THESIS BY PUBLICATION

A THEORY-BASED SMOKING INTERVENTION FOR CHINESE HIGH SCHOOL STUDENTS: DEVELOPMENT, IMPLEMENTATION, AND EVALUATION

Xiang Zhao, B.Sc., M.Ed.

Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

School of Psychology and Counselling, Faculty of Health

Queensland University of Technology

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ABSTRACT

Background: With 316 million smokers, China is the world's largest tobacco consumer. Adolescent smoking rates are increasing among females, and remain at a high level among males. Reducing smoking behaviour and associated cognitions in this transitional period is important to curb smoking in early adulthood.

Objective: There were two objectives in this PhD: (i) to explore the psychological mechanisms underlying Chinese adolescents' smoking behaviour (Study 1); and (ii) to develop, implement, and evaluate a school-based smoking intervention among Chinese adolescents (Study 2). The latter objective was based on the former.

Design: Mixed approaches were utilised. Study 1 used semi-structured focus groups based on the Theory of Planned Behaviour (TPB) among high school students. Following the Consensual Qualitative Research (CQR) methods, data were coded into seven domains. Based on the findings in Study 1, a belief-driven smoking programme ("Achieve my healthy future") was designed, and incorporated life skills training. After the implementation of the programme, smoking behaviour, associated cognitions, and skills were evaluated in a longitudinal design (3 time-points). Study 2 also included a qualitative study of the perceptions of school-based tobacco management among high school students and teaching staff members, using focus groups and interviews.

Setting: Two middle schools in Kunming, Yunnan Province, China (February – October 2016).

Participants: Thirty 10th graders in Study 1 (50% female and 50% male); 207 10th graders enrolled in Study 2 (106 in the intervention group; 101 in the control group).

Measurements: Two qualitative studies and one quantitative study were included. For the elicitation study (Study 1), focus groups was used. For the qualitative study (Study 2), smoking behaviour, associated cognitions (intention, attitude, subjective norm, perceived behavioural control, willingness, prototype), and life skills (stress coping, decision making, assertiveness, pragmatics, dispositions towards critical thinking) were tested. For the perception study (Study 2), mixed data from focus groups, interviews, and field observations were used.

Intervention: Based on the findings of Study 1, a four-session classroom-based intervention was designed. The programme focused on psychological constructs (attitude, subjective norm, perceived behavioural control, and prototype) as well as life skills (stress coping, decision making, assertiveness and pragmatics, and critical thinking). Each session lasted for 40 minutes.

Key findings: (i) Study 1 identified seven domains, namely, advantages, disadvantages, approvers, disapprovers, facilitators, barriers, and smoker images. Smoking as a gendered behaviour, smoking as influenced by cultural and environmental contexts, smoking as a strategy to cope with stress, and awareness of the harm of smoking, are highlighted themes across domains. Based on the elicited beliefs, a smoking intervention programme was designed. Study 2 showed that (ii) the pilot intervention based on the TPB curbed the growing pro-smoking attitudes among male students, but not among female students; the intervention also improved skills of pragmatics and critical thinking; (iii) trajectories of smoking behaviour, intention, and willingness all assumed two distinct but constant latent classes, independent of the intervention. In the final study (Study 2), I found that (iv) both students and teaching staff members held a pessimistic attitude towards tobacco control at schools, and that smoking is ubiquitous in social milieus outside of school campuses.

Conclusion: The TPB is able to encapsulate relevant psychological factors associated with Chinese adolescent smoking, but the pilot intervention based on the extended-TPB framework and life skills training did not change any smoking behaviour or associated cognitions. Environmental influences from the complicated social context might have undermined tobacco management in schools including our pilot intervention in research. Future programmes should be more specific for subgroup members (e. g., regular smokers), as our analysis considering heterogeneities among participants indicated two distinct subgroups among the population. Furthermore, interventions may achieve better success using community approaches rather than individual cognitive methods. This preliminary research project also calls for more attention on smoking among high school students as smoking in this transitional period might lead to heavy smoking in early adulthood.

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KEYWORDS

Tobacco smoking, school-based intervention, China, adolescence, high school, beliefs, trajectories, realistic evaluation, Theory of Planned Behaviour (TPB), Prototype/willingness (PW) model, life skills training, elicitation, Consensual Qualitative Research (CQR)

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List of Thesis Publications and Submitted Manuscripts

1. **Zhao, X.**, White, K. M., Young, R. M., & Obst, P. L. (2017). Smoking beliefs among Chinese secondary school students: A theory-based qualitative study. *Nicotine & Tobacco Research*. doi:10.1093/ntr/ntx012. [Q1 journal; Impact Factor = 4.609]
2. **Zhao, X.**, White, K. M., & Young, R. M. (Revision) A TPB-based smoking intervention among Chinese high school students: predictors of smoking-related trajectories. *Substance Use & Misuse*.
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A Refereed Conference Presentation

Zhao, X., White, K. M., & Young, R. M. (2016, December 9). Exploring smoking beliefs among Chinese adolescents to inform a theory-based intervention. *Fourteenth International Congress of Behavioural Medicine*. Melbourne, Australia. [Published abstracts are provided in full in Section 10.1]

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List of Abbreviations

ANOVA	Analysis of variance
BLRT	Bootstrapped Likelihood Ratio Test
GATS	Global Adults Tobacco Survey
LCA	Latent class analysis
LCGA	Latent class growth analysis
LMR-LRT	Lo-Mendell-Rubin Likelihood Ratio Test
MANCOVA	Multiple analysis of covariance
MANOVA	Multiple analysis of variance
PBC	Perceived behavioural control
PW	Prototype Willingness
SSABIC	Sample-size adjusted Bayesian information criteria
TPB	Theory of planned behaviour
TRA	Theory of Reasoned Action

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: QUT Verified Signature

Date: 29/JAN/2017

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1. INTRODUCTION AND BACKGROUND

1.1. Background of the study

Smoking behaviour among Chinese youth and smoking interventions for this at-risk group have gained increasing research attention. However, there have been few attempts to investigate youth smoking using well-validated decision-making models such as the Theory of Planned Behaviour (TPB). This thesis by publication will examine and extend current knowledge about the link between TPB constructs and Chinese adolescents' smoking behaviour by exploring the underlying psychological mechanisms. It is intended that this thesis will help to explain why the world's biggest population of smokers smoke in their teenage years and also provide an effective way for schools to initiate anti-smoking campaigns.

1.2. Purpose of the study

This study served three main purposes. The first purpose was to understand the underlying beliefs of smoking behaviour among adolescents in Kunming, China. Additionally, the type of anti-tobacco intervention that students thought would be beneficial for their age was also explored. The second purpose of this study was to develop a psychological theory-based smoking intervention. Finally, the third purpose of this study was to explore the perceptions of smoking interventions among students and teaching staff members. By including contextual information, it was hypothesised that the outcomes would inform us about the factors that have undermined/facilitated the intervention.

Two studies were conducted to achieve these purposes. Study 1 focused on elicitation of the meaning of smoking behaviour and the underlying beliefs of smoking decisions among Chinese youth. Study 2 is the central part of this study; a smoking intervention was designed

based on the findings of the first study, and the efficacy of the intervention was evaluated with both quantitative and qualitative approaches.

1.3. Study objectives and research questions

Smoking among Chinese adolescents has become a serious public health issue and effective interventions are needed. Most smoking campaigns have been conducted in China without a theoretical basis and full descriptions of the intervention and implementation and, thus, are hard to test further via replication. A review of the literature suggests that the (extended) TPB has the potential to become a base upon which an effective tobacco intervention can be developed. Thus, the PhD project aims to understand what smoking means among this research population of Chinese adolescents and to develop a subsequent smoking intervention. Accordingly, the research questions are as follows:

1. What are the psychological mechanisms underlying Chinese adolescents' smoking behaviour?

    A. What is the utility of the TPB in predicting Chinese adolescents' smoking behaviour?

    B. Besides the TPB constructs, are there other factors that directly or indirectly influence this behaviour? What are they?

2. What strategies are effective for developing a school-based smoking intervention among Chinese adolescents?

    A. Is a(n) (extended)TPB-based intervention effective for this target behaviour among this at-risk population?

    B. What do students and teaching staff members think of smoking interventions? And how do their perceptions impact on the intervention?

1.4. Significance of the study

This study will contribute to the knowledge in four main ways:

(1) Developing a smoking intervention for adolescents has profound significance for China. As a country with the world's largest number of smokers, China is lacking in smoking interventions. The exploration of this PhD may raise awareness of the importance of school-based smoking interventions, highlighting the need for more attention on this topic. Additionally, the intervention can be disseminated beyond the pilot site.

(2) The research will provide an understanding of the meaning of smoking among adolescents through a psychological theory-based view. Although previous research has investigated this topic, most research has used a top-down process (using the framework of experts/theories) or investigating one group based on the formative elicitation result of another target group. In contrast, this is a programme that took account of the local context and values of a non-Western society.

(3) Since previous smoking research conducted in China seldom used longitudinal designs among high school students, the dynamic nature of mid- and late- adolescent smoking remains unclear (especially in Yunnan Province). This PhD utilised a longitudinal design (for 6 months), and, thus, may result in some important findings for future research.

(4) In contrast to the previous school-based interventions in China, this PhD also included a thorough investigation of perceptions of anti-smoking strategies available at schools, which considered the contextual factors of the school environment. Such a study will provide policy makers with valuable information.

1.5. Definitions of terms

Smoking, short for tobacco smoking, is the combustion of the tobacco leaves and inhaling of the smoke (Asma et al., 2015). This term is used in the thesis to refer to manufactured

cigarette smoking, which is currently the dominant form of tobacco use in China (Chinese Center for Disease Control and Prevention, 2011).

Passive smoking, also known as second-hand smoking or environmental tobacco smoke, is the smoke from burning tobacco products, such as cigarettes, cigars, or pipes (Institute of Medicine, 2009).

2. LITERATURE REVIEW

2.1. Current status of smoking in China

Prevalence and gender

Currently, China is the world's largest tobacco consumer and has 316 million smokers (Chinese Center for Disease Control and Prevention, 2015). Research on tobacco use in China is, however, still at a beginning stage. There was no national survey on smoking (definition see p. 3) prevalence before 1984 (G. Yang, 2008). In the first national survey, the smoking rate was 34.45%, with 61.01% for males and 7.04% for females (Weng, Hong, & Chen, 1987). Subsequent studies conducted in 1996, 2002, 2010, and 2015 showed a slight decrease in smoking prevalence; the latest current smoking rate is 27.7%, with 52.1% for males and 2.7% for females. Nevertheless, more smokers are identified among young people aged from 15 to 24 years compared with 5 years ago (Chinese Center for Disease Control and Prevention, 2015; Q. Li, Hsia, & Yang, 2011; G. Yang et al., 1999; G. Yang, Ma, Liu, & Zhou, 2005). Worryingly, cigarette consumption among current smokers has recently increased (Chinese Center for Disease Control and Prevention, 2015).

The current smoking prevalence is so markedly different between males (52.1%) and females (2.7%) that it is important to take gender into account when understanding investigations of smoking in China (Chinese Center for Disease Control and Prevention, 2015; Giovino et al., 2012). This gender discrepancy was identified in previous nationwide surveys among adults, as well as investigations among young teenagers (Chinese Center for Disease Control and Prevention, 2014; Q. Li et al., 2011; Weng et al., 1987; G. Yang et al., 1999; G. Yang et al., 2005). Globally speaking, most countries, especially middle and low income countries, report higher smoking rates among men (Asma et al., 2015; Hitchmana & Fonga, 2011). Due to the stark contrast between genders, smoking is often regarded as a male behaviour and, thus,

some anti-tobacco interventions in China are designed only for males (e.g., C. Liu, Gu, & Wang, 2011). Consequently, the issue of female smoking tends to be neglected. It should be noted that emerging research has revealed that females in China (especially youth) are at considerable risk (Chinese Center for Disease Control and Prevention, 2011):

First, smoking rates gathered from self-report surveys might fail to report incidence accurately. J. Ma et al. (2014) utilised a novel capture-recapture method. Smoking status was gathered from adolescents and their parents separately, and then, with an algorithm used for wildlife population estimation, they estimated the number of 'hidden smokers' among adolescents aged 12 to 18 years in Shanghai. They estimated higher smoking rates for both male and female students; specifically, the estimated female rate (14.2%) was more than twice their self-reported rate (5.2%). Similarly, in South Korea—a country with close proximity to China—Park, Kim, Nam, and Hong (2014) investigated response accuracy regarding current smoking status with self-report surveys and urinary cotinine concentration methods, and found that female smoking prevalence was highly underestimated. Anti-tobacco interventions in China should include both genders since female smoking largely remains unexamined and—even if the prevalence of female smoking is low—this offers a baseline against which to measure future behaviour.

Second, compared with other countries that took part in the Global Adults Tobacco Survey (GATS), the rate of passive smoking (definition see p. 3) among Chinese women is among the highest in the world (Centers for Disease Control and Prevention, 2012). Furthermore, motivated by traditional views of family and collectivism, women in Chinese families tend to accept the smoking behaviour of their husbands as a way of identifying themselves as supportive wives (Mao, Bristow, & Robinson, 2013). This finding suggests that females with low smoking rates still cannot escape from the hazards of second-hand smoking.

Third, it is found that, in countries with higher gender equality and income, the difference in smoking prevalence between genders is less marked (Hitchmana & Fonga, 2011; Peters, Huxley, & Woodward, 2014). As China's economy rapidly expands, the smoking rate of young females in three national surveys already demonstrated a slight increase.

In summary, China has the largest population of smokers. Although current smoking is mainly a male behaviour, emerging evidence shows that the number of female smokers is underestimated and is gradually increasing. Therefore, research focussing attention on smoking should include a consideration of both genders.

Locality

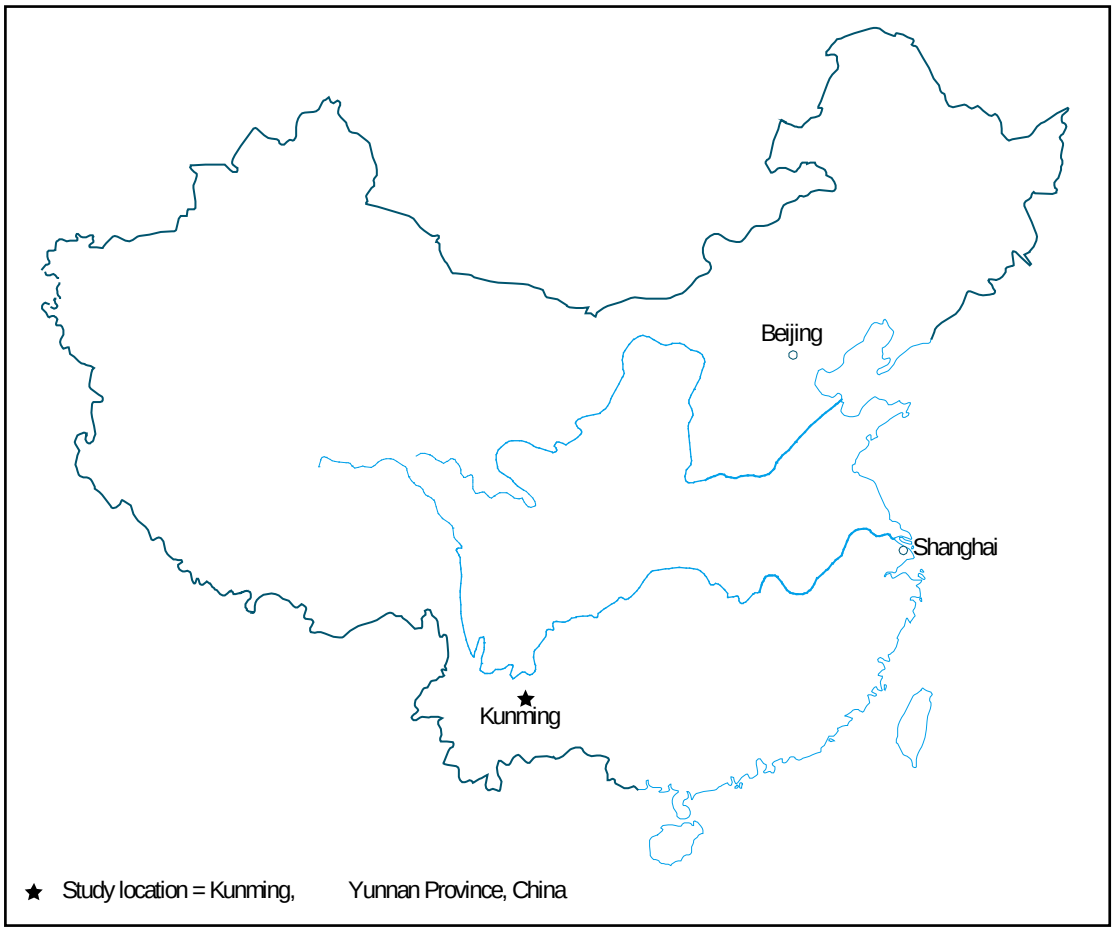


Figure 1 Research location: Kunming, Yunnan Province, China*

* Disclamation: This figure adapts from the map of China provided by the National Administration of Surveying, Mapping,

As a vast country with many regions, smoking prevalence in China varies from place to place: even in the same region, male smoking in rural areas is more prevalent than that in urban areas (for a map of China, see Figure 1). Researchers previously noted that the western part of China has the highest male smoking rate (59.2%), while the central part of China has the highest female smoking rate (4.1%); rural areas usually have higher smoking rates than urban areas (Chinese Center for Disease Control and Prevention, 2011). However, this pattern is not well established. A recent national survey comprising of 14 cities indicated that Shenyang, a northeast city, had both highest male (44.8%) and female (5.0%) current smoking rates (Liang, 2015). Preliminary epidemiological studies identified that smoking is correlated with contextual variables attributed to certain locations. For example, T. Yang et al. (2015) investigated smoking status in 27 cities by using multilevel logistic regression (both city level and individual level) and found that living in places with higher rates of cigarette production might lead to tobacco use. Research also identified that cities with a higher male population are associated with higher male smoking prevalence and lower female smoking prevalence (T. Yang et al., 2016).

Although associations between smoking rates and other variables are identified in cross-sectional designs, previous research often overlooked local subtleties such as regional tobacco production. Sophisticated models grounded in theory should be built to understand how smoking behaviour is influenced by contextual factors. To achieve this goal, in-depth investigations are necessary to elicit local idiosyncratic facets. For instance, in Yunnan Province (our research site, details see Figure 1), sociological research has illuminated that ethnological influence impacts beliefs of smoking in a local community (Zhao & Davey, 2015). Furthermore, quantitative research examining region or location thus far is mostly

and Geo-information of the People's Republic of China. It was originally published in June 2008 (No. GS (2008) 1045). I use this illustration only for diagrammatical purpose and it does not render any actual territorial meanings.

cross-sectional in design and, thus, fails to capture any longitudinal changes. Reanalysis of national data revealed that smoking rates varied in different cohorts (F. Liu, 2015). Therefore, future studies in this field should consider longitudinal designs for greater accuracy.

Another noticeable shortcoming of previous research is the imbalance in study locations. So far, the majority of smoking research (especially those involving cessations/interventions) was conducted in cities with comparatively higher economic levels (such as Shanghai, Beijing, and Guangzhou). With higher income and stricter policies, these areas usually have more developed anti-tobacco social norms than other cities. The very low smoking rates reported in some research (e.g., Cai et al., 2015) suggest that future prevention and intervention should focus on regions with higher smoking rates so as to focus on larger numbers of smokers. Having been reported as one of the provinces with the highest smoking rate in China, Yunnan Province is in need of more research (G. Yang et al., 2005; T. Yang et al., 2015). Yunnan is China's pre-eminent producer of tobacco and cigarettes, and, thus, its regional contextual effects on smoking are different from other provinces/municipalities (T. Yang et al., 2015). A comparative study undertaken in Beijing and Yunnan Province also shows that students in Yunnan had significantly higher smoking rates than students in Beijing (P. Hu, Ji, & Song, 2011).

In sum, locality plays an important role in residents' smoking. Nascent research has showed that multiple local factors such as tobacco economy, gender ratio, and culture relate to smoking, but nuanced investigations are rare. Locality- and culture-specific studies with longitudinal designs are required. This perspective also informs us that, due to the differences among regions, it may be better to focus on a specific place rather than nationwide so that the interventions can be more locally tailored (L. Chen et al., 2014). As few smoking related studies have been undertaken in Yunnan, it is valuable to explore the mechanisms underlying

people's smoking behaviour and to develop culturally tailored anti-tobacco interventions in this region.

Knowledge of the harm of smoking

Tobacco came to China in the mid- and late-16th century through southern, northern, and western neighbouring countries (W. Wang, 2002). In traditional Chinese medicine, tobacco's pharmacological functions were valued. Doctors then generally used tobacco to protect people from the malarial miasmas (辟瘴除秽). Nevertheless, based on their clinical observations, medical practitioners discovered that long-term tobacco smoking did harm to people's lungs and facial appearance. As per traditional medicine, tobacco's harms originate from its nature of "fire", which substantially damages people's *yin*. Unfortunately, in the times when the Chinese government faced both foreign invasions and civil rebellions, these findings were unable to promote public health and were only restricted to academic medicine (Benedict, 2011; W. Wang, 2002). In the early 20th century, information about the harm of smoking came to China via American Christian missionaries. Those materials were written in a tone of half-science and half-religion, and combined Social Darwinist notions (e.g. smoking will lead to "degeneration" of the Chinese race) and puritanical asceticism; the information was, however, distorted by traditional Chinese ideas that doing things moderately does not harm health, and were also hampered by linguistic inappropriateness (Benedict, 2011; W. Liu, 2015).

Biomedical knowledge about the harm of smoking was publicised in China from the late 1970s onwards. From national survey data, F. Liu (2015) found that people born after 1978 demonstrated a decline in smoking prevalence, indicating that the hazardous nature of smoking began to spread among the public. A recent national research project (N = 15,095) investigated whether people knew smoking causes stroke, myocardial infarction, lung cancer,

erectile dysfunction, as well as whether second-hand smoking causes lung diseases (Chinese Center for Disease Control and Prevention, 2015). The outcome showed that nearly 80% of people knew that smoking leads to lung cancer but were unfamiliar with the fact that smoking leads to other diseases; more than 60% of people knew that passive smoking causes lung illness but fewer people (41.7%) knew that it also causes cardiac diseases (Chinese Center for Disease Control and Prevention, 2015).

Knowledge of the harm of smoking does not necessarily stop or reduce people's smoking. Studies have consistently pointed out that, although Chinese smokers mostly know the harm of smoking, their intention to quit is still low (Chinese Center for Disease Control and Prevention, 2015; Gong et al., 1995). People with higher education levels, and teachers in a medical school of a university, have reported comparatively greater smoking-related knowledge but it did not lead to less smoking behaviour (Chinese Center for Disease Control and Prevention, 2015; L. Niu, Luo, Silenzio, Xiao, & Tian, 2015; Xu, Liu, Sharma, & Zhao, 2015).

In-depth qualitative research has further explored this gap between knowledge and behaviour. Focus group discussions and interviews among Chinese people revealed some alarming beliefs, including that the harm of smoking is not serious and can be controlled; that second-hand smoke can be removed by air circulation; and the mistrust of negative health consequences of smoking (Berg, Zheng, & Kegler, 2016; S. Ma et al., 2008). In a study among a minor ethnic community in Yunnan Province, older participants even regarded smoking as a behaviour beneficial to their health (Zhao & Davey, 2015).

Interestingly, the smoking of leaders (at the highest level of politics) often influences Chinese people's understandings of tobacco's harms. The fact that leaders who smoked lived many years (famous examples are Mao Zedong, who lived for more than 80 years, and Deng

Xiaoping, who lived for over 90 years) has become a counter-argument of smokers to defend their reasons for smoking (Davey & Zhao, 2018; S. Ma et al., 2008). By the same token, historically, anti-smoking attitudes from elite members of Chinese society in the past can also be used as a barometer of the tobacco control policies. In 1905, a leading newspaper reported that the Empress Dowager Cixi (1835 – 1908) had studied materials regarding health and found that cigarette smoking is harmful to cognitive functions, and, thus, she quit smoking and banned the smoking of eunuchs and maids who served the imperial palace (Min, 1998). Consequently, anti-smoking rules were stipulated in the public policies (including school tobacco control, see p. 19), although the government then failed to implement these policies. Currently, none of the members of the Politburo Standing Committee smokes in public, which is entirely different from the Mao Zedong or Deng Xiaoping eras; Chairman Xi Jinping's wife, Peng Liyuan, was the "Anti-Smoking Ambassador" for the Chinese Association on Tobacco Control (C. Li, 2012). All these political factors indicate a potential unprecedented opportunity for China to implement successful tobacco control.

In short, most Chinese people including smokers understand the negative outcomes of smoking but this knowledge does not reduce/stop tobacco use. The intervention experience in the West also shows that dissemination of information about the harm of tobacco can change knowledge and attitudes but not necessarily behaviours (Botvin & Griffin, 2007). Importantly, in China, knowledge of smoking seems to be influenced by other factors such as beliefs of traditional medicine and the incidence of senior politicians' smoking. Although the current Chinese top leadership adopts a position of anti-smoking attitudes, designing and implementing culturally tailored smoking interventions that take account of situational idiosyncrasies are crucial to transform people's understandings of negative outcomes of smoking into actions (Gertner et al., 2010).

National tobacco control

As the country with one third of the world's smokers and a rapid growth of new smokers, it is estimated that mortality attributed to tobacco smoking in China has increased from 700,000 to 1,400,000 from 1990 to 2010 (G. Yang et al., 2013). If this trend is not curbed, China is predicted to have 2 million tobacco-related deaths annually in 2025 and 3 million in 2050 (B.-Q. Liu et al., 1998; H. Zhang & Cai, 2003). Researchers have realised the potential socioeconomic burden that the huge number of smokers will produce but it is hard for the government to rapidly shut down the tobacco industry which makes a substantial contribution to the national economy (T.-W. Hu, Lee, & Mao, 2013; G. Yang, Wang, Wu, Yang, & Wan, 2015).

The earliest legislation banning public smoking and teenage smoking was enacted in 1980 although it was only minimally enforced (C. Li, 2012). With the growth of public awareness of the hazards of smoking and second-hand smoking, a series of national and local regulations and rules have been implemented from 2008, such as warning notices on packaging and labelling and greater control of the depiction of smoking in the media. Recently, the government has adopted a number of aggressive national tactics including increasing the cigarette tax and legislative responses to tobacco control (G. Yang et al., 2015). However, these efforts are often "interfered" with by the tobacco industry (G. Yang, 2014; G. Yang et al., 2015). For example, companies used names like "low tar" or "Chinese herbal cigarettes" to suggest the product has lower harms than conventional cigarettes (G. Yang, 2014). Advertisements and promotions of tobacco industries, as well as low tobacco prices, are regarded as substantial triggers for adolescent smoking. Although the Law of the People's Republic of China on the Protection of Minors forbids the sale of tobacco to minors, in reality, grocers often violate this law (Chinese Center for Disease Control and Prevention, 2014; Shi, 2017).

The current status of tobacco control shows that China on the one hand has a long way ahead to achieve the goal of a smoke-free country but, on the other hand, is making an effort to reduce smoking prevalence. In this sense, this PhD project is timely as it is aligned with a current aim of the nation's development. Given the complexities of Chinese society, any tobacco control initiative would work only if socio-political factors that undermine anti-smoking initiatives are taken into account.

2.2. Smoking among Chinese adolescents

In China, most people spend their adolescence in schools. Currently, China has 524,000 junior middle schools with 43.12 million students, and 132,000 senior middle schools with 23.74 million students (Ministry of Education of the People's Republic of China, 2016). It is important to understand the smoking status of this huge population, as their health determines China's future.

Prevalence

So far, national data about adolescent smoking mainly come from the GATS (sampling age ≥ 15 years). However, these data are not fully transparent and information about specific age groups is lacking. The age group of our interest (15-19 years) is often grouped into 15-24 years. According to the latest official statistics, a smoking prevalence survey in 2010 reported that 14.2% male and 0.9% female 15- to 19-year-olds were estimated to be current smokers in China (Chinese Center for Disease Control and Prevention, 2011). In contrast to the adult smoking rate, which has slightly decreased in the past three decades, the smoking prevalence of adolescents is currently increasing. Specifically, surveys showed a decline from 1980 to the late 1990s before another rise in the smoking rates of men; but a significant increase in the smoking rates of women since the late 1990s (Chinese Center for Disease Control and

Prevention, 2011; Han & Chen, 2015; Weng et al., 1987; G. Yang et al., 1999; G. Yang et al., 2005).

Compared with countries like Ukraine and Turkey, China does not seem to have a high smoking prevalence among older teenagers (15 to 17 years; Asma et al., 2015). However, if the large population of China is considered, about 9 million regular teenage smokers is a staggering number (Centers for Disease Control and Prevention, 2014). If current trends continue, tobacco-caused deaths and diseases such as cancer, heart disease, and premature death will assume greater prominence (S. Niu et al., 1998; G. Yang et al., 2001; G. Yang et al., 2004; G. Yang et al., 2005).

Crucial age

Ji et al. (2009) have undertaken a large scale national survey on smoking behaviour among Chinese secondary and tertiary schools comprising 213,253 participants. The results showed that current smoking rates of male students gradually increased from junior middle school (12.3%) to senior middle school (26.3%) then to the tertiary stage (40.5%); and female students reached the peak at high school age (5.2%). It should be noted, however, that the majority of current studies examining Chinese adolescent smoking are cross-sectional and, thus, fail to capture changes across time within a cohort. In contrast, longitudinal studies conducted in the West provide valuable information for smoking in adolescence. Chassin, Presson, Rose, and Sherman (1996) used a longitudinal research design to look at the natural history of participants' smoking changes from middle adolescence to adulthood. They identified that adolescents significantly increased their smoking as they became adults. Using a statistical technique that considers heterogeneities among smoking patterns, Orlando, Tucker, Ellickson, and Klein (2004) followed up participants for 10 years (13 to 23 years old) and identified 6 different trajectories among this group; more importantly, all trajectories

merged into 2 distinct types in 23 years: low-frequency and high-frequency smokers. A longitudinal research study undertaken by Morrell, Song, and Halpern-Felsher (2011) showed that initiation of smoking in mid and late teenage years (16-17 years), as opposed to early teenage years, is more likely to mean the person becomes a smoker and maintain this habit. This result was evidenced in a Korean study (Chung & Joung, 2014), and is aligned with the dramatic growth of current smoking rates in the 15-19 and 20-24 age cohorts in China (Chinese Center for Disease Control and Prevention, 2011). It also explains that, although 82.3% of the Chinese smoking experimenters smoke before they are 13 years old, the prevalence stays comparatively low until 20 years of age (Chinese Center for Disease Control and Prevention, 2014).

Although the above longitudinal studies were conducted in the West, they have importantly highlighted that the later teenage years are a crucial age for smoking interventions. Therefore, based on available longitudinal findings, a smoking intervention in late adolescence (14-17 years) would appear timely in terms of a person's future smoking status and habits.

Current studies

Generally, studies examining Chinese adolescents' smoking behaviour are self-report surveys of smoking behaviour and associated variables such as demographic status and psychological factors. The aims of these studies are to investigate the factors influencing smoking behaviour to establish the smoking rates in different regions and to discover the correlations between smoking and other health-risk behaviours (X. Chen, Unger, Cruz, & Johnson, 1999; Chinese Center for Disease Control and Prevention, 2014; Fang, Zheng, & Lin, 2001; Huang & Li, 2005; H. Liu et al., 2012; L. Liu et al., 2012; Unger et al., 2001; Weiss et al., 2008; G. Yang et al., 2004; L. Zhang, Wang, Zhao, & Vartiainen, 2000). Most of these studies are

descriptive and correlational but offer limited insights into the underlying psychological mechanisms of smoking behaviour among Chinese people.

Existing correlational studies suggest that the determinants of adolescent smoking in China are multifaceted, consistent with those identified in the West, including individual, social, familial, biological, and political factors (Grenard et al., 2006; Piko, Luszczynska, Gibbons, & Teközel, 2005; Tyas & Pederson, 1998). Applying the theory of triadic influences, Grenard et al. (2006) synthesised the body of influences into three categories; interpersonal influences (e.g., parental monitoring, peer smoking), attitudinal/cultural influences (e.g., school academic performance, the concept of smoking), and intrapersonal influences (e.g., susceptibility to smoking). Q. Guo et al. (2010) found eight important cognitive attributions of adolescent smoking decisions from previous studies on the "meanings" of smoking: curiosity, coping, social image, social belonging, engagement, autonomy, mental enhancement, and weight control.

Overall, previous research in China and elsewhere has shown that the mechanisms of adolescent smoking are likely to be different to other age groups such as adulthood, suggesting a specific focus on this age group is necessary. Whereas the identification of the determinants of Chinese adolescent smoking behaviour is complex, relevant cognitions and cultural factors may play a role in attempts to prevent smoking onset and to reduce the uptake of smoking. While Western adolescent smoking suggests the possibility of basing Chinese programmes on existing prevention or intervention programmes (Grenard et al., 2006), a key factor of this thesis is to examine more fully these assumptions to ensure a culturally appropriate intervention response in attempts to tackle the concerning prevalence of smoking among Chinese youth.

2.3. School-based smoking interventions

Intervention levels and the scope of this PhD

There are multiple types of interventions. Each type is often based on different theories and the practices which may vary due to the concepts they are based on. According to Lane and Beebe-Frankenberger (2004), school-based interventions can be conducted at four stages.

- Level 1. Primary prevention. In this stage, interventions will be undertaken in class or at the school level, and the aim is mainly to prevent problematic behaviours.
- Level 2. Secondary prevention. Parents will be involved in this stage as the problem is not able to be fixed by only school teachers. It also means that familial influences are accounted for in this stage.
- Level 3. Tertiary prevention. Selective prevention programmes will only be conducted in a group of people or individually as the problem is not prevalent.
- Level 4. Special education. Only conducted when students feel they are unable to adapt to certain environments.

Most school-based smoking interventions can be categorised as Level 1 as most students are non-smokers. Therefore, a smoking intervention needs to incorporate two aims: for the majority group of non-smokers, it is a prevention programme; for the rest with smoking experience (current smokers and smoking experimenters), it is a cessation programme. This mixed approach has shown some preliminary success in reducing smoking rates among Chinese middle school students (X. Chen, Fang, Li, Stanton, & Lin, 2006).

Although this PhD is targeted at the Level 1 intervention (mainly to prevent student smoking), there are a number of ways to accomplish this aim. As this thesis aimed to design an intervention adopting a psychological lens, the use of “intervention” in this document does not include any medical or pharmaceutical approaches such as nicotine replacement therapy.

In other words, I define a smoking intervention as a specific type of health promotion practice. In the following section, school-based smoking interventions in China and the West will be reviewed. As the focus of this PhD is to develop and evaluate a school-based smoking intervention following psychological theories (for details, see Section 3), the following content refers to the factors related to this research endeavour.

Interventions in China

Given its large number of smokers, China does not have sufficient smoking cessation interventions to impact at the individual level alone. Undertaking a systematic literature review, Owotomo (2014) reported that smoking cessation interventions in low- and middle-income countries are not generally available and affordable for adults, and therefore cost-effective and culturally appropriate interventions are needed. The situation is similar for adolescents. Although numerous school-based smoking campaigns (both cessation and prevention) have been conducted in developed countries (Botvin & Eng, 1980; Botvin & Griffin, 2015; Gillespie, Stanton, Lowe, & Hunter, 1995; Leatherdale & McDonald, 2007; Lovato, Swihart, & Shoveller, 2008; Tortu & Botvin, 1989), interventions developed for Chinese teenagers are very limited.

Traditionally, school-based smoking intervention programmes in China comprise group meetings in class, teachers' guidance, and refusal skills training with mixed success in prompting attitudinal and behavioural change (Fang & Lin, 2003; Wen, Chen, Liang, et al., 2007; W. Yang, Zhang, Zhuo, Pan, & Ma, 2013; Y. Zhu et al., 2014). All these interventions' aims included both prevention and cessation as they were based on school students with different smoking experiences. One well-known school-based tobacco control framework, the only specific anti-smoking available guidebook in Chinese schools, is called "Do not smoke the first cigarette", developed by B. Tian (2004). In contrast to systems well applied in the

West, this guidebook coined a “new educational framework for school-based smoking prevention”, which aims to help students to establish correct views of aesthetics and values, to recognise the harm of smoking, and to refuse cigarettes offers. Different from other Western approaches, this framework suggests anti-smoking education should be ubiquitous in all school subjects. For example, English teachers should teach students sentences about the harm of smoking, fine art teachers should arrange students to draw smoker images, and biology teachers should educate students about a knowledge of nicotine (B. Tian, 2004). It also sets up different objectives for primary, junior middle, and senior middle school, respectively. For example, high school students should achieve the anti-smoking goals shown in Table 1. Although this framework provided a blueprint for tobacco control in schools, it does not have enough practical strategies. The collaboration across school teachers, parents, and residential representatives requires a considerable amount of time and resources. Moreover, activities in the guidebook are not evidence-based. For example, the activity “no-smoking healthy excursion” suggests students play a pass-the-parcel-like game with questions about the harm of smoking, but it seems unlikely that teachers would choose to play such a game and that it could be age-inappropriate for many students (especially high school students).

Table 1 Anti-smoking goals of high school students as per B. Tian's (2004) framework

Layer	Goals
Knowledge	• Most adolescents and adults are non-smokers. • Smoking impacts people’s health, appearance, socialisation, and economy in the short term and long term. • Cigarettes with and without tobacco both directly influence people’s health. • Residents’ committees are providing tobacco-related information and helping people to quit smoking. • Tobacco control projects can successfully help people to quit smoking. • Smoking has not been scientifically shown to alleviate stress and control body weight. • Smoking during pregnancy is harmful to foetuses. • Schools and communities can promote smoking-free environments. • People know that smoking harms one’s health, but many people feel quitting smoking is difficult.

Attitudes	• Vow that one won't smoke. • Be proud of being a non-smoker. • Be responsible for one's health. • Support others' non-smoking decision. • Be confident and determined to refuse smoking. • Support anti-smoking work in schools and communities to help others to quit or refuse smoking.
Skills	• Encourage others not to smoke. • Support and help those experimenting with smoking. • Express one's own attitudes towards smoking. • Demonstrate skills of rejecting cigarettes. • Understand tobacco advertisements and other forms trying to promote tobacco. • Find the right methods to deal with parents who smoke, to deal with personal troubles such as situations where one is encouraged to smoke by classmates. • Apply approaches taught by schools and communities to help others to quit or refuse smoking. • Initiate activities in schools or communities to support smoking-free environments.

Some limitations of previous studies and interventions include: (1) general and unclear reporting of procedures, which is problematic for replication (e.g. H. Ma, 2002; Wen, Chen, Liang, et al., 2007; Y. Zhu et al., 2014); (2) content focus on health information education, as noted by Fang and Lin (2003), without emphasising changes in underlying beliefs or skill development; and (3) limited study locations such as developed areas, e.g. Beijing, Zhejiang, and Guangdong (e.g. Fang & Lin, 2003; W. Yang et al., 2013; Y. Zhu et al., 2014), whereas areas with higher smoking rates (e.g., Yunnan, Qinghai) have been overlooked and require more attention.

