Chapter 2
Epidemiological Transition of Smoking in China

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Abstract This chapter focuses on trends in smoking prevalence and examines classic models of the smoking transition and their relevance to China. Traditionally these models have been used to explain major shifts in smoking prevalence in richer nations and variations between different population groups. The chapter describes current smoking prevalence in China and how this compares to global patterns, especially those of other transition economies which have undergone substantial political and socio-economic change. This is followed by an outline of the smoking transition model and its main components. In keeping with western research, three main dimensions of prevalence, age/gender, socio-economic status (SES) and ethnicity, are discussed. The final section examines the issue of geographical variations in smoking transitions. Understanding such differences is particularly important in a country as large and diverse as China.

Keywords Cohort effects · Diffusion · Ethnicity · Gender differences · Smoking intensity · Smoking prevalence · Smoking transition model · Socio-economic status · Transition economies

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2.1 Introduction

Any study of smoking in China must locate the country in the context of the global tobacco epidemic. This chapter focuses on trends in smoking prevalence and examines classic models of the smoking transition and their relevance to China. Traditionally these models have been used to explain major shifts in smoking prevalence in richer nations and the differences that have occurred among different population groups. There has been less attention to changes in the smoking population in low- and middle-income and non-western countries, and there remains some uncertainty over the relevance of the western experience to China and of the role of different cultural, political, economic and social values. It is important, therefore, to situate China within this broader context and to show how current trends in smoking differ from the western experience in important respects.

With this in mind, the chapter is organised as follows. We begin by focusing on current smoking prevalence in China and how this compares to global patterns, especially those of other transition economies which have undergone substantial political and socio-economic change. In the second part of the chapter, we briefly outline the smoking transition model and its main components. In keeping with western research, we focus on three main dimensions of prevalence: age and gender effects, socio-economic status (SES) and variations between ethnic groups. For each section we provide a brief synopsis of the key findings and how they relate to the smoking transition. In the final part of the chapter, we specifically examine the issue of geographical variations in smoking transitions, paying particular attention to gender and, to a lesser extent, SES differences in smoking prevalence, the latter being dealt with in detail in Chap. 6. Understanding such differences is particularly important in a country as large and diverse as China.

2.2 Smoking in China: Data Scorecard, 2015

China, in common with many other transition economies, continues to have a high prevalence of smoking. This peaked at 35.3% in 1996, with only a very modest decline occurring since then to 27.7% in 2015 (China CDC 2015). However, since smoking prevalence varies markedly by gender and other demographic factors, this is a relatively meaningless statistic especially in contexts which such group differences are most pronounced. For example, in 2015 current adult prevalence in China was 52.1% among men but only 2.7% for women. Because of such gender differences, therefore, overall smoking prevalence in China is relatively modest when compared to some other major consumers, such as Russia (40.9%) or Indonesia (39.9%).

When male smoking prevalence is considered separately, a different picture emerges. Males account for the majority of smokers in China; of the 318 million adults who smoked in 2010, 95.6% were men (Liu et al. 2017). In 2015, China, with

an age-adjusted male prevalence rate of 47.6%, was ranked 20th internationally in terms of male prevalence rates (WHO 2016). Although lagging far behind some other large consumers, such as Indonesia (76.2%) and Russia (59.0%), China was similar to many other countries in Eastern Europe, the former Soviet Union and the Middle East that also recorded high smoking rates (Fig. 2.1). These figures are very similar to estimates obtained from other surveys, such as National Health Surveys conducted in China (2003–2013), which recorded an adult (15 years and over) male age standardised prevalence rate of 47.2% in 2013 (Wang et al. 2019a, b). This aligns with Zhang et al.'s (2019) estimate of 46.3% for regular male smokers (18 and over) in 2013–2014, but lower than the 54% prevalence rate for current smokers in 2010 recorded by Liu et al. (2017) for adults 18 years and over.

