultural factors and parenting practices affect adolescent smoking, which is an under-explored yet nontrivial topic (Yang & Schaninger, 2010). As an effort to address these gaps in the literature, several findings from the present study are worth noting and are discussed in the following sections.

Cultural Values and Adolescent Smoking

One important finding of this study is that smoking-related cultural values had a strong direct impact on Chinese adolescents' smoking behaviors. Adolescents with higher endorsement of traditional Chinese pro-smoking values and norms were more likely to smoke than those with lower endorsement of such values and norms.

It's plausible, if not self-evident, that culture shapes people's smoking-related attitudes, norms, beliefs, and behaviors. However, the scientific inquiry of how culture and smoking interact is far from clear (Unger, Cruz, Shakib, Mock, Shields, & et al., 2003). Traditionally, the influence of culture on health has been defined as distal and unspecified (Eckersley, 2005). Researchers often take an epidemiological or psychopathological approach and neglect cultural

context when they investigate substance use (Wood, France, Hunt, Eades, & Slack-Smith, 2008), because culture tends to be “invisible” as it’s deeply internalized as assumptions and beliefs (Eckersley, 2005). However, culture plays a more pronounced role than researchers used to assume in explaining health differences between populations. As Wilcox (2003) contended in his review, the broader contexts such as culture and religion impact people’s smoking behaviors above and beyond individual-level factors and non-random patterns of aggregated smoking rates usually indicate the need for investigating context characteristics beyond individual-level. Although researchers have become more aware of the importance to develop ecological models that include the complex contexts in which smoking behaviors occur (Piko et al., 2005), the most typical research on adolescent smoking still involves only individual-level variables and very proximal contexts (e.g., peer groups and families) (Wilcox, 2003). There is lack of empirical research that has explicitly examined how smoking-related cultural values and norms impact adolescent smoking behaviors, especially in countries such as China where adolescents are constantly exposed to pro-smoking cues (Lazuras, Rodafinos & Eiser, 2011).

The present study contributes to the literature by explicitly testing the role of “culture” in adolescent smoking and demonstrating the prominent role of smoking-related cultural values and norms in shaping adolescent smoking behaviors in Chinese society. The finding highlights the importance of including macro-level variables such as cultural values in the future studies on substance use. This finding also has valuable implications for future intervention programs for adolescent smoking in Chinese society. If the traditional pro-smoking cultural values play such a big role in bolstering adolescents’ smoking behaviors, these prevalent cultural values and norms of smoking inevitably compromise the effectiveness of intervention programs at the individual

level. Thus, programs solely focusing on individual characteristics such as stress may not be sufficient for smoking cessation in Chinese adolescents. Effective intervention programs should take into consideration the social and cultural environments in China (Li, Mao, Stanton, & Zhao, 2010). Many Chinese people including adolescents hold strong pro-tobacco attitudes and have astonishing misconceptions on the health consequences of smoking, which stems from the deeply-rooted smoking culture in China, the lack of health knowledge with regard to smoking, as well as the incomplete legislation and ineffective law enforcement against public smoking (Ma et al., 2008).

In order to effectively reduce smoking among adolescents and other segments of the Chinese population, China needs to make a stronger effort to educate people regarding misleading cultural beliefs such as “smoking represents power and prestige”. Efforts should also be made to educate people about health consequences of tobacco smoking and to reinforce its laws against smoking in public places. Whereas anti-smoking policies are relatively well-established in Western societies, China requires stronger legislative policies that restrict smoking behaviors. As prior research has indicated, policies targeting the broad population such as comprehensive smoke-free air laws and increased taxation have had effects on reducing smoking in general as well as in adolescents (Chaloupka, 2003). The implementation of such policies to de-normalize smoking in the social environment is essential for decreasing adolescent smoking in China. School systems and community centers could be important venues to provide education programs on the health consequences of smoking.

In addition to the direct effect, smoking-related cultural values also had an indirect effect on adolescents’ smoking behaviors through the mediation of smoking-related cognitions. More

specifically, smoking-related cultural values shaped adolescents' attitude toward smoking and their perceived subjective norms of smoking, which in turn impacted their smoking behaviors. Results of this investigation indicated that perceived behavioral control did not function as a mediator. This may be explained by the fact that almost all adolescents reported that they think they had pretty good control over themselves against smoking.