However, there are still some valuable insights from the existing school-based interventions: (1) health knowledge is easier to change than health beliefs, and health beliefs are easier to change than behaviours (Botvin & Griffin, 2007; F. Gao et al., 2011; C. Liu et al., 2011; L. Tian & Xiong, 2000); (2) the content of interventions should include more interactions rather than didactic delivery, and activities such as the "nicotine toxicity experiment" (likely a chemical experiment showing the toxicity of nicotine) is recommended (Wen, Chen, Lu, et al., 2007); (3) smoking interventions have better effect on middle school students than on primary school students, and it seems more suitable for senior middle school students than

junior middle school students (Fang & Lin, 2003; B. Tian, Qian, & Zhang, 2006); (4) some culturally-related health beliefs (such as completely refusing others' cigarettes) could not be significantly changed by the interventions (Cheng, Li, Zhang, & Zhang, 2009; L. Tian & Xiong, 2000); and (5) although health education is very common in Chinese interventions, some still failed to make students realise the hazard of passive smoking, suggesting both more and other types of strategies are needed (Y. Zhu et al., 2014).

Interventions in the West

Similar to Chinese smoking interventions, school-based programmes in the West mostly aim to prevent or stop smoking among students. For Western school-based prevention programmes which emphasise information only curricula, social competence curricula, social influence curricula, combined social competence and social influences curricula, and multimodal programmes are identified as different types of interventions (for a systematic review, see Thomas, McLellan, & Perera, 2013). Comparatively, a social competence approach (including life skills such as problem solving, decision-making, resistance skills against media, and group influence) and a social competence with a social influence approach (including training of resistance skills dealing with peer pressure) were found to be more effective than other programmes in preventing smoking initiation (Thomas et al., 2013).

Although the review highlighted the role that social competence plays in school-based smoking interventions, it also suggested that other factors should be considered when interventions are applied in different cultures and ethnic groups (Lovato et al., 2008). Most of the current school-based interventions administrated in China can be categorised into information only curricula. However, dissemination of health information (with or without fear appeals) rarely changes participants' behaviour (Botvin & Griffin, 2004b, 2007); thus,

interventions incorporating social competence and social influences should be applied in China.

From the West to China

In terms of intervention design, approaches suitable for implementation in both China and the West exist. In the review by Botvin and Griffin (2007), interactive teaching is listed among the most effective approaches to prevent smoking, which aligns with findings of Chinese research (e.g., Wen, Chen, Lu, et al., 2007). In a national survey in China, 74.9% of junior middle school students reported they had noticed tobacco control information, and the regions of Yunnan and Xizang/Tibet showed a comparatively higher level of knowledge about the harm of smoking. Interestingly, these two provinces have among the highest smoking prevalence in China (Chinese Center for Disease Control and Prevention, 2014).

Several interventions implemented in China have been based on an adapted Western programme. Chou et al. (2006) translated Project SMART (Hansen, Johnson, Flay, Graham, & Sobel, 1988) along with some adaptations, and applied the intervention among 7th graders in Wuhan, China. Project SMART is built upon a social influence model (emphasises external factors) and affective education model (emphasises personal shortcomings); and fostering skills to face social pressures as well as to increase personal low-esteem (Hansen et al., 1988). Results showed that the adapted programme reduced students' smoking (Chou et al., 2006). Based on Project TNT (Project Towards No Tobacco Use, Sussman et al., 1993) and the MSPP (Minnesota Smoking-Prevention Program, Murray, Davis-Hearn, Goldman, Pirie, & Luepker, 1988), X. Chen, Fang, et al. (2006) adapted components about negative health outcomes, refusal skills, messages of tobacco promotions, as well as social influence and implemented the programme among 7th, 8th, 10th, and 11th graders. At 6 months after the intervention, there was a decrease in smoking rates (whether they smoked in the past 30 days)

in the intervention group (either delivered by researchers or school teachers) and an increase in control groups (X. Chen, Fang, et al., 2006). With the PRECEDE–PROCEED model (Green & Kreuter, 2005) containing four stages of programming (one implementation phase and three assessment phases), Wen et al. (2010) undertook an intervention among 7th and 8th graders in order to change their smoking-related knowledge, attitudes, and behaviour. The follow-up results (1 year and 2 years post-intervention) showed an increased knowledge of harms of smoking but no significant changes to behaviour.

As academic achievement is the primary goal for Chinese middle schools, and time allocated for health education is limited, the implementation of anti-smoking programmes should consider the length of time required. Based on the brief smoking interventions previously undertaken in China (e.g., X. Chen, Fang, et al., 2006; Zheng et al., 2007), it seemed reasonable that four sessions delivered on a weekly basis should be able to encapsulate sufficient activities for social cognitions and life skills, especially as part of a pilot study approach.

As Thomas et al.'s (2015) meta-analysis pointed out, although smoking interventions report their effectiveness (e.g., repeated measures quantitative statistics), the reason why they worked is difficult to ascertain without feedback from participants using qualitative methods such as focus groups. Such feedback is especially needed for Chinese intervention evaluations as anti-smoking programmes are at an early stage. Evaluations incorporating participants' agentic understandings of smoking and anti-smoking programmes may provide future interventions with valuable insights. As the delivery of all interventions is embedded in social structures, the mechanisms which influence the success of a smoking intervention can be elicited from these evaluations (Pawson & Tilley, 1997).

Life skills training: An established school-based intervention framework

Among school-based smoking interventions, life skills training is a well-known programme that has successfully worked among a wide range of students (Botvin & Griffin, 2004a, 2015). Based on social learning theory (Bandura, 1977) and problem behaviour theory (Jessor & Jessor, 1977), this training programme postulates that adolescent smoking is influenced by multiple factors (for the model of life skills training, see Figure 2). In terms of training curricula, the life skills training consists of three key parts: (1) a personal competence component (self-management skills), (2) a social competence component (social skills), and (3) a substance resistance component (health knowledge, resistance skills, health promotion attitudes and norms) (Botvin, 1980; Botvin & Eng, 1980; Botvin & Griffin, 2015). Although skills in this programme are mostly derived from cognitive behaviour techniques, they are used in educational environments rather than therapeutic settings.

Life skills training is an effective school-based smoking prevention programme (Thomas et al., 2013). Most studies used this method among junior middle school students, and successful results have also been obtained with primary school and high school students (Botvin & Griffin, 2015; Botvin, Griffin, & Williams, 2015). Although this training was not explicitly mentioned in previous interventions conducted in China, most Chinese programmes have included life skills training such as refusal skills and self-efficacy development (e.g., X. Chen, Fang, et al., 2006; Wen et al., 2010). Therefore, it is hypothesised that enhancing social skills will reduce the likelihood of using other substance such as alcohol and illicit drugs (Botvin & Griffin, 2007). For example, integrating life skills training and activities based on a psychological theory, J.-L. Guo, Lee, Liao, and Huang (2015) successfully reduced illicit drug use and other related psychological constructs among 7th graders in Taiwan. Thus, life skills training is likely a promising approach in preventing and reducing Chinese adolescent smoking. Practically, given that life skills training could

potentially provide students with outcomes beyond substance use prevention (e.g., academic improvement, health-risk behaviours prevention), it is more likely to be adopted by school administrators (Botvin & Griffin, 2015).

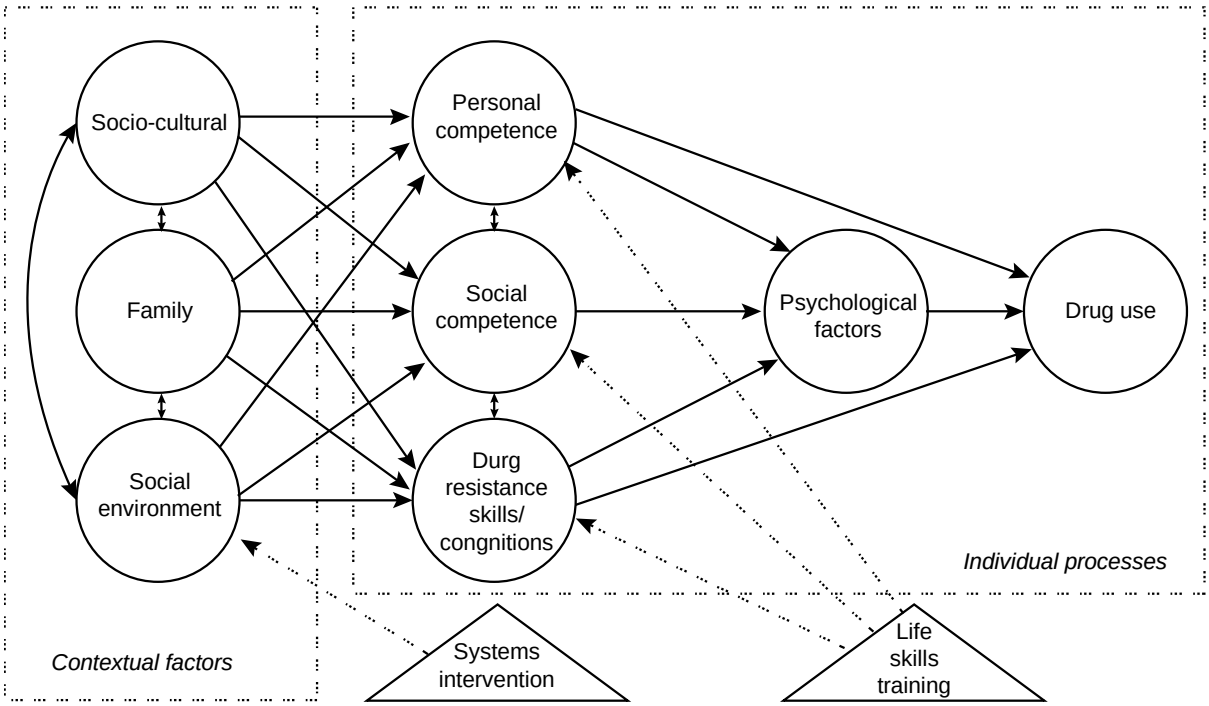


Figure 2 Targets of life skills training when developing interventions for adolescent drug use (Botvin & Griffin, 2015, p. 179)

Conclusion

Focusing on a psychological perspective, the aim of this PhD thesis is to develop a smoking intervention in China, a country where school-based smoking interventions are in their infancy. Similar to previous smoking interventions undertaken in China and elsewhere, the intervention in this PhD mainly aimed to prevent smoking among students. By reviewing previous anti-smoking programmes among adolescents, it is clear that intervention content should avoid information-only curricula. Although social competence seems to be an important target for smoking prevention programmes, cultural factors should also be considered in the design of activities. As an established approach, life skills training offers a potential for reducing smoking among adolescents by fostering students' social competence.

Furthermore, it is important to understand the effectiveness of the smoking intervention by taking account of social entities and perceptions actively constructed by participants.

2.4. Smoking as a historical and cultural phenomenon in China

China has a rich history of civilisation as well as a history of tobacco smoking longer than four centuries (W. Wang, 2002). Historically speaking, tobacco smoking and anti-smoking education are also influenced by other cultures (W. Liu, 2015). Thus, tobacco histories might unpack some myths of smoking in China relevant to designing an intervention.

Previously, scholars in various disciplines have worked on the history of smoking in China. Japanese researcher Kawatoko (2010) delineated the cultures of tobacco in China. Using folktales, histories, as well as the author's observations in field trips, his work provides readers with a general description of the various types of tobacco use traditions across China. In the PhD thesis of W. Wang (2002), the history of tobacco use in China during the Ming and Qing Dynasties (*circa* 1550 to 1900) was introduced in terms of a tobacco economy and people's understandings of the harms of smoking. This pioneering work pointed out that anti-smoking movements in the beginning of the 20th century were largely based on economic reasons rather than health considerations. As the factory-made cigarettes in the late 19th century were dominated by foreign brands, smoking bans could have stopped China's wealth "leaking" outside. Thus, early anti-smoking movements often regarded smoking as an issue of the whole nation and race rather than of an individual. American historian Carol Benedict located China's history of smoking in a global landscape, and importantly explained the current low smoking rate among Chinese women with the social influences during 1900 – 1976 (see the following section; Benedict, 2011). Huangfu (2012) analysed the status of the tobacco industry in the 1930s and concluded that awareness of smoking-related health issues was largely restricted to teenagers; instead of harm to one's health, the cost of cigarettes was emphasised as a primary concern in adult smoking. Recent work by W. Liu (2015) focused

on anti-smoking movements during the 1900s – 1940s. Teasing out the synchronicity of anti-smoking movements and patriotic movements, his work highlighted the difficulties of adapting modern Western ideas of the harm of smoking into the Chinese context. Given the scope of this thesis, the following section will only review those themes pertinent to my studies.

Gendered images

The low smoking prevalence rates of Chinese females has been a long-standing puzzle. The notion of female smoking was respectable until late in the Qing Dynasties (*circa* 1900), despite a few radical Confucians who condemned women who smoked for a lack of thriftiness and frugality, which was considered as one of the properties of an exemplary Chinese woman of the time. Interestingly, tobacco smoke was regarded as a strong *yang* medicine, a potent herb that women could inhale when their uterus was "cold" or their menses were irregular. However, since women are considered as having more *yin* than men, too much smoking was not considered good for women. In the early 20th century, the image of female smoking has gradually and dramatically become a sign of promiscuity (a so called "Modern Lady"). This stigmatised image did not change after 1949, when the People's Republic of China was founded. Women who smoked in the 1950s to 1970s were labelled as bourgeois or decadent people. For this reason, Chinese movies made at that time portrayed women who smoked as foreign spies or prostitutes (Benedict, 2011). With Chinese economic reforms, the gender empowerment of females in China has largely improved in the past 30 years, but the stigma of women who smoke has remained. Even in recent research, it is still reported that female smoking is associated with the image of a "bad girl" among adolescents (Davey & Zhao, 2012b; Okamoto et al., 2012).

Compared with the stigma of female smokers, men who smoke have been typically perceived as appropriate, with tobacco regarded as a *yang* medicine, agreeing with a male's nature within a traditional medicine framework (Benedict, 2011). Further, the male smoker image became a symbol of male authority and leadership after two Chinese chairmen, Mao Zedong and Deng Xiaoping, smoked in public (Davey & Zhao, 2012b; C. Li, 2012).

Confucian influence

Confucian ideas like filial piety, gendered social roles, and harmony have influenced smoking behaviour in China. As a traditional and dominant philosophy in China, Confucianism has defined a cultural disposition in Chinese families including how family members should behave. Filial piety (孝道) is an important concept in Confucianism. It originally meant the relationship between father and son, but was later extended to refer to other relationships like husband and wife. Based on filial piety, a wife should not disobey her husband (Rainey, 2010). Confucianism defines that males should take over the "outer matters" (business, earning money) and females the "inner matters" (domestic affairs). Smoking in a Chinese social context is often considered as a basic tool of socialisation, especially in business associations where accepting a cigarette could mean the possibility of a future partnership (Wank, 2000). For this reason, men smoke as part of their social duty. Moreover, family harmony is so crucial in Chinese families that disagreements about a husband's smoking are discouraged and not taken seriously (Mao et al., 2013). Consequently, female smoking is not proper, but females have to accept male smoking in the family (Mao et al., 2013).

Gifting and face: Sharing cigarettes

Based on the traditional meaning of gifting and face (面子), sharing/offering cigarettes is important in Chinese socialisation. It is a common social practice in China, as a part of the gifting culture (M. M. Yang, 1995). Sharing cigarettes has several implications. Tobacco

products with various prices reflect different socioeconomic status—people who smoke more expensive tobacco are considered to have higher socioeconomic levels. Offering expensive tobacco gives the receivers respect and face, and cartons of cigarettes are a common gift in Chinese society (M. Hu, Rich, Luo, & Xiao, 2012). Additionally, refusing a cigarette might be rude in Chinese culture, especially in business associations and work places (Wank, 2000). Culturally speaking, accepting offers of cigarettes relates to the concept of *bao* (报); in Chinese society, people believe that an action will consequently have a result, and thus the offer of a cigarette should have a reciprocal response (M. Hu et al., 2012; L. S. Yang, 1957).

Implications from this perspective

From the brief overview above, it can be seen that smoking in China is interwoven in cultural context, a complex web of meanings underpinned by Confucianism, traditional Chinese medicine, media, and social practices like gifting. From these meanings, male smoking is respectable and even necessary, but female smoking mainly symbolises immorality and promiscuity. Due to this social context, many men choose to smoke to socialise. Age also plays an important role in smoking as smoking among adolescents was regarded as unhealthy, but this health imperative for adults is not as salient.

2.5. Summary

China has the world's largest population of smokers, but current smoking interventions (both prevention and cessation) are insufficient. Smoking in middle and late adolescence is a crucial matter in the development of smoking interventions. However, the current interventions for this age are in their infancy. By reviewing existing interventions, most programmes applied in China were adapted from Western versions and generally failed to change smoking behaviour/cognitions. Without a deep understanding of smoking behaviour in a specific content, such research may be overlooking important underlying beliefs. Future

interventions, then, should be developed with a more comprehensive understanding of the target participants. Based on these understandings, my smoking intervention should be culturally-tailored and population-specific. Understanding Chinese history and culture is relevant when understanding proposed intervention strategies (e.g., refusal skills or independence training) and future studies.

3. THEORETICAL BACKGROUND

As mentioned previously, most smoking intervention programmes conducted in China were developed without strong theoretical grounds. Theory-driven interventions, however, can inform us of crucial or potentially amenable variables (Sutton, 2010). By conducting a theory-based intervention, researchers can also understand the mechanisms of a behaviour or beliefs by comparing the longitudinal data.

This PhD project developed a school-based intervention based on the theory of planned behaviour (TPB; Ajzen, 1991). The choice of this theory is based on the TPB's robust ability to predict intentions and behaviours as well as to design behavioural change interventions (Ajzen, 2011; Armitage & Conner, 2001; Schwenk & Möser, 2009; Steinmetz, Knappstein, Ajzen, Schmidt, & Kabst, 2016). Furthermore, as opposed to other psychological theories often used for behavioural change, the TPB is considered to be highly specific with clear operationalised guidelines (Sutton, 2015). However, as a risky adolescent behaviour, constructs from a variant of the TPB, the prototype willingness (PW; Gibbons & Gerrard, 1995) model, will be also considered (this model's inclusion is based on the findings from Study 1, see Section 5.5). This section will review these two models.

3.1. Theory of planned behaviour and its application

As one of the most influential social cognition models used in social and health psychology for the prediction of health-related behaviours, the TPB (Ajzen, 1991) posits that behaviour is co-determined by two cognitive components, namely behavioural intention to perform the behaviour, and perceived behavioural control. Intention is a proximal measure of behaviour as individuals typically engage in behaviours they intend to perform and is determined by three constructs: attitude towards the behaviour, subjective norm, and perceived behavioural control. Attitude represents an individual's evaluation of the favourability of performing the

target behaviour. Subjective norm denotes an individual's evaluation of the social acceptance or pressure to perform the target behaviour. Specifically, descriptive norm (describes perceptions of what others do) and injunctive norm (motivates action through social reward/punishment) are two components of subjective norm. Perceived behavioural control is an individual's assessment of the ease or difficulty of enacting the target behaviour (Ajzen, 1985; 1991; See Figure 2).

According to the TPB, these three constructs are influenced by beliefs: behavioural beliefs are used in the theory as people's estimation of a behaviour's possible consequences; normative beliefs are one's estimation of the likelihood that important referents would approve or disapprove of a certain behaviour; and control beliefs refer to one's estimation of the likelihood that a facilitator or inhibitor might occur (Ajzen, 2011). Although an individual may hold a number of beliefs, salient beliefs are considered as the immediate determinants of one's attitude (Ajzen, 2005; Ajzen & Fishbein, 1980). Specifically, Ajzen and Fishbein (1980) suggested that most frequently mentioned beliefs (considering both frequencies of each belief and distributions among participants) can roughly be regarded as one's salient beliefs. Thus, behavioural interventions (activities including persuasive messages, group discussion, modelling) need to change the underlying beliefs so that the factors proceeding to intention and behaviour can be influenced. This process can be accomplished by three methods: changing existing salient beliefs; turning existing non-salient beliefs into salient beliefs; or creating new salient beliefs (Ajzen, 2011, 2015; Sutton, 2010).

Although the TPB is a popular theoretical model used by health psychologists to investigate smoking behaviour, the majority of research has been conducted in Western countries (Harakeh, Scholte, Vermulst, de Vries, & Engels, 2004; Hassandra et al., 2011; A. J. Hill, Boudreau, Amyot, Déry, & Godin, 1997; Kok, de Vries, Backbier, & Dijkstra, 1995; McMillan, 2005; O'Callaghan, Callan, & Baglioni, 1999; ter Doest, Dijkstra, Gebhardt, &

Vitale, 2009; Trafimow, Sheeran, Conner, & Finlay, 2002). There is a nascent interest in the TPB among Chinese scholars. So far, only a few studies have explored the smoking behaviour of Chinese youth from a TPB framework. Notably, Q. Guo et al. (2007) conducted a preliminary evaluation of the TPB in a large (N = 14, 434) national (including seven cities) sample of school students with the TPB constructs predicting intention and behaviour reliably. In another TPB study (in Kunming) of 18- and 19-year-old students (Davey, McClenahan, & Zhao, 2014), the TPB explained significant amounts of variance in smoking intentions; 55-65% when measured directly. All standard TPB constructs were significant predictors of intention, although their relative importance differed between students depending on their experience of smoking (for instance, current smokers had higher mean scores in attitude, subjective norm, and perceived behavioural control than participants with other smoking experiences suggesting that, by reducing these constructs, one's smoking intention may consequently be reduced). The TPB also demonstrated utility in explaining Chinese rural middle school students' smoking intentions and behaviours (Su et al., 2015). Meanwhile, some extended TPB models have also been applied by researchers. Y. Ma, Ma, Luo, and Zuo (2013) investigated 1,303 middle school students (both in junior and senior cohorts; in Sichuan Province) and showed attitude, perceived behavioural control and past behaviour predicted smoking intention, although the predictive model for each cohort was different. Injunctive norm (whether one's smoking behaviour is approved or disapproved by certain groups) predicted intention better among junior middle school students, while descriptive norm (whether most people around you actually smoke) predicted intention better among senior middle school students. In the study by Y. Wang, Krishnakumar, and Narine (2014), the standard TPB constructs were combined with parenting practices such as psychological control and home rules to examine their effect on the smoking behaviour of Chinese adolescents (N = 658, 14-17 year olds). The results suggest parenting norms could

be an important component in future smoking campaigns. In another study focused on smoking behaviour among teenagers in rural areas of Guangdong Province, the results identified that TPB constructs and friends' smoking behaviour were important factors for the research population (Su et al., 2015). Additionally, besides predicting the intention and behaviour of smoking, Chinese researchers also applied the TPB to predict the intention of quitting smoking (Y. Yang, Zhang, Yu, Yu, & Wang, 2015; Zhou & Su, 2014).

In summary, a review of the relevant literature indicates that the TPB may serve as an appropriate guiding framework for this topic. However, it can be argued that there is much room for improvement for future TPB research in China. Firstly, as a basic principle in TPB design, TACT (Target, Action, Context, Time) for target behaviour specification is not firmly adhered to. Secondly, most studies are cross-sectional in design and, thus, they are not able to disentangle the predictors from the prediction of behaviour that a prospective design would allow. Thirdly, although the TPB is a theory open to other influences (i.e., can incorporate other constructs if they make theoretical sense and add to the explained variance; Ajzen, 1991), some research extended the TPB without a strong rationale. In addition, some surveys investigated populations ranging from 15 to 60 years, regardless of the heterogeneity in the samples. Fourth, most research adapted questionnaires from previous research, omitting the process of an elicitation study to identify population-specific beliefs (cf. Davey et al., 2014). Thus, it was difficult to know if the salient beliefs were representative of the target population. Moreover, as mentioned above, no TPB-based interventions have been developed for smoking among Chinese youth. Therefore, this PhD will contribute to existing knowledge by evaluating the utility of the TPB to explain smoking among Chinese youth and through the design and evaluation of a new TPB-informed anti-smoking intervention.

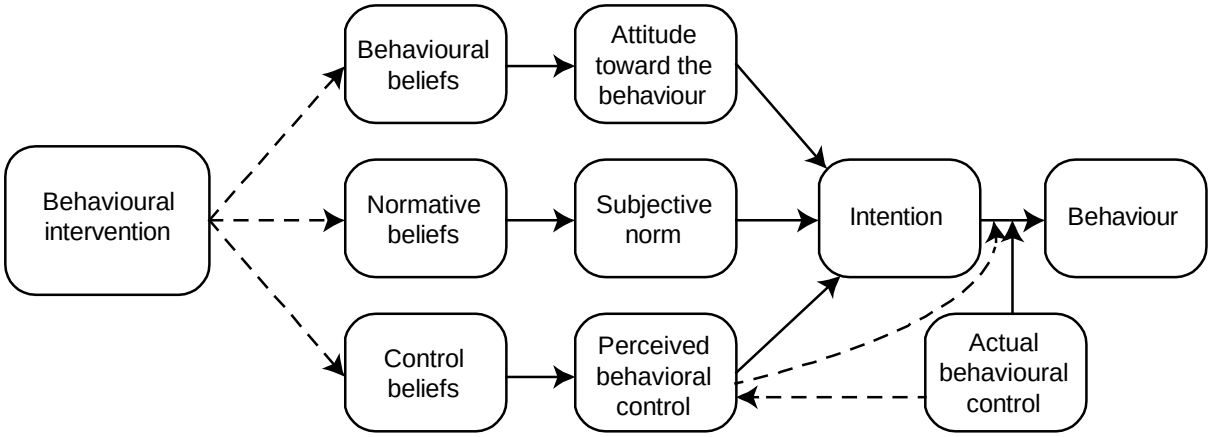


Figure 3 Expected effects of a behavioural intervention in the Theory of Planned Behaviour (Ajzen, 2011)

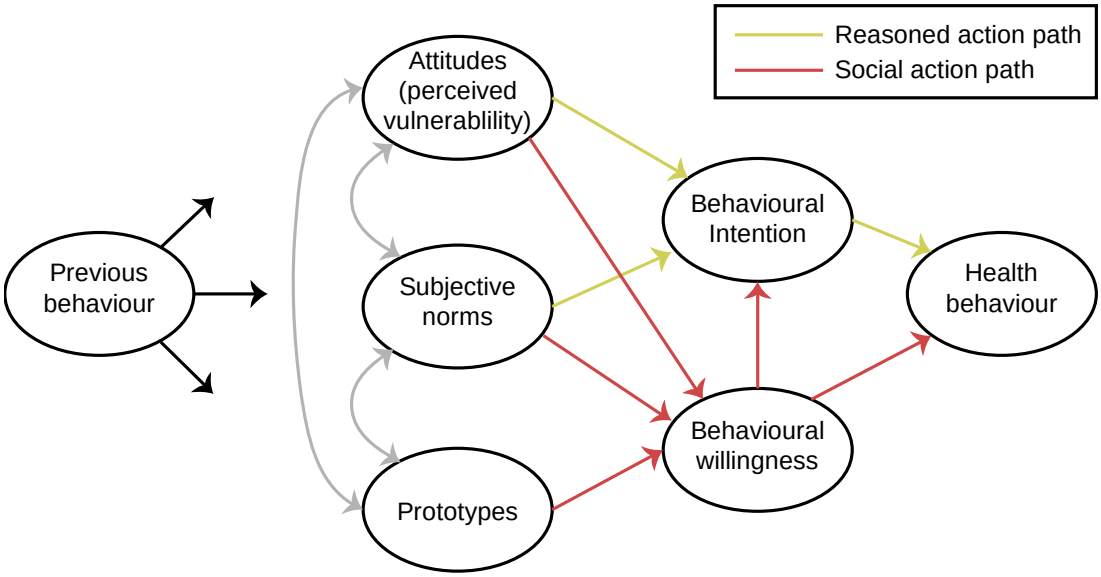


Figure 4 The Prototype Willingness model (Gibbons, Houlihan, & Gerrard, 2009)

3.2. Prototype willingness model

As a popular psychological theory of health behaviour, the TPB is often applied in social and health psychology. Nevertheless, emerging criticism has pointed out that the TPB fails to predict and change health-related behaviours, since the measures in the model only partially explain behaviours (Sniehotta, Presseau, & Araújo-Soares, 2014). As meta-analytic evidence by Armitage and Conner (2001) shows that the TPB explains 35-55% and 26-35% of the variance for intention and behaviour respectively, it suggests that the efficacy of the TPB varies according to the populations and behaviours, in part due to the assertion that the TPB is a reasoned decision-making model. In addition, the TPB works well for health-promoting behaviours, but less well for risky behaviours especially among adolescents (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; McCaul, Sandgren, O'Neill, & Hinsz, 1993; McEachan, Conner, Taylor, & Lawton, 2011; Webb & Sheeran, 2006).

Based on the precursor to the TPB, the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975), the Prototype Willingness (PW) model was developed for better predictive validity of adolescent health risk behaviour, with a more heuristic approach to decision making (Gibbons & Gerrard, 1995; Gibbons, Houlihan, & Gerrard, 2009). This dual-processing model (see Figure 4) contains a reasoned action path which is mediated by behavioural intention, and a social action path which is mediated by behavioural willingness. These two processes operate at the same time. The reasoned action path is similar to the process of the TRA and TPB, with cognitions proceeding to behaviour through intention. Besides intention, another proximal construct leading to behaviour is behavioural willingness, which is defined as the openness to risk opportunity, indicating one’s willingness to do some behaviour under certain conditions. Behavioural willingness is influenced by attitudes, subjective norm, and prototypes (social images of the typical person who does the behaviour); it determines intention and behaviour (Gibbons et al., 2009).

Previous research has demonstrated that prototypes and social norms play an important role in adolescents' smoking behaviour (Gibbons & Gerrard, 1995; Niedenthal, Cantor, & Kihlstrom, 1985) and it is likely that smoker images influence adolescents' decisions (Q. Guo et al., 2010). This finding is aligned with the PW model where there is another path preceding behaviour. As a model built for risk behaviour among adolescents, the PW model would be suitable for this PhD.

3.3. Summary

Both the TPB and the PW model provide useful conceptual frameworks to understand the determinants of behaviour in different domains, to develop interventions, and to evaluate the effectiveness of an intervention. As a reasoned or planned model, the TPB-based intervention targets changing beliefs, which can influence attitudes, subjective norms, and perceived behavioural control. This process should eventually lead to a change in intention and behaviour if people have volitional control over their behaviour. By adding a social action path, the dual-processing PW model posits that intention and willingness are both proximal antecedents leading to behaviour. This model was particularly designed for risky behaviours among youth, suggesting the future behavioural interventions should consider including content targeted at prototypes, which are an important component determining willingness. Following the above frameworks, different interventions can be designed, the effects of an intervention can be evaluated, and the reasons for an intervention's failure or success can be determined.

4. METHODOLOGY AND OVERVIEW

4.1. Methodology

The research program undertaken by the PhD candidate includes quantitative and qualitative methods. As shown in Figure 5, Study 1 was a qualitative study which aimed to explore the salient beliefs about smoking using the TPB among Chinese high school students. Given this purpose, this study is often called an elicitation study in the TPB field (Ajzen, 1991, 2011). The qualitative research based on the TPB was used to tap the beliefs of health behaviours (Duncanson, Burrows, Holman, & Collins, 2013; Dunn, Mohr, Wilson, & Wittert, 2008; Erasmus et al., 2009; Leske, Young, White, & Hawkes, 2014), and the results from this study will inform the next study on how to develop an intervention.

The second study contains several components: intervention development, implementation, and evaluation. The evaluation was a longitudinal design comprising three time points. To adjust for confounding effects, the design included both an intervention group and a control group. By comparing data from three time points, individual changes were identified (Ajzen, 2011). To enhance the understanding of the process and outcomes of the intervention, we also included qualitative studies, to understand how people really engaged in the programme (Palinkas et al., 2011). For the detailed protocol of the intervention, please see Section 6.3. The final stage of Study 2 is a qualitative design examining students' and teaching staff members' perceptions. By considering contextual factors, findings from this study can ecologically explain what actually happened in the intervention.

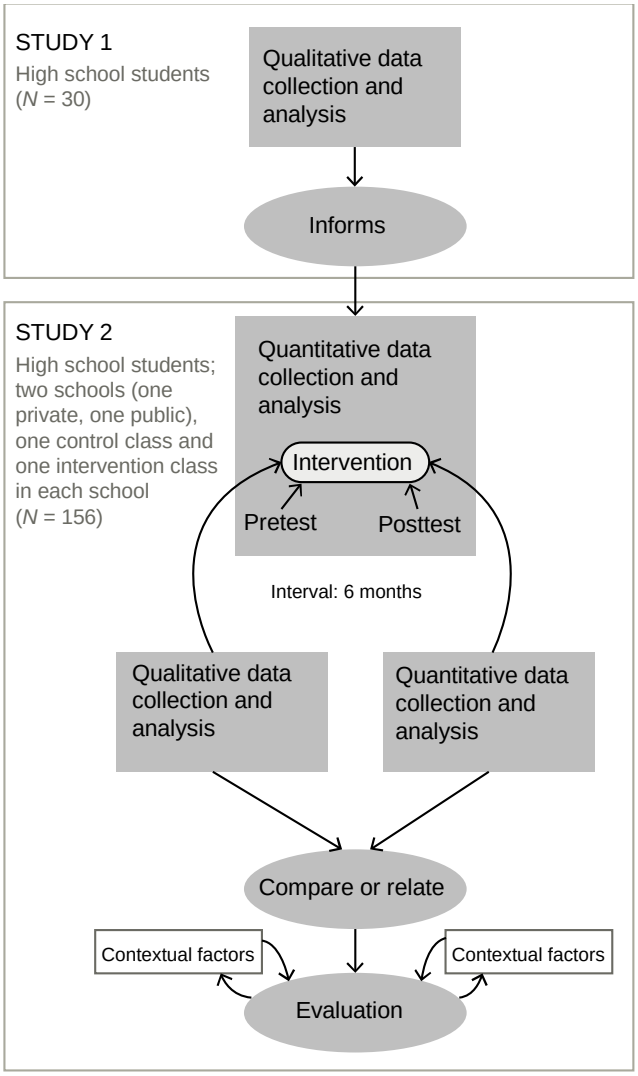


Figure 5 Project design

4.2. Overview

This thesis by published papers is prepared in accordance with the Queensland University of Technology Thesis by Published Papers Guidelines (see Section 10.9). The following sections in this thesis followed the aims and methodologies stated above:

- Section 5: A qualitative study exploring smoking beliefs among Chinese high school students. This study answers the research question 1, and its results inform the following studies. (Study 1)

- Section 6: Based on the beliefs elicitation study, an intervention ("Achieving my healthy future") was proposed. This section is a protocol of the intervention.
- Section 7: Using data (both quantitative and qualitative) from three time points, smoking-related changes were evaluated to answer the research question 2.A. Trajectories of smoking behaviour, intention, and willingness were also modelled. This paper shows the effect of the intervention as well as some smoking-related developmental tendencies across time. (Study 2A)
- Section 8: To answer the research question 2.B, a qualitative study was conducted. This study, including various qualitative methods such as observations, interviews, and focus groups, elucidated perceived barriers of the smoking intervention in Chinese schools. Findings also highlighted that social influences outside of schools substantially affected the smoking intervention. (Study 2B)

The final section will provide a general discussion covering key outcomes, significance of key outcomes, strengths and limitations of this research programme, and implications and future directions for research.

4.3. Ethics

This PhD project applied for two separate ethics applications from QUT University Human Research Ethics Committee (UHREC). Approval Numbers for Study 1 and Study 2 are 1500000044 and 1500001027, respectively. The variation of Study 2 was also approved before data collection. For emails/approvals from the Committee, please refer to Appendix (see Sections 10.2, 10.3, and 10.4). Given the fact that the study was conducted in China, principals of participating schools reviewed the research plan and provided consent to undertake the study before the study began, as per local research ethics practice. Due to the requirements of ethics (in Study 2B, participants' inputs potentially create a negative

reputation for participating schools), details about any of the school will not be reported in this thesis.

This intervention was registered at the Australian New Zealand Clinical Trials Registry. The Trial ID is ACTRN12616000224426.

4.4. Data management

The data from qualitative studies were stored via audio recordings. The transcribing and translation were administrated under a confidentiality agreement by the PhD Candidate himself. Documents from the above process were put into an encrypted zip package. Only the research team members can access these audio files. Once the project is completed, the audio files will be destroyed and the transcripts will be saved only for future research purposes.

The data from Study 2 were partly pencil-and-paper questionnaires. The valid information was entered into a computer with SPSS/Excel/Word and stored as the compatible form as per specific software (e.g., Mplus). Due to the expensive overseas post from China to Australia, storing original data at QUT is impractical. As per the data management policy of the School (the Candidate consulted with the School's Postgraduate Research Coordinator), the original paper format questionnaires were destroyed after scanning using readable digital format.

5. SMOKING BELIEFS AMONG CHINESE HIGH SCHOOL STUDENTS

5.1. Notes

This section is reproduced from Zhao, X., White, K. M., Young, R. M., & Obst, P. L. (2017). Smoking beliefs among Chinese secondary school students: A theory-based qualitative study. *Nicotine & Tobacco Research*. doi:10.1093/ntr/ntx012.

The authors listed below have certified that:

1. They meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. They take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. There are no other authors of the publication according to these criteria;
4. Potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit, and
5. They agree to the use of the publication in the student's thesis and its publication on the Australasian Research Online database consistent with any limitations set by publisher requirements.

Contributor	Statement of contribution
Mr Xiang Zhao (PhD Candidate) Signed: QUT Verified Signature Date: 31 Aug. 17	The PhD candidate was responsible for all aspects of this manuscript's preparation, including reviewing the literature, conducting the focus group discussions and interviews, analysing the data, and developing the arguments and ideas.
Professor Katherine White Professor Ross Young Dr Patricia Obst	All co-authors are or have been members of the supervisory team and provided on-going feedback (both oral and written) on all parts of the manuscript and provided permission for this paper to be included in this PhD thesis.

Principal Supervisor Confirmation

I have seen email or other correspondence from all Co-authors confirming their certifying authorship.

QUT Verified Signature

Professor Katherine White		31 Aug. 17
Name	Signature	Date

5.2. Abstract

Introduction: China has the world's greatest number of smokers but theory-based smoking interventions are rare. To develop an effective intervention, understanding the determinants of Chinese adolescent smoking is crucial. The Theory of Planned Behaviour (TPB) is empirically supported to predict and assist in informing intervention strategies to change health-related behaviours. Based on the TPB, the elicitation of shared smoking beliefs among adolescents can inform future intervention designs among this at-risk population. **Methods**: We investigated the beliefs from six focus groups (N = 30) of one senior secondary school in Kunming, Yunnan Province, China. We used semi-structured questions based on the TPB framework, including prompts about behavioural (advantages and disadvantages), normative (important referents), and control (barriers and facilitators) beliefs. Following the Consensual Qualitative Research (CQR) methodology, data were discussed until consensus was reached. Auditing was undertaken by an external researcher. **Results**: Seven domains (advantages, disadvantages, approvers, disapprovers, facilitators, barriers, and smoker images) were examined. Smoking as a gendered behaviour, smoking as influenced by cultural and environmental contexts, smoking as a strategy to cope with stress, and awareness of the harm of smoking, are highlighted themes across domains. Data suggested an extended-TPB framework as an appropriate approach to adopt when addressing smoking beliefs among the target population. **Conclusions**: These beliefs can be utilized to inform future school-based interventions and public health campaigns targeting smoking among Chinese adolescents. **Implications**: A modified TPB approach has potential for future smoking interventions among Chinese adolescents. Beliefs elicited in this study form a strong basis for designing a location- and population-specific antismoking programme.