However, cigarette consumption per capita tells a different story. Figure 2.2, drawing on data from Hoffman et al. (2019), shows that after plateauing in the 1990s, after 2000 consumption rates increased again, a trend also evident only for Indonesia. While an even more dramatic increase had occurred in the Russian Federation after the break up of the Soviet Union, by the early 2000s this was largely over with per capita consumption declining after 2010. By contrast, other large tobacco consumers, such as the USA, Japan and Germany, all witnessed declining patterns of per capita consumption typical of countries in advanced stages of the smoking epidemic. In China Liu et al. (2017) reported that between 1996 and 2010 the number of cigarettes smoked per current smoker rose from 15.2 to 17.9 cigarettes per day, with the highest per capita rates occurring in middle age groups (40–59). The slight decline in smoking prevalence thus has been matched by a rise in consumption per capita, reflecting the impact of the industry in countering declining domestic demand among certain sections of the population (see Chap. 4).

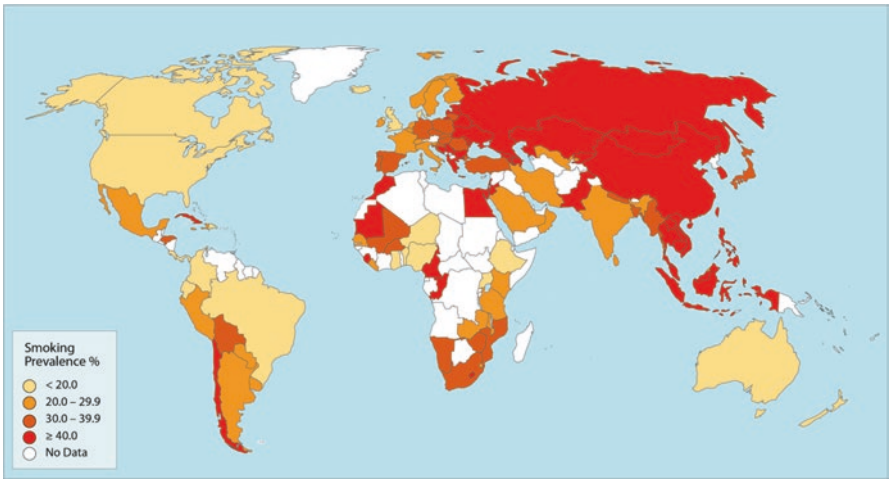

Fig. 2.1 Age-standardised current smoking prevalence among males aged 15 years and older (%), 2015. (Credit: WHO (2016) Global Health Observatory (GHO) data. https://www.who.int/gho/tobacco/use/en/ public domain)