This finding supports the argument that cultural traditions not only influence people's behaviors, but also their attitudes and beliefs (Triandis, 1972). Although researchers have called for culturally appropriate models for smoking cessation programs, cultural sensitivity in these programs rarely extends beyond language use (Baker, Fortney, Wewers, & Ahijevych, 2011). However, understanding culturally rooted norms and beliefs about smoking is a critical step toward building effective and culturally appropriate intervention programs. The mediational mechanism of smoking-related cognitions revealed in this study suggests that prevention programs designed to alleviate the impact of pro-smoking cultural values and alter adolescents' attitudes and subjective norms of smoking could be effective.

In a similar vein, smoking-related cultural values also had a significant direct and indirect impact on nonsmoking adolescents' intention to smoke in the future. These findings provide important implications for prevention programs for adolescent smoking in China. In order to keep adolescents from taking up the smoking habit, it's crucial to change the whole pro-smoking cultural environment and to foster adolescents' anti-smoking attitudes and norms.

Parental Influences and Adolescent Smoking

Parents influence adolescents' smoking behaviors through their own smoking behaviors as well as their parenting behaviors. In this study, parent smoking had no direct influence on

adolescent smoking behaviors. However, parent smoking had an indirect effect on adolescent smoking behaviors through smoking-related cognitions including attitude and subjective norm. More specifically, parental smoking was associated with more favorable attitude and subjective norm toward smoking among adolescents, which in turn led to increased smoking behaviors in adolescents. As mentioned in the literature review section, although parent smoking is believed to be an important predictor of adolescent smoking (Otten, Engels, & van den Eijnden, 2008), there has been inconsistency in the literature regarding whether parental smoking had a significant impact on adolescent smoking behaviors (see Avenevoli & Merikangas, 2003, for review). In fact, researchers have been reexamining the explanatory mechanism of how parental smoking influences adolescent smoking. They have proposed that the role model theory may not be sufficient to explain the pathway of intergenerational pattern of smoking behaviors. The inconsistent findings on whether parental smoking had a significant impact on adolescent smoking suggest that other factors may mediate the link between parent and adolescent smoking (Avenevoli & Merikangas, 2003). Recent theory has suggested that children are affected by their parents' smoking behaviors through internalizing family values and norms of smoking (Engels et al., 1999) and this type of transmission of values and norms may have a long-lasting effect (Bricker et al., 2007). Although research investigating the mediational mechanisms for the relationship between parental and adolescent smoking is scant, some studies reveal that the effect of parental smoking on adolescent smoking is often indirect (Avenevoli & Merikangas, 2003). The findings from this study support the recent theory and suggest that the absence of a direct link between parent and adolescent smoking might be a result of the mediational mechanism of smoking-related cognitions. Thus, more future research should be designed to uncover the

mediating mechanism between parental and adolescent smoking instead of just testing the simple link between these two.

Another aspect of parental influences on adolescent smoking is parenting practices. In the present study, psychological control was found to have a significant direct impact on adolescent smoking behaviors, which is in line with previous research findings (e.g., Gray & Steinberg, 1999). Researchers believe that higher levels of psychological control are related to greater misbehavior including smoking among adolescents and the detrimental effect of psychological control could be long-lasting (Harakeh et al., 2010; Huver, Engels, van Breukelen, & de Vries, 2007). In fact, parental psychological control has been found to be related with increased current and future smoking behaviors in adolescents (e.g., Barber, Olsen, & Shagle, 1994; Gray & Steinberg, 1999; Harakeh et al., 2004; Huver, Engels, Vermulst, & de Vries, 2007a). Although there has been an argument that adolescent behavioral problems, such as smoking, are influenced more by parental behavioral control than psychological control (Gray & Steinberg, 1999; Huver et al., 2007a), this study's findings highlighted the salient role of psychological control among all parenting practices in shaping Chinese adolescents' smoking behaviors.