5.3. Introduction

China is the world's largest tobacco consumer and manufacturer. It is estimated that 14.2% males and 0.9% females among Chinese 15-19-year-olds are current smokers (Chinese Center for Disease Control and Prevention, 2011). National investigations illustrate dramatic growth in male smoking rates from older teenagers to those in their early twenties—roughly, from 15% to 50% (Chinese Center for Disease Control and Prevention, 2011). China's portion of deaths attributed to tobacco use increased from 12% (0.6 million) in 1990 to 16.5% (1.4 million) in 2010 (B.-Q. Liu et al., 1998; G. Yang et al., 2013). If this trend continues, cigarette smoking will kill 3 million people in China per year by 2050 (B.-Q. Liu et al., 1998). Given mid- and late adolescent smoking is likely to lead to heavier cigarette consumption in adulthood (Morrell et al., 2011), smoking interventions among senior secondary school students are urgently needed in China.

Schools are ideal settings for smoking interventions among adolescents (Thomas et al., 2013). The legitimacy of health promotion, including school-based tobacco control is supported by Chinese laws and regulations. However, Chinese school-based smoking interventions are in their infancy. Most interventions undertaken in China have not been theory-driven and have methodological shortcomings (Wen & Chen, 2005; Wen et al., 2010). Further, adolescent smoking behaviour varies across regions and ages, and high risk regions such as tobacco growing areas are particularly worthy of attention (Anderson Johnson et al., 2006; Weiss, Spruijt-Metz, Palmer, Chou, & Johnson, 2006; T. Yang et al., 2015).

Previous interventions in China have been developed from the researchers' experience and/or by translating Western programmes with minor adaptations (L. Chen et al., 2014; X. Chen, Fang, et al., 2006; Chou et al., 2006). Although influences affecting adolescent smoking show some similarities between China and the West (Grenard et al., 2006; S. Wang, Yu, Zhu, Liu, & He, 1994; Weiss et al., 2006; B. P. Zhu, Liu, Shelton, Liu, & Giovino, 1996), an

investigation of the aetiology of the target population's smoking behaviour might increase the validity of subsequent intervention strategies. The determinants of adolescent smoking are multifactorial, including stress, peer pressure, media advocacy, social images, and curiosity (Davey et al., 2014; Davey & Zhao, 2012b; Grenard et al., 2006; Q. Guo et al., 2010; Tyas & Pederson, 1998). Given the complexity of the aetiology of smoking, it is suggested that interventions should be based on theory so that crucial variables that are potentially amenable to change can be identified (Sutton, 2015; Tyas & Pederson, 1998).

The Theory of Planned Behaviour (TPB; Ajzen, 1991) is a social cognition model which has been used as the theoretical basis to inform strategies to change health-related behaviours (Murgraff, Abraham, & Mcdermott, 2007; White, Hyde, O'Connor, Naumann, & Hawkes, 2010) and has been shown to encapsulate the factors influencing adolescent smoking (Davey et al., 2014; Q. Guo et al., 2007; Higgins & Conner, 2003). The TPB posits that one's behaviour is determined primarily by intention (i.e., a person's readiness to perform a behaviour). Intention is influenced by 3 factors: favourability towards the behaviour (attitude; e.g., I think it would be good if smoked); perceived social pressure to perform/not perform the behaviour (subjective norm; e.g., people important in my life would not want me to smoke); and perceived ease and perception of control to perform the behaviour (perceived behavioural control, also said to influence behaviour directly; e.g., I feel it is within my control whether or not I smoke; Ajzen, 1991). Previous studies showed that these factors reliably predicted smoking intention and behaviour among Chinese adolescents (Davey et al., 2014; Q. Guo et al., 2010).

Furthermore, the above 3 factors are influenced by beliefs: behavioural beliefs are people's estimation of a behaviour's possible consequences (e.g., smoking will lead to lung cancer); normative beliefs are the perceived likelihood that specific important referents (e.g., friends, family, teachers) would approve/disapprove of a certain behaviour; and control beliefs refer

to the perceived likelihood that facilitators (e.g., cheap cigarettes) or inhibitors (e.g., cigarettes not readily available) might occur that help/hinder the likelihood of my smoking. These beliefs are influenced by background factors such as demographic factors (e.g., age, sex) and knowledge (Ajzen, 1991, 2005). Identifying and changing critical beliefs should influence intended and actual behaviours. Thus, a belief elicitation study is typically used to obtain salient beliefs (prevailing thoughts) shared among a target population which can not only provide the content of belief-based measures in subsequent TPB predictive studies but can inform the design of future behavioural interventions in relation to which beliefs should be targeted (Ajzen, 1991, 2011).

Little research has investigated Chinese adolescents' smoking beliefs using a phenomenological approach. Several qualitative studies highlight the cultural differences of smoking in China. Notably, Hsia and Spruijt-Metz's in-depth qualitative study proposed that smoking has different meanings to Chinese immigrants in America as oppose to non-Chinese Americans (e.g., smoking is a culturally appropriate behaviour and is improper for females; Hsia & Spruijt-Metz, 2003). Another qualitative study found that, although females rarely smoke in China, they still tolerate male smoking at home, regarding it as a social tool for males (Mao et al., 2013). Research using focus groups reported that cigarette sharing is a form of gift-giving in rural China (M. Hu et al., 2012). Other qualitative studies showed that smoking is often regarded as a male action and smokers are thought to be manly and authoritative (Davey & Zhao, 2012b; S. Ma et al., 2008). As Ajzen pointed out, background factors (including culture) can influence beliefs; thus, eliciting the beliefs that are relevant for the target population is important (Ajzen, 1991, 2011).

We used a set of standard TPB elicitation questions to explore the salient beliefs of smoking held by 10th graders in a high school in Yunnan Province, China. Belief elicitation is a preliminary process by which researchers tap common beliefs with qualitative questions

among a specific population; as salient beliefs change over time, belief elicitation is an important initial stage when using a TPB framework (Ajzen, 1991, 2011). Yunnan Province was chosen because tobacco is Yunnan's pillar industry and the male smoking rate in this province is the highest in China (G. Yang et al., 2005; T. Yang et al., 2015). Students of this age were chosen because mid- and late adolescent smoking relates to heavy tobacco consumption in adulthood (Morrell et al., 2011). We conducted this study to inform a TPB-based anti-smoking intervention for this target group. The specific research questions were: (1) What are the behavioural beliefs of smoking for Chinese adolescents? (2) What are the normative beliefs of smoking for Chinese adolescents? (3) What are the control beliefs of smoking for Chinese adolescents? (4) Are there any other beliefs influencing smoking for Chinese adolescents?

The TPB has been criticised for its parsimony; its standard constructs might only partly explain the variance in behaviour (Sniehotta et al., 2014). Different approaches that have been adopted to extend the theory, including incorporating the TPB into a dual-process model (Conner & Armitage, 1998). Consequently, we encouraged discussion beyond the TPB constructs during the focus groups.

5.4. Methods

Location & participants

We conducted the study in Kunming, Yunnan Province, China. Kunming is in the southwest of China. It is the capital city of Yunnan Province, currently with 6.63 million residents (W. Hu, 2015). We selected one public secondary school for the study. Before the focus group, a consent letter was obtained from the Principal. With the help of the school Principal, the recruitment was conducted through paper flyers. Students who wanted to participate contacted their class monitors (students with disciplinary duties) or teachers. Fifteen female

and fifteen male participants who met the criteria (enrolled in 10th grade; 16 or 17 years old) were chosen (demographic information see Table 2) and grouped into 6 groups with different gender distributions (2 female groups, 2 male groups, and 2 gender-mixed groups) in order to balance any gender effects (Hsia & Spruijt-Metz, 2003).

Researchers

The research team consists of two Western professors (supervisors) and one Chinese male PhD student. The Chinese student conducted the focus groups. The team designed the question prompts and analysed the focus group responses together. Another Western academic was the external auditor, as per a Consensual Qualitative Research (CQR) approach (C. E. Hill, Thompson, & Williams, 1997). All three team members have experience regarding qualitative research in the health field including in CQR methods. With a working background as a school counsellor and teacher in secondary school, the Chinese student was familiar with the setting and target population. Also, as a local Kunming person (who was born, studied, and worked in Kunming for more than 25 years), the student was sensitive to local cultural differences and was informed about local slang and dialect. Given that the large cultural difference from the West to the East might lead to different understandings of the focus group data, the CQR method was utilised (C. E. Hill et al., 1997). Compared to grounded theory (Glaser & Strauss, 1967), the CQR depends more on collective work, member checking, and external auditing. Further, as an elicitation study for a smoking intervention, comparing systematically across data assures the representativeness of the results. Before the focus groups, the team discussed their assumptions: the 2 professors have extensive experience in social psychology, health psychology and clinical psychology, and have knowledge about interventions, and the Chinese student offered his understanding of Chinese adolescent smoking behaviour based on both his own working and research experience and his life experience as a Chinese person (Creswell, 2013; C. E. Hill et al.,

1997). The team members had developed a friendly and collaborative relationship which is essential for the consensus process and international collaboration, since each member can feel free to express his/her opinions (C. E. Hill et al., 1997; Palmer et al., 2011).

Data sources

Demographic form

Before each focus group, participants were asked to complete a brief demographic survey including their smoking experience, and the smoking status of their parents, best friend, teachers, and classmates.

Focus group protocol

Following the standard TPB elicitation questions (Sutton, 2010), 9 questions were asked for each focus group: *(1) What do you believe are the advantages of smoking? (2) What do you believe are the disadvantages of smoking? (3) Is there anything else you think is good or bad about smoking? (4) Which individuals or groups of people would approve of you smoking? (5) Which individuals or groups of people would disapprove of you smoking? (6) Are there any other individuals or groups of people would approve or disapprove of you smoking? (7) What factors or circumstances would make you more likely to smoke? (8) What factors or circumstances would make you less likely to smoke? (9) Are there any other factors you can think of that make smoking easy or difficult?* Questions 1 to 3 were designed to elicit salient behavioural beliefs, questions 4 to 6 salient normative beliefs, and questions 7 to 9 salient control beliefs.

Consistent with Ajzen's recommendations (Ajzen, 1991), we encouraged participants to answer the above questions freely. Specifically, these open-ended questions were asked with a funnel-based strategy: we raised them at the beginning, and used appropriate probes subsequently based on participant responses (Hsia & Spruijt-Metz, 2003; Morgan, 1997).

Moreover, as the initial study of a research program aimed at developing a culturally-relevant smoking intervention, the interviewer also asked the 5 focus groups some ideal ways of developing a smoking intervention in China (results to be reported elsewhere). Finally, participants were given the opportunity to add any other comments about the topic.

We chose focus groups because they generate rich data, with the ability to address cultural issues (Hsia & Spruijt-Metz, 2003). Compared to one-to-one interviews, participants in focus groups often feel free to express themselves in a more casual and relaxed way rather than a more formal manner since the number of participants in focus groups dilute the researcher's influence (Forrester, 2010). The interaction between participants also ensures that the information is gathered to establish commonly held beliefs as opposed to richer, individual experiences, consistent with the aim of an elicitation study in the TPB framework to obtain salient beliefs among the target population (Ajzen, 1991). A further practical reason of using focus groups was that students would likely feel more at ease when the smoking-related discussions were conducted as a group rather than one on one given that school-based individual interviews on this topic might resemble interrogation, especially for students who currently smoke. Focus groups as a way to elicit the meaning of smoking worked well in previous research among young Chinese adults (Hsia & Spruijt-Metz, 2003), although their research faced more complexities such as cultural and age differences (18-26 years) among participants.

Procedure

Six focus groups were conducted at the participants' school campus in a quiet classroom. To create a private and comfortable environment, no teaching staff members were present. Some participants may have been acquaintances. As Chinese secondary schools are close-knit communities, it was not hard for students to carry on conversations even though they may not

have known each other. Before each focus group, signed consent was obtained from every participant. The research explained the importance of respecting privacy, asking students not to share information about other students' smoking experience using any identifying detail since smoking is forbidden at schools. Some daily life topics served as an "ice-breaker" before each focus group. To avoid conformity, the interviewer emphasised that everyone's point is important and valued, that everyone was regarded as an expert of their own experience, and all answers were encouraged. Each focus group lasted about 1 hour and was audio recorded. QUT's University Human Research Ethics Committee granted ethical clearance for this study.

Table 2 Demographic characteristics of the sample (*N* = 30)

	N	%
Age		
16	27	90.0%
17	3	10.0%
Ethnicity		
Han*	24	80.0%
Others	6	20.0%
Gender		
Male	15	50.0%
Female	15	50.0%
Smoking experience		
Never smoker	21	70.0%
Experimental smoker	5	16.7%
Current smoker	3	10.0%
Former smoker	1	3.3%
Mother		
Smoker	0	0.0%
Non-smoker	30	100.0%
Father		
Smoker	24	80.0%
Non-Smoker	6	20.0%
Best friend		
Smoker	8	26.7%

Non-smoker	22	73.3%
Teacher smoking in current school		
Yes	30	100.0%
No	0	0.0%
Classmate smoking in current school		
Yes	20	66.7%
No	10	33.3%

*Han is the dominant ethnic group in China.

Data saturation was considered as the focus groups progressed. After each focus group, the interviewer started a preliminary sorting of themes attributing to behavioural beliefs, normative beliefs, and control beliefs. The content of the focus groups showed a high consistency and homogeneity, and the cumulative frequency of shared beliefs was stable for the last three focus groups which is an indicator of data saturation for theory-based elicitation (Charmaz, 2006; Francis et al., 2009).

Chinese Mandarin (*Putonghua*) was used during the focus groups because, as the team had discussed before the focus groups, Mandarin is the official language in school settings and everyone in schools can fluently use it. Before the focus groups, the investigator practised some questions with adolescents, finding that both the local dialect and Mandarin generated rich data. Given it was the official school language and produced data equally rich to that of the local dialect, Mandarin was chosen as the language used throughout the focus groups. After the focus groups were concluded, the audio-recordings were transcribed and translated verbatim and the investigator checked the transcripts to ensure their accuracy.

Following the custom in Chinese classes, participants were asked every question in turn. This approach has two benefits: everyone has the opportunity to speak and the interviewer can control the flow of dialogue lest the discussion digresses too much. This cultural modification was used more in a way to manage interactions (e.g., to encourage shy participants or to redirect a discussion that strayed from the topic) rather than mechanically repeating “next

please". Although the gender distribution varied, the discussions of each groups remained largely consistent. All of the discussions were friendly with some students stating that they enjoyed the experience. Participants provided deep and open expressions in all groups. In terms of the dynamics of groups, participants generally discussed the topics in a harmonious atmosphere and no participant tended to dominate any group.

Data analysis

The Consensual Qualitative Research (CQR) method was used for data analysis (C. E. Hill et al., 2005; C. E. Hill et al., 1997). The CQR method was originally designed to analyse clients' experience in psychotherapy, and is suitable in exploring the inner experience. Following the CQR process, the investigator, in conjunction with his supervisory team, designed the focus group protocol. The investigator collected data, individually read and analysed the transcripts, and the team discussed the content openly with various perspectives, and reached consensus on the meaning of research data. As a way to improve the validity and reliability, CQR also requires an external auditor who reviews the entire project and gives feedbacks on the domains and ideas (Creswell, 2013; C. E. Hill et al., 1997). Another academic audited the transcripts and provided feedback, which was incorporated into the data analysis. The major modification in this study as opposed to many previous CQR studies is to apply the CQR via focus groups although there are precedents in the use of a CQR analysis approach for focus groups (Chronister, Chou, Kwan, Lawton, & Silver, 2015; Leske et al., 2014; Veach, Bartels, & LeRoy, 2001). The present paper followed the guideline of the Consolidated criteria for reporting qualitative research (COREQ; Tong, Sainsbury, & Craig, 2007). No specific qualitative IT package, except MS Word, was used for the data analysis.

5.5. Results

As an elicitation study driven by the TPB framework, the analysis retained 3 TPB themes, namely, attitudinal beliefs (advantages of smoking & disadvantages of smoking), normative beliefs (approvers of smoking & disapprovers of smoking), and control beliefs (facilitators of smoking & barriers of smoking). The 3 themes comprised 6 domains, including 47 categories in total. Please see Table 3, Table 4, and Table 5 for the list of domain structures with selected quotes. Gender and prototype (social image) were identified as additional themes across the transcripts (see Table 6). Thus, besides the standard TPB constructs, prototype is an additional domain. Insomuch as gender played an important role in participants' beliefs, the analysis of each domain considered the influence of gender, with differences noted where relevant. The occurring frequency of each category was counted and assigned to three levels, as per previous studies utilising CQR methods—see notes underneath Table 3, Table 4, Table 5, and Table 6 (C. E. Hill et al., 2005; Leske et al., 2014).

Domain 1: Advantages of smoking

Participants described 6 advantages of smoking. For 'social tool', participants, no matter whether they were males or females, had thorough understandings of this advantage, and regarded smoking as a useful tool in socialisation. This category is associated with the last domain regarding social image (see Domain 7). Releasing pressure was frequently regarded as an advantage of smoking. Participants of both genders reported that smoking helps people to release pressure, alleviate negative emotions, and even lessen the pain in a "nervous breakdown".

For 'smoker image enhancement', male and female participants reported that smoking enhances one's maturity and "coolness". This positive connotation of a smoker image is discussed also in Domain 7.

For being ‘refreshing and stimulating’, participants reported scenarios from their own observation and knowledge of nicotine. For ‘passing time’, male participants claimed that they smoked when they were waiting or had nothing to do. For ‘helping the local economy’, students of both genders reported that smoking contributes to the tobacco industries and, thus, improves the economy.

Domain 2: Disadvantages of smoking

Participants described 11 disadvantages of smoking. For ‘harm to oneself’, most participants knew smoking causes illnesses such as cancer and respiratory problems. Also, participants thought smoking caused addiction.

Participants reported the harm of second-hand smoking, especially for young and old people. Also, both males and females said they disliked the smell of tobacco. For social conflict, participants mentioned the discord in their families when their fathers smoked. For ‘costing money’, although students spend money differently depending on their socioeconomic status, smoking was considered as a waste of money. As far as the negative female smoker image is concerned, participants of both genders showed a strong negative attitude towards female smoking, although the female smoker image also contains some positive connotations (see Domain 7).

For exposure to bad social influences, some of the participants mentioned smoking might lead to people getting acquainted with “bad” guys. Also, smoking was sometimes reported as a possible way to get addicted to other types of substance abuse such as drugs. For punishment from school, students reported that, although they can find a solution for smoking on campus without getting caught, it will be troublesome if teachers catch them. For encouraging others to smoke, participants treated smoking in class as a social influence which will lead to other classmates to smoking.

Table 3 Domain 1 & 2: Advantages and disadvantages

Categories*	Quotes
	Domain 1: Advantages of smoking
Social tool	If you stay with many people and all of them are smokers, smoking will make the atmosphere harmonious. (Male)
	Your relationship with others will be better [when you smoke with others] …if you do not accept other's tobacco, others will think you are out of the group and you can't join the group. (Female)
Releasing pressure	I think smoking has an important point that is to release the pressure… (Female)
	During the Senior High School Entrance Examination, I was under very big pressure then, the examination was very competitive. I wanted to enter a key school, so I had to study till very late. They understood it and approved me of smoking. (Male)
Smoker image enhancement	Once, I joked to [my good friends] that I wanted to smoke with them, and they gladly said: "Man, you finally grew up!" That's because smoking shows a kind of maturity. (Male)
	I saw some girl in the campus smoking to show off her coolness. (Female)
Refreshing and stimulating	One thing that made an impression of me was once my father drove his car overnight, from 1am to 6am and if he had not smoked, he would have fallen asleep; so he smoked one cigarette after another. He smoked 5 to 6 cigarettes during that night. (Female)
Passing time	When you are bored and have nothing to do, smoking kills time. (Male)
Helping the local economy	Smoking helps to develop the tobacco industry and boost the economy…My aunt plants tobacco, and she told me that this business is lucrative. (Female)
	Domain 2: Disadvantages of smoking
Harm to oneself	When people smoke, the tar, nicotine, and other chemicals in the cigarettes will enter the lungs and be absorbed by the human body, and something that stimulates the brain will be produced. (Male)
	Education always tells us that smoking is harmful to our physical health. (Female)
Addiction to tobacco	Smoking causes addiction. In my opinion, it is a weak poison—you cannot get rid of it if you smoke a lot. (Female)
	Smoking causes addiction. It is like the internet, which you can't get rid of. (Male)
Harm to others	Smoking also does harm to the people around. (Female)
	It [smoking] does harm to your health and your family members' health. (Male)
Bad smell	She would not like my smoking, since most girls hate the smell. (Male)
	I personally hate the smell—it is very strong. (Female)
Social conflict	My father is a smoker. I and my mother hate it very much. (Female)
	Even at home, my mother will blame my father when he smokes. And blaming makes people feel very bad. (Male)
Costing money	You will spend all of your life expenses to buy the tobacco. (Male)
	[Smoking is] a waste of money… Rich students smoke tobacco costing from 40 to 60 yuan [one pack, 20 cigarettes]. (Male)
Negative female smoker images	Maybe people think that girls who smoke are bad girls. (Female)
	I feel girls who smoke look abnormal and different. (Male)

Exposure to bad social influence	It may acquaint you with some bad guys. It is not good for yourself and others. (Male)
Leading to other types of substance abuse	In my opinion, smoking is easy to make you get addicted to drugs. (Female)
Punishment from school	In Chinese schools…you can find a way to do it afterwards. But if you are found by teachers, you will be punished—that's a problem. (Female)
Encouraging others to smoke	In my junior middle school, my class had one or two smokers at first…Later, more and more students were smoking. (Female)

* Note: General: mentioned by more than 4 focus groups (underlined). Typical: mentioned by 3-4 focus groups (regular font). Variant: mentioned by 1 or 2 groups (*italicized font*).

Domain 3: Approvers of smoking

Participants described 6 referents who would approve of them smoking. Participants reported that both casual friends and friends who are thoughtful and considerate are likely to approve of them smoking.

Both males and females mentioned that their fathers had approved of them smoking. This category is gendered, however, as smoking was often regarded as men's duty (see Domain 7). Only a few examples showed fathers' support for girls' smoking. For retailers' approval, participants reported that tobacco products could be also found in some entertainment places, and students could buy single cigarettes so that even with limited money they could smoke.

One male student mentioned his mother's ambivalent attitude towards his smoking. Other family members, especially those long-term smokers, were identified as approving of teenagers' smoking.

Domain 4: Disapprovers of smoking

Participants described 5 referents who would disapprove of them smoking. Participants often referred to their parents as the disapprovers of their smoking behaviour for the sake of health and that close friends (male or female) who cared about them disapproved of their smoking. Older relatives and relatives who care about them were reported as disapprovers of students' smoking; they even taught students how to reject cigarette offers in an appropriate way.

Participants reported that all teachers disapproved of smoking, at least on campus. They felt that it was unjust that teachers smoke but they cannot. However, students noted that teachers were not always strict with smoking, as they regarded smoking as a way for students to release pressure. Participants mentioned members of the general public who disapproved of smoking including bus drivers, doctors, and nurses.

Table 4 Domain 3 & 4: Approvers and disapprovers

Categories*	Quotes
	Domain 3: Approvers of smoking
Friends and classmates	My good friends, people who understand that I am under pressure, and considerate and tolerant people will approve of my smoking. They might pass me a cigarette when I am in bad mood. (Male)
	Maybe 'fair-weather friends'. They want it because they want to hang out with you… [They are] friends with whom you only have dinners. You only meet them at dinner tables. (Female)
Father	In the opinion of my father, drinking spirits and smoking cigarettes are a man's duties; you can, however, decide how much to drink and smoke. (Male)
	I guess my father will approve it [my smoking] … he told me that I was at a rebellious age, smoking at times does not matter… (Female)
Retailers	There is a kind of claw game in cheap game houses. The shop owner puts tobacco in the game machine… there [the machine] is no toys, only tobacco. (Male)
	There are some small shops near our school gate. You can buy one cigarette instead of a whole pack. Some students buy a few cigarettes together and share them… (Female)
Mother	My mother told me her attitude of smoking. It seems when you reach some age, smoking is unavoidable—you need learn how to smoke, as she said. (Male)
Other family members	Maybe some family members who have smoked from their childhood would approve it. (Male)
Friends of parents	Sometimes, my parents' friends pass me a cigarette on purpose… they are kidding you and trying to know if you are a smoker on campus. (Male)
	Domain 4: Disapprovers of smoking
Parents	My father told me that it is better not to smoke and smoking does harm to my health. (Male)
	My parents don't approve it, although my father smokes. He thinks it is bad for your body, so he won't let me smoke. (Male)
Friends	Generally speaking, most people and most places don't allow me to smoke…Friends who know the harm will persuade me not to touch it and advise me to quit it gradually. (Male)
	Friends who treat you genuinely will definitely disapprove it. (Female)
Other family members	My grandmother strongly disapproves of my smoking. When I was very young, she often told me that if someone passes me a cigarette, I should tell the person that I am ill in order to refuse it. (Male)
	Family members older than me will disapprove it. (Male)
Teachers	The teachers are smokers but they forbid us. It is contradictory. I feel the rules in school are arbitrary, someone can smoke but someone can't. (Male)
	Before the Senior High School Entrance Exam, teachers also turned a blind eye when they found students smoking, especially in the last two months before the exam. My dorm mate was caught when he was smoking, he explained it to the teacher why he smoked, and then he was not punished. (Male)

Members of the general public who disapprove of smoking	Smoking is banned in buses, because anyone who gets on the bus smoking will be forced to stop by the bus driver. When the passengers boarded, the driver has a kind of right to stop their smoking behaviour. It's similar to an aeroplane cabin. (Male)
	In hospitals, doctors and nurses will persuade you to stop smoking when they walk pass you, because your smoking affects others. (Female)

* Note: General: mentioned by more than 4 focus groups (underlined). Typical: mentioned by 3-4 focus groups (regular font). Variant: mentioned by 1 or 2 groups (*italicized font*).

Domain 5: Facilitators of smoking

Participants described 10 facilitators of smoking. For negative emotions, breakdown, stress, and difficult situations were thought to be facilitators of smoking. For social norm, smoking was thought to be prevalent and was considered as a social tool by which people communicate better with others (see also Domain 1 & 7). Cigarettes used as gift were reported as a facilitator. For environmental influences, internet cafes, pubs, game houses, and business trading associations were mentioned as places that encourage people's smoking.

Students also mentioned that they would initiate smoking due to curiosity. For tobacco price, students reported the low price of cigarettes and some cigarette shops made cigarettes even more accessible by selling single cigarettes. For tobacco packaging, participants regarded Chinese ones attractive and an indicator of price. They also have seen overseas tobacco packaging containing aversive imagery (government-regulated to discourage smoking).

Participants reported that boredom facilitated smoking, just like playing on mobile phones when people have nothing to do. For popular culture, participants were reminded of film scenes containing smoking which they interpreted as cool and a facilitator of smoking. Participants also thought that parents' smoking behaviour serves as an example to their children. For lack of health knowledge, participants thought smokers did not really understand the harm of smoking, and so they smoked.

Domain 6: Barriers to smoking

Participants described 9 barriers to smoking. For personal dislike, most female participants mentioned that they did not like smoking. However, only a few males expressed their strong dislike towards smoking. For environmental influences, gas stations, hospitals, airports, formal places, and some restaurants were thought as places where people are less likely to smoke. For objections of others, smoking will be embarrassing if people around are not smokers. The attitude of others such as a girlfriend and boss also played a role in one's smoking. For health education, information from schools and family were mentioned as a way to educate students. Also, impressive advertisements can influence. In terms of laws, participants usually compared anti-tobacco laws from China to other developed countries.

As far as conscience is concerned, male participants found that smokers limited their smoking in front of children, old people, and pregnant women. Participants reported that distracting yourself with other tasks help people forget smoking. For refusal skills, since refusing other people's cigarettes is regarded as a rude behaviour, participants often adopted an indirect way although direct refusal was also acceptable to be accepted by some participants. Illness, no matter minor or major, would stop people's smoking.

Table 5 Domain 5 & 6: Facilitators and barriers

Categories*	Quotes
	Domain 5: Facilitators of smoking
Negative emotions	Maybe it is a method you will choose when you have a breakdown… (Male)
	When something very destructive for you happened, you cannot cope with the pressure, you will suddenly begin smoking. This method won't do harm to others and it will reduce your negative emotions. (Female)
Social norm	People often send one carton of cigarettes as a gift. Some cigarettes are very expensive, as a valuable thing for smokers...(Female)
	Although I have not been in that kind of place, I can imagine it would be like this: people around you are smoking and you are sitting with them. If you do not smoke, there will be an intangible wall between you and the smokers. You cannot manage many things without smoking, since the society is built on socialisation. (Male)
Environmental influences	I can see many smokers around me, many people smoke in places like internet cafés and pubs. (Male)
	Places like pubs and nightclubs would be more likely to make me smoke. (Female)

Curiosity	When you see others smoking and you have never tried it before, you will be curious, even if you know smoking is harmful. (Female)
	If your parent smokes, you will imitate it because you feel curious. And it will become a habit. (Female)
Tobacco price	If the price is as much as that of houses [house prices are considered to be very expensive by the public in China], I believe few people will continue smoking. (Male)
	The price might discourage one's smoking, if it is too high. But you will smoke if it is cheap. (Male)
Tobacco packaging	Packaging is another factor. I saw local tobacco packaging when I travelled in Thailand. Their packaging contains all kinds of sickening pictures which will discourage me to smoke. (Male)
	Recently, I saw there is a new tobacco called "Secret Garden". I quite like its packaging, very beautiful. It is a little expensive, made by Yunnan Tobacco Company. I heard it was designed by Chanel designers. (Female)
Boredom	Take my father for example…he will smoke at the balcony when he feels bored, so as to kill time and relax. (Female)
Popular culture	The idea that smoking is a symbol of maturity is wrong. But it is not only the idea of students, but also the idea portrayed by books and media. It is misleading to regard smoking as something different and mature. (Female)
Parental smoking	Children smoke because they imitate their parents. (Female)
Lack of health knowledge	Although they say smoking is unhealthy, they look very healthy every day, so they think the knowledge is just a saying. The one who persuades and the one who is persuaded both haven't deeply realized the harm of smoking. (Female)
	Domain 6: Barriers of smoking
Personal dislike	My parents are non-smokers and I won't smoke even though they turn a blind eye. First and foremost, smoking does a lot of harm to me. (Male)
	I don't like smoking, so I will definitely not become a smoker. But if I want to smoke, I will join them and feel that nothing is wrong. (Female)
Environmental influences	When you are in a smoke-free place, you don't want to smoke… Vegetarian restaurants, hospitals, and somewhere formal such as the Great Hall of the People. (Male)
	But if you are in a place with good scenery and landscape, you feel smoking pollutes the environment. Also, in places like hospitals people seldom smoke. (Female)
Objections of others	Someone hates smoking very much, hoping all the smokers go away from them, because smoking does harm to them. If adolescents' smoking behaviour is regarded as an indecent behaviour, some teenagers might stop it because of the view of others. (Female)
	If your girlfriend hates smoking and you love her, you will not smoke, because you can do something for her. (Male)
Health education	The propaganda about the harm of smoking is everywhere. When you see that information, you don't want to smoke…The photos of a smoker's lungs are horrible. You don't want to smoke because you don't want your lungs to be like those. (Male)
	If the advertisement is impressive, I will be influenced; but if it is just ordinary, I think it is nothing to value. Further, if smoking produces negative effects for you, your behaviour will be prohibited. Education from schools and family also works. (Female)
Laws	I think the factors include legislation. I have been to Singapore. I found that country was very clean and no one smoked or spat in the streets. Even durians were not allowed there. If you want to smoke in the public, you will be fined a lot. Singapore has good legislation which makes you dare not to smoke even if you want to. (Female)
	Chinese laws, unlike laws in Singapore, do not strictly ban smoking in the public. Since we do not have such laws, people take smoking for granted. Most litters on the streets are the butts of cigarettes. The butts worsen the environment. And I don't think this will happen in Singapore. (Male)
Conscience	My father and cousin love smoking, but they will control their smoking behaviour when there is someone pregnant at home. (Male)
Distracting yourself with other tasks	For me, if I am very concentrated on the games, I will forget the cigarette is there. (Male)

Refusal skills	Refusing cigarettes from others is fine. However, if you are in business or formal associations, offering cigarettes means giving 'face' rather than asking you to smoke. Thus, it is OK you do not smoke it, but you should better accept it, so as to save other people's face. In other words, you should decide whether to accept it or not according to what place you are in and what people you are with. (Male)
Illness	If you know someone who has lung cancer because of smoking, this knowledge will influence you a lot. (Male)

* Note: General: mentioned by more than 4 focus groups (underlined). Typical: mentioned by 3-4 focus groups (regular font). Variant: mentioned by 1 or 2 groups (*italicized font*).

Domain 7: Prototype

Prototype (social image) is an important salient domain in participants' beliefs, besides the TPB domains. Participants regarded smoker images as 6 prototypes—with 2 negative connotations, 3 positive connotations, and 1 related to gender.

The smoker image was strongly related to gender. Compared to females, males look 'normal' when they smoke. However, smoking was described as acceptable by women when they were powerful and acting like males.

The negative smoker images were described based on the participants' identity as a student (e.g., a student who was not good at study, students from technical schools) and moral judgements (e.g., "childish"). Comparatively, the positive smoker images contained multiple layers—on and beyond campus circumstances, within or beyond participants' age groups. These images were derived from students' real life experience, as well as film imagery. Notably, social images related to business were reported across different positive prototypes.

Table 6 Domain 7: The prototypes of smokers

Prototype*	Meaning(s)	Quotes
	Gender related connotation	
Smokers are male	Smoking was regarded as a male behaviour. Female smokers were thought of as ill-mannered. Powerful females' smoking is appropriate.	"I feel most smokers are male; there are fewer female smokers." (Male) "In the opinion of my father, drinking spirits and smoking cigarettes are a man's duties" (Male) "Family members think females should be ladylike, and should not touch things like smoking." (Male) "Well, she smokes, wears things like an adult, with earrings, perms. She thinks smoking is a way of socialisation and self-confidence and maturity. She smokes with boys." (Female)

		"Some women smoke because they have the same social condition as males. You know, if a woman wants to do things that only men do, people will regard her as a 'superwoman'." (Male) "In my family, girls who smoke are regarded as not very cultivated." (Female)
Negative connotations		
Smokers are bad at study	An exemplary middle-school student is typically considered as a non-smoker. Compared to their peers, technical schools are thought to have a higher prevalence of student smokers.	"I think the fact that we do not accept other's cigarettes is related to our role as a student." (Female) "I think as a middle school student, smoking is not a proper behaviour." (Male) "In my opinion, girls attending technical schools are more likely to smoke…More students in those schools are socialising with people outside the campus." (Male)
Smokers are childish	Smoking was regarded as a childish behaviour.	"…in the eyes of my good friend, smoking is a symbol of manhood and maturity. Maybe he is kind of childish." (Male) "I know some boys smoke outside of the school campus. I think they are very childish. They said smoking and drinking alcohol is the only way for boys to become a mature man. I disagree with it." (Female)
Positive connotations		
Smokers are social (especially in business associations)	It is typical to smoke in Chinese socialisations. Especially in business associations, smoking plays an important role in negotiations.	"When I am a guest or catch up with friends and relatives, people will pass you a cigarette or a shot of alcohol if you look old enough." (Male) "Businessmen are more likely to use tobacco when they talk about the business…To adapt to this environment, you have to accept it." (Male) "Smoking can quickly reduce you and other's social distance, and make you understand people deeper when socialising, say, when discussing business." (Male) "If you discuss business in China, bosses would think that smoking is a facilitator for successful negotiation. Smoking plays a role for a win-win achievement." (Male)
Smokers are mature and fashionable	Smoking shows an image related to maturity, coolness, and fashion.	"For some people, smoking is a symbol of manhood and maturity." (Male) "Some people think it is fashionable to smoke…I can see many smokers around me, many people smoke in places like Internet cafés and pubs. Their behaviour makes me feel smoking is fashionable." (Male) "Smoking gives us a cool image. In films and dramas, a female smoker makes some girls feel that is what they want to be, and thus they will follow this behaviour. For boys, smoking is usually a cool thing." (Female)
Smokers are rich men	Participants reported that smokers who smoke expensive tobacco are rich men, since the price indicates one's socioeconomic level.	"For a rich person, smoking some tobacco might suggest his power and richness…The rich usually smoke very expensive tobacco…Especially in public places, they'd like to send cigarettes over the dinner table. I think it is a showing off of his power and richness." (Male) "Sending expensive tobacco shows their special status… In Yunnan Province, the most common tobacco is Yunyan and Yinxiang [local brand names]. Usually, Yinxiang is 60 to 100 yuan per pack. My father often takes it when he goes for dinner with other people." (Male) "There are some cigars, dearer and thicker, showing a person's status." (Male)

* Note: General: mentioned by more than 4 focus groups (underlined). Typical: mentioned by 3-4 focus groups (regular font). Variant: mentioned by 1 or 2 groups (*italicized font*).

5.6. Discussion

The present study is the first-known TPB-based qualitative study about smoking in China.

Methodologically, it provides a useful example of how to elicit salient beliefs among Chinese

adolescents, an approach with potential to be applied to other important health topics among this cohort. In the context of the TPB, an appropriate elicitation of beliefs can be an important base to design behavioural interventions. With an age- and location- specific sampling, important differences from previous studies were identified. For example, the influence of the local tobacco industry and academic stress due to the entrance examination before senior secondary school are unique findings for this research population. In addition, factors previously reported, such as smoking as a social tool, a stress coping strategy, and as a harm to health, were consistently raised. Friends and family members were mentioned as important referents affecting smoking. While social norm (smoking was regarded as a prevalent behaviour and commonly used socially) and negative emotions triggered smoking, certain environments impeded smoking. Four main findings are discussed below.

Smoking is a highly gendered behaviour

Participants reported that smoking was prevalent and related to gender. This finding is consistent with Chinese male smoking rate being among the world's highest, whereas the rate among females is the lowest (Asma et al., 2015). Furthermore, smoker images are strongly gender based. Smoking was regarded as a male behaviour and male students were, at times, encouraged by their parents to smoke given that they were male. In contrast, female smoking was regarded as ill-mannered; female smoking was seen as only looking appropriate when it is done by "women acting like men". In addition, these beliefs seem to be reinforced by popular culture (Davey & Zhao, 2012b). In contrast to previous adolescent studies in China, some participants challenged the historical and social background of disrespect for female smoking as sexist. This gender empowerment might explain the increasing tendency of young women choosing to smoke in recent years (Chinese Center for Disease Control and Prevention, 2011).