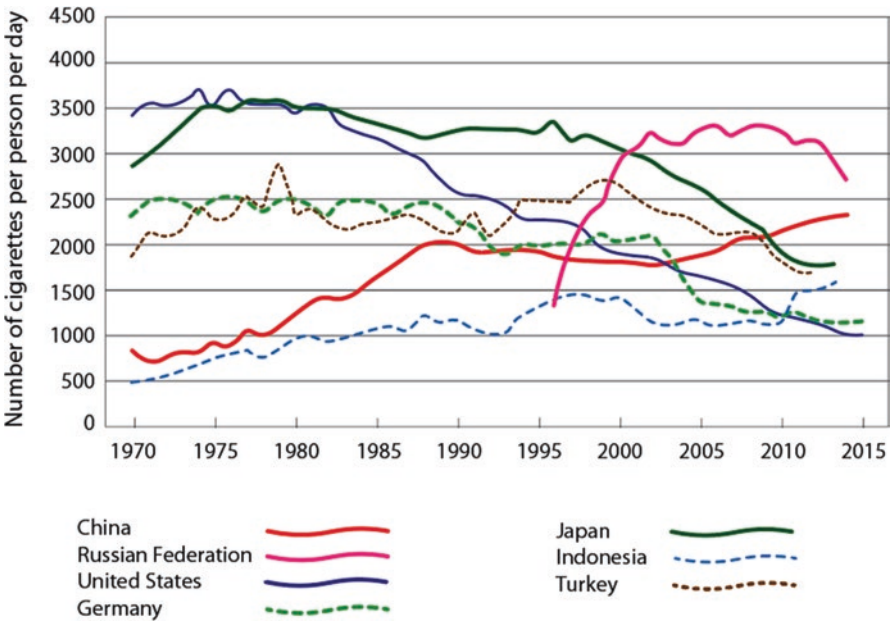

Fig. 2.2 Trends in cigarette consumption per capita 1970–2015 for countries which consumed the greatest volume of cigarettes in 2017*. (Credit: Reproduced courtesy of the British Medical Journal. Modified from Hoffman et al. (2019), p. 6; This file is licensed under the Creative Commons Attribution (CC BY 4.0) Licence; *Egypt, India and Vietnam are not included in Hoffman et al.'s dataset because of data quality issues)

2.3 Smoking Transition Models

To help understand changes in the smoking epidemic over time, and its impact on different population groups, western scholars, in particular Lopez et al. (1994) and more recently Dixon and Banwell (2009) and Thun et al. (2012), developed the concept of the smoking transition. These models have been discussed in detail elsewhere (Barnett et al. 2017) so only a brief overview is provided here. The original transition model developed by Lopez et al. (1994) consisted of four stages to detail the shift in smoking from a practice initially dominated by higher-income men, followed soon after by high-income women to one where gender differentials are later much reduced. Although Thun et al. (2012) consider their model useful as a rough guide to describing changes in male and female smoking (and death) rates in western countries, it suffers because it fails to consider the many of other factors, such as individual SES, ethnicity or levels of urbanisation and female empowerment which may also affect the extent of gender differences.

Perhaps more important than gender differences has been the relationship between socio-economic status (SES) and smoking. Here the work of Pampel (2001, 2005, 2006) has been significant in emphasising the importance of status differences in the initial uptake of smoking and its later diffusion from high to low

status groups. The development of mass production and cheaper cigarettes initially led to a narrowing of the social gradient in smoking prevalence, but this soon reversed once the health costs of smoking became apparent to more educated sections of the population. As discussed by writers such as Dixon and Banwell (2009), the transition model highlights the concentration of smoking among more deprived populations. Again such trends hide important interactions between SES and gender and particularly ethnicity and how these have shaped temporal trends in prevalence.

A third important component of the transition model, but one which has been least explored, has been the links between ethnicity and smoking. Writers such as Factor et al. (2011) consider both macro and micro processes to explain such differences. They argue that ethnic differentials in smoking prevalence occur not only as a result of discrimination and alienation but also because of social resistance to dominant (white) public health narratives. To this can be added high levels of residential segregation which may help perpetuate social norms and high levels of smoking, particularly among lower-income women.

The three components (gender, SES and ethnicity) have all been well-rehearsed themes in research on smoking transitions in western countries. While they provide a general guide to demographic differences in smoking prevalence between countries, they have been less explored in non-western contexts, such as China. There has also been little attention to geographical differences in the pace of transitions within particular countries, a theme taken up later on in this chapter.

2.4 Demographic Differences in Smoking Prevalence in Post-Reform China

2.4.1 Age and Gender Differences

Without doubt, the contrast between males and females constitutes the major demographic difference in smoking prevalence in contemporary China. Much of the literature on gender differences in smoking has stressed differences in traditional sex roles and social norms which, for women, have emphasised a strong disapproval of smoking (Waldron 1991; Pathania 2011). This was not always so, and during the early twentieth century in China and some other Asian countries, female smoking rates were much higher than they are now (Hermalin & Lowry 2012). In China the initial reaction against female smoking began in the 1930s and reflected strong feelings of nationalism and resentment against western commercial domination and a desire to avoid decadent western practices. Trendy fashion conscious women (Fig. 2.3) began to be seen as immoral and a threat to traditional Confucian values and national well-being (Edwards 2000; Yen 2005). Other countervailing forces such as Madame Chang Kai-shek's New Life Movement in 1934 emphasised Confucian values and activities appropriate for each gender, which excluded smoking. Hermalin and Lowry's (2012) analysis of smoking rates of six 4-year birth