In the Chinese culture, elements of psychological control are said to have originated from the application of the Confucian doctrine on parenting practices which demands the absolute obedience of children and are further fortified by the excessive parental expectation for children to be successful (Shek, 2007). Previously, some scholars have pointed out the possible cultural differences in the definition and perception of psychological control and argued that Chinese children may feel less intruded by parental psychological control because of the cultural tradition and therefore suffer less from highly controlling parents (Chao & Tseng, 2002). However, more

recent empirical findings have provided evidence for the “culturally similar perspective” which assumes the presence of psychological control adversely affects children’s development in both Eastern and Western societies (Barber, Stolz, & Olsen, 2005). The findings from this study lend further support for the culturally similar perspective by demonstrating the positive link between psychological control and adolescent smoking. Therefore, as far as adolescent smoking behaviors are concerned, parental psychological control has similar negative influence as found in research conducted in Western societies. Recently, there has been an increased interest in intervention programs that include parents as a major source of social influence on adolescent smoking (Engels & Willemsen, 2004). The existence of a direct link between psychological control and adolescent smoking behaviors suggests that intervention programs involving parents should work on eliminating traditionally widely-adopted psychological control behaviors as a parenting strategy in Chinese families.

Unlike most prior research, this study did not find a significant protective effect of parental support (e.g., Gray & Steinberg, 1999). However, there are some previous studies which have also found no association between parental support and adolescent smoking (e.g., Bush et al., 2005; Huver et al., 2007a). It has been proposed that the inconsistency may be explained by cultural differences in the effects of parenting practices on adolescent behavioral problems (Huver et al., 2007a). Clearly, more research is needed to further explore how different parenting behaviors are linked to adolescent smoking behaviors in diverse cultural settings.

In addition to the lack of direct association between parental support and adolescent smoking, this study also found no direct impact of parental knowledge of child activities, parent–child communication about smoking, or parent disapproval of smoking on adolescent smoking

behaviors. This finding is not totally surprising given the fact that the inconsistency has been reported in the literature regarding whether these smoking-specific parenting practices have a significant impact on adolescent smoking (e.g., Den Exter Blokland, Hale, Meeus, & Engels, 2006; Ennett et al., 2001; Harakeh et al., 2005; Huver, Engels, Vermulst, & de Vries, 2007b). However, a number of parenting practices, including psychological control, frequency of communication about smoking, disapproval of adolescent smoking, and home rules against smoking, were found to be indirectly linked to adolescent smoking behaviors through smoking-related cognitions. More specifically, psychological control and frequency of communication about smoking were associated with more favorable attitudes and subjective norms in regard to smoking, which in turn led to more adolescent smoking; whereas parental disapproval of adolescent smoking and home rules against smoking were associated with less favorable attitude and subjective norm in regard to smoking, which in turn led to less adolescent smoking. These findings are consistent with previous studies which also found significant mediating effects of smoking-related cognitions (e.g., Harakeh et al., 2004; Huver et al., 2007a). The results also suggest that parental anti-smoking socialization practices, which are usually explicitly stated, may be internalized by adolescents and in turn shape their actual smoking behaviors (Huver et al., 2007a). Therefore, it may be fruitful to promote smoking-specific parenting in future prevention programs for adolescent smoking that are focused on the family domain (Engels & Williems, 2004).

As for adolescent intention to smoke, parental disapproval and home rules against smoking had a direct effect in reducing adolescents' intention to smoke, whereas psychological control, frequency of communication about smoking, parental knowledge of child activities,

disapproval of adolescent smoking, and home rules against smoking indirectly impacted adolescents' intention to smoke through smoking-related cognitions. These findings again highlight the importance of parental psychological control in shaping adolescent smoking behaviors. In addition, these results underscore the importance of smoking-specific parenting practices, such as establishing home rules against smoking and expressing disapproval of child smoking, in preventing adolescents from smoking (Engels & Willemsen, 2004). These results also suggest that both general (i.e., knowledge of child activities) and smoking-specific parenting (i.e., disapproval of adolescent smoking and home rules against smoking) can be effective, once they are internalized by adolescents, in preventing non-smoking adolescents from taking up the bad habit. Therefore, family-oriented intervention/prevention programs could focus on promoting positive parental control (i.e., knowledge of child activities) and certain anti-smoking parenting practices that can influence adolescents' smoking-related cognitions and eventually reduce adolescent smoking.