Cultural and environmental influences

Like previous findings, cigarette smoking and gifting were believed to be a way to socialise and improve interpersonal relationships (M. Hu et al., 2012; S. Ma et al., 2008). Smoking was seen as making the atmosphere "harmonious", indicating tobacco use as a social tool in China. In places like restaurants and pubs, participants reported that they were often exposed to smoke. However, places such as hospitals and gas stations are barriers to smoking. Business trading was sometimes mentioned as a natural association for tobacco use as businessmen often pass cigarettes and/or sent expensive cigarettes during business sessions. Accepting the cigarette or not could indicate whether the businessman would like to continue the business trade or not (Wank, 2000). Moreover, tobacco products were seen as being used in social relationships to express respect—expensive cigarettes represent wealth. Unique to the students in this study, local influences such as using tobacco products in commercial activities (e.g., claw game) indicate the high social acceptance of smoking. Likewise, several students had family members working for the tobacco industry and this may increase their favourability towards smoking.

Smoking is a strategy to cope with stress and negative emotions

Participants understood smoking as a way to cope with stress from life and study. Smoking before major exams was viewed as an acceptable coping strategy, used by some participants or their friends/classmates. Besides stress from study, some destructive events in their life also prompted smoking. This finding is consistent with previous studies in China, reflecting students' relative lack of healthy ways to deal with psychological problems and stress (Davey & Zhao, 2012b; Q. Guo et al., 2010). The present study identified specifically that the Senior Secondary School Entrance Examination (*zhongkao*) could cause young adolescents to smoke due to stress which suggests that interventions should be designed to target candidates of this

exam. Accommodating the smoking needs of stressed students by teachers ("turning a blind eye") also reinforced the culture of using tobacco to cope with stress.

Harms of smoking are well-known

Participants often mentioned that smoking and passive smoking are bad for people's health. They were aware of lung cancer and oral cancer being caused by tobacco use. Previous investigations also showed that most Chinese knew smoking is bad for health, but the health consequences of smoking were not fully known (Chinese Center for Disease Control and Prevention, 2011; S. Ma et al., 2008). This point was confirmed by our study, as participants thought that lack of health knowledge and education facilitates smoking.

Implications and future research

As an elicitation study, key beliefs collected can be translated to practice through school-based interventions and health promotion. First, given the high prevalence of male smoking and the positive social image of male smokers, programmes should increase the perceptions of control over smoking and/or influence over smoking of one's friends and family members. Second, practical and useful strategies of coping stress should be included in future interventions, as many students felt smoking is a way to cope with stress and negative emotions. Third, although the adverse consequences of smoking were known, triggers such as curiosity and imitation indicate students might smoke in a spontaneous way, so life skills training such as thoughtful decision-making may be useful (Botvin, Renick, & Baker, 1993). Fourth, social norms appear to be an important facilitator of smoking. Fifth, given that business trading was often related to tobacco use and positive social images, some consideration of future planning to resist smoking (i.e., when students have finished school) should be incorporated into interventions. As students sometimes fail to refuse cigarettes when offered as refusal might break social rules in Chinese society, culturally-appropriate

refusal skills should be considered as part of intervention strategies. Given the ‘meanings’ of expensive tobacco gifts, media literacy education may be beneficial (e.g., critical analysis of tobacco advertisements/ smoking images in films; Davey & Zhao, 2012b). Last, locality played a role in adolescent smoking, especially in a leading tobacco producing region, suggesting interventions should include local considerations including brand loyalty and economic sensitivities.

The present study provides many avenues for future studies. The methodology of this study can serve as an example for further phenomenological research in China and other countries. Accurate understanding of salient beliefs held by certain populations can be elicited and, thus, evidence-based intervention programmes can be designed. Based on the TPB factors elicited from this study, future research should operationalise these beliefs as part of quantitative studies to examine the adolescent smoking beliefs depending on age, schools, and locality. Although senior secondary school students were our target population, it was raised by participants that students from technical schools may have a higher smoking prevalence; future studies on the latter population should be conducted, then, to explore salient beliefs among a cohort with a potentially higher smoking rate. Furthermore, environment was a factor that could both facilitate or impede smoking, but the clear relationship between these places and tobacco use remains unknown. For example, it is easy to understand that gas stations forbid smoking due to safety reason but the mechanism by which places such as vegetarian restaurants and religious facilities impede people’s smoking requires further exploration.

Limitations and strengths

Limitations of this study include: (1) the small sample size limiting the generalisability of the results, although qualitative methodology posits probabilistic rather than representative

sampling; (2) the school was chosen with convenience sampling; (3) no female participants reported smoking experience; (4) the theory-based semi-structured format may have constrained responses; (5) more background factors such as socioeconomic status of the participant's family could have been obtained for a better understanding of the sample.

Strengths of the study include: (1) the salient beliefs identified can be quantified and tested among a wider population and to inform a theory-based anti-smoking intervention; (2) rather than simply considering the frequency of beliefs as suggested by Ajzen (1991, 2011), we utilised a phenomenological approach, revealing the complexity of adolescent smoking, as well as key beliefs of an additional domain (Prototype), extending the TPB (Sniehotta et al., 2014); (3) given the large number of smokers in China and the lack of tobacco control experience, this study's findings have far-reaching potential.

5.7. Conclusion

The present study is the first, known to the authors, specifically exploring Chinese adolescent smoking beliefs using a theory-based qualitative method. Our study has both clinical and theoretical significance. It can inform future smoking interventions and provide the beliefs to examine as part of an extended-TPB framework among Chinese adolescents. The research provides possible foci for developing school-based interventions and health promotion programmes, which are still in their infancy in China. These programmes should focus attention on male cessation, reinforce women abstaining, acknowledge cultural influences, and incorporate emotional regulation skills development.

6. PROTOCOL: “ACHIEVING MY HEALTHY FUTURE”

6.1. Abstract

Background: Reducing tobacco smoking and exposure to smoke will lower the risks for lung cancer. Targeting adolescents to prevent smoking or to assist them to cease smoking early in life will have positive health impacts. China is the world’s largest tobacco consumer and producer but theory-based smoking interventions for adolescents are lacking. As of yet, there has not been an intervention in this context based on the Theory of Planned Behaviour (TPB), although the theory has been shown to predict smoking behaviour well among Chinese adolescents. This study protocol describes a school-based intervention based on an extended theory of planned behaviour framework that aims to improve anti-smoking attitudes, intentions and behaviour among Chinese adolescents.

Methods/Design: We will recruit about 160 high school students (15-17 years) from a public school and a private school in Kunming, Yunnan Province, China, and randomise classes within each school to the intervention (n=80) or ‘wait-list’ control (n=80) group conditions. The intervention will encourage anti-smoking attitudes and beliefs, foster perceptions of normative support for anti-smoking behaviour, increase perceptions of control/self-efficacy to resist smoking, and enhance the favourability of non-smoker images. A licenced counsellor and teacher will deliver 4 × 40 minutes session over 4 weeks in both schools during class time. Data will be collected 1 week before intervention (Time 1), and at 1 week (Time 2) and 6 months (Time 3) post-intervention. Primary outcomes are smoking intention, willingness, and behaviour. Secondary outcome are attitudes, subjective norms, and perceived behavioural control over smoking, as well as smoker images, general assertiveness, dispositions toward critical thinking, coping without smoking ability, and decision-making ability.

Discussion: This study will examine the effectiveness of the theory-based intervention in improving Chinese adolescents' anti-smoking behaviour and intention.

Trial ID: ACTRN12616000224426. Registered on 18 February 2016.

6.2. Background

China's over 2 million yearly cancer deaths account for over one fifth of the world's yearly mortality (Stewart & Wild, 2014). Lung cancer is the most common and fatal cancer in China, and its incidence and mortality are increasing in rural and urban areas (W. Chen et al., 2016). As the primary cause of lung cancer, as well as a trigger for other types of cancer, tobacco smoking is prevalent in China. With over 300 million smokers, China is now the largest tobacco consumer and producer in the world (Chinese Center for Disease Control and Prevention, 2011). Reducing tobacco use and exposure to second-hand smoke is vital to reduce future lung cancer burden (Stewart & Wild, 2014). Although the government has developed campaigns to promote anti-smoking beliefs among the public, China does not have sufficient anti-smoking interventions.

Anti-smoking interventions for mid- and late adolescence are crucial. China's smoking prevalence among people over 14 years is 33.5%—62.8% for males and 3.1% for females (Chinese Center for Disease Control and Prevention, 2011). Recent nation-wide surveys showed slight declines in adult smoking prevalence, but investigations in 1996, 2002, and 2010 demonstrated dramatic increases in male smoking rates from the 15-19 age group to the 20-24 age group, from less than 20% to about 50% (Chinese Center for Disease Control and Prevention, 2011; Liang, 2015). Furthermore, the comparatively low rates of smoking among female teenagers (about 2%) are beginning to increase (Chinese Center for Disease Control and Prevention, 2011). This trend indicates the importance of anti-smoking interventions for the middle and late adolescent years, since increasing anti-smoking beliefs might reduce

males' future smoking behaviour and curb the rising tendency of smoking among girls. A longitudinal study also highlighted that between 15 and 19 years is a critical age for smoking interventions, as smoking at this age could lead to heavier cigarette consumption in adulthood (Morrell et al., 2011). Thus, a prevention and cessation intervention aimed at mid- and late adolescents may reduce the likelihood of their smoking in the near future.

Chinese school-based smoking interventions are still in their infancy. Traditionally, schools in China are the typical location for anti-smoking education. This placement was enforced by an official guideline, issued by the Ministry of Education and the Ministry of Health (now known as the National Health and Family Planning Commission) in 2010. Due to the nature of education in China, most school-based smoking intervention programmes comprise solely of anti-smoking information (mostly physical harms of smoking to the body) delivered by a school teacher (e.g., biology teachers). Previous research in China and elsewhere has established that dissemination of health information rarely changes participants' behaviours (Botvin & Griffin, 2004b, 2007; Fang & Lin, 2003). In a national survey, participants from Yunnan and Xizang/Tibet showed a comparatively higher level of knowledge of the harm of smoking. However, these two provinces are among the highest smoking regions in China (Chinese Center for Disease Control and Prevention, 2014). This finding supports the notion that information only is not sufficient to reduce people's smoking behaviour. Furthermore, as a country with diverse regions, location-specific programmes in China may be warranted (T. Yang et al., 2015). Thus far, most of the school-based interventions in China have been conducted in areas with higher socioeconomic levels such as Beijing, Zhejiang, and Guangdong, whereas areas with higher smoking rates—such as Yunnan and Qinghai—have been overlooked and require attention.

Most of the existing smoking interventions in China are not theory based; however, from a theory-driven intervention we can identify which variables are crucial or potentially

amenable to change (Sutton, 2010). As one of the most influential social cognition models used in social and health psychology for health-related behaviours, the Theory of Planned Behaviour (TPB; Ajzen, 1991) posits that behaviour is co-determined by two cognitive components, namely behavioural intention to perform the behaviour, and perceived behavioural control. Intention is a proximal measure of behaviour as individuals typically engage in behaviours they intend to perform, and is determined by three constructs: attitude towards the behaviour, subjective norm, and perceived behavioural control. Attitude represents an individual's evaluation of the favourability of performing the target behaviour. Subjective norm denotes an individual's evaluation of the social credence and pressure to perform the target behaviour. Perceived behavioural control is an individual's assessment of the ease or difficulty they would feel if they enact the target behaviour (Ajzen, 1991). According to the TPB, these three constructs are influenced by beliefs: behavioural beliefs are used in the theory as people's estimation of a behaviour's possible consequences; normative beliefs are one's estimation of the likelihood that specific important referents would approve or disapprove of a certain behaviour; and control beliefs refer to one's estimation of the likelihood that facilitators or inhibitors might occur (Ajzen, 1991, 2011).

The TPB constructs have been used to investigate adolescent smoking in China, although the majority of research has been conducted in Western countries. Q. Guo et al. (2007) conducted a preliminary evaluation of the TPB in 14,434 middle and high school students in 7 cities, with the TPB constructs predicting intention and behaviour reliably. In another TPB study (Davey et al., 2014) of 18- and 19-year-old students, the TPB explained significant amounts of variance in smoking intentions; 55-65% when measured directly and 29-33% indirectly. All standard TPB constructs were significant predictors of intention, although their relative importance varied between students with a differing experience of smoking (for instance, current smokers had higher mean scores in attitude, subjective norm, and perceived

behavioural control than participants with other smoking experiences). Although the TPB can explain 35-55% and 26-35% of the variance for intention and behaviour, respectively (Armitage & Conner, 2001), emerging criticism has argued that this theory fails to predict and control health-related behaviours, since the measures in the model only partially explain behaviours (Sniehotta et al., 2014). Previous research also identified constructs beyond the TPB variables that may influence Chinese adolescents' smoking behaviour such as peer smoking, parental monitoring, exposure to smoking imagery in film, academic performance at school, curiosity, coping strategies, and social images (Cai et al., 2015; Davey & Zhao, 2012b; Grenard et al., 2006; Q. Guo et al., 2010). The multifaceted nature of smoking determinants among adolescents suggest an extended TPB with other constructs that make theoretical sense, and add to the explained variance might be suitable, consistent with Ajzen's (1991) recommendations.

A smoking intervention based on the TPB has not been conducted thus far in China. According to the conceptual framework of the theory, volitional control over behaviours is to increase if the TPB factors are changed (Ajzen, 2011). However, the TPB is often used more for predictive models, but is less often used to develop behavioural change interventions (Sutton, 2015). Previous TPB-based interventions, conducted in the West, showed positive changes over some health-related behaviours [e.g., promoting sun protective behaviour (White et al., 2010) and reducing alcohol consumption (Murgraff et al., 2007)], although anti-smoking interventions are rarely conducted using the TPB. In light of the experience of school-based smoking interventions, a social competence approach (including life skills such as problem solving and decision-making, resistance skills against media and group influence) and a social competence with a social influence approach (including training of resistance skills dealing with peer pressure) are more effective than programmes of other types (Thomas et al., 2013). Chinese school-based intervention programmes incorporating trainings of social

competence approaches and social competence with a social influence approaches also showed effectiveness (L. Chen et al., 2014; X. Chen, Fang, et al., 2006; Wen et al., 2010). Thus, beside TPB belief-changing activities (changing existing salient beliefs, turning existing non-salient beliefs into salient beliefs), the ongoing programme will also include training from successful school-based smoking interventions such as general coping, assertiveness, and resistance skills as well as decision-making (Ajzen, 2011; Botvin, 1980; Botvin & Griffin, 2007).

The authors completed an elicitation study that is typically used in TPB research, investigating the salient beliefs held by Chinese adolescents (smokers and non-smokers; 16-17 years; N=30) in one high school in Kunming, China (Zhao, White, Young, & Obst, 2017). Data were collected from 6 focus groups and analysed using the Consensual Qualitative Research (CQR; C. E. Hill et al., 1997) method. Following this method, 3 researchers in the team analysed and coded the transcripts individually, then an external researcher audited the results and gave feedback. Six TPB domains (advantages, disadvantages, approvers, disapprovers, facilitators, and barriers of smoking) with different categories were identified. Additionally, social images (prototype) was an extra salient category throughout the focus group interviews. This elicitation study provided the salient beliefs the intervention needs to target, and suggests that constructs beyond the standard TPB variables, such as social image, should be considered.

Non-TPB variables will be considered. In view of the fact that Life Skills Training is a successful intervention programme to reduce risky behaviours among teens (including tobacco, alcohol, and marijuana use), we will incorporate training for general coping skills, refusal skills, assertiveness and decision making (Botvin, 1980, 1985). Given the favourability of the images of some types of smokers (e.g., a smoker is a rich businessman) and tobacco packaging we found in the elicitation study, we will use discussions of smoker

images and activities applied in media literacy education that have successfully reduced participants' intention to use tobacco (Kupersmidt, Scull, & Austin, 2010). Since visual imagery related to tobacco use can bias logic-driven thinking, facilitating students to critically challenge (with deconstruction skills like identifying target audience, hidden message, and visual elements) the seemingly positive visual messages (both movie images and commercial images promoted by tobacco industry) is suggested (Davey & Zhao, 2012b; Kupersmidt et al., 2010). Built on the findings of our previous study, we will pilot the present intervention in 2 classes of Chinese high schools.

Culturally appropriate adaptations for interventions are considered throughout the design process in the present study. Since most of the previous smoking interventions were developed in the West, languages, values, and other factors are likely to influence their effectiveness (Palmer et al., 2011). Thus, the intervention in the present research is not simply a translation of a Western programme. For example, the refusal skill training will show participants how to use pragmatic strategies to save others' 'face' when offered cigarettes, rather than emphatically refusing cigarette offers. As the leading tobacco producing region in China, Yunnan Province is also distinguishable from other regions in that research suggests that people in Yunnan have easier access to tobacco products (T. Yang et al., 2015). Therefore, in addition to culturally-specific sensitivities, we will include location-specific considerations in the intervention design.

This paper presents the study protocol for a pilot school-based intervention to improve anti-smoking behaviour and intention among Chinese adolescents. The research will use an extended TPB framework to develop and test the effectiveness of a smoking intervention. Besides the advantages, disadvantages, approvers, disapprovers, facilitators, and barriers of smoking—typical TPB constructs—we will also target social images and willingness in the Prototype Willingness (PW) model (Gibbons & Gerrard, 1995; Goldberg-Lillehoj, Spoth, &

Trudeau, 2005). We hypothesise participants with different smoking experience exposed to this intervention will report a significant improvement in their anti-smoking beliefs. We expect current smokers will reduce their smoking behaviour and/or intention and willingness after partaking in the intervention. We also hypothesise the increase of participants' anti-smoking beliefs and behaviour is based on an improvement of their general coping skills, refusal skills, assertiveness, decision making skills, and dispositions toward critical thinking. This research will contribute to the literature given the dearth of theory-driven smoking interventions in China, and the protocol has potential to provide a practical example to design anti-smoking interventions for the nearly 100 million Chinese youth in middle and late adolescence (15-19 years).

6.3. Methods/design

Study design

The study is a two-armed prospective cluster randomised controlled trial in which 4 classes (approximately 200 10^{th} graders; 15-17 years; both genders) will be randomised in a 1:1 ratio to the intervention or a wait-listed control group. Participants in both groups will complete surveys at baseline and post-intervention.

Study aim

This study aims to evaluate the effectiveness of a TPB-based smoking intervention for Kunming high school students in terms of increasing anti-smoking attitudes, normative support, self-efficacy, and perceptions of social images, leading to reduce smoking behaviour, intentions, and willingness. It is also expected that general assertiveness, dispositions toward critical thinking, coping without smoking ability and decision-making ability will be improved through this intervention programme, thereby promoting anti-smoking beliefs and behaviour.

Study sample

Eligibility criteria will include female and male students from Grade 10 with any smoking experience in one public high school and one private high school in Kunming, China. We will conduct an age/grade-specific intervention for two reasons: (1) cigarette smoking in adolescence is developmental, and thus varies between ages (Botvin & Griffin, 2007); (2) in terms of practicality, 11th and 12th graders have limited time to partake in intervention programmes due to the pressure of their upcoming College Entrance Examination.

We will recruit 2 high schools (1 private and 1 public) with convenience sampling. The research team will firstly obtain the approvals from the Principals, and then contact the leaders in charge of grade 10 via the Principals and randomly select 4 classes (2 in each school) from this grade (the public school has 12 classes in 10th grade, and the private school has 7 classes in 10th grade, as per the information provided). Then, the researcher will explain the project to the form teachers of eligible classes and ask for their approvals to access their students. If there is no interest expressed by the form teachers, the researcher will need to randomly choose classes from the remaining ones. Once the form teacher approve the participation of their class, their students will partake in the intervention or/and surveys compulsorily. All the intervention sessions and surveys will be conducted in the classroom on their campus. The school allowed the research team to use their "Class Lessons" (*banhuike*; in China, students usually discuss recent things that have happened in the class or listen to the form teachers' didactic talks or do academic exercises by themselves during this time) for the project. Both schools are boarding schools (most students live on campus during week days), acting *in loco parentis*, and thus the consent will be obtained from school leaders and form teachers rather than from parents (similar to other studies conducted in Chinese schools; X. Liu, 2003; Y. Wang et al., 2014).

The sample inclusion criteria and recruitment procedures were approved by the Queensland University of Technology Human Research Ethics Committee (approval number: 1500001027).

Sample size

Prospective power calculation suggested that about 130 participants (65 per group) were required to undertake a 3-time repeated measures MANOVA and multiple regression ($\alpha = .05$, $\beta = .2$); this sample size also enabled the utilisation of latent growth curve models (Newsom, 2015; Tabachnick & Fidell, 2013).

6.4. Study conditions

Control

Control participants will be wait-listed to receive the study intervention. Since the intervention will be conducted during school time, the control groups will attend their classes as usual. The facilitator manual of the intervention programme will be given to participating schools. Control participants will have the opportunity to receive the intervention delivered by teachers in the school when the study finishes.

Intervention

The intervention aims to (1) encourage anti-smoking attitudes and beliefs, (2) foster perceptions of normative support for anti-smoking behaviour, (3) increase perceptions of control/self-efficacy to resist smoking, and (4) enhance favourability of non-smoker images. Intervention sessions will be facilitated by a PhD student from Queensland University of Technology. With a sound understanding of local culture and school settings, this facilitator is a Chinese registered school counsellor and teacher with teaching and counselling experience in middle schools in Kunming. To comply with Queensland (Australia)

regulations, the facilitator will also have a Positive Notice Blue Card (an Australian safety check card that allows access to work with children). The intervention will be undertaken with middle school students during school hours. Approval of the form teacher of each participating class will be obtained before starting the intervention. All intervention-related activities will be conducted following the directions of the Principal or other senior staff regarding access to student participants and the location of testing. Testing and intervention sessions will take place in an accessible area designated by the school Principals or other administrative staff. Assistance will be available from school staff when required. The facilitator will follow the required procedures for visitors to the school (e.g., registering with an ID card at the school gate).

The intervention will be a 1 × 40 minutes session (equal to 1 class-time session) per week for 4 weeks (for details, see 10.8). Each intervention session will address a different construct (a diagram illustrating the intervention, see Figure 6). Session one will be designed to encourage anti-smoking attitudes and beliefs. Session two will focus on fostering perceptions of normative support for anti-smoking behaviour. Session three will aim to increase perceptions of control/self-efficacy to resist smoking. Session four will target enhancing favourability of non-smoker images. Activities for the intervention will include class-based discussions, generic skills training (e.g., culturally appropriate refusal skills, pragmatics including dialect use), and critical thinking over tobacco packaging and smoker images. At the conclusion of each session, participants will evaluate the program via a self-report feedback survey.

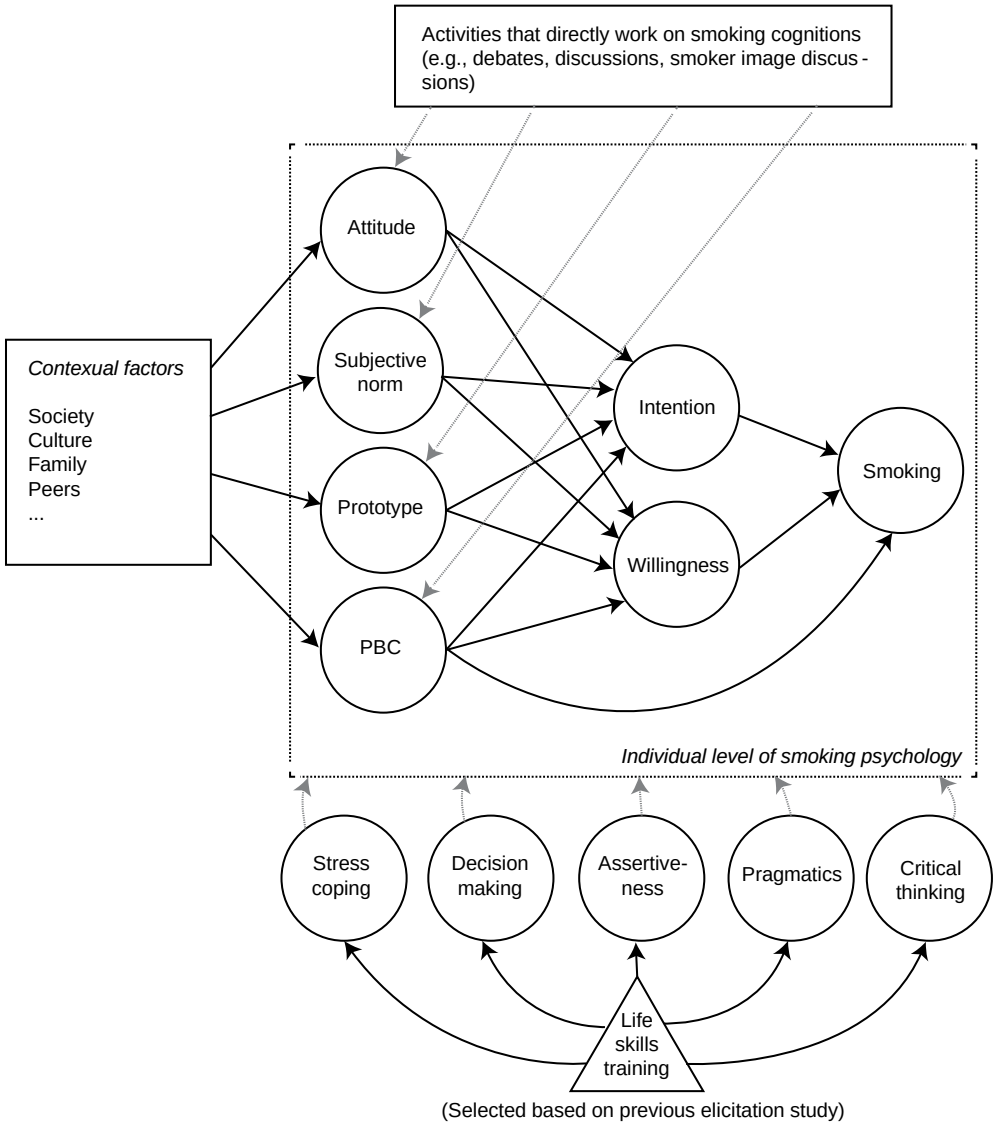


Figure 6 Theoretical framework and strategies of the intervention

6.5. Study and data integrity

The study design will be guided by the SPIRIT (Standard Protocol Items: Recommendations for Interventional Trials) Statement (Chan et al., 2013). Cluster randomisation will be conducted with a random number generator app by the investigator. The intervention was documented in detail as a facilitator manual, and the outline of the intervention was reviewed by the Principals and form teachers prior to the programme delivery, to ensure sessions are in

accordance with Chinese laws and regulations. Social validity (Lane & Beebe-Frankenberger, 2004) was considered, as tobacco control is aligned with the promotion of the all-round development of children and young people, as legislated by the Constitution of the People's Republic of China (Article 46); the Principals, form teachers, and school leaders in charge of moral education also supported the potential outcomes of life skills trainings, as these trainings have been proven to be able to reduce other types of substance use among adolescents (Botvin & Griffin, 2007).

6.6. Proposed measurement

We will use 3 waves of pre- and post- intervention (1 week before the intervention, 1 week and 6 months after the intervention). All surveys will be completed in students' classrooms (in Chinese high schools, each class has a fixed classroom) as paper-and-pencil self-administered questionnaires.

Variables

Demographic data in the pre-intervention will include age, gender, ethnicity and student type (boarding student or day student). Smoking status (including personal, parental, and friends' smoking status) will also be investigated; specific questions such as daily cigarette consumption, and favourite tobacco brands will be asked for current smokers. As an anonymous survey, a unique code for each student will be used to track changes across time.

Primary outcome variables will assess the changes of participants' smoking behaviour, intention, and willingness before and after the intervention. Secondary outcome variables will assess to what extend the intervention will improve participants' TPB constructs (attitudes, perceptions of normative support and perceived control) and other constructs (perception of non-smoker images, general assertiveness, dispositions toward critical thinking, ability to cope with stress, decision making abilities) in relation to smoking (see Section 10.6).

The target behaviour is “smoking cigarettes during the next week (i.e., the following period of 7 days)”. On the basis of information obtained in the initial focus groups, we are also testing secondary behaviours including asking others to stop smoking in their presence and refusing cigarettes from people with seniority. These behaviours will be measured at the same level of specificity in terms of in terms of target, action, context and time (TACT; Ajzen, 1991). All the TPB questions are developed using TPB guidelines (Ajzen, 1991, 2011), with 7-point Likert scales. Questions on willingness and prototype were developed strictly according to the PW model recommendations (Gibbons & Gerrard, 1995), with 7-Likert scales. In addition, other possible predictors will be assessed with an adapted general assertiveness scale (Gambrill & Richey, 1975), and dispositions toward critical thinking scale (Yeh, 1999), revised according to the language habits in Mainland China, as well as questions assessing coping ability and decision-making ability developed by the researchers with 7-Likert scales. To evaluate the effectiveness of the programme, future smoking intention (when the participants are aged 20-25 years and 40-45 years) will be measured with questions developed based on our initial qualitative interviews; for smoker respondents, their smoking habits (quantity, brands, self-smoking or smoking with others), and questions about trying to quit or reduce smoking will be assessed with items developed by the researchers along with open questions such as strategies used to quit or reduce their smoking.

Intervention implementation

At the end of the sessions, participants will score their overall satisfaction with the programme, as well as their immediate smoking plans after the intervention via an anonymous self-report feedback survey (for questionnaire, see Section 10.6). All of the intervention will be delivered by the chief investigator which assists in the consistency and fidelity of programme delivery across different classes. To ensure the appropriateness and suitability of the intervention fidelity, some practice/pilot activities (by myself or with

teenagers) will be conducted. As each activity will be a specific duration (see Section 10.8), the programme can be delivered similarly across classes.

6.7. Data analysis

We will compare baseline characteristics between groups with Chi-square and ANOVA. Outcomes will be mainly analysed using repeated measures MANCOVA to test the changes before and after the intervention for variables. Mediational analyses will be conducted if needed to assess that any change in the constructs and behaviour is via the effects of the intervention. Multiple regression will also be used to identify the relationships between smoking intention and other variables such as attitude, subjective norm, perceived behavioural control, general assertiveness, dispositions toward critical thinking, and abilities for coping and decision making. We will analyse the answers from the open questions (e.g., smoking cessation strategies one has used), applying content analysis. Missing data will be screened before data analysis; methods such as maximum likelihood estimation will be used if missing data are assumed to be missing completely at random and covariates will not be replaced when missing values occur (Little & Rubin, 2002; L. K. Muthén & Muthén, 1998-2015).

6.8. Discussion

This study trials a pilot school-based intervention to encourage anti-smoking beliefs and behaviour among Chinese high school students. As a country facing significant mortality and morbidity of cancer and other smoking-related diseases, China needs theory-driven smoking interventions, especially for older adolescents who are approaching early adulthood. This TPB-based intervention comprises psychological factors influencing adolescents' smoking behaviour, and has the potential to encourage anti-smoking beliefs and behaviours, which will ultimately reduce the lung cancer incidence due to smoking and exposure to smoke. In

the long term, this intervention could be adapted for other ages (primary school students, junior middle school students, and undergraduates) and in other Chinese regions.

7. INTERVENTION OUTCOMES AND SMOKING-RELATED TRAJECTORIES

7.1. Notes

This section is reproduced from Zhao, X., White, K. M., & Young, R. M. (Revision) A TPB-based smoking intervention among Chinese high school students: predictors of smoking-related trajectories. *Substance Use & Misuse*.

The authors listed below have certified that:

1. They meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. They take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. There are no other authors of the publication according to these criteria;
4. Potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit, and
5. They agree to the use of the publication in the student's thesis and its publication on the Australasian Research Online database consistent with any limitations set by publisher requirements.

Contributor	Statement of contribution
Mr Xiang Zhao (PhD Candidate) Signed: QUT Verified Signature Date: 15 Jan. 18	The PhD candidate was responsible for all aspects of this manuscript's preparation, including reviewing the literature, conducting the focus group discussions and interviews, analysing the data, and developing the arguments and ideas.
Professor Katherine White Professor Ross Young	All co-authors are or have been members of the supervisory team and provided on-going feedback (both oral and written) on all parts of the manuscript and provided permission for this paper to be included in this PhD thesis.

Principal Supervisor Confirmation

I have seen email or other correspondence from all Co-authors confirming their certifying authorship.

Professor Katherine White	QUT Verified Signature	15 Jan. 18
Name	Signature	Date

7.2. Abstract

China is the largest tobacco consumer and its adolescent smoking rate is increasing. Adolescence is a transitional period to adulthood. Research examining tobacco control in high schools has been overlooked. The aim of this study was to pilot and evaluate a brief theory-based smoking intervention in China, with a focus on anti-smoking cognitions.

The intervention programme was based on the constructs of an extended Theory of Planned Behaviour and life skills training. Using cluster (class-level) randomisation sampling, 106 10th graders from two high schools in Kunming, China received a four-session intervention; 101 students were assigned as control group members. Surveys were conducted at 3 time-points (1 week before the intervention, 1 week post-intervention, and 6 months post-intervention). MANOVA and propensity score matching (LCGA) were used to test the intervention's effectiveness and personal change trajectories over time.

The intervention failed to change smoking behaviour/intention, but curbed the increasing trend in pro-smoking attitude among male participants. Pragmatics and critical thinking also improved. However, the perceived approval to smoke from significant others unexpectedly increased in the intervention group. Trajectories of smoking behaviour, intention, and willingness, all assumed two distinct but constant latent classes, independent of the intervention. Regression analyses showed that being a male and current smoker, attitude, ability to cope with stress, assertiveness, and critical thinking predicted high smoking likelihood.

This study suggests that addressing attitudinal beliefs among adolescent males and building on pragmatics and critical thinking via additional strategies in life skills including stress coping and assertiveness may be beneficial.

7.3. Introduction

Smoking in mid- and late- teenage years leads to heavier smoking in adulthood (Chinese Center for Disease Control and Prevention, 2011). China is the world's largest tobacco consumer with adolescent smoking rates constantly high among males and increasing among females (Han & Chen, 2015).

China's smoking interventions are in their infancy. School-based smoking interventions previously undertaken in China had methodological shortcomings and rarely managed to reduce/prevent smoking at 6-month follow-up (L. Chen et al., 2014; Wen & Chen, 2005; Wen et al., 2010). Although most programmes have targeted junior secondary school students, national surveys indicate an upsurge in smoking rates from late-teenage years to early adulthood, signifying that tobacco control in this transitional period is crucial (Chinese Center for Disease Control and Prevention, 2011).

The Theory of Planned Behaviour (TPB; Ajzen, 1991) is a suitable framework for examining smoking in this age group. In the TPB, behaviour is determined by intention and perceived behavioural control (PBC; perceptions of control over behavioural performance); intention is influenced by attitudes, subjective norm (perceived pressure from others), and PBC (Ajzen, 1991), all with respective underlying beliefs. By changing underlying beliefs, the TPB constructs can be modified. Relatedly, the Prototype Willingness Model (PWM; Gibbons & Gerrard, 1997; Gibbons et al., 2009) posits that, besides a reasoned path of decision making as per the TPB, there is a social reaction path where prototypes (social images) predict people's willingness to perform a behaviour given supportive circumstances. The PWM has successfully predicted adolescent risk behaviours including smoking (Hukkelberg & Dykstra, 2009; van den Eijnden, Spijkerman, & Engels, 2006).

In addition to meta-analytic evidence for TPB interventions including among adolescents (Steinmetz et al., 2016), the TPB is able to encapsulate relevant psychological factors associated with smoking among Chinese high school students (Davey et al., 2014; Zhao et al., 2017) but its ability to inform an effective intervention in this context remains unknown. Based on a previous belief elicitation study (Zhao et al., 2017), we designed a TPB-based smoking intervention including life skills training which has demonstrated success in deterring students' smoking (Botvin, 1980).

Longitudinal studies on Chinese adolescent smoking are scarce. Limited research has showed that friends' smoking and attitudes towards smoking influenced teenagers' smoking (X. Chen, Stanton, et al., 2006). However, relationships between smoking/cognitions and other life skills are unknown, although life skills are associated with adolescent smoking (Botvin, 1980; Wills, Baker, & Botvin, 1989).

The aims of this study were: (1) to assess the efficacy of a brief theory-based intervention especially on anti-smoking cognitions; and (2) to explore any longitudinal changes (over 6 months) among participants (with or without intervention experience). As the majority of high school students are non-smokers, we hypothesised that participants in the intervention group, compared to control group participants, would show a larger increase over time in their anti-smoking cognitions (attitudes, subjective norm, PBC, prototypes) as well as their life skills; also, the smoking incidence in the intervention group was hypothesised to reduce.

7.4. Methods

Design

The study was a prospective cluster randomised controlled trial conducted in Kunming, Yunnan Province, China. Two secondary schools (1 public, 1 private) were recruited using convenience sampling. Four classes were randomly selected out of 19 classes in 10th grade

and allocated randomly to the intervention or control group. The study was approved by the University Ethics Committee and principals of participating schools provided consent to undertake the study.

Participants

Consent for students to partake in the study was provided, as per school protocol, by the form teachers of the participating classes.

As shown in the Figure 7, 207 students (all boarding students) were recruited. Classes were randomly allocated as intervention (n = 106 students) and wait-listed control (n = 101) groups. To balance school effects, each school had a class as a control group and a class as the intervention group. Attrition occurred at Time 2 (3.9%) and Time 3 (21.6%).

Considerations of sample size were threefold: (1) based on prior contacts with Principals in participating schools, one intervention class (usually 40 students per class) from each school was feasible for school operations; (2) As a pilot trial, 30 participants in each condition is recommended (Browne, 1995; Lancaster, Dodd, & Williamson, 2004); (3) Since changes in smoking-associated cognitions were the main focus of this trial, IBM SPSS MANOVA procedure was used to calculate the required sample size (60 participants in total could obtain a power of .76, with a mean standard deviation of 1.33 and an estimated correlation between all variables of .3), which could detect significant changes between the intervention and control groups (D'Amico, Neilands, & Zambarano, 2001). Based on these considerations, the number of participants at Time 1 (N = 207) allowed for an attrition rate of up to 71%.

Intervention

The intervention was designed based on formative research comprising a qualitative study among Chinese middle school students (Zhao et al., 2017). The decision for the number of intervention sessions was based on both previous research and practicalities. Some

programmes with only a few sessions have shown promise to reduce smoking among high school students and adults in China (X. Chen, Fang, et al., 2006; Zheng et al., 2007). Further, time constraints exist for school-based interventions; thus, the number of sessions (four sessions delivered on a weekly basis) was also chosen based on the practicalities of Chinese high schools where students typically have little class time allocated to health education. Similarly to a previous intervention targeting illicit drug use (J.-L. Guo et al., 2015), our intervention (facilitated by the first author) targeted extended TPB psychological constructs and life skills (for the theoretical framework, see Appendix A). Each session (40 minutes) included one main construct and one life skill (for practical strategies, see Table 1). Prototypes, part of the PWM's social reaction path, were included because distinct smoker images were salient among the target population (Zhao et al., 2017). The programme comprised activities designed to foster or strengthen anti-smoking beliefs (debates, discussions) and skill training (role-play, advertisement analysis).

Three surveys were conducted throughout the intervention: baseline (Time 1; 1-week pre-intervention), post-intervention (Time 2; 1 week post-intervention), and follow-up (Time 3; 6 months post-intervention). After each session, anonymous feedback surveys were completed. To triangulate the effect of the intervention in a qualitative approach, focus groups among participants and individual interviews of form teachers of participating classes were conducted six months after the intervention. The effects of the intervention during the past six months and suggestions for future improvement were openly discussed.