One finding worth noting is that the frequency of communication about smoking was positively associated with adolescent attitudes and subjective norms in regard to smoking. In fact, there is ambiguity in the literature on whether more frequent communication about smoking is a protective or risk factor of adolescent smoking (Harakeh et al., 2010). The present study lends support to the argument that higher frequency of communication about smoking is associated with more adolescent smoking (e.g., Ennett et al., 2001; Harakeh et al., 2005). However, the positive link observed in this study should be interpreted with caution because the causal relationship is far from clear. It's possible that parents talked to their children more frequently after they found their children smoking. Future research using longitudinal designs are needed to

further examine the relationship between frequency of communication and adolescent smoking in diverse cultural settings to arrive at a more comprehensive understanding of this issue.

Other Familial Influences and Adolescent Smoking

Another important finding about familial influences in the present study was that the smoking behaviors of extended family members such as cousins, grandparents, and uncles had a direct impact on adolescent smoking behaviors. The Chinese culture values extended family, especially grandparents, who play an important role in many multigenerational families (Strom et al., 1999). It's understandable that these extended family members serve as important role models and proximal social context for adolescents. Multiple social influences such as siblings smoking have been found to predict adolescent smoking status (Avenevoli & Merikangas, 2003). However, as a result of the one-child policy, many Chinese adolescents today have no siblings but cousins. Therefore, cousins can exert as pronounced influence as peers and family members on adolescent smoking behaviors in Chinese society. Most studies focusing on familial influences on adolescent smoking have only included parents and siblings and have rarely examined how grandparents and other relatives play a role in adolescent smoking behaviors (Avenevoli & Merikangas, 2003). Results from this study suggest that extended family members such as grandparents, uncles and aunts, and cousins, play an influential role in adolescent smoking behaviors in China. Future research should include assessments of the smoking behaviors of extended family members in order to get a full picture of how the broader family unit influences adolescent smoking within the cultural settings.

Media Influence and Adolescent Smoking

In contrast to the existent literature which has demonstrated a strong relationship between exposure to media and adolescent smoking in Western societies (e.g., Sargent et al., 2001, 2005), exposure to media smoking had neither direct nor indirect effects on adolescent smoking behaviors in the present study with Chinese adolescents. One possible explanation for this inconsistency could be the differences in the measures used in different studies to assess media exposure. Whereas some studies have used self-reports (as was the case with this investigation), others have employed the “beach method” to assess media exposure. When using the “beach method” approach, researchers first do an assessment of which movies adolescents watch and carry out a content analysis on the amount of smoking scenes in each movie (Sargent, Worth, Beach, Gerrard & Heatherton, 2008). Adolescents are then asked to respond to whether they recognize the movie titles which were presented (as a list) and recall whether they had seen the movies. Adolescent responses were then combined with the results of an extensive content analysis of the movies to get an approximate estimation of adolescent exposure to portrayals of smoking behaviors in those movies. In addition to utilizing alternative approaches to assessing media exposure, it is important to note that cultural mores and practices may be the reason for the nonsignificant relationships between media exposure and adolescent smoking in this study – an issue that should be addressed in future investigations.

Despite the lack of a direct link between media exposure and adolescent smoking behaviors, exposure to media smoking had a significant direct impact on nonsmoking adolescents’ intention to smoke (similar to the finding in the study by Dalton et al., 2009). This finding provided important information for future prevention programs targeting nonsmoking adolescents. According to the Chinese Association on Tobacco Control, 90% of Chinese TV

shows and movies portray smoking scenes (The Wall Street Journal, 2011). Policies on how smoking scenes can be presented in movies and TV series especially those where adolescents are the target audience should be implemented. A number of studies have indicated that anti-tobacco advertisements are effective in reducing adolescent smoking, especially among younger adolescents (Villanti, Boulay, & Juon, 2010). Therefore, in addition to reducing smoking scenes in the mass media, the Chinese government should also make an effort to sponsor more anti-smoking advertisements/campaigns. For example, antismoking campaigns on TV with “celebrities” from various walks of life could help de-normalize smoking behaviors among adolescents.

Health-Related Values and Adolescent Smoking

In the present study, health-related values had an indirect impact on adolescent smoking behaviors through smoking-related cognitions. Specifically, adolescents who placed more value on their physical health were less likely to hold favorable attitudes and subjective norms with regard to smoking and in turn less likely to smoke compared to those who placed less value on their health. In addition, health-related values had both direct and indirect effects on adolescent intention to smoke in the future. The concept “value placed on health” is not new and has been identified as an important factor in studies of health behaviors. However, researchers often assume that all people place very high value on their health and thus rarely directly measured this concept in empirical research (Lau, Hartman, & Ware, 1986). In the context of health behaviors, the limited research on the subject suggests that the value that individuals place on health predicts their involvement in health protective behaviors (e.g., Lonquist, Weiss, & Larsen, 1992). The present study partially supports the assumption that health-related values are linked to

adolescent smoking behaviors. However, this link was indirect and took effect through adolescent smoking-related cognitions. These findings underscore the importance of including health-related values in future research on adolescent smoking behaviors and suggest that future intervention/prevention programs for adolescent smoking may be effective by focusing on encouraging adolescents to place more value on their physical health.

Limitations and Future Directions

This study represents an initial step toward a better understanding of adolescent smoking behaviors in Chinese society but is not without its limitations. First, the present study is cross-sectional in nature, which limits the possibility of inferring the cause-effect relationships among variables. Our understanding of the developmental processes of adolescent smoking behaviors could be further advanced by testing these models using longitudinal data. An important finding in this study was that parenting practices, both general and smoking-specific were linked to adolescent smoking behaviors. However, as mentioned before, it is important to consider the possibility of a bidirectional relationship between parenting and adolescent behaviors. Hence, it would be beneficial for researchers to design longitudinal studies to better understand the directionality of the effect between these constructs - i.e., whether parenting behaviors determine adolescent smoking behaviors or whether adolescent smoking behaviors determine parenting behaviors. Longitudinal studies would also be helpful in determining the strengths of these effects over time.

The existing literature has provided a wealth of data about the correlates of adolescent smoking behaviors, but our understanding about how the various socio-cultural, familial, and personal factors influence adolescent smoking and the relative importance of each factor over the

developmental course remains limited (Darling & Cumsille, 2003). Traditional statistical techniques such as regression analysis are excellent for identifying risk factors, but they fall short in modeling developmental processes involving multiple interrelated systems and therefore become deficient to answer theoretical questions such as how various micro and macro systems influence adolescent smoking vary over time. In the future, approaches such as growth curve analyses, nested multilevel modeling, and typological approaches could be employed to explore the trajectories of adolescent smoking in order to achieve a clear understanding of the underlying developmental processes (Darling & Cumsille, 2003).

Second, although this study proved cultural values as one important antecedent of adolescent smoking, the actual influences of culture could involve far more complicated mechanisms than just simply being an isolated predictor. Cultural values as an important context are usually intertwined with other antecedents of adolescent smoking. In fact, cultural context is the larger ecological background for all other levels of influences and its impact is therefore infused into each level. Phenomena occurring at cultural, familial, and personal levels are inevitably interconnected. Any change at the cultural level is invariably associated with changes at other levels (Unger et al., 2003). For example, health related values may be considered as a smaller value system that's partially determined by the larger cultural context. Simple models that simultaneously examine the effects of health related values and cultural values cannot answer questions such as whether personal-level values (i.e. health related values) override cultural values in shaping people's smoking behaviors or vice versa. Therefore, future research should use a multilevel framework which integrates the personal, familial and cultural levels as nested systems and examine the possible joint effects of these systems.

Third, this study didn't explore more complicated interactions between parenting practices and other socio-cultural influences, as well as how these interactions make impacts on adolescent smoking behaviors. For example, some researchers proposed that parent smoking status may have an impact on how much they may become involved in smoking-specific parenting and how effective it is (Engels & Willemsen, 2004). Empirical evidence is somewhat ambivalent: whereas some research indicates that smoking parents are involved in less smoking-specific parenting and are less effective than nonsmoking parents, other research shows no difference in the effectiveness of smoking-specific parenting between smoking and nonsmoking parents (Engels & Willemsen, 2004). Future studies on how parent smoking status may interact with their smoking-specific parenting behaviors and adolescent smoking behaviors are important. Results from this study indicated that parental disapproval can have a direct negative impact on adolescent intention to smoke. Studies that examine how the pathways differ between adolescents with smoking and nonsmoking parents could provide valuable information on whether smoking-specific parenting practices are effective when parents themselves are smokers.