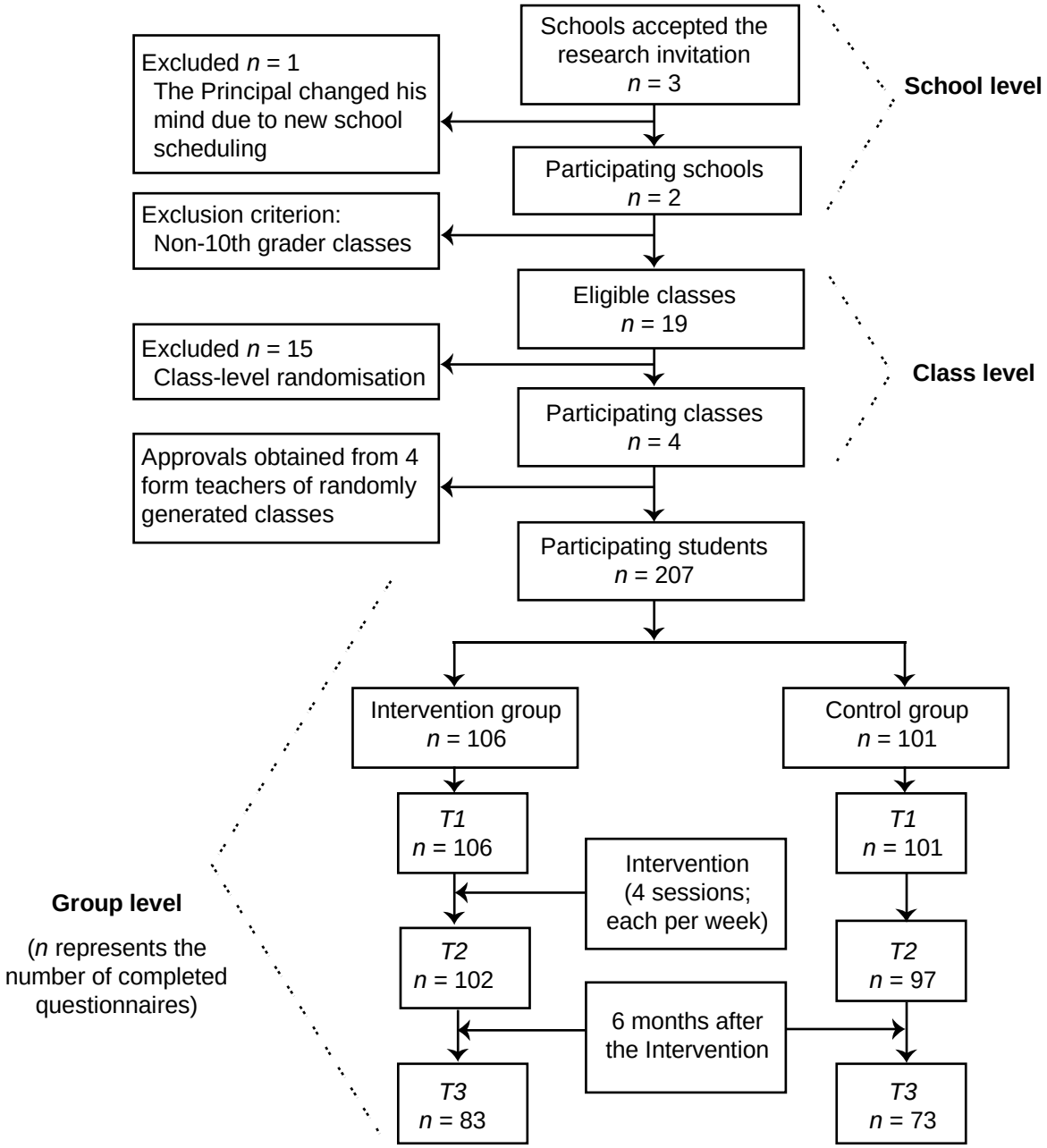
Measures

Age, gender, ethnicity, smoking status, smoking behaviour in the past 4 weeks, parents' smoking status, and friends' smoking status were assessed (see Section 10.6 for all measures).

Self-administrated measures based on TPB and PWM guidelines were specified to a behaviour (smoking cigarettes) and a timeframe (in the following 7 days) (Ajzen, 1991).

In addition to the Assertiveness Inventory (Wills et al., 1989) and the Critical Thinking Dispositions Inventory (Yeh, 1999), we assessed stress coping, decision making, and pragmatics based on the elicitation study (Zhao et al., 2017). As assertiveness (substance assertiveness, general assertiveness, and social assertiveness) and critical thinking (intellectual curiosity, open-mindedness, holistic and reflective, and systematicity and analyticity) are comprised of distinct subscales, we further analysed their subdomains rather than at the global level only.

All scales showed acceptable/close to acceptable reliability. To evaluate the intervention programme, we used quantitative responses including ratings of overall satisfaction of each session and asked open-ended questions for feedback on the intervention. All questions were developed in English and were later translated into Chinese.



Note. Considerations of sample size were threefold: (1) based on prior contacts with Principals in participating schools, one intervention class (usually, 40 students per class) from each school was feasible for school management; (2) As a pilot trial, 30 participants in each condition is recommended (Browne, 1995; Lancaster, Dodd, & Williamson, 2004); (3) Since changes in smoking-associated cognition were the main focus of this trial, IBM SPSS MANOVA procedure was used to calculate the required sample size (60 participants in total could obtain a power of .76, with a mean standard deviation of 1.33 and an estimated correlation between all variables of .3), which could detect significant changes between the intervention and control groups (D'Amico, Neilands, & Zambarano, 2001). Based on these considerations, the number of participants at Time 1 (N = 207) allowed for an attrition rate of up to 71%.

The relatively large sample lost at Time 3 resulted from students' school transfers. Although we deemed this attrition was unrelated to the intervention given the programme's compulsory nature, we conducted attrition analyses and identified no differences between participants who remained and dropped out in terms of their smoking behaviour (χ^2 (3) = 1.735, p = .629) or smoking intention, t(204) = -.420, p = .675.

Figure 7 Flow of the trial

Table 7 Overview of sessions of the intervention: Achieving my healthy future

Session[a]	Construct/skill	Activities	Aims of the TPB-based activities
1	Attitude Stress coping	Debate: What is the impact of smoking for people of your age and for your future life? Coping training: deep breathing techniques	Linking smoking to participants' current and future health and success in order to create their new beliefs against smoking.
2	Subjective norm Decision making	Discussion of approvers and disapprovers of smoking Decision making steps	By linking Confucian teachings on friendship and filial piety, the session highlighted that smoking is killing people who are important to participants and that participants can influence smoking of their friends or relatives.
3	Perceived behavioural control Assertiveness, pragmatics	Group discussion Training and role play: culturally appropriate refusal skills	With situational examples elicited from our previous qualitative study, this discussion focused on goal setting, and strategies to overcome barriers.
4	Prototypes Critical thinking dispositions	Smoker image discussion Critical thinking over tobacco packaging	Deconstructing social images of smokers (such as 'cool boys') among participants.

[a]The duration of each session was 40 minutes. A 5-minute-feedback survey was conducted at the end of each session.
Note. Session 4 of the intervention at the private school was delayed 1 week due to the school's scheduling.

Data analytic plan

Statistical significance was defined as $p \leq .05$ and the Confidence Interval (CI) was 95%. T-tests and χ^2 tests were undertaken to compare baseline variables. Intervention effects were examined through changes on self-reported smoking behaviour and related cognition variables. As smoking behaviour in the past 4 weeks is a repeated measured dichotomous scale, we used Cochran's Q test (Katz, 2010). We used repeated measures MANOVA to examine the changes over time between groups on related variables: proximal set (intention, willingness), cognition set (attitudes, subjective norm, controllability, self-efficacy, prototype), skills set (coping, decision making, assertiveness, pragmatics, and critical thinking), assertiveness set (3 subscales), and critical set (4 subscales). These MANOVAs

were undertaken among all participants and different genders. With psmatch2 available in Stata 14.2, propensity score matching with kernel logit function was used in order to balance baseline differences between intervention and control groups, thereby generating a more accurate trial evaluation (Katz, 2010; Leuven & Sianesi, 2017; Strong, Juon, & Ensminger, 2016; Timberlake, Huh, & Lakon, 2009). Specifically, the smoking status of participants and their friends, intention, attitude, and controllability of smoking were balanced between groups using a propensity score as they showed significant differences. The propensity score was adjusted in the MANOVA analyses as a covariate.

For the second research aim, changes across time were explored with latent class growth analysis (LCGA), analysing the smoking behaviour, intention, and willingness across 3 times, in a person-centred perspective (Jung & Wickrama, 2008; L. K. Muthén & Muthén, 1998-2015; Wickrama, Lee, O'Neal, & Lorenz, 2016). As opposed to smoking rates, which are traditionally used to compare behavioural changes, LCGA allows research to trace the smoking behavioural changes at an individual level. We modelled linear, rather than nonlinear, growth for 3 LCGAs as there were only 3 time points; variance and covariance values for the growth factors within each latent class were constrained to zero as per the guidelines of LCGA (B. O. Muthén & Muthén, 2000; L. K. Muthén & Muthén, 1998-2015).

When selecting the optimal number of latent classes, we considered multiple fit indices following three steps (Wickrama et al., 2016). Firstly, models whose smallest class included fewer than 5% of the total sample size were excluded. Secondly, sample-size adjusted BIC (SSABIC) statistics were compared and the model with the smallest SSABIC was considered best. Thirdly, entropy and likelihood ratio were evaluated: higher entropy suggests better separation between classes, significant results from likelihood ratio test indicate the k-class model has a better fit than the k-1-class model. Both the Bootstrapped Likelihood Ratio Test (BLRT) and the Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT) were undertaken but

the more robust LMR-LRT was applied as the local solution was reported in most of the BLRTs (Nylund, Asparouhov, & Muthén, 2007).

Logistic regression was then used to identify the relationship between predictor variables and latent classes in three trajectory sets. Defining the classes as outcome variables, a series of univariate logistic regression were conducted using demographic and smoking-related variables as predictors (univariate models); cognition set (attitudes, subjective norm, controllability, self-efficacy), skill set (coping, decision making, assertiveness, pragmatics, and critical thinking), assertiveness set, and critical thinking set were used as predictors in separate multiple logistic regression models. As this analysis aimed to provide broader information about trends irrespective of the intervention evaluation, covariates (neither demographic nor propensity scores) were not used as an adjustment for multiple logistic regression so as to avoid overfitting by using the idiosyncratic characteristics of the sample (Babyak, 2004).

7.5. Results

Baseline status comparison

As shown in Table 8, the proportion of current smokers in the intervention group (24.05%) was higher than in the control group (4.00%), $\chi^2(3) = 13.775$, $p = .003$. Furthermore, more participants in the intervention than control group reported that the majority of their friends were smokers ($\chi^2(3) = 8.096$, $p = .044$). Finally, the intervention group had higher intentions ($t(133.205) = -2.243$, $p = .027$) and more positive attitudes ($t(149.745) = -2.044$, $p = .043$), as well as lower controllability at smoking behaviour ($t(146.879) = 1.986$, $p = .049$). These five variables, thus, were modelled as propensity scores to balance the group discrepancies.

Table 8 Baseline Characteristics of treatment groups

Variables[a]	Control (N =75)	Intervention (N = 81)	*p* value[b]
Male[2]	61.33%	56.25%	0.521
Han Ethnicity[2, c]	69.33%	81.25%	0.085
Private school student[2]	41.33%	45.68%	0.584
Smoking status			**0.003**
Never smoked[1]	58	46	
Ever smoked[1]	10	12	
Quitter[1]	4	2	
Current smoker[1]	3	19	
Smoker father[2]	64.00%	60.76%	0.678
Smoker mother[2]	1.33%	3.80%	0.337
Friends' smoking status			**0.044**
None[1]	3.00	5.00	
Few[1]	23.00	23.00	
Some[1]	38.00	26.00	
Majority[1]	11.00	25.00	
Intention	1.60	2.07	**0.027**
Willingness	1.84	2.19	0.062
Attitude	1.97	2.46	**0.043**
Subjective norm	2.06	1.98	0.651
PBC: Controllability	5.75	5.23	**0.049**
PBC: Self-efficacy	3.37	3.45	0.774
Prototype	2.51	2.70	0.390
Stress coping	5.51	5.41	0.638
Decision making	5.57	5.45	0.453
Assertiveness	3.33	3.36	0.736
Pragmatics	3.73	3.69	0.737
Dispositions towards critical thinking	4.57	4.56	0.962

[a]Different statistic values are shown for variables: [1] represents frequency, [2] represents percentage, and the rest are means.
[b]Differences of variables resulted from χ^2 test (the part above the horizontal line) and t-test (the part below the horizontal line).
Note. PBC = perceived behavioural control. *p* values ≤ .05 are highlighted in bold. Smoking intention refers to one's intention to smoke. Smoking willingness refers to one's openness to smoking.
With psmatch2 available in Stata 14.2, propensity score matching with kernel logit function was used in order to balance baseline differences between intervention and control groups, thereby generating a more accurate trial evaluation (Katz, 2010; Leuven & Sianesi, 2017; Strong et al., 2016; Timberlake et al., 2009). Specifically, the smoking status of participants

and their friends, intention, attitude, and controllability of smoking were balanced between groups using a propensity score as they showed significant differences. The propensity score was adjusted in the MANOVA analyses as a covariate.
[c]Besides Han Ethnicity, there were 13 Yi People, 11 Hui People, 7 Bai People, 3 Naxi People, 1 Dai People, 1 Ha'ni People, 1 Yao People, 1 Zhuang People. Since non-Han populations are officially termed as minority ethnicities, we grouped participants as Han and non-Han for analyses.

Effect of the intervention

Across three time points, both intervention (Cochran's Q = 1.400, p = .497) and control group (Cochran's Q = 2.000, p = .368) participants showed homogeneous patterns on their smoking behaviour in the past month, reflecting no significant changes due to the intervention.

Using a series of repeated measures MANOVAs among all participants, there were no intervention effects in multivariate tests across time on the proximal set, cognition set, skills set, or assertiveness set. However, significant univariate time by intervention interaction effects included subjective norm, $F(1.828, 259.521) = 3.983$, p = .023, η^2 = .027 and pragmatics, $F(1.973, 278.191) = 3.032$, p = .051, η^2 = .021. While pragmatics (noticeably at Time 2) increased in the intervention group, subjective norm gradually rose across time. Students in the intervention group perceived more approval from significant others to smoke, although their expressive skills of refusing smoking improved (i.e., pragmatics).

When splitting the data by gender, further analyses identified no intervention effects among female participants. However, several significant findings were identified among males. A time by intervention effect on disposition of critical thinking was found in multivariate tests, $F(2.799, 78) = 2.799$, p = .009, η^2 = .223, and univariate tests indicated the significant effect on 'holistic and reflective', $F(4.618, 141.859) = 4.618$, p = .016, η^2 = .052. Compared to the control group, the intervention group showed a larger growth in 'holistic and reflective' critical thinking. Moreover, although male participants generally showed an increasing trend in pro-smoking attitudes, only a minimal improvement was found in the intervention group, $F(1.893, 159.024) = 3.075$, p = .052, η^2 = .035. Unexpectedly, while subjective norm in the

control group gradually increased over time, it increased dramatically in the intervention group across time, $F(1.849, 155.349) = 3.806$, $p = .027$, $\eta^2 = .043$.

Smoking behaviour, intention, willingness trajectories

We applied LCGA to further evaluate the longitudinal changes of smoking and its proximal variables (intention and willingness) at an individual level. Results suggested that the 2-class model was optimal for smoking behaviour, intention, and willingness LCGA. For the behaviour trajectories, the smallest group sizes for the 3-class and 4-class models suggested these models are problematic. For the intention and willingness trajectories, the same pattern emerged with the decrease of entropies when the class number increased from 2 to 4, as well as the non-significance of the adjusted Lo-Mendell-Rubin Likelihood Ratio (LMR−LRT) test in the 3- and 4- class models, indicating that adding the class number from the 2-class model assumed no statistical meaning (see Table 9).

Table 9 Fit indices for latent class growth analysis

	SSBIC	Entropy	Adj. LMR−LRT (p)
Smoking behaviour			
2 classes	295.025	0.959	141.832 (<0.001)
3 classes	299.093	0.887	4.224 (0.108)
4 classes	304.746	0.920	0.001 (0.514)
Smoking intention			
2 classes	1350.091	0.986	232.416 (0.001)
3 classes	1287.795	0.975	63.626 (0.126)
4 classes	1260.539	0.954	30.769 (0.831)
Smoking willingness			
2 classes	1356.194	0.930	236.652 (0.001)
3 classes	1298.067	0.902	59.717 (0.059)
4 classes	1270.310	0.912	31.239 (0.247)

Note. SSBIC = Sample size adjusted Bayesian information criteria. Adj. LMR-LRT =Adjusted Lo-Mendell-Rubin Likelihood Ratio Test. *p* = *p*-value. When selecting the optimal number of latent classes, we considered multiple fit indices following three steps (Wickrama et al., 2016). Firstly, models whose smallest class included fewer than 5% of the total sample size were excluded. Secondly, sample-size adjusted BIC (SSABIC) statistics were compared and the model with the smallest

SSABIC was considered best. Thirdly, entropy and likelihood ratio were evaluated: higher entropy suggests better separation between classes, significant results from likelihood ratio test indicate the k-class model has a better fit than the k-1-class model. Both the Bootstrapped Likelihood Ratio Test (BLRT) and the Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT) were undertaken but the more robust LMR-LRT was applied as the local solution was reported in most of the BLRTs (Nylund et al., 2007).

For smoking behaviour in the past month (See Figure 8. (a)), the first latent class comprised 17.31% of the sample (n = 27). The characteristics of this trajectory are its constant high smoking likelihood with an increasing but non-significant tendency (intercept mean = 5.145; slope mean = 0.239, p = 0.349). We named this class as "likely smokers". In contrast, another class (n = 129; 82.69%) had a low start (intercept mean = 0.000) with a slightly declining trend (slope mean = -0.049, p = 0.686). We labelled this class "unlikely smokers". For smoking intention trajectories (see Figure 8. (b)), the smaller class (n = 21; 13.91%) was named "high intenders" as this trajectory started with a high smoking intention (intercept mean = 4.490) and slightly increased (slope mean = 0.012, p = 0.766). The other class (n = 130; 86.09%), with a comparatively low starting score (intercept mean = 1.402) and a small increasing trend (slope mean = 0.020, p = 0.139), was labelled "low intenders". For smoking willingness trajectories (see Figure 8. (c)), 24.50% of the participants (n = 37) showed a medium but increasing (not significantly) level across time (intercept mean = 3.860; slope mean = 0.073, p = 0.063). We labelled this class "more willing endorsers" in contrast to the other class "low willing endorsers". The "low willing endorsers" comprised 114 participants (75.50%), and showed a slowly increasing tendency (intercept mean = 1.503; slope mean = 0.011, p = 0.337).

Predictors of trajectories

We recoded the friends' smoking status as a binary variable (0 = "none", "few", "some"; 1 = "majority", "all"), as some options had few observations; due to the same reason, we also recoded ethnicity as a binary variable (0 = "non-Han people"; 1 = "Han people"). Mother's

smoking status was excluded due to 0 observations in some latent classes. All likely smokers, high intenders, and more willing endorsers reported that the majority of their friends smoked; thus, we excluded this predictor due to the low frequencies in the other trajectory group.

Among the demographic variables, ethnicity and father's smoking were non-significant predictors for any latent classes (See Table 10). As opposed to the opposite classes, being a male, a private school student, a current smoker at baseline, and partaking in the intervention predicted one's membership of likely smokers, high intenders, and more willing endorsers.

For the cognition set, attitude positively predicted the membership of likely smokers, high intenders, and more willing endorsers. Higher subjective norm also predicted a higher likelihood of smoking and more willingness endorsement. Moreover, higher self-efficacy and prototype predicted higher willingness of smoking.

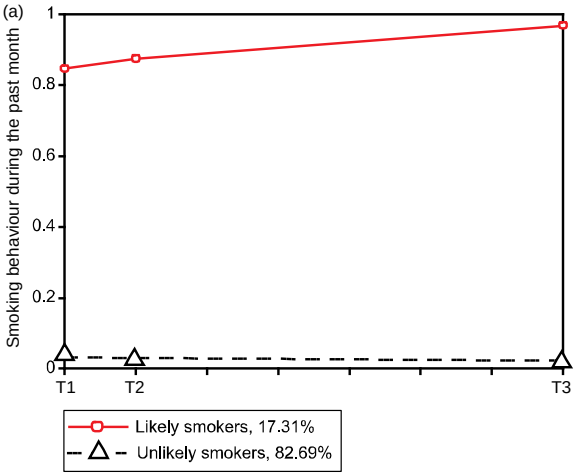
In the skills set, stress coping was a strong predictor. Likely smokers, high intenders, and more willing endorsers all showed significantly weaker ability to cope with stress. Compared to low intenders, high intenders also had fewer expressive skills to refuse others' requests/offers (pragmatics). Further analyses of the sub-constructs of assertiveness and dispositions towards critical thinking indicated that likely smokers, high intenders, and more willing endorsers had significantly lower substance assertiveness and open-mindedness. Furthermore, high intenders and more willing endorsers had higher social assertiveness. In addition, as opposed to unlikely smokers, likely smokers also showed significantly higher intellectual curiosity.

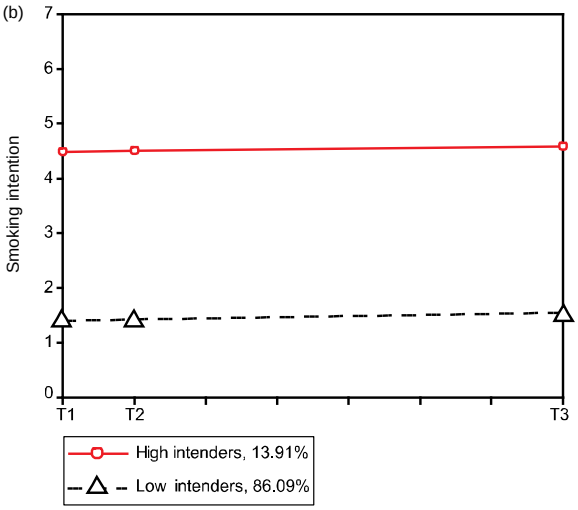
Intervention feedback

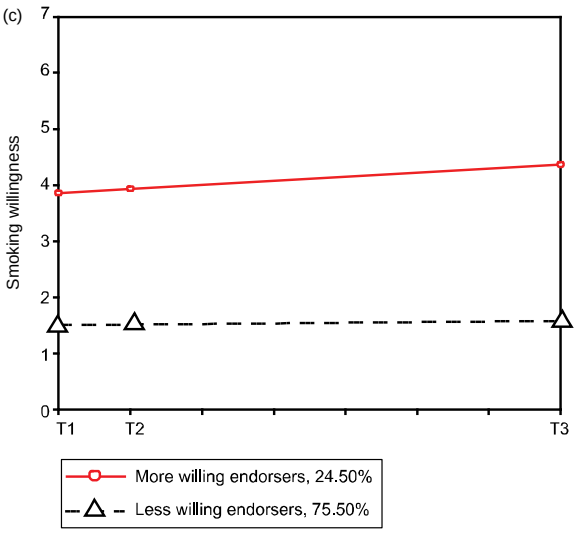
Participants were highly satisfied with their participation in the intervention (M = 4.219, SD = 0.594; aggregated scores of five questions).

Participants qualitatively evaluated the intervention in a positive manner (for quotes, see Section 10.7). Outcomes regarding smoking and life skills were both reported. Improvements on life skills among the students were also observed by the form teachers of participating classes. Although some sessions could be easily recalled 6 months after the programme (e.g., tobacco packaging discussion), it was suggested that the programme should include more sessions. Furthermore, a few students reported that they could not reduce their smoking due to cigarette offers from friends/classmates, stress, and dealing with negative emotions.

Limited changes for smoking behaviour were reported, although the programme seemed to establish an anti-smoking consensus within classes where non-smokers could express their dislike of passive smoking more freely.







Note. Smoking intention refers to one's intention to smoke. Smoking willingness refers to one's openness to smoking. We modelled linear, rather than nonlinear, growth for 3 LCGAs as there were only 3 time points; variance and covariance values for the growth factors within each latent class were constrained to zero as per the guidelines of LCGA (B. O. Muthén & Muthén, 2000; L. K. Muthén & Muthén, 1998-2015).

Figure 8 Estimated trajectories of smoking behaviour, intention and willingness from baseline (T1) to post-intervention (T2) to follow-up six months after the intervention (T3).

Table 10 Logistic regression analysis of smoking behaviour trajectory, intention trajectory, and willingness trajectory on demographic, cognitions, and skills variables

Predictors	Likely smokers vs. unlikely smokers				High intenders vs. low intenders				More willing endorsers vs. less willing endorsers			
	B	S.E.	CI	*p*	B	S.E.	CI	*p*	B	S.E.	CI	*p*
Demographic variables[a]												
Intervention condition	1.653	0.526	[1.862, 14.637]	**0.002**	1.853	0.648	[1.792, 22.715]	**0.004**	0.769	0.398	[.989, 4.708]	**0.053**
Han people	0.732	0.578	[.671, 6.451]	0.205	0.724	0.655	[.571, 7.453]	0.269	0.625	0.494	[.709, 4.920]	0.206
Male	3.227	1.034	[3.319, 191.326]	**0.002**	2.887	1.040	[2.338,137.688]	**0.005**	1.625	0.484	[1.966, 13.109]	**0.001**
Private school	3.986	1.036	[7.067, 410.469]	**0.000**	2.428	0.650	[3.168, 40.540]	**0.000**	1.593	0.412	[2.196, 11.020]	**0.000**
Current smoker	5.185	0.837	[34.611, 921.328]	**0.000**	4.597	0.722	[24.120, 407.995]	**0.000**	3.953	0.786	[11.172, 243.022]	**0.000**
Father as a smoker	0.228	0.447	[.523, 3.018]	0.610	-0.059	0.485	[.364, 2.441]	0.904	0.595	0.417	[.800, 4.109]	0.154
Cognitions set												
Attitude	0.498	0.192	[1.130, 2.398]	**0.009**	0.499	0.200	[1.113, 2.436]	**0.013**	0.517	0.201	[1.130, 2.489]	**0.010**
Subjective norm	0.667	0.290	[1.104, 3.440]	**0.021**	0.434	0.329	[.810, 2.940]	0.187	0.970	0.340	[1.355, 5.138]	**0.004**
PBC: Controllability	0.091	0.191	[.753, 1.595]	0.633	0.118	0.209	[.748, 1.694]	0.572	0.155	0.207	[.777, 1.753]	0.456
PBC: Self-efficacy	0.175	0.202	[.802, 1.769]	0.386	0.236	0.224	[.815, 1.966]	0.293	0.526	0.219	[1.102, 2.596]	**0.016**
Prototype	0.289	0.240	[.834, 2.136]	0.228	0.338	0.254	[.852, 2.305]	0.184	0.633	0.254	[1.144, 3.100]	**0.013**
Skills set												
Stress coping	-0.770	0.221	[.300, .714]	**0.000**	-0.533	0.216	[.384, .896]	**0.014**	-0.918	0.225	[.257, .620]	**0.000**
Decision making	0.374	0.326	[.767, 2.756]	0.252	0.421	0.334	[.791, 2.935]	0.207	-0.023	0.307	[.536, 1.784]	0.941
Assertiveness (global)	0.182	0.611	[.362, 3.972]	0.766	0.600	0.649	[.511, 6.499]	0.355	-0.328	0.562	[.240, 2.166]	0.559
Pragmatics	-0.685	0.380	[.239, 1.063]	0.072	-0.921	0.417	[.176, .902]	**0.027**	-0.476	0.347	[.315, 1.226]	0.170
Dispositions towards critical thinking (global)	0.018	0.400	[.465, 2.227]	0.965	-0.315	0.431	[.313, 1.700]	0.465	0.662	0.415	[.860, 4.373]	0.110
Assertiveness set												
Substance assertiveness	-1.712	0.382	[.085, .381]	**0.000**	-1.434	0.379	[.113, .502]	**0.000**	-1.211	0.292	[.168, .528]	**0.000**
General assertiveness	0.597	0.479	[.711, 4.644]	0.212	0.096	0.499	[.414, 2.928]	0.848	-0.063	0.387	[.440, 2.006]	0.871
Social assertiveness	0.687	0.375	[.954, 4.141]	0.067	1.102	0.422	[1.316, 6.883]	**0.009**	0.621	0.313	[1.008, 3.433]	**0.047**
Dispositions towards critical thinking												
Intellectual curiosity	0.905	0.462	[.999, 6.110]	**0.050**	0.877	0.492	[.916, 6.304]	0.075	0.346	0.372	[.682, 2.931]	0.352
Open-mindedness	-1.971	0.544	[.048, .404]	**0.000**	-1.879	0.580	[.049, .476]	**0.001**	-1.153	0.441	[.133, .748]	**0.009**
Holistic & reflective	-0.034	0.505	[.360, 2.598]	0.946	-0.061	0.546	[.323, 2.741]	0.910	-0.366	0.431	[.298, 1.614]	0.396
Systematicity & analyticity	0.814	0.741	[.529, 9.638]	0.272	0.698	0.821	[.402, 10.051]	0.395	1.050	0.635	[.823, 9.913]	0.098

[a]Mother's smoking status was excluded because only 4 students reported their mothers as smokers. Friends' smoking status was excluded because all members from likely smokers, high intenders, or more willing endorsers reported that their majority friends smoked. Rather than assessing the effects of the demographic variables as a block, six models were separately used for each trajectory for the demographic variables.

Note. Predictors were scores from baseline (Time 1). Unlikely smokers, low intenders, and less willing endorsers were set as reference categories. PBC = perceived behavioural control. *p* values ≤ .05 are highlighted in bold. Smoking intention refers to one's intention to smoke. Smoking willingness refers to one's openness to smoking.

7.6. Discussion

This study is, to the authors' knowledge, the first TPB-based smoking intervention in China. With successful changes in smoking attitudes and improvements for several life skills, the programme also received high satisfaction scores from participants. Consistent with previous school-based anti-smoking interventions conducted in China (L. Chen et al., 2014; Chou et al., 2006; Wen et al., 2010), however, smoking behaviour remained unchanged. Based on further analyses incorporating heterogeneities, this study suggests several implications for future research.

Noticeably, the programme only showed some improvements for males; it enhanced males' critical thinking, but this success in skill development was only evident for attitude but not intention nor behaviour. Statistically and culturally, smoking in China is mainly a male behaviour (Chinese Center for Disease Control and Prevention, 2011; Davey & Zhao, 2012b; Zhao et al., 2017); thus, future smoking programmes might be more effective if participants are separately targeted by gender. In addition, as participants were from the same school grade, contamination might have occurred, especially given the boarding school context. Unexpectedly, subjective norm increased over time for intervention participants; intervention discussions about the high prevalence of smoking in China and that smoking among especially adult males can lead to business success may have inadvertently served to normalise smoking and its perceived approval by others.

Gender (male), smoking status, and peer influence were strong predictors for students' smoking-related trajectories consistent with previous studies (Grenard et al., 2006; Sun et al., 2006). Intervention condition and private school status were significant predictors; due to the randomisation, this result was substantially influenced by the high smoking rate of intervention group students in the private school and, thus, should not be generalised. As attitude, stress coping, substance assertiveness, and open-mindedness were key predictors, it

provides some evidence that our intervention content comprised plausible choices of constructs to target. Consistent with the findings of Wills et al. (1989), adolescent smokers also showed higher social assertiveness. Unique to research conducted in China, open-mindedness was associated with anti-smoking, indicating teaching students to consider things from different perspectives could enhance their healthy behaviours. Consistent with previous studies (e.g., Gibbons et al., 2009), prototype was a predictor of high smoking willingness. Ability to appropriately refuse cigarettes impacted one's smoking since substance assertiveness and pragmatics were both predictors.

Our study highlights possible future research directions. The constant trajectories across time suggested students in high school could have smoking habituation which might be changed by habit formation strategies (Lally & Gardner, 2013). The change in critical thinking did not lead to changes in smoking intention; improvements in other skills such as stress coping could enable changes in intention. The unexpected findings for subjective norm could be tackled by ensuring future intervention activities emphasise others' disapproval of smoking and/or foster resistance to others' influence. Because the information for some variables (i.e., mother's and friends' smoking status) was unsaturated, the result might overlook the influences from mother and the nuances of different types of friends' smoking status (Flay et al., 1994); future studies with larger samples should be conducted.

Study limitations

Study limitations include the issue that intervention participants comprised both smokers and non-smokers of mixed sexes, possibly affecting the results (Thomas et al., 2013); that the cluster randomisation unit was class rather than individual; that potential contamination occurred considering that the intervention was conducted in boarding schools; that more sessions (or booster sessions) may be needed as stated by participants, and that three time

points might miss information about participant trajectories (e.g., changes beyond 6 months) (Orlando et al., 2004).

Conclusions

This research highlights the need for further examination of tobacco control strategies in high schools in China. Smoking at this age appears to be a habituated behaviour which creates challenges for smoking interventions. With the consideration of participant gender, future programmes with a stronger emphasis on critical thinking and sessions on attitudes, coping skills, and assertiveness may assist in efforts to control students' tobacco use.

8. “I’M NOT A SMOKER…YET”: A QUALITATIVE STUDY ON PERCEPTIONS OF SMOKING INTERVENTIONS IN CHINESE MIDDLE SCHOOLS

8.1. Notes

This section is reproduced from Zhao, X., Young, R. M., & White, K. M. (2018). ‘I’m not a smoker…yet’: A qualitative study on perceptions of tobacco control in Chinese schools. *BMJ Open*. doi:10.1136/bmjopen-2017-019483. [Open Access]

The authors listed below have certified that:

1. They meet the criteria for authorship in that they have participated in the conception, execution, or interpretation, of at least that part of the publication in their field of expertise;
2. They take public responsibility for their part of the publication, except for the responsible author who accepts overall responsibility for the publication;
3. There are no other authors of the publication according to these criteria;
4. Potential conflicts of interest have been disclosed to (a) granting bodies, (b) the editor or publisher of journals or other publications, and (c) the head of the responsible academic unit, and
5. They agree to the use of the publication in the student’s thesis and its publication on the Australasian Research Online database consistent with any limitations set by publisher requirements.

Contributor	Statement of contribution
Mr Xiang Zhao (PhD Candidate) Signed: QUT Verified Signature Date: 15 Jan. 18	The PhD candidate was responsible for all aspects of this manuscript’s preparation, including reviewing the literature, conducting the focus group discussions and interviews, analysing the data, and developing the arguments and ideas.
Professor Ross Young Professor Katherine White	All co-authors are or have been members of the supervisory team and provided on-going feedback (both oral and written) on all parts of the manuscript and provided permission for this paper to be included in this PhD thesis.

Principal Supervisor Confirmation

I have seen email or other correspondence from all Co-authors confirming their certifying authorship.

Professor Katherine White	QUT Verified Signature	15 Jan. 18
Name	Signature	Date

8.2. Abstract

Objective: Chinese adolescents' perceptions about tobacco control at schools are rarely researched. We explored how current anti-smoking strategies work in middle school environments, as well as the attitudes towards these strategies held by students and teaching staff members.

Methods: Four focus groups (24 11th graders; M_{age}=16 years) and five in-depth interviews (teaching staff members with tobacco control experience in schools) were conducted in Kunming, Yunnan Province, China. We used thematic analysis combining inductive and deductive processes, along with field observations and research group discussions, for data analysis.

Results: With educational approaches and practical strategies, anti-smoking education reported in the middle schools had limited effectiveness. Although smoking is banned in schools, students can circumvent schools' controls easily. Notably salient is the pessimistic attitude towards school-based anti-smoking strategies at school. Detrimental influences within (teacher's smoking) and beyond schools (high societal smoking prevalence) largely challenged the efforts to manage students' smoking.

Conclusions: Current anti-smoking approaches in schools fail to curb smoking among Chinese high school students. Their effectiveness is undermined by both within-campus and off-campus influences. Students' perceptions of smoking should be valued as their knowledge of smoking is actively constructed. Future anti-smoking education at school should incorporate interactive sections rather than merely didactic approaches about the harms of smoking. Although stricter rules for teachers' smoking are needed, complementary strategies such as population-level interventions and policy measures in wider society will assist in efforts within schools.

8.3. Introduction

Background

China is the world's largest tobacco consumer. It currently has 316 million smokers (current smoking rates: male 52.1%, female 2.7%), and its adolescent smoking rates have increased in the past three decades (Chinese Center for Disease Control and Prevention, 2015; Han & Chen, 2015). This trend is alarming because smoking in adolescence is a strong predictor of heavy smoking in adulthood (Morrell et al., 2011; Orlando et al., 2004). According to a meta-analysis, current smoking rates of males and females adolescents were estimated to be 17.4% and 3.26%, respectively (Han & Chen, 2015). Although China ratified the WHO Framework Convention on Tobacco Control as early as 2005, due to the interference by tobacco companies and lack of cross-ministerial cooperation for implementing the treaty, tobacco control in China has had little success (G. Yang, 2014; G. Yang et al., 2015). Given a drastic increase of smoking rates is seen from mid- and late-adolescence to the early 20s in several national surveys in China (Chinese Center for Disease Control and Prevention, 2011), tobacco control is needed targeting high school age adolescents.

Schools appear to be an ideal environment for tobacco control due to relatively low cost and ease of implementation (Galanti, Coppo, Jonsson, Bremberg, & Faggiano, 2014; Thomas et al., 2015). With 66.9 million secondary school students currently in China (Ministry of Education of the People's Republic of China, 2016), school-based programmes have the potential to prevent smoking efficiently. Nevertheless, despite government enforcement of anti-smoking policies in schools, teenage smoking has not been curbed (Han & Chen, 2015) and effective interventions are still scarce (L. Chen et al., 2014; Chou et al., 2006; Wen et al., 2010). Previous school-based smoking interventions were mostly undertaken in the West, especially in North America; generalising this experience to China is questionable (Thomas

et al., 2015). Moreover, without students' evaluations using focus groups or surveys, the mechanisms of the better outcomes shown in some types of smoking interventions remain unknown (Thomas et al., 2015). Given the novelty and necessity of this research topic in China, in-depth investigations are warranted to assist in understanding what aspects of school-based interventions may be the most effective.

Chinese adolescents' perceptions of smoking interventions have not been examined in studies to date. Citizens in leading tobacco producing areas (e.g., Yunnan Province) have a high smoking prevalence as tobacco consumption is deemed to help the local economy (T. Yang et al., 2015; Zhao et al., 2017) and social practices such as tobacco gifting and offers constitute a stumbling block for smoking cessation (Davey & Zhao, 2012b; Zachary C Rich, Hu, & Xiao, 2014). As for high school students, since they are facing the competitive national Entrance Examination at the end of their final year at school (Davey, De Lian, & Higgins, 2007), tobacco control is important as smoking can be a means of coping with academic stress among Chinese teenagers (Davey et al., 2014; Davey & Zhao, 2012b; Zhao et al., 2017). Specific to school environments, tobacco retail sales, which are officially banned within 100 metres of schools, are not fully enforced (L. Wang et al., 2017), including Yunnan Province (T. Yang et al., 2015). Establishing the perceptions of young people in such high-risk environments regarding how to best combat smoking is crucial for better smoking intervention designs in the future.

Our research focused on Chinese schools, which contain some status-related power differentials (i.e., teacher-student relationships) relative to anti-smoking management. Similar to the West (Cothran & Ennis, 1997), the student-teacher relationship in Chinese schools appears to be an "us-versus-them" structure, which is underpinned by traditional Confucian culture (Jin & Cortazzi, 1998) and the contemporary Marxism-based (L. Gao, 1998) national school moral education system (PRC State Education Commission, 2006). Distinguishable

from the West, however, teachers in China are regarded as a model of both knowledge and morality (Jin & Cortazzi, 1998). Partly due to the respect for teachers, compared to disciplinary approaches used in other countries, Chinese teachers tend to be lenient and supportive even when students misbehave (R. Lewis, Romi, Qui, & Katz, 2005). Moreover, all secondary schools in China follow the national outline of a moral education system (PRC State Education Commission, 2006), an omnibus educational programme including ideological, health, and other aspects; according to which, collectivism (e.g., to respect others, to contribute one's strength for the community, to handle the relations between individual and collective interests) is highlighted as an important aim to be achieved during middle school education. The Outline also specifies that form teachers (also known as 'class teachers') and the Head of the Teaching and Discipline Office play decisive roles in cultivating students' ideological and moral characters, as well as healthy habits (e.g., not to smoke). In this sense, Chinese schools, although with huge student numbers and regional differences, can be regarded as organisations directed under a unitary moral education system. Given the dramatically different powers belonging to students (objects of cultivation) and teachers (subjects of cultivation), analysing perceptions of both populations can serve to deepen the understanding of tobacco control at schools.

Given the absence of strong findings for anti-smoking interventions among Chinese high school students, the aim of this paper is to investigate the perceptions about school-based tobacco management among students and teaching staff members in high schools, in the hope of informing future research and practice. Our objective was to gain an understanding from students and teaching staff members in terms of: (i) how anti-smoking strategies work at school? (ii) what are the attitudes towards anti-smoking approaches at school? and (iii) what approaches of smoking management are regarded as ideal at school? We designed the above research questions based on our eclectic philosophical position: students perform their

smoking-related actions as rule-instructors at school; such actions are also knowledge-constructing activities. In other words, the anti-smoking perceptions that students possess are regarded as both the knowledge students receive from school policies, as well as the knowledge they create through discourse (Phillips, 1995; Vygotsky, 2010). For this reason, tobacco management at school is a dynamic process where students are not only passively following the rules but also act out their perceptions of the rules. Unlike positivistic research, our study did not aim to test predetermined hypotheses or create generalisation, but to holistically understand the intricacies of tobacco control in Chinese school contexts; thus, qualitative approaches were adopted as they are suitable for initial explorations of smoking-related perceptions, particularly among young people (Gray, Hoek, & Edwards, 2016; Nichter, Nichter, & Carkoglu, 2007; Shahwan et al., 2016).

8.4. Methods

Sample

The research location was Kunming, a leading tobacco-producing region in China. Given the research question is multi-layered, we used mixed methods with various samples to identify the factors that serve as facilitators/barriers for anti-smoking education at school; this approach potentially avoided bias in homogeneous sampling (Ritchie, Lewis, Elam, Tennant, & Rahim, 2014). Our qualitative data were generated from: (i) 4 focus groups with 6 students in each group (3 male and 3 female); and (ii) semi-structured interviews with 5 teaching staff members (3 school teachers, 2 dormitory managers). Twenty-four students were recruited from 4 classes in 2 high schools irrespective of their smoking experience. Using convenience sampling method, all student participants had previously completed 3-wave surveys about smoking; 2 focus group members had received a 4-session smoking intervention delivered by the research team (the team is comprised of one male PhD student and two Professors and all

members had qualitative research experience on this research topic; a brief evaluation of the intervention was conducted among participants who had intervention experience as a part of this research, reported in Section 7. Student participants were recruited by the researcher at the end of the third wave of the survey. There was no inclusion criterion (e.g., smoking experience) for student volunteers and all participants who previously completed questionnaires were given the opportunity to partake in the interviews. A purposive sampling method was used for selecting relevant teaching staff members. Two form teachers whose classes participated in the intervention were invited to participate and the Principals provided names of other staff members with relevant experience in the context of tobacco control in the school. The other three teaching staff members included one Head of the Teaching and Discipline Office and two Senior Dormitory Managers. Following the Outline (PRC State Education Commission, 2006), all interviewees were involved in smoking monitoring and control among students, as well as discussion with students who were caught smoking at school. To avoid identifying the informants, we only use ‘form teacher’ and ‘staff member’ at the end of the quotes.

Data collection

The study utilised several approaches including focus groups, interviews, field observations, and research team discussions to better comprehend the social settings surrounding school-based smoking (Oladele, Clark, Richter, & Laing, 2013). Focus groups were chosen because this approach encourages all participants to express their opinions (Morgan, 1997). As opposed to individual interviews, focus groups tend to generate more sensitive and personal disclosures for health-related topics (Guest, Namey, Taylor, Eley, & McKenna, 2017); practically, as smoking is forbidden in schools, school-based individual interviews on smoking topics might resemble interrogation (especially for students who smoke) which may further discourage free discussion (Zhao et al., 2017). Triangulating data from different

sources is especially important for our research as smoking at school is banned and participants might be reluctant to state their opinions due to this school policy. To manage possible social desirability, the following strategies were undertaken to encourage free expression at ideas: the interviewer emphasised the confidential nature of the research and requested that participants not share information (e.g., smoking experience) they heard from other interviewees. For teaching staff members, we provided each of them a copy of their interview recording so that they could inform the researcher not to report some quotes or entirely withdraw their participation (although no participant contacted us). Due to the distinctions (e.g., power, knowledge, age) between teaching staff members and students (Cothran & Ennis, 1997), analyses of the contrasts enable the identification of central themes across heterogeneous samples (Ritchie et al., 2014). Given the nature of our research questions, three or four focus groups were deemed as sufficient to achieve data saturation, as suggested by Krueger (1994); clear patterns appeared after the third interview among teaching staff members. It also should be noted that phenomena, instead of statistical inference, were the focus of this research. Therefore, using predetermined sample sizes to draw statistical inferences is not the aim of qualitative research (Ritchie et al., 2014).

Form teachers provided a quiet environment for focus groups, typically a classroom. Before data collection, participants were informed about the confidentiality of their data. Other people were not present when the interview/focus group was conducted. To compensate participants' time, we gave a notebook (approx. US$5) to each student and a cash payment (approx. USD$15) to each teaching staff member. Three teaching staff members completed the interview in the Kunming dialect as they felt more at ease; all others were in Chinese Mandarin. Dialogue was audio recorded and translated verbatim into English. The first author (who grew up in a Kunming dialect speaking area, received education in Chinese Mandarin, and is currently undertaking a PhD in English) completed and checked the translation;

epistemologically, this researcher/translator dual role could strengthen the rigor of research as the study was conducted with, from, and inside the language by a community member (Temple & Young, 2004). Several group discussions with other authors (native English speakers) were utilised to further understand similarities and differences, linguistically and culturally. Each interview/focus group lasted for about one hour. All participants completed the interview/focus group. Two teaching staff members chose to receive a copy of the audio recording of their own interviews, but no further comments/corrections returned to the research team. The above work was conducted by the first author. Generally, participants freely expressed their ideas in both interviews and focus groups; answers seemed genuine and natural. Although participants were not formally asked about their smoking status, both students and staff members frankly shared smoking-related experiences of their own or of friends and family members during the interviews.

To address the research questions, the research team developed the following general questions to elicit factors that may have facilitated or hampered achievement of the desired outcomes of school-based smoking programmes: (i) what anti-smoking approaches are available at school? (ii) how do they work? (iii) how do you evaluate these approaches? and (iv) how will you improve the tobacco management at school? Four questions were used consistently in all focus groups/interviews. Questions in the guidelines only served to stimulate the open discussions; follow-up discussions were further probed based on participants' responses. Before the data collection, several pilot interviews with older teenagers at the research site were conducted. No demographic or smoking-related information were collected from interviewees. This research was approved by the QUT's University Human Research Ethics Committee (Approval Number: 1500001027), Principals of participating schools reviewed the research plan, including the ethical components of the

research, and provided consent to undertake the study. Form teachers also gave their consent for students to partake in the study. All participants signed consent forms.

Field observations

The present study was conducted in Kunming, the capital city of Yunnan Province and the key tobacco-producing region in China. The tobacco industry constitutes a substantial part of the local economy. During the fieldtrips, public smoking was prevalent indoors and outdoors. Few places have strong smoking prohibitions, except for schools and petrol stations. Middle school students smoking on campus is not commonly observed as it usually occurs in hidden places (e.g., toilets). I (the first author) visited the male toilets in both schools and saw cigarette butts on the floor. During break-times, I saw some male students gathering together and smoking. They appeared astonished at first when they saw me as they thought I was a teacher from the school and might punish them. Teachers' smoking was witnessed in both schools. One or two posters with no smoking signs were seen on the campuses. Interestingly, during the field trips, local TV programmes reported several events where Kunming citizens who asked smokers to stop smoking in lifts or bus cabins were physically attacked by other smokers.

Data analysis

Data were analysed thematically(Braun & Clarke, 2006). Three researchers independently read the transcripts. The first author coded initial categories/themes from both focus groups and interviews. Themes across the dataset were collectively discussed and refined over several meetings, invariant themes across data were synthesised as final themes(Newman & Benz, 1998). Then, the first author reviewed the representativeness of themes and selected quotes. The analysis was finalised after several group discussions and revision. Three themes were identified across different samples as described in the following section. The present

paper followed the guideline of the Consolidated criteria for reporting qualitative research (COREQ; Tong et al., 2007).

8.5. Results

Tobacco control systems at school

The first theme is a descriptive summary of tobacco control system identified at two schools. Although the theme is mainly based on the narratives of teaching staff members, cross checking with data from student samples was also conducted. To retain thematic cohesion, the probing of these school policies is elaborated in the second and third themes.

All students are educated that smoking is harmful to their health. Schools provide this education using several methods including blackboard displays, theme class-meetings, and speeches under the national flag. The content is mainly about the negative outcomes of tobacco smoking. Visual materials showing the toxicity of nicotine were regarded as influential for students.

> *I once asked form teachers to play a video during their theme class-meetings; the video is an experiment which shows the harm of one cigarette's nicotine to a mouse. Form teachers were asked to lead related discussions with students after watching the video. [Staff member]*

If students are found smoking on the campus, form teachers will summon the parent(s) to school and tell them the situation and emphasise the anti-smoking policies at school. Additionally, form teachers will conduct "ideological work" with the student one-on-one. The ideological work is an all-purpose method to deal with various problematic students in Chinese schools(PRC State Education Commission, 2006); it aims to let the student know certain behaviour is wrong and, thus, to correct it. Rather than targeting a specific behaviour

(e.g., not to smoke), the ideological work compels students to obey the rules (i.e., smoking is banned, therefore one should not break the rules by smoking).

> *[If] a student has a problem, then the form teachers should talk to his or her parent(s) in order to know their family background, the student's family behaviour, and the parents' attitudes. [Staff member]*

> *…ideological education is more important…You have to let them know it is a wrong thing, as well as to remember it is wrong. The most important thing is to bring about the facts and reasons…I firstly talk to them and then let them write a guarantee showing his/her understandings of the issue—why it is a wrong thing, how to rectify it. [Form teacher]*

Teaching staff members lacked effective measures to deal with students who frequently smoked at school. The Teaching and Discipline Office plays an important role in dealing with these difficult cases. Depending on the seriousness of the case, the Office would issue a demerit (from minor to major), send the student back home to give up smoking, or expel the student. However, schools rarely expel students due to their smoking even it is serious. As some staff members reported, this inability to expel students makes tobacco control difficult at school. Similarly, if a demerit is issued, this record may be written into the student's Archive (a Chinese system which employers can scrutinise); practically, teaching staff members we interviewed in this study reported that demerits will often be retracted before the student graduates.

> *We cannot expel students or persuade them to quit school because they smoked. Especially during the compulsory education stage [from 1st to 9th grade], no student can be expelled; students in that stage have rights to receive education—such rights are protected in Education Law. Although high school students are not in the compulsory education stage, expelling them if they smoked will cause heaps of troubles. [Staff member]*

I have not heard of any student's misbehaviour being written in their Archives. [Form teacher]

Apart from the above measures, several auxiliary approaches are used. Teaching staff members often patrol the dormitory passages and monitor the male toilets. When students return to school, security guards routinely check students' bags to ensure that forbidden objects including tobacco are not brought onto campus. Inter-class competitions were also used, with smoking incidents in a class resulting in deductions of points of the class.

Students have to restrict their [smoking] desire till they leave the campus. However, in the morning, I at times pick up smoky smells in some rooms. In such cases, I will deduct the scores for that room and address students in the following noon break time. [Staff member]

Challenges and mistrust of anti-smoking strategies

The management approaches described by staff were confirmed from students, but several issues seemed to prevent tobacco control from functioning properly. Firstly, carefully monitoring a large number of students is impossible. Patrolling and bag control appeared to be ineffective as students could bypass those measures. Surprisingly, some students even reported that parcels were used to deliver tobacco to their dormitory; since a parcel is a personal property, schools could not check the contents. Teaching staff members also acknowledged that buildings are too large to be closely monitored.

You can never stop this. You think we are not likely to smoke at 3am or 4am, but we do it [in the dorm]. We observe the pattern—we smoke when we feel they [dorm staff] do not appear. [Male student]

I know some students separated a pack of cigarettes into single ones and hid them in different places such as pencil cases. [Male student]

In the teaching building, the space is big, it is impossible to monitor smoking in every corner. [Staff member]

Secondly, an inaccurate understanding of smoking was prevalent throughout the discussions. For students, the harm of tobacco was underestimated. Some students thought smoking was normal during adolescence, assisted coping with stress, helped the economy, and occasionally reported that smoking has benefits for one's health. In contrast, teaching staff members all acknowledged that smoking is harmful to health. Nevertheless, they agreed with most of the functions of tobacco use reported by students. Additionally, teaching staff members often regarded smoking as purely a psychological dependence. Even one of the form teachers who teaches biology did not think that tobacco addiction might require medical treatment.

> *I do not think smoking can have an impact on the country. Smoking adds tax income for the country. Even if it is at war time, soldiers who smoke will not be a problem. In recent decades, almost every soldier smokes; Chinese soldiers now are mostly smokers. Their combat ability and health is not weaker. So, I think smoking will not influence the country. [Male student]*

> *My mother works in a hospital and my grandpa was an in-patient there. I found [in that hospital], when a patient is badly ill, the doctor would comfort the patient with some toxic material. So, smoking should be like that; it helps people to deal with their pain… I think smoking is both good and bad. It helps people to cope with stress. Smoking moderately will not harm people. [Female student]*

> *Smoking can reduce stress, but we still need to educate students. They have other ways to reduce stress. For example, sports, chats, basketball matches, art festivals. [Staff member]*

> *How can we categorise it [smoking] as a serious problem as the tobacco industry is still running and cigarette trading is legal in the country? You know, our nation is still making the "Great Zhonghua" ["Zhonghua" is a pun: it refers to a famous Chinese cigarette brand as well as the literal meaning, "China"]. We get big money from Zhonghua cigarettes and foreigners are fond of it. [Staff member]*

Thirdly, the effectiveness of anti-smoking education was doubted by both students and teaching staff. Instead of health promotion, safety was the ultimate reason behind tobacco control at school as smoking causes fires, according to teaching staff members:

> *Kids put the lit cigarettes in the dorm and they might cause a fire in the room. Safety matters.* Some students craving a cigarette might light a cigarette and burn the beddings and *himself/herself. So, smoking cigarettes is not allowed. [Staff member]*

Both students and teaching staff held pessimistic attitudes towards smoking interventions. Health education, along with ideological education, were regarded as unlikely to be effective. Being an appropriate age and under heavy academic pressure were reported as justifications for smoking, especially among boys.

> *It is like a norm that most boys who are 16 or 17 years smoke. So, with intervention programmes, it is hard to control tobacco use. [Female student]*

> *Oh, my! You are too naïve. It [smoking interventions] definitely cannot control smoking…students are facing huge academic pressure, especially 12th graders. You ask them not to smoke?—no way! [Staff member]*

> *Speaking of ideological work, its effect is like the outcome of health education—not much effect. The form teacher did their work, I thought the content of the sermon was quite right, but after 2 hours or even just 2 minutes, I thought it actually was incorrect. [Male student]*

The lampoon below from two male students in response to a girl's suggestion vividly shows students' attitudes towards anti-smoking education:

> *Female: Maybe designing and posting some powerful [anti-smoking] signs…*

> *Male (1): They have no effect on people.*

Male (2): Right. People won't read them!

Male (1): People will smoke even when they read them. Nobody can stop smokers. So, any sign is merely a sign.

Interviewer: Could any powerful signs or languages work at all?

Male (1): I think they are useless no matter how powerful they are.

Male (2): I will just think the sign is interesting and take a picture of it and post it on my WeChat Moments [a Chinese phone app, similar to Instagram and Facebook]. Maybe take the photo while I am smoking under the sign.

Although teaching staff members generally lacked confidence in proposing any practical approaches to manage student smoking, a few plausible strategies were reported by students such as an intensive smoke surveillance system, as well as separating smokers from non-smokers:

My junior middle school did have smoke detectors in every corner. Anyone who smoked will be caught at once. It is a very good solution. I also think that form teachers should separate smokers into different groups. If a dorm room has many smokers, those who do not smoke might become smokers soon. [Female student]

Detrimental influences from wider society prompt smoking

During the field observation, shops selling cigarettes were easy to find around both participating schools. Students reported they were able to purchase cigarettes even as teenagers. Notably, in one school, students could buy cigarettes from a nearby supermarket with their smart cards (cards that parents deposit money in advance for students' daily expenses). Teaching staff members thought that restricting access to shops close to the school would be of little use as students could still get cigarettes from other shops slightly further away. Pocket-money control was referred to as a method to limit students' smoking which

was disregarded by another teaching staff member who stated that students have various ways of obtaining cigarettes such as asking for them from a friend.

> *Most shops sell cigarettes. Last time, when I bought something in a shop, I just glimpsed at the cigarettes. The shopper immediately asked me which type I wanted. [Male student]*

> *They can still get cigarettes. You know, there are day students who can bring cigarettes to the campus…Even if you stop the supermarkets from selling cigarettes, students can still buy them from other shops beyond the school. So, the issue is uncontrollable. [Staff member]*

The 'smoking world' beyond the campus was a big concern for both teachers and students. For teachers, they stated that their preventive work means little when influenced by students' family members. According to staff members, family was not the only source, but the whole society posed a risk in terms of smoking. When socialising with strangers, cigarette offers to alleviate embarrassment and bridge close relationships were commonly mentioned by both students and teachers, as exemplified in the quotes below. For this reason, male students reported that they might smoke in the future for better socialisation when they are adults, even though they did not smoke now as students. Although nearly impossible to stop, teaching staff members all thought that tobacco control at school was necessary. Concernedly, some approaches reported by staff members were likely to lead to future smoking among students.

> *We often feel that 5-day-controlling comes to naught due to their 2-day-home-staying. Their parents and their new friends can affect them. I feel that peer influence is larger than teachers' influence for these students. [Form teacher]*

> *When you go to places where people sing karaoke, if you do not smoke there with them [old friends], they will think that you despise them, and you don't smoke like them because you are now in a good school. Then, they*

might end their friendship with you. In that case, you have to light your cigarette and smoke with them. [Female student]

When I say "sorry, I'm not a smoker…yet." people will normally withdraw the cigarette. [Male student]

I will ask the student [who smoked] to go to my office…I will educate him as such: "how dare you smoke? Smoking is firstly bad for your body. And it is not easy for your parents to earn money. When you enter society and you feel you are stressed, then you can smoke occasionally. But it is not allowed for you to smoke now." [Staff member]

As a saying goes, 'tobacco and alcohol bring people together'. Strangers look friendlier when a cigarette is offered. [Staff member]

Even within the school campus, smoking influences existed. Students reported that they had seen teachers smoking in the campus which was confirmed by all teaching staff interviewees. Some teachers even presented students with knowledge about the positive outcomes of smoking. Furthermore, students observed that people with authority smoked such as soldiers smoking during military trainings. Interviews with teaching staff members agreed that there are teachers who smoke and that stringent anti-smoking rules should be stipulated at school so that staff are good role models for students.

I remember my form teacher in junior middle school told us that a successful man is abnormal if he does not smoke. [Male student]

The school should set up rules to deal with this matter [teachers' smoking]. Like what I said, teaching by setting yourself as an example is more important than teaching by words, teachers cannot control students' tobacco use if they themselves are smokers… Students watch what teachers do. Sometimes, teachers asked students not to smoke with a lit cigarette in their mouth. It will only be less effective. [Staff member]

I think teachers' smoking in front of students is very bad. [Female student]

8.6. Discussion

This is an in-depth exploration among students and staff members about perceptions of health education-related smoking strategies in Chinese school settings. Combining both participants' perspectives as well as field observations, tobacco control at school is richly represented. The study highlighted the shared pessimistic attitudes towards smoking interventions, whose outcomes are undermined by social environmental factors beyond schools. In terms of the tobacco management at schools, our findings shed light on the teacher-student structure by comparing discussions from both samples, providing implications for future anti-smoking strategies. To date, school-based anti-smoking programmes have failed to curb adolescent smoking in China, findings from this study contribute valuable information for future tobacco control.

Two main strategies were identified in middle schools: health education and punishment related contraventions of smoking-free policies; the latter approach was considered as more effective. Other practical approaches such as patrolling are also reported. However, participants reported that both approaches failed to sufficiently curb students' smoking, especially for high school students who reported multiple strategies to circumvent the tobacco control efforts at school. These strategies to manage smoking at school are strongly influenced by moral education approaches. One example is the collective punishment (group demerit points). Driven by the aim of cultivating collectivism among students (PRC State Education Commission, 2006), such an approach might not be suitable to shape students' self-disciplined health concepts. Consistent with previous educational findings, Chinese teachers in our research also tend to use lenient, inclusive approaches to deal with students' smoking behaviours at school; strategies included discussions and seeking support from parents (L. Gao, 1998; R. Lewis et al., 2005). These methods might work for other problematic behaviours, but, ironically, because most fathers are smokers in China, the above

methods may be of little assistance to stop smoking. Obviously, both collective and individual approaches were ineffective; rather than using an omnibus method following the Outline (PRC State Education Commission, 2006), it may be beneficial to design specific courses for smoking behaviours targeting students who have difficulties with smoking cessation.

Two contexts appeared to be crucial to decipher the ineffectiveness of schools' tobacco control policies. Firstly, at a personal level, understandings of smoking and anti-smoking programmes included inaccuracies. Consistent with findings of other adolescent/youth samples, "willpower" was believed to be more effective than anti-smoking programmes provided by schools (Abdullah & Ho, 2006; Amos, Wiltshire, Haw, & McNeill, 2005), and harm-related information was largely underestimated (Shahwan et al., 2016). Some perceptions were likely to be underpinned by lay health beliefs such as tobacco's medical functions in traditional Chinese medicine (Benedict, 2011; Berg et al., 2016; S. Ma et al., 2008; Zhao & Davey, 2015). Although anti-smoking knowledge is available at school, as it is driven by ideological/moral education-based approaches (e.g., simply forbidding students to smoke), the health-related influences of smoking might be largely downplayed. Secondly, at a school-environment level, the one-sided smoke-free policy undermines the effectiveness of tobacco control: teaching staff members are privileged as they have elevated status with the special "right"—although unsanctioned—to smoke on campus. The structural power between teachers and students at school is, therefore, likely to prompt students to challenge any health imperative from the school's authority (e.g., looking for the loopholes in tobacco management; Cothran & Ennis, 1997; S. Lewis & Russell, 2013). This finding also helps to explain why previous studies identified the positive associations between teachers' smoking and student smoking (Galanti et al., 2014; Paek, Hove, & Oh, 2013; Sinha, Gupta, Dobe, & Prasad, 2007).

In this study, mechanisms that enabled tobacco control to be effective were only limited to the concern about safety. By contrast, social norms related to smoking were identified as a constraining mechanism for tobacco control at school. Participants reported that smoking outside of school campuses was ubiquitous and perceived as a useful social tool. As found previously, the smoking behaviour of parents and teachers can lead to adolescent smoking and pro-smoking attitudes (X. Chen, Stanton, et al., 2006); high acceptability, and prevalence of smoking outside of schools also served as a barrier for smoking cessation (Kruger et al., 2012; Twyman, Bonevski, Paul, & Bryant, 2014). Consistent with most smoking studies among Chinese secondary school students, coping with academic stress was mentioned by students and teaching staff members as a reason to smoke (Davey et al., 2014; Davey & Zhao, 2012b; Zhao et al., 2017). As reported by our participants, this stress is especially pronounced for high school students as they are facing the Entrance Exanimation (Davey et al., 2007). Thus, although the current school-based tobacco control has room to improve, the social norms of smoking and huge academic pressure further diminish any health imperatives about smoking.

Findings from this study provide global implications for future research. Anti-smoking policy in Chinese schools is seemingly a well-structured system with education, monitoring, and enforcement processes. However, consistent with evaluations of the effectiveness of tobacco management in the West (Galanti et al., 2014), the policy does not appear to be effective. Importantly, smoking intervention in China including school policy and parental modelling also failed to control middle school students' smoking initiation (Wen et al., 2010), which again amplifies the fact that schools are not vacuums and smoking intervention should move beyond the individual level (Mielewczyk & Willig, 2007). In light of the power structure between teachers and students in school contexts, addressing teachers' smoking is important. However, given the high smoking prevalence in wider society perceived by both students and

staff, policy intervention beyond schools is necessary to better support tobacco control at school. Findings from other Asian regions with high smoking rates among males showed that influences beyond school appear to be more impactful than those within schools (Ahsan, Underwood, & Atkinson, 1998; Smet, Maes, De Clercq, Haryanti, & Winarno, 1999). As reported by students and informants, some well-reported functions of smoking such as an academic stress coping strategy might be also learnt by social osmosis (e.g., media, social interactions) from wider society (Davey & Zhao, 2012b; Nichter et al., 2007; Zhao et al., 2017). Since the effectiveness of school-based smoking interventions hinge on the social environment outside of schools, aggressive and comprehensive anti-smoking policies in wider society should be implemented (Au, Ma, Zhu, Chen, & Tang, 2016; Paek et al., 2013; L. Wang et al., 2017; G. Yang, 2014). In light of the high acceptance and prevalence of smoking in Chinese social milieu, developing and implementing programmes with community-based approaches and ecological approaches could be important complementary strategies for school-based interventions (DiClemente, Crosby, & Kegler, 2002). Given the interferences from the tobacco industry (e.g., leading advertisements; G. Yang, 2014; G. Yang et al., 2015), multi-ministerial policy interventions should also be considered. Measures such as supply-side interventions and establishment of smoke-free areas could shape an anti-smoking social norm and behaviours. Broad societal changes may be necessary before strategies can be successful targeting individual cognitions.

Sampling is a potential limitation and generalising the findings of the current study should consider contextual factors in a particular area. Moreover, although we tried to limit social desirability influences, teaching staff members might have restricted their negative opinions about school policy due to their positions at school. Importantly, our study highlights that high school students obtain their knowledge about smoking in an agentic and active way

rather than passively receiving education and rules. School tobacco management strategies may not result in successful outcomes if within-campus and off-campus influences remain.

9. GENERAL DISCUSSION

Smoking in China remains a serious issue for public health. Given the consistently high male smoking rates and increasing female smoking rates among adolescents, effective school-based interventions are warranted. Programmes to reduce smoking behaviour and cognitions among high school students have long been overlooked but this transitional age is crucial in terms of continuation of smoking in their near future.

Overall, this PhD project developed, implemented, and evaluated a theory-based smoking intervention among 10th graders. Starting with an elicitation study, commonly held beliefs regarding smoking were identified following the TPB framework (see Study 1; Section 5), based on which a smoking intervention was developed and implemented (see Section 6). The intervention received positive feedback from participants, and it increased pragmatics and critical thinking skills in the intervention group (see Study 2; Section 7). Generally, the intervention failed to change smoking intention/behaviour, but curbed the increasing trend in pro-smoking attitudes among male participants. Unexpectedly, the perceived approval to smoke from significant others (subjective norm) increased in the intervention group. In order to explore how school-based tobacco control strategies operated, the PhD Candidate undertook a qualitative study among students and teaching staff members and found that wider social influences outside of schools constituted constraining mechanisms for tobacco management in schools (see Study 2; Section 7). This PhD dissertation synthesises key findings from the above studies and presents the process of developing a smoking intervention in China. Its results provided important implications for future studies and interventions for this transitional age period.

9.1. Key findings for the research objectives

The programme of research's key findings will be elaborated below as per the thesis objectives (see Section 1.3).

Q1 Psychological mechanisms underlying Chinese adolescents' smoking behaviour

The TPB framework

As stated in Section 2.3, from its inception this PhD project narrowed its scope to only psychological rather than medical, pharmaceutical, or other approaches to undertake smoking interventions. Consistent with this scope, the initial aim was to explore the psychological mechanisms underlying Chinese young adults' smoking behaviour. Among well-established psychological theories, the TPB is widely used in health behaviour interventions (Steinmetz et al., 2016). Its parsimonious structure—comprising only 4 main psychological constructs—as well as the specific guidelines provide clear foci to implement in interventions (Sutton, 2015). Although a previous study revealed that the TPB is able to explain smoking intention and behaviour among Chinese adolescents (Davey et al., 2014), TPB-based qualitative explorations have never been undertaken in China. Existing studies provided some correlations between adolescent smoking and other psychological factors but, as the TPB emphasises specific behaviours among a specific population, an elicitation study was needed to identify the salient beliefs. For the entire PhD project, this initial qualitative study (Study 1) played a vital role as its outcomes informed the subsequent studies.

Consistent with previous qualitative findings (Davey et al., 2014), the qualitative results of Study 1 showed that the TPB is able to encapsulate relevant psychological factors associated with smoking among Chinese high school students. The results indicated that a TPB-based smoking intervention is likely to affect one's smoking intention and then behaviour if one's attitudes, subjective norm, and PBC are challenged. Considerations of contexts are always

necessary when transferring or generalising results, and this study provided a thorough and practical methodology for future research. For this PhD, this study both elicited salient beliefs among the target population (see Table 3, Table 4, Table 5, and Table 6) and highlighted four critical themes on which the intervention should focus.

Firstly, smoking as a highly gendered behaviour in China was confirmed. Chinese male smoking rates are among the world's highest whereas the rate among females is the lowest (Asma et al., 2015). Apart from this contrast in smoking prevalence between genders, there was also a significant distinction between male smoker images and female smoker images. Specifically, female smokers were regarded as 'bad' girls whereas male smokers were deemed as 'normal'. Such patterns have been reported in previous studies (Davey & Zhao, 2012b; Hsia & Spruijt-Metz, 2003). Viewing these findings from historical and cultural literature (for more information, see Section 2.4), female smokers were portrayed as modern hypersexual and promiscuous women in early Chinese anti-smoking movements (*circa* 1910s-1920s) and as seductive women conducting espionage activities in movies made in the 1950s (Benedict, 2011). Such a link between female smoking and promiscuity has constituted a cultural barrier for teenage girls to smoke. On the contrary, smoker images such as Chairman Mao and Chairman Deng in films and dramas associate male smoking with manhood, patronisation, and authoritativeness which, in turn, enforced the normalisation of smoking among males (Davey & Zhao, 2012b). Additionally, some participants in the present research challenged the historical and social background of disrespect for female smoking as sexist. This gender empowerment might explain the increasing tendency of young women choosing to smoke in recent years (Chinese Center for Disease Control and Prevention, 2011). This tendency may suggest the necessity of smoking prevention among Chinese females, although the majority of smokers in China are currently males.

Secondly, the prevalence and acceptance of smoking in Chinese society appears to be very high. Although some places such as petrol stations and hospitals were designated as smoke-free areas, smoking was reported as ubiquitous in most public places. According to the TPB, such high prevalence works detrimentally for both subjective norm (smoking is a social norm) and perceived behavioural control (public smoking facilitates adolescent smoking); furthermore, students also perceived that smoking can be a useful tool for socialisation (an advantage of smoking) and, thus, their attitude is influenced by the high visual preference of smoking. Specially, in business associations, smoking also signifies whether the trading would like to continue or not (Wank, 2000). Thus, these multilayered contextual factors constitute strong forces of the social environment.

Thirdly, stress coping was an important reason for adolescent smoking. This reason can be better understood in the context of the Chinese Entrance Examination (Davey et al., 2007). Millions of high school students sit the Entrance Examination every year and the chances to enter prestigious universities are limited. High school students are, thus, facing considerable academic pressure owing to the competitiveness of this system (Davey et al., 2007). Study 1 in this PhD uniquely identified that even teaching staff members at schools "turned a blind eye" to students' smoking before examinations as they perceived this behaviour as a useful way for students to release their stress. Therefore, training students how to release stress in a healthy way may be a useful component in subsequent smoking interventions.

Unexpectedly, smoker images were also salient (see Table 6). As mentioned above, female smokers were generally regarded as ill-mannered. Other elicited smoker images symbolised mature, social, fashionable, rich, and academically poor students as smokers. This theme beyond the TPB suggested an extra construct related to social images should be included in the framework to further explain adolescent smoking behaviour. Developed from studies on "health images", the PW model is particularly suitable for adolescent risky behaviour

including smoking (Gibbons & Gerrard, 1997; Gibbons, Gerrard, Blanton, & Russell, 1998; Gibbons, Gerrard, & Lane, 2003; Hukkelberg & Dykstra, 2009). Thus, an extended TPB incorporating the impact of commonly-held images seemed to be appropriate for developing the intervention.

Overall, the qualitative results of Study 1 indicated that the TPB is able to encapsulate relevant psychological factors associated with smoking among Chinese high school students; and an extended TPB including an image-related construct (such as in the PW model) could further explain smoking among adolescents. From the TPB framework, to alter smoking, interventions should successfully change the attitude, subjective norm, and perceived behavioural control. Elicited beliefs (see Table 3, Table 4, Table 5, and Table 6) provided possible targets for the intervention. To achieve this goal, interventions typically can either weaken the pro-smoking beliefs or establish new salient beliefs (Ajzen, 2011).

Beliefs identified from Study 1, however, highlighted the importance of some life skills. Noticeably, skills to cope with stress related to study and to resist social pro-smoking influence appeared to be vital for students to keep non-smoking status. In light of this issue, the research team incorporated life skills training (Botvin, 1980; Botvin & Griffin, 2015). This training programme (for more information, see Section 2.3) conceptualises smoking (a type of drug use) as a multifaceted behaviour influenced by psychological factors, personal competence, and resistance skills which can be enhanced through life skills training. Life skills training does not deny the effect of contextual factors from social life (i.e., social-cultural factors, family, social environment; see Figure 2), but deems them as underlying forces (Botvin & Griffin, 2015). Furthermore, given the favourability of the images of some types of smokers (e.g., smoker as fashionable and cool) and tobacco packaging was important in the elicitation study, discussions of smoker images and tobacco packaging to enhance students' media literacy and critical thinking were included (Gallun; Kupersmidt et al., 2010).

Since visual imagery related to tobacco use can bias logic-driven thinking, encouraging students to critically challenge (with deconstruction skills like identifying target audience, hidden message, and visual elements) the positive visual messages (both movie images and commercial images promoted by tobacco industry) is suggested (Davey & Zhao, 2012b; Kupersmidt et al., 2010). Using an intervention integrating the TPB and life skills training, J.-L. Guo et al. (2015) successfully reduced illicit drug use and enhanced planned behaviour-related constructs in Taiwanese adolescents. From these findings, it seemed reasonable to expect that a smoking intervention combining extended TPB-related activities and life skills training may reduce Chinese adolescent smoking behaviour and cognitions.

Smoking-related trajectories among adolescents

To further explore adolescents' psychological mechanisms of smoking, this PhD included a longitudinal study over 6 months. It should be noted that this longitudinal study was a secondary outcome from Study 2 to identify smoking trajectories over time and the study occurred subsequently to the intervention design and implementation. However, results from this study consolidated the understanding of psychological mechanisms underlying adolescent smoking as well as providing ideas for future research, especially as longitudinal studies examining Chinese adolescent smoking are scarce (for more information, see Section 9.5).

Data from Study 2 represented the behavioural and cognitive changes from 10^{th} grade to 11^{th} grade. As opposed to previous studies, analysis in this study considered heterogeneities among populations by using latent class growth modelling (LCGM). The results importantly showed that there were a subgroup of students who constantly smoked and held higher smoking intention and willingness (see Figure 8). By considering several statistical indices

(see Table 9), smoking behaviour, intention, and willingness all comprised two distinct subgroups. The subgroups of smoking-related trajectories suggest that behavioural change strategies targeting habituation might be a promising direction for some smokers in high schools (Lally & Gardner, 2013).

Correlations between these trajectories and psychological constructs should also be noted (see Table 10). Attitude, stress coping, substance assertiveness, and open-mindedness appeared to be important for high school students' smoking. Unique in Study 2 are the findings for the construct of "open-mindedness" of dispositions towards critical thinking, whose relationship with smoking has barely been reported among the Chinese population. Compared with the findings from Study 1, this longitudinal design consistently showed the importance of attitude (as a part of the TPB) and gender (male as a predictor). In agreement with the PW model, prototype was a significant predictor of the willingness tendency.

Overall, findings for this research question shed light on the importance of some psychological constructs and skills training for future smoking interventions among Chinese adolescents. Apart from the gender effect, findings from both cross-sectional and longitudinal designs illustrated that adolescent smoking was triggered by stress and the perception that smoking is socially normative. Given the multifaceted nature of adolescent smoking in China identified from this PhD, the TPB might demonstrate better utility when other salient components (e.g., stress coping and other life skills) are included (Zhao et al., 2017). Consistent with the assumptions of Botvin et al. (2015), skills such as stress coping, assertiveness, and critical thinking training are likely to combat the high acceptance and prevalence of smoking in society, as these skills enhance adolescents' competence and resistance skills. These findings partly explained the outcomes of the pilot intervention in this PhD (more information, see Section 7.4) and can provide information for future research examining adolescent smoking.

Q2 Effective strategies for developing a school-based smoking intervention among Chinese adolescents

Based on the findings of Study 1 (the TPB belief elicitation study), a smoking intervention was developed. The intervention was aimed at both smoking prevention and smoking cessation. To achieve this goal, the programme integrated activities targeting TPB-constructs (attitude, subjective norm, and PBC) as well as life skills training (for an overview of the intervention structure, see Table 7). Evaluations of this intervention included both quantitative data and qualitative feedback which were collected after each session and 6 months after the entire intervention. The following sections will cover the salient themes across findings in Section 7 and Section 8.

Effectiveness of a TPB-based smoking intervention

Generally speaking, the intervention did not change students' smoking intention or behaviour. Although female participants showed no significant changes, the intervention curbed the increasing trend in pro-smoking attitude among male participants. However, the perceived approval by significant others to smoke (subjective norm) unexpectedly became more pro-smoking in the intervention group. In terms of life skills, although most skills were not significantly improved, scores in pragmatics increased for the intervention group.

In qualitative findings, a few participants reported a reduction in their intention to be a non-smoker. For example, a female student who had tried a few puffs reported a stronger intention to stay a non-smoker as a result of the intervention. Another male student reported alcohol cessation after the programme. However, these qualitative data did not match the quantitative analysis using both variable-centred and individual-centred approaches showing no evidence of smoking behaviour/intention reduction over time. Thus, based on current data, the intervention was not clearly effective for smoking behaviour or cognitions.