Another potential research question is the relationship between general parenting and smoking-specific parenting. In their review, Darling and Steinberg (1993) proposed that general parenting should be considered as the important context for more specific parenting to be formed and they contended that the distinction between these two should be maintained. The existent literature suggests that general parenting such as support and psychological control is positively related with the frequency and quality of communicating about smoking, which in turn related with adolescent smoking behaviors, but the mediating effects of smoking-specific parenting are not always significant (Otten, Engels, & van den Eijnden, 2008). Although this study examined

both general and smoking-specific parenting, the link between these two was not explored. Obviously, more research is needed to ascertain whether general parenting practices serve as the context of smoking-specific parenting behaviors and how do smoking-specific parenting practices mediate the link between general parenting and adolescent smoking behaviors.

Fourth, although this study utilized data from adolescents and parents, intergenerational transmission of values and beliefs have not been explored. For example, parents' smoking-related cultural values and smoking-related cognitions may have impacts on adolescents' values and cognitions, which in turn shape their smoking behaviors. As mentioned in the literature review, adolescents don't merely model parents' smoking behaviors; but rather, they seem to acquire their parents' values on smoking (Bricker, Peterson, Sarason, Anderson, & Rajan, 2007). If this is the case, studying parents' smoking-related cultural values and cognitions and the intergenerational transmission of such values and cognitions will be imperative to uncover important pathways of smoking imitation among adolescents.

Fifth, this study mainly focused on socio-cultural and familial influences on adolescent smoking behaviors and didn't control for other personal variables such as stress, academic performance, and physical health. As indicated by earlier research, these personal factors could be important determinants for adolescent smoking initiation (Liu, 2003). Future research should control for these personal factors known to affect adolescent smoking to disentangle the socio-cultural and familial impacts from other potential compounders. In addition to solely focusing on the unhealthy habit (i.e., smoking), future research could also explore how adolescents make efforts to improve their health (e.g., physical activities) and whether these efforts are linked to less smoking behaviors.

Sixth, the present study used adolescent self-reports of their smoking behaviors, which inevitably involved social desirability response bias as adolescents might under-report their smoking behaviors. However, some recent research has indicated that under-reporting is not a major source of error in school-based surveys and self-reported smoking by adolescents is actually comparable to the result from biochemical indicators of smoking (Messeri et al., 2007). In addition, this study used anonymous online survey to ensure the better protection of adolescents' privacy, which also helped to reduce the social desirability response bias. Future studies should also include data from biochemical indicators to measure adolescent smoking behaviors.

Seventh, this study is a quantitative investigation which only included information from survey data. In the future, it would be beneficial for researchers to gather qualitative data to enrich our understanding on this topic of adolescent smoking. Some researchers have suggested that qualitative studies are urgently needed for the development of quantitative studies (e.g., survey) on adolescent smoking, as qualitative approaches would enable us to better understand aspects of smoking related behaviors that are often not measurable by quantitative research (e.g., Walsh & Tzelepis, 2007). For example, future research could use interviews or focus groups to investigate how adolescent perceive smoking scenes on Chinese mass media. Information gathered from qualitative research could not only inform future quantitative studies on adolescent smoking but also policy makers about effective ways to prevent adolescent smoking.

Finally, this study only explored the mediating effect of smoking related cognitions, whereas these cognitions may also function as moderators in the relationship between various sociocultural influences and adolescent smoking behaviors. It's quite possible that adolescents

with more positive attitude, stronger subjective norms, and weaker self-control over smoking may be more susceptible to pro-smoking cues from the environment. If this is the case, then the magnitude of influences from the cultural, familial and personal factors may be larger for these adolescents compared to those with less positive attitude and subjective norms as well as stronger self-control. Future research could explore this moderating effect by comparing these two groups of adolescents and results from such research may be informative for intervention programs targeting different groups of adolescents based on their existing levels of smoking-related cognitions.

Despite the limitations, the present study represents a significant step toward a better understanding of the multiple antecedents of adolescent smoking behaviors in China. The findings from this study lay the groundwork for future systematic investigations on adolescent smoking in Chinese society and provide valuable information for future prevention and intervention programs targeting adolescent smoking.

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