Although Chinese school-based smoking interventions have rarely changed smoking cognitions or behaviour (L. Chen et al., 2014; Chou et al., 2006; Wen et al., 2010), there may be some reasons for the findings of this specific intervention. Firstly, the lack of a gender-sensitive approach in the intervention may explain the unsuccessful outcomes reported by the female participants. It is also possible that the exercises/activities may not have been culturally appropriate (e.g., debates, stress management techniques) although end-of-session written feedback suggested the participants were comfortable with the approaches (for further discussion, see Section 9.5). In addition, as the control and intervention group participants were drawn from the same grade at a school, contamination might have occurred, especially given the boarding school context. Practically, given life skills training usually has over 10 class periods, our intervention should consider longer session periods, especially for students with smoking experience, and the inclusion of booster sessions (Botvin, 1985; Botvin & Griffin, 2015). This potentially insufficient amount of skills training might partly explain why the effect on attitudes was not associated with a reduction in smoking intention among male students. Furthermore, the higher smoking prevalence in the intervention group might also have weakened the contrast in outcomes.

Despite the absence of strong evidence for greater effectiveness on smoking outcomes, the intervention received positive comments from students (i.e., comments on the questionnaires and subsequent focus groups). Not only did they remember the activities used in the programme, they also reported practising them in their daily lives. For instance, a male student reported that the last session in the programme (the discussion about tobacco packaging) had a strong impression to him and he realised how tobacco industries manipulate customers. One interviewee reported that he had used the deep breathing method he learnt from the first session in this programme when he participated in a competition. This qualitative feedback is consistent with the programme's satisfaction scores from all

participants. Participants showed their high satisfaction with their participation in the intervention with mean satisfaction questions ranging from 4.082 to 4.268 (out of 5). According to the form teachers (in interviews), however, the reason why students were fond of the intervention was that students typically like courses unrelated to examinations. In-depth investigations of these reasons were beyond the research question, but previous findings point out the lack of health education in China, which is a result of the intensive examination-oriented education in middle schools where only subjects directly related to the College Entrance Examination are valued (Davey et al., 2007; Davey & Zhao, 2012a).

In conclusion, informed by the elicitation study, the intervention was designed based on the extended TPB framework and life skills training. As a result, the intervention did not show any changes in smoking behaviour or intention, but pro-smoking attitudes among male participants were curbed and improvements in pragmatics and critical thinking were identified. The different intervention outcome for both genders is consistent with the findings of Study 1 which showed that the smoking in China is largely a male behaviour; different intervention strategies based on gender are warranted in the future. Feedback from the intervention was positive, but changes related specifically to smoking were rare. Building on the limited successful results from this intervention, future programmes with more sessions might be more effective.

Attitudes towards tobacco control within schools

> "Oh, my! You are too naïve. It [smoking intervention] definitely cannot control smoking."
>
> —From a teaching staff member

Prior smoking interventions undertaken in China including activities targeting attitudes, self-efficacy, and refusal skills (L. Chen et al., 2014; Wen et al., 2010) also failed to deter adolescent smoking. Underlying mechanisms that constrain the effectiveness of life skills training are therefore important to investigate. In the follow-up study of Study 2, qualitative methods were used to explore the perceptions of high school students and teaching staff members about their attitudes towards tobacco management in schools.

One of the key findings of this study was the pessimistic attitudes towards tobacco control at schools. The fundamental reason for tobacco control in Chinese schools was safety, since cigarette smoking might lead to fire accidents. Teaching staff members and students typically thought that adolescent smoking cannot be controlled. One teaching staff member said that the idea to control students' smoking with an intervention is naïve. This pessimistic attitude towards tobacco control itself is important as no study had previously discussed it. A succession of unsuccessful school-based smoking interventions might be explained, in part, by this systemic pessimistic attitude.

In a closer look at the findings, some underlying perceptions further explained this attitude: students had inaccurate understandings regarding the harm of tobacco use. For example, "moderately" smoking was thought as a way to reduce the harm of smoking. Similar misbeliefs related to smoking's harms were reported in other studies in China (Berg et al., 2016; S. Ma et al., 2008; B. P. Zhu et al., 1996). These inaccurate beliefs reported in other studies include: second-hand smoking is thought to be diminished by air circulation, smoking cessation is regarded as an easy thing to deal with, and there is mistrust of medical evidence that shows smoking causes cancer (Berg et al., 2016; S. Ma et al., 2008). As far as some preliminary research is concerned, the above beliefs might come from lay health beliefs in China (Zhao & Davey, 2015). Traditional medicine and other local medicine may also play a

key role in shaping these beliefs, so that the harm of smoking is significantly devalued (Benedict, 2011; W. Liu, 2015; W. Wang, 2002).

Owing to these inaccurate beliefs, “willpower” was regarded as the most effective way to stop smoking, although the function of “willpower” was previously identified in smoking studies among teenagers (Abdullah & Ho, 2006; Amos et al., 2005). It seems apparent that the current anti-smoking strategies available in Chinese schools are not without problems. As students and school staff members reported, there are generally two types of tobacco management: education and punishment. Although both ways have drawbacks, punishment is regarded as a better solution to stop students’ smoking. Schools are providing various approaches to inform students of the harm of smoking including blackboard displays, theme class-meetings and speeches under the national flag. However, the content is knowledge-based platitudes, which has been shown to be ineffective even when the information is with fear appeals (Botvin & Griffin, 2007). It is also apparent that age differences are not considered when this education is implemented. In terms of the punishment approaches, students have ways to circumvent all management strategies from schools. Thus, dorm staff members had to confess that they could not monitor every corner of the campus.

To further understand this attitude among students and teaching staff members, we can review the history of tobacco use and tobacco control in China (for more information, see Section 2.4). Historically, tobacco smoking and anti-smoking education are all foreign products (W. Liu, 2015). In the early 20th century, the issue that the smoking ban was only applicable for students but not for adults was raised (Huangfu, 2012). However, this biased anti-smoking status remains the same in China until now. In other words, tobacco control is targeting adolescents and children only and adult smoking in public is lacking in strict management (Au et al., 2016). In Study 1, students mentioned strict anti-tobacco policies in Singapore and tobacco packaging with warning pictures produced overseas, a contrast to

Chinese current tobacco policies. These opinions highlight the role the wider social environment plays in smoking perceptions (a point further elaborated in the following section). Thus, the pessimistic attitude about the effectiveness of school-based smoking interventions identified in the research mirrors the insufficient tobacco management in the wider society because the effectiveness of school-based tobacco control largely hinges on schools' wider social environment.

In conclusion, both middle school students and teaching staff members held a pessimistic attitude towards anti-smoking strategies in schools. This attitude may be constructed by their inaccurate understandings of the harm of smoking. Further research is needed as smokers' understandings regarding nicotine addiction are rarely studied (Wigginton, Morphett, & Gartner, 2017). Current tobacco management might also fail to alter smoking behaviour and the attitudes of students especially high school students, because considerations of age differences are lacking.

Tobacco control in schools: a wider picture

> "We often feel that 5-day-controlling comes to naught due to their 2-day-home-staying."
>
> —From a form teacher

Schools are ideal for anti-smoking education programmes because they can be implemented to a substantial number of students in a short period of time (Galanti et al., 2014; Thomas et al., 2013). However, no school is a vacuum and, thus, the productivity of school-based interventions is mediated by factors from social milieus outside of schools. The above section demonstrated that even on school campuses, smoking occurs by circumventing anti-tobacco rules; such behaviour is, nevertheless, restricted as smoking is forbidden on the campus. In

contrast, adolescent smoking outside of campus is thus far without control (at least in Yunnan Province, the research site). In this PhD, one important finding is the strong influence of wider social environments and the anti-smoking strategies at schools are greatly undermined by this influence.

As reported by the participants, the pilot intervention was similar to 'ideological education' available in Chinese schools. According to the experience of form teachers and the teaching staff members who had rich experience of tobacco control at school, 'ideological education' deters students' smoking behaviour and intention by discussing the harm of smoking and giving some examples of people who suffered from smoking-related diseases. However, it can be argued that our pilot intervention did not emphasise the harm of smoking as students demonstrated their already established understanding of this harm in the elicitation study (Zhao et al., 2017). The main reason that led teaching staff members to state that the pilot intervention resembled conventional anti-smoking education at school could be its expected unsuccessful outcomes. A teaching staff member concisely summarised: "students smoke because the influence of social environments is bigger than the power of school education." Similarly, when speaking of the outcomes related to socialisation skills training in the smoking intervention, a student questioned that improving students' sociability might lead to their higher likelihood of smoking. This assertion is supported by our quantitative results: logistic regression indicated that students with higher social assertiveness were significantly more likely to be members in the 'high intenders' and 'more willing endorsers' groupings. Such associations have also been identified among teenagers elsewhere (Wills et al., 1989). In this sense, the similarity between this study's pilot intervention and conventional smoking education at schools is that they both face clear challenges in their efforts to deter students' smoking.

To further understand these unsuccessful outcomes, the results from Study 1 should be reviewed. In the elicitation study, smoking as a social norm was salient across many categories (see Table 3, Table 4, and Table 5). This powerful norm is shaping students' pro-smoking attitude, more approvers of their smoking, as well as a facilitator of smoking. In the final qualitative study, this norm appeared to be a detrimental influence on students' smoking. Consistent with previous findings, both students and teaching staff members mentioned that smoking is related to socialisation and the tobacco industry (Davey & Zhao, 2012b; S. Ma et al., 2008; Mao et al., 2013; Zachary C. Rich & Xiao, 2012; Zhao et al., 2017). A considerable number of personal experiences were also reported. For example, one form teacher told the researcher that her boyfriend is a doctor who knows the harm of smoking but has to smoke with his colleagues for better socialisation. A female student reported that the peer pressure might make students feel compelled to smoke when catching up with friends who smoke. Given this high smoking prevalence in social environments outside of schools, the pessimistic attitude towards tobacco control was attributed to their lived experiences.

Following the rules of Chinese educational departments, schools are conducting tobacco management (e.g., regular patrolling, bag checking, and inspection of men's toilets). However, school anti-smoking approaches face considerable hurdles because of the pro-smoking atmosphere beyond school campuses. This split between schools (smoke-free) and beyond (free to smoke) comprises such opposing forces that any innovations in smoking intervention are fraught with difficulty because their results are deemed to be similar to other school-based smoking management approaches. Instead of pessimism, participants' negative attitudes are more likely to reflect the reality of the challenge of altering students' smoking behaviour and attitude. Thus, in agreement with previous research (X. Chen, Stanton, et al., 2006; Kruger et al., 2012; Twyman et al., 2014; B. P. Zhu et al., 1996), findings from this

PhD underscored the point that high prevalence and acceptability of smoking outside of the school undermined tobacco management in schools.

Even in school environments, smoking is not impossible. Apart from those who deliberately contravene school policies, some teachers allow students to smoke before examinations ("turning a blind eye"), and some even present students with knowledge about the positive outcomes of smoking (Zhao et al., 2017). As previously found in other studies (Davey & Zhao, 2012b; Twyman et al., 2014; Zhao et al., 2017), coping with stress was both a barrier for smoking cessation and a facilitator of smoking initiation. High school students are facing considerable academic pressure in school; without sufficient mental health support, smoking is perceived as a valuable means to release stress. Alarmingly, from the results in Study 2, the majority of participants (69.54%) showed a significantly increased tendency of smoking willingness which could be interpreted as a result of their heavier academic pressure.

The current challenge of tobacco control at schools also mirrors the contemporary zeitgeist in China. Historically, Chinese anti-smoking policies were implemented from the 1900s, adopting similar measures from Western countries and Japan (Huangfu, 2012). For better economic outcomes, the government then did not aggressively ban smoking. Consequently, several anti-smoking campaigns emerged, forming as a grass-root anti-smoking force. Using updated Western medical knowledge about the harm of smoking, these campaigns emphasised that teenagers and children are China's future (Benedict, 2011; Huangfu, 2012; W. Liu, 2015). Since China had just suffered from several foreign invasions, most society members, especially intellectuals, valued these viewpoints and subsequent official regulations from education departments mostly consisted of tobacco management policies aiming to restrict students' smoking at schools, in efforts to revitalise the entire nation (for more information, see Section 2.4). In stark contrast, China is one of the leading countries in the world with a strong and still growing economy, the world's largest tobacco producer, and,

thus, the historical context considerably changed. Whereas banning juvenile smoking was aimed at defending China against foreign aggression, current tobacco control policy lacks a consensus against tobacco; on the contrary, tobacco is widely used in socialisation processes (Davey & Zhao, 2012b; Zachary C. Rich & Xiao, 2012; Zhao et al., 2017) and the harms of smoking are not truly believed (Berg et al., 2016; S. Ma et al., 2008; Zhao & Davey, 2015). Within this social and historical context, health education is most unlikely to reduce adolescents' smoking behaviour.

In conclusion, in a wider social and historical perspective, the high prevalence and acceptance of smoking in Chinese society suggests tobacco management in schools is an uphill battle. Considering China's current social context, the underlying purpose of tobacco control among adolescents has not been appropriately established. Therefore, the pilot intervention in this PhD is only a microcosm, beset by wider environments where smoking is a dominant social norm.

9.2. Theoretical and methodological implications

To explore the psychological mechanisms of smoking and to inform the design of an intervention, this PhD project was based on the Theory of Planned Behaviour (TPB; Ajzen, 1991, 2011, 2012). The results showed that the TPB is able to encapsulate relevant psychological factors associated with smoking among Chinese high school students (Zhao et al., 2017). Although the TPB framework has previously demonstrated its ability to explain Chinese adolescent smoking behaviour and cognitions quantitatively (Davey et al., 2014; Q. Guo et al., 2007), this PhD has qualitatively elucidated the related salient beliefs on this topic and identified several critical themes among the target population (Zhao et al., 2017). As qualitative applications in the TPB field are comparatively rare, this study showed that they can capture findings which can enrich global perceptions about the meanings of smoking.

Unique to most TPB studies thus far conducted in China, this PhD utilised a longitudinal design, allowing an analysis of changes in smoking behaviour, intention, and willingness (a construct from an extended TPB framework) over 6 months. With latent class growth modelling (LCGM), a statistical method considering heterogeneities among participants, the results showed two distinct but constant trajectories in each construct. In other words, there seemed to be two groups of adolescents holding comparatively different mindsets towards smoking. As opposed to cross-sectional designs, this design allowed for more in-depth analysis over time. Many previous interventions used the changes of smoking rates to indicate if a program had worked or not (e. g., X. Chen, Fang, et al., 2006). As this thesis showed (Paper 2), adolescent smoking has heterogeneities. So, population-centred variables such as smoking rates failed to capture the accurate changes at an individual-centred level (Jung & Wickrama, 2008; B. O. Muthén & Muthén, 2000). For example, if a programme shows that 10% of smokers became 5% from time 1 to time 2, it might that reflect the original 10% of people who stopped smoking but another 5% recently started smoking, blurring the results of the programme. Taking heterogeneity into account, modern technologies such as latent class analysis (LCA) are able to describe distinct subgroups within a population. Developed from the LCA, latent class growth modelling (LCGM) can detect distinct trajectories across time. These techniques may provide tools for future analysis within this context.

It is also theoretically important that the TPB-based intervention did not effectively change adolescent smoking in China. As mentioned above, previous smoking interventions claiming to be based on the TPB usually lack evidence to support this assertion (Hardeman et al., 2002; Sutton, 2015). TPB-based interventions have successfully changed a number of health behaviours (Steinmetz et al., 2016) but, as the findings of Study 2 showed, adolescent smoking is a behaviour involving various contextual factors. Therefore, although the TPB

provides a framework to understand adolescent smoking in China, to achieve the successful changes in attitude, subjective norm, and perceived behavioural control might need considerations of other layers rather than only focusing on the constructs (Ingham, 1993; Mielewczyk & Willig, 2007).

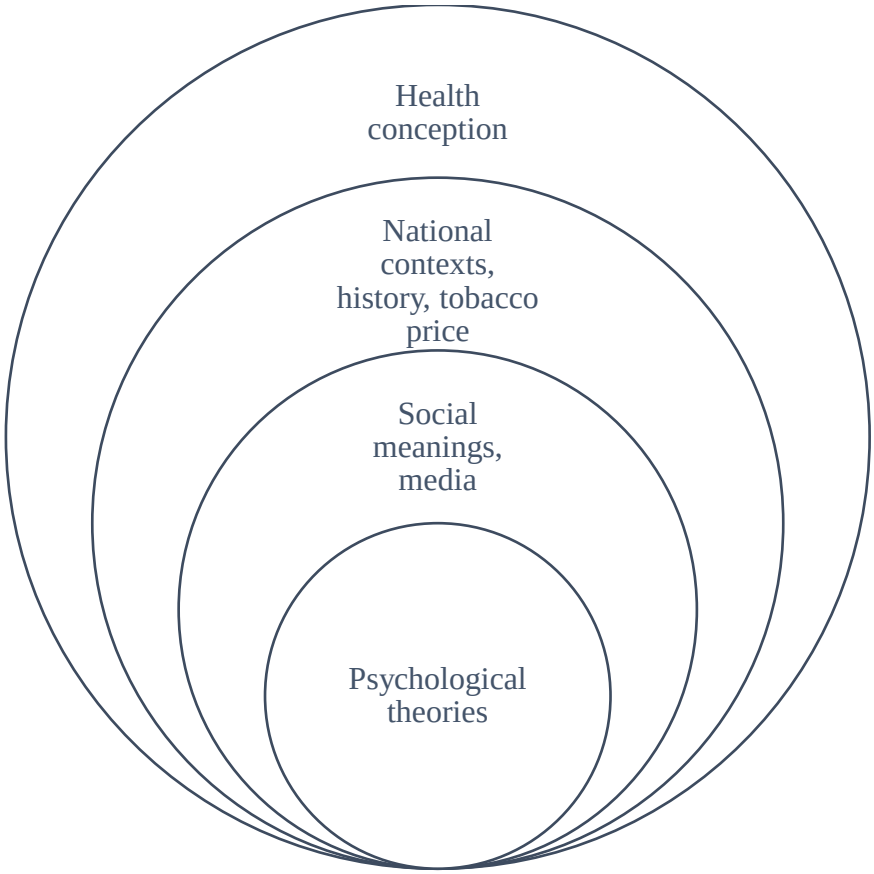


Figure 9 From psychological theories to wider social factors

Another important theoretical lesson from this PhD is about the concept of "health behaviour". As our studies showed, smoking behaviour is not a de-contextualised or unitary health behaviour, but represented by many social and idiosyncratic characteristics (Ingham, 1993; Mielewczyk & Willig, 2007; Piko et al., 2005; Zachary C Rich et al., 2014). Looking at the development of the TPB itself, of note is that Ajzen (1991) has realised this importance of context as he has incorporated PBC into a former theory and emphasised specific context,

time, and participants. Although the TPB is often categorised as a social cognition theory operating at an individual level, a review of TPB-based interventions found that programmes have better outcomes when they are conducted in groups rather than individuals (Steinmetz et al., 2016). However, how to specifically manage the contextual factors and group dynamics is definitely beyond the TPB. This issue is not exclusively restricted to the TPB. Based on this PhD, it is clear that merely working on people's cognitions is insufficient to alter smoking behaviour in China given the multilayered influences from the wider society (see Figure 9). Psychological theory-based interventions might yield poor outcomes as the fundamental understanding of health is not compatible with these cognitions. To alter the fundamental understanding of health in a community, a reconstruction of existing social meanings related to a certain behaviour and enforcement of strict tobacco control are warranted.

9.3. Practical implications

As China's smoking interventions are still in their infancy, this intervention provides several important practical implications. Given the methodological implications mentioned above, the focus of interventions should move from theoretical constructs (abstractions such as attitudes and subjective norm) to the meanings underlying health behaviours in real life (Ingham, 1993; Mielewczyk & Willig, 2007). The intervention in this PhD did include some activities to facilitate participants' ability to unpack meanings underpinning smoking. For example, in the last session, discussions about smoker images and tobacco packaging were liked by students. In the follow-up focus group, a participant reported that the packaging analysis was impressive and enabled him to understand how the tobacco industry manipulates customers. This experience, therefore, shows that the focus of future school-based interventions could be practices/activities targeting the meanings of a behaviour socially constructed by social actors.

Whereas school tobacco management traditionally utilises information about harms of smoking along with the issuing of demerits, approaches with a positive direction (e.g., rewarding students who quit smoking) should be considered. Enhancing both perceived and received social support for smoking at school might also be a promising direction for smoking cessation (Ochsner et al., 2015; Ochsner et al., 2014). Seeking a balanced or neutral way to undertake school-based anti-smoking education is extremely important when we consider the intervention in the PhD adversely increased the perceived approval to smoke from significant others (subjective norm) in the intervention group. This outcome might have occurred due to the non-judgemental position of smoking throughout the programme (for example, the first session included free discussion about both the advantages and disadvantages of smoking), which is in stark contrast to the conventional school tobacco control approach that stigmatises students who smoke. Moreover, the discussions about the high prevalence of smoking in China, and that smoking among adult males can lead to business success, may have served to normalise smoking and its perceived approval by others. A non-punishment-driven approach may also alleviate the rebellion as students would understand that tobacco control is not only targeting adolescents but also aimed at health promotion at all ages.

Another important implication is related to gender. As the results showed, the smoking intervention yielded different outcomes for males and females. As predominantly non-smokers, smoking interventions among females might focus more on how to influence other people to stop/reduce their smoking. In contrast, for those female students who are experimenting with or currently smoking, interventions could focus on image perceptions, as prototypes (smoker images) predicted the smoking willingness trajectory; strategies to foster desirable images without smoking could be fostered. In general, future programmes should be more tailored to gender and smoking experiences.

Findings from the longitudinal data suggested that smoking behaviour and cognitions in high schools seemed stable. Thus, the majority of students should receive a prevention programme, and the rest a cessation programme. The stable smoking status also suggests that, to achieve a smoke-free generation, schools at different levels should utilise different approaches (Lane & Beebe-Frankenberger, 2004). For example, primary prevention should be used in early stages with every student, whereas high level methods such as interventions on a group of problem students should be applied in high school for some students who are already addicted to nicotine.

However, the above school-based education is unable to be realised unless the Chinese government takes initiative. Obviously, new programmes in health education require more than information delivery, so, resources such as funding and specialists are needed. Moreover, given the current examination system (i.e., the College Entrance Examination) has not been changed, students' academic stress will be intensive in high schools which will be a trigger of smoking initiation or remaining as a smoker (Abdullah & Ho, 2006; Zhao et al., 2017). Thus, the priority of Chinese education determines the quantity and quality of its anti-smoking education. Only when schools prioritise students' health can higher-level interventions such as community-based and ecological approaches be realised (Crosby, Kegler, & DiClemente, 2009).

Needless to say, careful consideration about any psychology approaches should be undertaken as smoking prevalence changes at the broad societal level would have profound ramifications in many fields. For example, in the case of the economy, as the government currently encourages farmers to grow tobacco rather than other types of crops (C. Li, 2012), alternative crops or other enterprises would need to be considered if tobacco control is managed at a macro level.

9.4. Strengths and limitations of this research

The strengths and limitations of each chapter/paper have been addressed in their respective discussion sections; as such, to avoid repetition this section will focus on the overall strengths and limitations of the program of research as a whole.

Generally, this PhD comprises preliminary research, although its results are important for future studies of Chinese smoking behaviour. This body of work has a number of strengths. Firstly, the strong methodology combining both qualitative and quantitative approaches enriched the research. As mid- and late-adolescent smokers in China have rarely been researched, a thorough understanding of the nature of their behaviour is an essential step for following work. By using quantitative methods based on the TPB, changes among a larger population can be mathematically modelled and results can have generalisability due to statistical inference. To fully understand the outcomes of the intervention, qualitative approaches were also used to tease out perceptions of tobacco management in schools. Secondly, the specific scope of the research identified idiosyncrasies related to smoking in the research context, which will be insightful for future studies in terms of sampling and generalisation. For example, tobacco production appears to be a facilitator of adolescent smoking; thus, in other Chinese regions with high tobacco production (e.g., Sichuan Province and Guizhou Province), it is expected that the impact of a pro-smoking culture may be important to consider among middle school students.

There are several limitations to this work. Firstly, given the limited resources associated with a PhD programme of research, longer follow-up surveys and larger samples would have been beneficial to examine the research questions. As the life skills training in the programme requires some time and beyond-school environments, participants may demonstrate some

significant changes for their social skills in the longer-term. Secondly, the intervention had multiple goals (smoking cessation and prevention) and, thus, the aim might not have been specific enough. Furthermore, as per the guidelines of the TPB, the study was undertaken only with 10th graders in Kunming to achieve specificity of age. Thus, replication in other populations is necessary to ensure the longitudinal patterns and effectiveness of the intervention are similar. Finally, smoking behaviours in this thesis were only measured with a self-reported approach which may be different from students' real smoking status.

9.5. Future research directions for smoking interventions

This PhD project points to several future research directions. As descriptions related to each study have already been included in each section, only overall future research directions will be discussed here.

Firstly, more specific smoking interventions should be implemented for high school students. As the results showed, adolescent smoking is gendered and contains subgroups, and therefore future programmes among high school students should consider grouping participants based on more specific criteria such as gender and smoking status. By doing so, the intervention will have a clearer direction (prevention or cessation).

Secondly, although the final study qualitatively explored the perceptions of students and teaching staff members, other tobacco business-related stakeholders (e.g., retailers, government officials, and health practitioners) may also be important to investigate so as to capture a wider social landscape of tobacco use in China. For example, parents' opinions on school-based smoking interventions will enrich our understanding of this research question, as a student in the elicitation study reported that her family member who plants tobacco told her that the tobacco industry is lucrative (Zhao et al., 2017).

Finally, as the results showed that an intervention using individual approaches barely altered adolescent smoking, future interventions should consider community approaches using well-established frameworks such as the RE-AIM to evaluate any changes on personal and organisational dimensions (Crosby et al., 2009; Glasgow, Vogt, & Boles, 1999). However, this approach needs to consider local factors. Previously, Wen et al. (2010) included environmental intervention components such as persuading shoppers around schools not to sell cigarettes to students, and directing parents to sign smoke-free contracts; this intervention also failed to show desired outcomes of a reduction in smoking.

Although more research in China should be undertaken to develop suitable programmes, some successful experiences in other countries can be considered in order to assist future interventions. For example, limiting tobacco advertising (Lovato, Watts, & Stead, 2011) and controlling the exposure of smoking scenes in mass media (Durkin, Brennan, & Wakefield, 2012) have been reported as effective ways to control adolescent smoking. To establish a smoke-free environment, the Chinese government has launched a series of anti-smoking policies. However, research identified that these regulations are not strictly obeyed (Au et al., 2016; L. Wang et al., 2017). Moreover, given the relatively limited resources at schools, adolescents might need free professional cessation services which are currently limited and in their infancy in China.

9.6. Conclusion

In agreement with most smoking intervention previously undertaken in China (L. Chen et al., 2014; Chou et al., 2006; Wen et al., 2010), this programme of research showed that it is still an uphill battle to alter smoking behaviour and cognitions among adolescents. Only some attitudinal changes and improvements in life skills were found as a result of participating in the intervention. Theories such as the TPB are able to explain smoking behaviour, but a TPB-based intervention did not show promise in changing behaviour or intention at least at this

point in a society with pro-smoking norms and acceptance. Stable smoking-related trajectories suggest that belief-based programmes might be inadequate in this context. Given the prevalent smoking cultures in all walks of Chinese society, future interventions may be ineffective unless changes are made at wider social levels.

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10. APPENDIX

10.1. Published abstracts from the PhD research program

Reference:

Zhao, X., White, K. M., & Young, R. M. (2016). Exploring smoking beliefs among Chinese adolescents to inform a theory-based intervention. *Fourteenth International Congress of Behavioural Medicine*. Melbourne, Australia. *International Journal of Behavioural Medicine.* Vol. 23 (Suppl 1): pS195-6. doi:10.1007/s12529-016-9586-3.

Abstract:

Introduction: As the world's largest tobacco consumer and producer, China's smoking prevalence among adolescents is increasing. While significant epidemiological research has been conducted in China, research examining adolescent smoking is rare. This study aimed to understand Chinese adolescents' smoking beliefs to inform a theory-based anti-smoking intervention.

Methods: Thirty 10th graders (aged 16 to 17 years) were recruited from Kunming, China. Six focus groups were conducted with different gender distributions. The semi-structured interview guide was based broadly on the Theory of Planned Behaviour (TPB)'s underlying salient beliefs. A Consensual

Qualitative Research (CQR) approach was adopted for data analysis.

Results: Seven domains with 51 categories were identified by the researchers and external auditor. These domains include the TPB constructs: advantages (including smoking as a social tool), disadvantages such as addiction to tobacco, approvers and disapprovers (including friends and teachers), facilitators such as negative emotions, especially examination stress, and barriers of smoking (e.g., environmental influences), as well as non-

TPB constructs such as different smoker prototypes (e.g., smokers are regarded as ’successful’ men). Moreover, gender was important throughout the data in that smoking was generally regarded as a male behaviour.

Conclusions: Besides typical TPB beliefs, smoker prototype was found to be an additional determinant of adolescents’ smoking in China. This finding suggests that, to develop culturally-appropriate anti-smoking interventions among Chinese adolescents, TPB constructs as well as extended constructs such as smoker images, should be included. Given the positive connotations of smokers, activities deconstructing smokers’ images, including in films and advertisements, may be helpful.

10.2. Ethics approval for Study 1

10/2/2015 11:27 AM

Dear Prof Katherine White and Mr Xiang Zhao

Project Title: Developing and piloting a theory-based intervention for smoking cessation among Chinese middle school students (Study 1)

Ethics Category: Human - Low Risk
Approval Number: 1500000044
Approved Until: 2/05/2016
(subject to receipt of satisfactory progress reports)

We are pleased to advise that your application has been reviewed and confirmed as meeting the requirements of the National Statement on Ethical Conduct in Human Research.

I can therefore confirm that your application is APPROVED.
If you require a formal approval certificate please advise via reply email.

CONDITIONS OF APPROVAL
Please ensure you and all other team members read through and understand all UHREC conditions of approval prior to commencing any data collection:
> Standard: Please see attached or go to http://www.orei.qut.edu.au/human/stdconditions.jsp
> Specific: None apply

Decisions related to low risk ethical review are subject to ratification at the next available UHREC meeting. You will only be contacted again in relation to this matter if UHREC raises any additional questions or concerns.

Whilst the data collection of your project has received QUT ethical clearance, the decision to commence and authority to commence may be dependent on factors beyond the remit of the QUT ethics review process. For example, your research may need ethics clearance from other organisations or permissions from other organisations to access staff. Therefore the proposed data collection should not commence until you have satisfied these requirements.

Please don't hesitate to contact us if you have any queries.

We wish you all the best with your research.

Kind regards

Janette Lamb on behalf of Chair UHREC
Office of Research Ethics & Integrity
Level 4 | 88 Musk Avenue | Kelvin Grove
p: +61 7 3138 5123
e: ethicscontact@qut.edu.au
w: http://www.orei.qut.edu.au

10.3. Ethics approval for Study 2

University Human Research Ethics Committee (UHREC)

HUMAN RESEARCH ETHICS APPROVAL CERTIFICATE

NHMRC Registered Committee Number EC00171

Date of Issue: 12/2/16 (supersedes all previously issued certificates)

Dear Prof Katherine White

This approval certificate serves as your written notice that the proposal has met the requirements of the *National Statement on Ethical Conduct in Human Research* and has been approved on that basis. You are therefore authorised to commence activities as outlined in your application, subject to any specific and standard conditions detailed in this document.

Project Details

Category of Approval:	Negligible-Low Risk
Approved From:	10/02/2016 **Approved Until:** 10/02/2018 (subject to annual reports)
Approval Number:	1500001027
Project Title:	Developing and piloting a theory-based intervention for smoking cessation among Chinese middle school students

Investigator Details

Chief Investigator: Prof Katherine White

Other Staff/Students:

Investigator Name	Type	Role
Mr Xiang Zhao	Student	Doctoral (Research)
Prof Ross Young	Internal	QUT Associate Supervisor

Conditions of Approval

Specific Conditions of Approval:

No special conditions placed on approval by the UHREC. Standard conditions apply.

Standard Conditions of Approval:

1. Conduct the project in accordance with QUT policy, the ***National Statement on Ethical Conduct in Human Research*** (http :// www . nhmrc . gov . au / guidelines / publications / e 72), the ***Australian Code for the Responsible Conduct of Research*** (http :// www . nhmrc . gov . au / guidelines / publications / r 39), any associated legislation, guidelines or standards;
2. Gain UHREC approval for any proposed variation (http ://www . orei . qut . edu . au / human / var /) to the project **prior** to implementation;
3. Respond promptly to the requests and instructions of UHREC;
4. Declare all actual, perceived or potential conflicts of interest;
5. Immediately advise the Office of Research Ethics and Integrity (http :// www . orei . qut . edu . au / human / adv /) if:
   - any unforeseen development or events occur that might affect the continued ethical acceptability of the project;
   - any complaints are made, or expressions of concern are raised, in relation to the project; o the project needs to be suspended or modified because the risks to participants now outweigh the benefits;
   - a participant can no longer be involved because the research may harm them; and
6. Report on the progress of the approved project at least annually, or at intervals determined by UHREC. The Committee may also choose to conduct a random audit of your project.

If any details within this Approval Certificate are incorrect please advise the Research Ethics Unit within 10 days of receipt of this certificate.

End of Document

10.4. Ethics approval for amendments of Study 2

24/8/2016 11:14

Dear Prof Katherine White

Approval #: 1500001027
End Date: 10/02/2018
Project Title: Developing and piloting a theory-based intervention for smoking cessation among Chinese middle school students

This email is to advise that your variation has been considered by the Chair, University Human Research Ethics Committee. This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007).

Approval has been provided for the:
< Addition of school teachers/staff in schools in China.
< Addition of flyer for student focus groups.
< Modifications to student focus groups enquiry.
< Modification of student questionnaire.
< Addition of interviews for teachers.

PLEASE NOTE:
RESEARCH SAFETY -- Ensure any health and safety risks relating to this variation have been appropriately considered, particularly if your project required a Health and Safety Risk Assessment.

CONFLICTS OF INTEREST -- If this variation will introduce any additional perceived or actual conflicts of interest please advise the Research Ethics Advisory Team by return email.

Please don't hesitate to contact us if you have any questions.

Regards

Janette Lamb / Debbie Smith
on behalf of Chair UHREC
Office of Research Ethics & Integrity
Level 4 | 88 Musk Avenue | Kelvin Grove
+61 7 3138 5123
ethicscontact@qut.edu.au
http://www.orei.qut.edu.au

10.5. Protocols for qualitative studies

Questions List used for focus groups in Study 1:

Following questions would be asked:

1.	What do you believe are the advantages of smoking?
2.	What do you believe are the disadvantages of smoking?
3.	Is there anything else you think is good or bad about smoking?
4.	Which individuals or groups of people would approve of you smoking?
5.	Which individuals or groups of people would disapprove of you smoking?
6.	Are there any other individuals or groups of people would approve or disapprove of you smoking?
7.	What factors or circumstances would make you more likely to smoke?
8.	What factors or circumstances would make you less likely to smoke?
9.	Are there any other factors you can think of that make smoking easy or difficult?

The questions listed above are guiding questions to initiate discussion, and can be followed up with more specific questions depending on the answers the students will give. So those questions do not include all the questions to be asked, just some initial general questions.

If participants are struggling to answer the prompts, then the reviewer's suggestion of personalising the questions more may be adopted such as "How about for you, what would be the advantages to you to smoke?" and "How about for other people you know who smoke, like your friends and your parents?"

Questions List used for focus groups in Study 2:

Following questions would be asked (The questions listed are guiding questions to initiate discussion, and can be followed up with more specific questions depending on the answers the students will give. So those questions do not include all the questions to be asked, just some initial general questions):

(Intervention groups)

Six months ago, we had a smoking intervention. Can you tell me what you remember about it?

How did it affect your thoughts about smoking?

What can be improved based on your experience?

Apart from the intervention, did you receive any other smoking intervention from your school in the past 6 months? If so, what were they and what did you think of them?

Before and after the intervention, what changes in relation to thoughts about smoking did you experience?

Before and after the intervention, what changes in relation to smoker images did you experience?

Remember we undertook sessions related to stress coping, decision making, and other skills? Can you tell me about your experiences in the last 6 months in relation to the life skills training we addressed in the intervention? (1) stress coping; (2) decision making; (3) assertiveness; (4) pragmatics; (5) critical thinking. [Discuss these skills one by one, with a simple definition at beginning of each discussion so as to remind students with prompts]

Can you tell me about your experiences in relation to “requesting that a smoker cease in your presence” during the last 6 months?

Can you tell me about your experiences in relation to “refusing people with seniority offering you cigarettes” during the last 6 months?

Broadly speaking, how do you think the intervention may influence your future?

What other interventions/strategies do you think would be useful at School to encourage anti-smoking beliefs and behaviours?

What other interventions/strategies outside of School (e.g., laws, regulations) would encourage anti-smoking beliefs and behaviours?

(Control groups)

Did you know we had a smoking intervention in your grade half year ago? If so, can you tell me what you know about it and how you know about it?

Did you receive any smoking intervention from your school in the past 6 months? If so, what were they and what did you think of them?

What changes have you experienced in relation to smoking (thoughts and behaviours) in the last six months? No matter positive or negative.

Can you talk about the relationship between the following life skills and students’ smoking? (1) stress coping; (2) decision making; (3) assertiveness; (4) pragmatics; (5) critical thinking. [Discuss these skills one by one, with a simple definition at beginning of each discussion so as to remind students with prompts]

Can you tell me about your experiences in relation to “refusing others’ smoking in your presence” during the last 6 months?

Can you tell me about your experiences in relation to “refusing people with seniority offering you cigarettes” during the last 6 months?

What interventions/strategies do you think would be useful at School to encourage anti-smoking beliefs and behaviours?

What interventions/strategies outside of School (e.g., laws, regulations) would encourage anti-smoking beliefs and behaviours?

Questions List used for individual interviews (teaching staff members) in Study 2:

Following questions would be asked (The questions listed above are guiding questions to initiate discussion, and can be followed up with more specific questions depending on the answers the students will give. So those questions do not include all the questions to be asked, just some initial general questions. Questions will be asked depending on the person’s role in the school):

What is your role in the school? How long have you worked as this role? What is your experience related to campus tobacco control?

(For Teachers form the intervention classes): We had a smoking intervention in your class in the last term, can you tell me what students said about it?

(After describing/showing them the intervention materials) What do you think the impact of the intervention has been? What might be missing in the approach? What could be added? What could be deleted/replaced? Are there other interventions (e.g., school policies, quit smoking counselling) offered by the School that should accompany this intervention?

In what way do you think the intervention should be improved? (I think now covered above!)

Is there any other education on smoking delivered in your middle school? If so, then what are they? How do you work? What do students think about them?

In your opinion, why do students smoke in school given that there are anti-smoking rules?

What are the barriers for school-based smoking interventions?

What help them to be successful?

As a staff member who is in charge of student life after class, how do you deal with students who smoke?

10.6. Primary and secondary outcome measures reported in the protocol for the middle school smoking intervention

Variable	Number of items	Scale	Measurement Strategies
Primary outcome variables			
Behaviour	2	Yes or no	"In the last week, I smoked." and "In the last 4 weeks, I smoked."
Intention	3	1 (strongly disagree) to 7 (strongly agree)	"I intend to smoke."; "I plan to smoke."; "It is likely that I will smoke."
Willingness	3	1 (strongly disagree) to 7 (strongly agree)	"I am willing to smoke."; "Suppose I were with a group of classmates on campus where no school staff could find me and there were cigarettes that I could have if I wanted. I am willing to smoke in such a situation."; "Suppose I were at some entertainment place (e.g., karaoke room, mah-jong house) with my friends and there were cigarettes that I could have if I wanted. I am willing to smoke in such a situation."
Secondary outcome variables			
Attitude	6	1 (pleasant) to 7 (unpleasant) 1 (good) to 7 (bad) 1 (wise) to 7 (unwise) 1 (easy) to 7 (difficult) 1 (nice) to 7 (awful) 1 (positive) to 7 (negative)	"Smoking cigarettes during the next week would be..."
Subjective norm	4	1 (strongly disagree) to 7 (strongly agree)	"Those people who are important to me would want me to smoke."; "Most of my friends smoke."; "Most people who are important to me would approve of me

			smoking."; "My friends think that smoking is a good thing to do."
Perceived behavioural control	4	1 (strongly disagree) to 7 (strongly agree)	"I have complete control over whether I smoke."; "It is mostly up to me whether I smoke."; "If I wanted to, it would be easy for me to smoke."; "I am confident that I could smoke."
Prototypes	5	1 (strongly disagree) to 7 (strongly agree) [wording changed according to the question]	"In general, how favourably do I view the typical smokers around my age?"; "My view of male smokers around my age is positive."; "My view of female smokers around my age is positive."; "In general, how similar am I to the smokers around my age?"; "Do the characteristics that describe the smokers around my age also describe me?"
General assertiveness	14	1 (never do this) to 5 (always do this)	"Resist pressure to drink alcohol."; "Resist pressure to smoke cigarettes."; "Resist an unfair request from a friend."; "Express an opinion that different from what the person I am talking to is saying."; "Tell people when I feel they have done something that is unfair."; "Ask for service when I am not getting it."; "Request that someone return borrowed things."; "Return items that I am not satisfied with."; "Ask a person annoying me to stop."; "Resist sales pressure from a salesman."; "Tell someone I like them."; "Compliment a person I really appreciate."; "Ask whether I have offended someone."; "Start a conversation with a stranger."
Dispositions toward critical thinking	20	1 (never) to 6 (always)	"Think about one question from different perspectives."; "Use new ideas or viewpoints."; "Respect others' views during discussions."; "Remain a rational and logical thinking, even when I face complicated situations."; "Think if a piece of information is reliable before I use it."; "Examine the

			value and reliability of a new viewpoint."; "Consider situational factors when I make decisions." "Clarify the question before I deal with it."; "Test if my idea is convincing by challenging my own ideas."; "Collect relevant information that is updated and holistic when I deal with a problem."; "Quickly understand others' feelings and thoughts by discussions and observations."; "Postpone a decision when lacking evidence."; "Consider other possible solutions when I deal with a problem."; "Immediately correct my own viewpoints when enough evidence shows my bias."; "Find out the causes of a problem when I start to handle it."; "Look for the histories of controversial issues that have recently happened."; "Find out the hidden hypotheses when one raises an argument."; "Further explore novel things and ideas."; "Carefully listen to others' viewpoints in a discussion."; "Predict the consequences of all the alternative plans before making decisions."
Coping without smoking ability	3	1 (strongly disagree) to 7 (strongly agree)	"I am able to cope with stress."; "I am able to cope with stress from study without smoking cigarettes."; "I am able to cope with stress from life, in general, without smoking cigarettes."
Decision-making ability	3	1 (strongly disagree) to 7 (strongly agree)	"I am able to make good decisions."; "I consider more than one option when weighing up my decisions."; "I make decisions after finding out enough information to base my decisions on."

Final scales used for data collection in Study 2 (Section 7)

Variable	Item	Scale	Reliability (Cronbach's α/Pearson correlation)
	Behavioural section		
Smoking status	What is your smoking status?	I have never smoked I have tried smoking a few times I used to smoke regularly but I quit I am a smoker (even if I smoke casually)	N/A
Smoking behaviour	In the last 4 weeks, I smoked.	1 (yes) to 0 (no)	N/A
Father's smoking status	Does your father smoke?	1 (yes) to 0 (no)	N/A
Mother's smoking status	Does your mother smoke?	1 (yes) to 0 (no)	N/A
Friends' smoking status	Among your friends, ____ of them are smokers?	None, Few, Some, Majority, and All	N/A
	Psychological section		
Intention	I intend to smoke. I plan to smoke. It is likely that I will smoke.	1 (strongly disagree) to 7 (strongly agree)	.928
Willingness	I am willing to smoke. Suppose I were with a group of classmates on campus where no school staff could find me and there were cigarettes that I could have if I wanted. I am willing to smoke in such a situation. Suppose I were at some entertainment place (e.g., karaoke room, mah-jong house) with my friends and there were cigarettes that I could have if I wanted. I am willing to smoke in such a situation.	1 (strongly disagree) to 7 (strongly agree)	.858
Attitude[a]	Smoking cigarettes during the next week would be...	1 (pleasant) to 7 (unpleasant) 1 (good) to 7 (bad) 1 (wise) to 7 (unwise) 1 (easy) to 7 (difficult) 1 (nice) to 7 (awful) 1 (positive) to 7 (negative)	.938
Subjective norm	Those people who are important to me would want me to smoke. Most of my friends smoke. Most people who are important to me would approve of me smoking.	1 (strongly disagree) to 7 (strongly agree)	.735

	My friends think that smoking is a good thing to do.		
PBC: Controllability[b]	I have complete control over whether I smoke. It is mostly up to me whether I smoke.	1 (strongly disagree) to 7 (strongly agree)	.538**
PBC: Self-efficacy[b]	If I wanted to, it would be easy for me to smoke. I am confident that I could smoke.	1 (strongly disagree) to 7 (strongly agree)	.539**
Prototype	In general, how favourably do I view the typical smokers around my age?	1 (very unfavourable) to 7 (very favourable)	.414**
	In general, how similar am I to the smokers around my age?	1 (nothing similar) to 7 (very similar)	
	Life skills		
Stress coping	I am able to cope with stress. I am able to cope with stress from study without smoking cigarettes. I am able to cope with stress from life, in general, without smoking cigarettes.	1 (strongly disagree) to 7 (strongly agree)	.818
Decision making	I am able to make good decisions. I consider more than one option when weighing up my decisions. I make decisions after finding out enough information to base my decisions on.	1 (strongly disagree) to 7 (strongly agree)	.638
Assertiveness[c]	*[Substance assertiveness]* Resist pressure to drink alcohol. Resist pressure to smoke cigarettes. Resist an unfair request from a friend. *[General assertiveness]* Express an opinion that different from what the person I am talking to is saying. Tell people when I feel they have done something that is unfair. Ask for service when I am not getting it. Request that someone return borrowed things. Return items that I am not satisfied with. Ask a person annoying me to stop. Resist sales pressure from a salesman. *[Social assertiveness]* Tell someone I like them. Compliment a person I really appreciate. Ask whether I have offended someone. Start a conversation with a stranger.	1 (never do this) to 5 (always do this)	.775

Pragmatics	Knowing the wording used to refuse a request. Knowing the wording used to refuse a refuse cigarette offers.	1 (never do this) to 5 (always do this)	.396**
Dispositions towards critical thinking	*[Intellectual curiosity]* Think about one question from different perspectives. Use new ideas or viewpoints. Further explore novel things and ideas. *[Open-mindedness]* Respect others' views during discussions. Postpone a decision when lacking evidence. Consider other possible solutions when I deal with a problem. Carefully listen to others' viewpoints in a discussion. *[Holistic & reflective]* Consider situational factors when I make decisions. Test if my idea is convincing by challenging my own ideas. Find out the hidden hypotheses when one raises an argument. Predict the consequences of all the alternative plans before making decisions. *[Systematicity & analyticity]* Remain a rational and logical thinking, even when I face complicated situations. Think if a piece of information is reliable before I use it. Examine the value and reliability of a new viewpoint. Clarify the question before I deal with it. Collect relevant information that is updated and holistic when I deal with a problem. Quickly understand others' feelings and thoughts by discussions and observations. Immediately correct my own viewpoints when enough evidence shows my bias. Find out the causes of a problem when I start to handle it. Look for the histories of controversial issues that have recently happened.	1 (never) to 6 (always)	.927
	Evaluation of the intervention		
Overall evaluation	I am satisfied with the new facts, strategies and skills I have learned in the programme? I am glad that I participated in this programme. Overall, the activities were enjoyable.	1 (not at all) to 5 (completely)	.855

	Overall, the activities helped me to learn new things.		
	Overall, the programme leader was easy to understand and I felt comfortable to ask questions when needed.		
Immediate smoking plans after intervention (participants with smoking experience)	I am willing to stop smoking/remain a non-smoker.	1 (strongly disagree) to 7 (strongly agree)	.899
	I intend to stop smoking/remain a non-smoker.		
	It is likely that I will be more anti-smoking.		
	It is likely that I have enough social skill to resist smoking.		
Immediate smoking thoughts and plans after intervention (participants without smoking experience)	I am willing to remain a non-smoker.	1 (strongly disagree) to 7 (strongly agree)	.909
	I intend to remain a non-smoker.		
	I plan to remain a non-smoker.		
	It is likely that I will be more anti-smoking.		
	It is likely that I have enough social skill to resist smoking.		

[a]Scores have been reversed in order to keep consistent direction with other variables. Note: **p<.01 Note. PBC = perceived behavioural control. Smoking intention refers to how one is motivated to perform smoking. Smoking intention refers to one's intention to smoke. Smoking willingness refers to one's openness to smoking.

[b]As suggested by Ajzen (2002), separate measures of controllability and self-efficacy and were used instead of a global PBC scale. Note. Composites (mean scores) of each variable were used for the analyses

[c]We deleted a question that was deemed unsuitable for Chinese middle school students due to the sensitivity of the topic ("resist pressure to use drugs").

10.7. Intervention feedback: table of quotes

Number	Quote
Q1	I was quite immature… and tried to smoke due to curiosity… I viewed smoking as something to be proud of. As I am getting mature, I corrected those inaccurate thoughts. After these sessions, I have strengthened the belief that I will not smoke. [Female, intervention group, previously smoked][a]
Q2	[The intervention] informed me with many methods to deal with problems in my life. I am using the methods you taught us when I need to make choices. [Female, intervention group, never smoked][a]
Q3	I rarely reflected on my actions, but now I even quit alcohol. [Male, intervention group, current smoker][a]
Q4	After the intervention, I reckon it is easier to stop classmates smoking in my presence…Now, classmates who smoke do it away from us….after the intervention, classmates all know that people do not like them smoking around us. I do not know how to say it, but I can feel it is easier to stop their smoking now as opposed to before. [Female student, intervention group][b]
Q5	I remember you gave us some colourful pictures of different tobacco packaging, with which we discussed how packaging was designed. That activity impressed me a lot. I think those tobacco companies manipulate consumers' minds for better sales. [Male student, intervention group][b]
Q6	I think all the activities will help my future life. [Female student, intervention group][b]

Q7	I have practised [stress coping skill]. When I attended a competition in the school, my classmate and I were very nervous and we tried to cope with it by the deep breathing method you taught us, and we felt we got better. When we performed, we were not that nervous. [Male student, intervention group][b]
Q8	I used to think smokers are very bad and I did not make friends with people if I saw them smoke. Now, I know people smoke for some reasons and I can evaluate their behaviour in a rational way. [Male student, intervention group][b]
Q9	The intervention may not have changed their smoking but it taught them much about life skills. They studied it carefully because I found that some students wrote things they learnt from the intervention in their 'Weekly Logs' [a system that form teachers use in order to gather information of each students whereby students are asked to report on their life or reflections of their life in the past week]. Students said that they got insights and lessons from your programme…I feel there are some changes in terms of their life skills. [Form teacher][c]

10.8. Intervention facilitator manual

Intervention name: Achieving my healthy future

Developed by Xiang Zhao (2016)

Supervised by Professor Katherine White and Professor Ross Young

General introduction for facilitating the programme

Background: China is the world's largest tobacco consumer and producer. Among the mid-and-late teenagers (15-19 years old), the current smoking rates for males and females were 14.2% and 0.9% respectively in 2010 (Chinese Center for Disease Control and Prevention, 2011). If the current trend continues, tobacco will kill 3 million people in China every year by 2050. Of great concern, about 100 million of the 0.3 billion Chinese smokers that are now younger than 30 years will eventually have tobacco-related deaths (G. Yang et al., 2015).

According to the Constitution of the People's Republic of China, the state promotes the all-round development of children and young people, morally, intellectually and physically (Article 46). As for health education in schools, the School Hygiene Act requires that all kinds of schools should regard health education as a part of teaching programme (Article 13). Notably, the Ministry of Education and the National Health and Family Planning Commission issued "On strengthening tobacco control in schools" (JTYT [2010] No. 5), demanding that schools should conduct tobacco control and equip students with anti-smoking-related knowledge and skills such as tobacco's hazard and refusal skills.

Although school-based smoking interventions have been undertaken for about 20 years in China, nearly 15% of male smoking rate among teenagers still needs considerable attention. What is more important is the fact that young males tend to have higher smoking prevalence when they reach their early twenties (Chinese Center for Disease Control and Prevention,

2011). The quality of current smoking cessation intervention in China may be inhibiting the reduction of smoking in young people. So far, few well-designed school-based programmes for school teachers are available. Currently, as Chinese schools mostly focus on students' academic achievement (i.e., high marks), dedicating time on smoking prevention on school is unlikely to be a priority. Thus, effective intervention programmes are in need.

Introduction to this programme

Among 4 levels of school interventions (Bradley, Danielson, & Hallahan, 2002), this programme is a the Level I, primary prevention; thus, it is an early intervention class-wide programme. The programme is targeting students with all smoking experience (non-smokers, current smokers, and ever smokers). For non-smoker students, the intervention goal is to retain their current smoking status. For smoking students, the goal is to minimise or cease their smoking behaviour. Previous school-based smoking intervention programmes (e.g., Botvin & Griffin, 2007) have proven the effectiveness of an approach based on generic skills such as refusal that also helps students to resist other types of substance (e.g., alcohol, marijuana, ice) in future (Botvin et al., 1993). For this reason, we generally utilise generic skills rather than sticking to smoking topics only.

This programme is developed based on qualitative interviews (elicitation) at a middle school in Kunming, China. The smoking related beliefs elicited from the previous study will be targeted in 4 sessions in the programme. The programme is designed upon an often used decision-making model, the Theory of Planned Behaviour (TPB; Ajzen, 1991). According to this theory, one's behaviour and intention is influenced by behaviour attitudes (one's evaluation of the favourability of performing the target behaviour), subjective norms (one's evaluation of the social credence and pressure to perform target behaviour), and perceived behavioural control (one's assessment of the ease or difficulty they would feel if they enact

the target behaviour). These three components will, thus, become main foci of three sessions in this program (Ajzen, 1991). According to the TPB, these three constructs are influenced by beliefs: behavioural beliefs are used in the theory as people's estimation of a behaviour's possible consequences; normative beliefs are one's estimation of the likelihood that important referents would approve or disapprove of a certain behaviour; and control beliefs refer to one's estimation of the likelihood that a facilitator or inhibitor might occur (Ajzen, 1991, 2011). Furthermore, in light of another psychological theory especially designed for adolescents' health behaviours—the Prototype Willingness (PW) model (Gibbons & Gerrard, 1995)—one session will mainly focus on social images (prototype).

Session format

For each session (time frame is 40 minutes for each session), a similar format for the facilitator manual is used as:

- Objectives: The major aims for each session
- Contents: Main issues that will be covered in each session
- Recourses required: All the materials needed for each session (all questionnaires used in sessions can be found in the Appendices)
- Procedure: The process of each session in detail, with approximate time limits for each activity.

Brief outline of the programme

This programme targets the smoking intentions and behaviours of 10th graders (15-17 years) for smoking cessation/minimisation. For each session, the facilitator will work on one cognitive objective and one behavioural objective (*generic skills*). The generic skills will not only promote students' anti-smoking cognitions and behaviours, but also discourage their potential risks to try other types of substances such as drugs (Botvin, 1980, 1985). This whole programme is designed as below:

Sessions	Objectives	Theoretical construct(s)	Activities	Time limit (min)
1	*Programme introduction*	Attitudes; Stress Coping		5
	Cognitive: Encourage anti-smoking behaviour related attitudes and beliefs		Debate: *What is the impact of smoking for people of your age and for your future life?*	20
	Skill: Coping with anxiety and stress		Training: Self-control skills	10
	Participant feedback		Survey	5
2	Cognitive: Understand that social factors such as family members, friends, and classmates influence students' decision making	Normative beliefs; Decision making	Discussion of approvers and disapprovers of smoking	15
	Skill: Improve students' ability of making decisions		Training: Decision making and problem solving	20
	Participant feedback		Survey	5
3	Cognitive: Increase self-efficacy to resist smoking	Self-efficacy / perceived behavioural control; Refusal skills; Assertiveness	Group discussion	10
	Skill: Culturally appropriate refusal skills		Role play	25
	Participant feedback		Survey	5
4	Cognitive: Understand how smoker image is constructed by the society	Prototypes & willingness; Resistance; Critical thinking; Self-image	Smoker image discussion	20
	Skill: Improve students' ability to resist advertisement and to envision self-images		Tobacco ad analysis; discussion	10
	Summing-up		Revision	3
	Participant feedback		Survey	7

The development of target participants

This programme is targeting Grade 10 students (i.e., Grade 1 of Senior High School) in China. Students of this Grade are likely to be (Lin, 2002):

- in possession of a strong sense of personal identity
- thinking that they "know it all"
- seeking greater independence from parents
- influenced by peer attitudes
- open to information provided by trusted adults
- experiencing an illusion of immortality

Thus, facilitators should give participants considerate room to express their own thinking, rather than dominate the classroom.

Session 1 Attitudes, beliefs, and stress management

OBJECTIVES

- Develop anti-smoking behaviour related attitudes and beliefs.
- Improve students' ability to cope with situations causing anxiety.

CONTENTS

- What is this programme about?
- What are the long and short term effects of quitting smoking?
- How to use self-control skills to deal with anxiety that directly affect the body.
- How to use self-control skills to deal with anxiety that involves controlling what you think.

RESOURSES REQUIRED

- ☐ PowerPoint Slides (including relaxing music)
- ☐ Student tool #1
- ☐ Student feedback surveys#1

PROCEDURE

Activity 1. Welcome participants to the programme **(5 min)**

- A brief introduction to the programme
- Future-directed benefits that students can have such as social skills, mindfulness, and pragmatic competence.
- All responses are confidential and that any responses or attempts to work through the activities will be respected.

Activity 2. Debate: *Is smoking good or bad for people of your age?* **(20 min)**

- Divide the class into two teams. One half will be in favour of that smoking is good for people of their age, the other against. A game (rock-paper-scissors) will be used at the beginning of the debate and the winner group can choose which viewpoint they support. **(1 min)**
- Groups think of as many points that support their viewpoint and note them down. Each student discuss with neighbour students. **(4 min)**
- Each team generates 4 students for the debate. During this period, debate students will have time to collect ideas from other students in the team and prepare for the debate. **(8 min)**
- Encourage students to think about the near future and long future result of smoking, especially emphasising on the early 20s smoking status. With the guide of facilitator, students record their thoughts in their Student tool #1. **(7 min)**

Activity 3. Techniques for coping with anxiety (Botvin, 1980) **(10 min)**

- Introduction: Most of students at your age regard smoking as a way to deal with stress and anxiety. In psychology, there are a number of specific techniques for dealing with anxiety. Now, let us look at the way of dealing with nervousness and anxiety involves the use of self-control skills designed to affect your body physically. These include tension reduction techniques such as relaxation exercise and deep breathing. **(1 min)**
- Relaxation exercise: This exercise is simple and easy to do, involving the following steps: **(5 min)**
    - Sitting quietly in a comfortable position
    - Closing your eyes
    - Gradually relaxing all of the muscles in your body, beginning with your toes and working up the rest of your body to your face and head
    - After all of the muscles in your body are relaxed, focus on your breathing and allow yourself to become more and more relaxed with every breath you take in—breathing in relaxation and breathing out tension
    - Imagine yourself in some quiet, peaceful place, feeling completely relaxed without a care in the world
    - After this brief description, play some relaxing music
    - Homework: Students should practice this exercise once or twice a day in some quiet place (for example, in your room at home or in the garden at the school campus). The more the exercise is practiced, the more skilled people become in learning to relax their bodies quickly and completely. Since tension is connected to anxiety and relaxation is connected with feeling calm and free of anxiety, this type of exercise is a very effective strategy against anxiety.
- Deep breathing: Deep breathing is a simple and effective way of reducing the physical tension you feel when you are anxious. In addition to helping you feel more relaxed, deep breathing reduces your heart rate and helps to "slow down" your body. **(5 min)**
    - Slowly breathing in through your nose letting the air go into your diaphragm (your chest should not move) for a count of 4
    - Breathe out for a count of 8
    - Repeat about 4 or 5 times

Activity 4. Participant feedback **(5 min)**

- A quick review of the debate and relaxation exercise (**about 1 min**).
- Distribute the participant feedback survey #1. Remind participants that the feedback they are giving will be read by the designers of the session and may be used to improve future versions of this programme.
- Instead of collecting these sheets, indicate a 'return spot' in the room (a desk near the exit is best). Ask participants to leave completed forms at the 'return spot' as they leave.
- Collect the completed sheets.
- Don't forget to end the session on a high point – thank the participants for their input and remind them of the day for the next session.

Confucius said, “There are three friendships which are advantageous, and three which are injurious. Friendship with the uplight; friendship with the sincere; and friendship with the man of much observation: — these are advantageous. Friendship with the man of specious airs; friendship with the insinuatingly soft; and friendship with the glib-tongued: — these are injurious.”

“Filial piety and fraternal submission! — are they not the root of all benevolent actions?”

Think thrice, and then act.

From *Confucian Analects*[*]

OBJECTIVES

- Understand that social factors such as family members, friends, and classmates influence students’ decision making.
- Improve students’ ability of making decisions and problem solving.

CONTENTS

- Who are approvers and disapprovers of smoking behaviour for people of your age?
- What good things do you bring to your family members and what good things do they bring to you?
- What have you done to help your family members or friends reduce their smoking?

[*] English translations are from the ‘Chinese Classics Electronic Project’ (www.cnculture.net).

- Introduce and practice strategies for making decisions/problem solving.

RESOURSES REQUIRED

- ☐ PowerPoint Slides
- ☐ Student tool #2
- ☐ Student feedback surveys#2

PROCEDURE

Activity 1. Discussion: Family members, friends, and smoking **(15 min)**

- What good things do you do to your family members and what good things do they do to you?
- What good things do you do to your friends and what good things do they do to you?
- What have you done to help your family members or friends reduce their smoking?
- (Encourage students to discuss above questions firstly in 3-4 groups then invite some of them to share with other classmates. The following table can be shown on the slide to guide students' discussion. The aim is to help students understand that their decision making is influenced by friends and family members. However, once a person is clear what is good or healthy, he or she should resist those bad influences and try to help them instead.)

Important others	**Would they approve or disapprove of your smoking behaviour?**	**How would they influence your smoking behaviour?**	**How would you influence their smoking behaviour?**
Parents	☐ Approve ☐ Disapprove		
Other family members	☐ Approve ☐ Disapprove		
Close friends / boyfriends / girlfriends	☐ Approve ☐ Disapprove		
Other friends (classmates/ game mates / sports mates)	☐ Approve ☐ Disapprove		
Teachers / sports coaches	☐ Approve ☐ Disapprove		

- (Some traditional concepts might be discussed here. For example, good/bad friend images as well as the 'filial piety' described by Confucius. Inform students that the more non-smoking friends a person has, the less possibility a person will smoke. Although the traditional Chinese concept 'filial piety' refers to the obedience to parents, students should rethink here whether obedience is really good to everyone's health.)

Activity 2. Decision making practice (Botvin, 1980) (**20 min**)

- Effective decision making is very important for everyone's socialisation. However, decisions should not be made impulsively. Here are some general method you can use for making decisions.

    - Clarify the decision to be made or problem to be solved. (What are the problems?)
    - Think about the possible choices. (What are the possible choices? Try to come up with as many choices as possible.)
    - If necessary, get more information so that you can make the best decision possible. (Do you know enough to make a decision now? If not, get whatever facts or information you need to make an **informed** decision.)
    - Think about the consequences of each choice. (What are the advantages and disadvantages of each choice? What will happen if you make choice X, Y, or Z?)
    - Choose the best thing to do, and follow through.
- NB. Get used to the steps listed above. Although the methods may seem time-consuming, they can be used for most ordinary situations involving making a decision quickly and efficiently. However, complicated and important decisions generally require more time and effort.
- Decision making exercise. Have the class participate in the following exercises. Describe a problem to the class where making a decision is challenging even it is a simple situation (see example below). Thinking about the consequences is always important before doing. Have students take turns being the one to identify the issue and identify and assess possible options in a small group.
- Students should follow the strategy on the board. Have them go through the various steps out loud—stating what the decision/problem is, laying out the possible choices, deferring the decision if they do not have the necessary information, spelling out the potential consequences of each choice (pros and cons), and making the decisions. The facilitator should do the first one to provide students with an example:
    - One who purchases a pair of shoes has to consider many factors such as price, brand, design, quality, durability, and frequency of using. So, making a decision is always not easy.
- Coach them as they go through each step in the decision making process. Students may also coach each other with their neighbouring classmates. Students will probably need the most help in spelling out the possible choices—having a tendency to see only a rather limited range of options—and anticipating the consequences of each alternative.
- Spend about 2 minutes on the first exercise. After that try to go through the exercises as quickly as possible in order to involve as many students as possible. Use the same exercise for 2 or 3 students. Give them feedback and prompt them as they go through the exercises (e.g., “Yes. That’s good. Are there any other possible choices? What about…? Okay. Very good.”).
- Several decision making/problem solving situations are contained in the Student tool #2. Remember, the key objective to this session is to involve as many students as possible in actually practicing (one at a time) making decision by the mentioned systematic decision making/problem solving strategy.

Activity 3. Participant feedback **(5 min)**

- A quick review of this session (**about 1 min**).

- Distribute the participant feedback survey #2. Remind participants that the feedback they are giving will be read by the designers of the session and may be used to improve future versions of this programme.
- Instead of collecting these sheets, indicate a 'return spot' in the room (a desk near the exit is best). Ask participants to leave completed forms at the 'return spot' as they leave.
- Collect the completed sheets.
- Don't forget to end the session on a high point – thank the participants for their input and remind them of the day for the next session.

Session 3 Self-efficacy and refusal skills

> The Master said, "The superior man is affable, but not adulatory; the mean man is adulatory, but not affable."
>
> From *Confucian Analects*

OBJECTIVES

- Increase self-efficacy/perceived behavioural control over smoking behaviour
- Culturally appropriate refusal skills training

CONTENTS

- Encourage students to think about the following questions:
  - What have you done to control smoking behaviour/thinking?
  - What are your anti-smoking goals?
  - What barriers might prevent you from achieving these goals?
- Effective skills to refuse offers of cigarettes.
- Simple skills to influence others.

RESOURSES REQUIRED

- ☐ PowerPoint Slides
- ☐ Student tool #3
- ☐ Student feedback surveys

PROCEDURE

Activity 1. What can we control? **(10 min)**

- A brief review of the topic in the previous sessions and deliver the Student tool #3, containing important information on smoking.
- Encourage students to read the student tool and discuss the following questions in groups:
    - What have you done to control smoking behaviour/thinking? (students' own smoking behaviour and friends/parents' smoking behaviour)
    - What are your anti-smoking goals? (these need to be as specific as possible)
    - What barriers might prevent you achieving these goals?
- Invite some participants to share their control strategies.
- Summarise students' ideas in the blackboard/slides in the table below (non-smokers can think about what factors might change their current smoking status and how to tackle these factors).

Behaviour	**Goals**	**Barriers**	**Strategies to overcome**
Own smoking			
Friends/parents' smoking			

Activity 2. Refusal skill: resisting peer pressure. (**25 min**)

- Identify situations involving peer pressure to smoke.
    - Have students describe situations that they have seen or heard about involving peer pressure and smoking. Ask for volunteers and compile a list of these situations on the blackboard. (NB. Besides peer pressure, students might also mention situations related to family pressure to smoke. These situations are also suitable for the refusal skills discussing here.)
        - Possible situations include friends or classmates' party time, hanging out with peers who smoke, dating someone who smokes and drinks, catching up with friends in karaoke places or mah-jong houses, fitting in with a group of people who smoke since you are a freshman there, some family member want you to smoke to "get in the mood" at a wedding dinner.
- Role play: Learn what to say in peer pressure situations involving an offer to smoke.
    - As with the situations covered in the last session (cf. student tool#2), there are two parts to being assertive. The first involves knowing *what to say* and the second concerns *how you say it*. To be effective and get your point across it is necessary to remember both.
    - It is important to know that refusal does not simply mean a direct "no", especially in Chinese cultural milieu. For this reason, both direct and indirect refusal skills will be covered, so that students can compare which one is suitable depending on specific scenarios. Since these pragmatic strategies will be of benefit to students' daily life, there is no need to link every skill to smoking. Dialect usage can be considered here.
        - **Direct refusal.**
        - "*No, thanks*." (short and sweet)
        - "*No, thanks. I don't smoke*." (direct and to the point)

- "*If I won't smoke, I won't.*" (tautology)
- **Indirect refusal.**
- "Not now. I'm in a hurry." (delay)
- "Not now. I'm not into it tonight." (the cool approach)
- "Are you kidding? I won't go near that stuff." (self-confidence approach)
- "How can you do that? Smoking doesn't make you look like a good student. You should be more like Xiao Ming." (education; often used to people with lower social class, e.g., younger brother)
- "You know, you can try relaxation when you feel stressed." (suggestion—giving more information)
- "Maybe I will do it later." (fake agreement)
- "Look, many kids around here." (giving hints)
- "Thank you. But one man's meat is another man's poison." (Humours, jokes, or idioms)
- **Assertive skills (body language)**
- Loudness of voice (no mumble or whisper)
- Eye contact (don't look away or at the floor)
- Facial expression (make it clear that you are serious)
- Body position (stand or sit up)
- Distance (make sure you're not too far away)
- **Culture matters**
- Researchers found that most Chinese refuse others with this formula: **"(appellation/title; if the person has higher social standing than you) + apology + reason"**. For example, you can say: "Sorry, sir, but I have sore throat." (English translation is adjusted) The aim here is to raise the offer supplier's social standing and down play oneself.
- For Asians, we also reply depending on social distance. Thus, if the cigarette is offered by your family members, friends, or your boss (in the future), you might feel it hard to refuse. The trick here is to be more polite, so that you can save others' face. For example, instead of saying "you", you could say "thou"; rather than directly using verbs, you could add "please" or "could you please".

- Several situations from student tool #2 will be given, and volunteer students will be invited to do the role play in the front of the classroom.
- Practice: Below are a number of different expressions that could be used in an attempt to achieve the same effect. Please rank them in order in the following scale (students are encouraged to think this question by role-plays with their neighbouring classmates):

Most impolite	

Least impolite	

- The management requests customers to extinguish their cigarettes.
- Don’t smoke!
- The management respectfully requests customers to refrain from smoking.
- No smoking please.
- Thank you for helping to improve the environment by keeping this area smoke-free.
- Thank you for not smoking.

Answer: (Invite students to analyse the different factors using in these replies)

Most impolite	Don't smoke!
	No smoking please.
	The management requests customers to extinguish their cigarettes.
	The management respectfully requests customers to refrain from smoking.
	Thank you for not smoking.
Least impolite	Thank you for helping to improve the environment by keeping this area smoke-free.

- Conclusion: Encourage students to compare both ways of refusing, considering how to save “face” at the mean time.

Activity 3. Participant feedback **(5 min)**

- A quick review of this session (**about 1 min**).
- Distribute the participant feedback survey #3. Remind participants that the feedback they are giving will be read by the designers of the session and may be used to improve future versions of this programme.
- Instead of collecting these sheets, indicate a ‘return spot’ in the room (a desk near the exit is best). Ask participants to leave completed forms at the ‘return spot’ as they leave.
- Collect the completed sheets.
- Don’t forget to end the session on a high point – thank the participants for their input and remind them of the day for the next session.

Session 4 Critical thinking on smoker image and tobacco advertisement

OBJECTIVES

- Understand how the impact of smoker images are constructed by society.
- Improve students’ ability to resist advertisements by using critical thinking.
- Help students to envision non-smoker image of themselves.

CONTENTS

- Understand the smoker images that films and TV shows portray.
- Understand the different advertising strategies that tobacco companies use.
- Summary of the intervention.

RESOURSES REQUIRED

- ☐ PowerPoint Slides
- ☐ Student tool #4
- ☐ Student feedback surveys

PROCEDURE

Activity 1. Smoker images **(20 min)**

- Give students 10 minutes to discuss the following questions:
    - What images will come into your mind when you think about smokers?
    - Where do these images come from?
- The facilitator invites students discuss in group on what typical come into their mind when thinking about smokers and where these images come from. The important goal here is to encourage students to generate the typical smoker image constructed by culture and society (e.g., movies and TV shows) and rethink the so-called "fashionable", "cool", "manly", and other labels of smokers.
- Discuss questions related to students' future: What kind of person you are going to become? Is that image/position/job related to smoking? If yes, would it be fine if you are a non-smoker? Introduce the benefit of 'international citizen' here by asking students the following questions:
    - Can you think of any smoking related experience when you travelled overseas?
    - As China's business becomes increasingly global, do you think there will be any impact on smoking during business meetings?

Activity 2. Tobacco promotion (Gallun) (**10 min**)

- Divide class into small groups and each group discuss one tobacco packaging from student tool #4. Students will be asked to analyse the packaging on their colour, designs, pictures, and other factors they can observe. Also with these questions:
    - Is the packaging targeted at a specific group (e.g., women, teens, or a specific cultural group)?
    - Does the packaging give a good reason for using the product? What is the reason?
    - Does the packaging give useful information about the long- or short-term effect of tobacco use? Is the information warning enough?
- Students from each group will present their analysis of each packaging, other students can comment on these analysis.

- Hold a class discussion about personal responsibility and decision making (link to Session 2). The facilitator should also show how to analyse these questions by using critical thinking including identifying and analysing arguments, utilising external sources.
    - Who is ultimately responsible for an individual's smoking?
    - Are people powerless under the influence of tobacco advertisements, or should they take responsibility for their smoking?
    - Why might it be more difficult for young people to make responsible choices about smoking?
    - Should this be a factor in how tobacco advertisements are regulated?
- Frugality is a good traditional character of Chinese, when think about tobacco, students can think about financial wellness (Queen, 1994):
    - Do you NEED it or just WANT it? (curiosity)
    - Do you NEED to smoke because you are badly addicted to it or do you NEED it because all of your friends smoke?
    - If your current wants vs. needs status continues into your adulthood, how financially well will you be? (thinking about the cost of your health in the future)
- Summary of the intervention and feedback survey. (**10 min**)
    - A quick review of all the 4 sessions (**about 3 min**).
    - Distribute the participant feedback survey #4 (including the overall feedback. Remind participants that the feedback they are giving will be read by the designers of the session and may be used to improve future versions of this programme.
    - Instead of collecting these sheets, indicate a 'return spot' in the room (a desk near the exit is best). Ask participants to leave completed forms at the 'return spot' as they leave.
    - Collect the completed sheets.
    - Don't forget to end the session on a high point – thank the participants for their input and their participation to all the sessions.

10.9. QUT Thesis by Published Papers Guidelines

Introduction

1. QUT recognises three types of thesis - Traditional Monograph Thesis, Thesis by Creative Works, and Thesis by Published Papers. Students in the Faculty of Health can submit their thesis by monograph or publication.
2. These guidelines apply to students enrolled in the Doctor of Philosophy (PhD) and Master of Applied Science (Research) in the Faculty of Health.

Background

3. All theses, regardless of format, have a common goal: to demonstrate to examiners and other readers that the research has made an appropriate contribution to knowledge within the candidate's chosen field of study and to provide evidence of the quality of the student's understanding and research.
   The Thesis by Published Papers model was developed to encourage the student-researcher to enhance skills necessary for publication in peer-reviewed journals and to communicate research results in a professional arena and an international context.
4. The decision regarding thesis format must be made in consultation with the Principal Supervisor as various issues may impact on the feasibility of the different approaches. Students are encouraged to consider thesis format relatively early (by Stage 2 for Masters students and by Confirmation of Candidature for PhD students at the latest).
5. The time from submission to publication needs to be considered when determining whether thesis by publication is feasible. Depending on the journal, the time between submitting a paper and having it accepted can be six months or longer. Submission and acceptance dates often appear as a footnote in published papers. Other factors to consider include the potential for research-related delays and extensions, particularly for large-scale, complex or longitudinal research projects.

Format

6. A thesis by published papers may comprise published papers, manuscripts accepted for publication, manuscripts submitted for publication or under review.
   The minimum number of papers and manuscripts is three. At least one paper must have been published or accepted. Additional papers must be published, accepted, submitted or undergoing revision following refereeing. There must be no more than one review paper within the thesis and it cannot be the only accepted publication. The published or accepted paper must be an original contribution to research. The faculty will make this judgement.
   Where papers have multiple authors, the student must be the principal author on the accepted publication and at least one of the two other publications or manuscripts. The student must have written permission from the co-authors to include the papers in the thesis.
7. Published papers must be reformatted (e.g. in Word) to ensure consistent presentation throughout the thesis. When a published paper has been reformatted there should be a footnote containing a full citation of the publication.

Requirements of Papers

8. Normally, papers published in or submitted to journals recognised for the Higher Education Research Data Collection (HERDC) are considered acceptable as national or international peer-reviewed journals for the purposes of Thesis by Published Papers. HERDC specifications can be found on the Office of Research website.
9. Manuscripts rejected by journals must not be included unless they have been substantially rewritten to address the referees' comments. In this case, the thesis must be accompanied by a statement endorsed by the Principal Supervisor confirming that the original

correspondence from the editors has been sighted and that the editorial advice has been followed.

Copyright

10. In submitting an article to a journal, authors are asked to sign a publication agreement. Students and their supervisors should read such agreements carefully. They commonly state that authors are to assign the copyright in their work to the publisher of the journal. Rather than assign all the rights completely, authors should seek to retain some rights.
11. As a minimum, students may seek to retain the rights to (1) make a copy of the article available as part of the thesis on QUT ePrints and (2) reproduce the paper and make it available online in an institutional repository of any educational institution where the student may be employed.
12. It is not necessary to obtain permission from the publisher to include the article in the copies of the thesis submitted for examination. The examination is an essential element of your course of study. Reproduction of an article for the purpose of research or study is a 'fair dealing' under the Copyright Act so permission of the copyright owner is not required.

Summary

13. Early in the candidature, students should discuss the most appropriate model for presenting their thesis with their principal supervisor. Students are encouraged to review examples of different thesis models and discuss the advantages and disadvantages of each with their supervisors prior to deciding on a thesis format. Students should discuss appropriate journals for publication with their supervisor and ensure that the combination of papers forms a cohesive thesis.