Fig. 2.3 Traditional and foreign cigarette posters targeting female consumers with visuals suggestive of femininity and modern lifestyle. (Credits: (left) Alamy Image ID: MHC64E Stock photo (Vintage cigarette advertising poster for Nanyang Brothers Tobacco Co, Shanghai, dated 1920s). (Right) Alamy Image ID: 2B0319F (Advertisement characteristic of 'Old Shanghai' (1920–1940s) started by American Carl Crow who established the first western advertising agency in the city featuring modern 'China Girl' posters))

cohorts between 1908–1912 and 1933–1937 reveals a sharp drop off in female smoking over this period.

These trends continued after the formation of the People's Republic of China in 1949. During the Maoist period, campaigns against unhealthy behaviours started in response to Mao's call to eradicate 'backward feudalistic traditions', which swept aside a wide range of traditional ideas and behaviours. It was officially proclaimed, and dubiously in the eyes of academic observers, that into the 1960s, prostitution had been eradicated from China along with opium poppy smoking – a hallmark symbol of the subjugation of the Chinese nation in the wake of the Opium Wars 1839–1860 (British-China Wars).

Smoking and drinking, however, was recalcitrant in the face of the campaign against substance use. Thus tobacco control during this period focused on education and health promotion often included in a range of moralistic teachings without concrete measures. By the time of the first major China national health survey in the 1980s, the gender gap in smoking had become substantial (26.9%), increasing slightly to 31.5% in 1996, but later decreasing to 25% in 2015, largely due to the greater decline in prevalence for men (Parascandola and Xiao 2019).

However, two identification problems in public health, which have been fully described by Bell (2020), thwart our full understanding of temporal trends in smoking in China and keep us from affirmatively answering how the decline in male smoking occurred. First, the decline may have been due to various trends that naturally advance as time passes: the level of education increases, the country becomes gradually modernised and knowledgeable of the harms of smoking and tobacco slowly loses its popularity. All of these occur as a structural trend over which individuals have little control. Second, perhaps no external trend in structural factors occurred, with the decline simply reflecting an ageing population and older people with more illness desisting from smoking.

The key difference between the two explanations is that the ageing effect is natural and inherent to individuals' health behaviour while the trend over time is exogenous. To complicate the matter further, there is also a separate explanation called the 'cohort effect': successive cohorts of people show different rates of smoking due to their unique life course experiences associated with their birth era. For example, we know that the 'famine cohort' tends to show worse health outcomes than their predecessors (i.e. age effect) (Chen and Zhou 2007; Luo et al. 2006) and their health outcomes still lag behind as the time passes (i.e. the period effect). These different mechanisms are methodologically and conceptually difficult to disentangle largely because they share collinearity. Thus, because of this, scholars have developed sophisticated statistical techniques to constrain or decompose the three effects (Rutherford et al. 2010; Yang and Land 2016).

2.4.2 Cohort Analysis of Changes in Smoking Prevalence by Gender

To analyse how age, period and cohort effects, respectively, affect the changes in smoking, the data need to at least contain a sufficient number of age points, cohort groups and survey periods (waves). Since the longest conducted survey, the China General Social Survey, does not include any consistent measure on smoking, we used data from the China Health and Nutrition Survey (CHNS). With ten survey waves spanning from 1989 to 2015 and including all adult respondents, this dataset should serve well to decompose the three separate effects. We used Stata add-on 'APCFIT' to conduct the analysis, separately for both genders since smoking in China is highly gendered, and plotted the growth curves of smoking.

2.4.2.1 Age and Cohort Effects

Usually in the tradition of demography, cohorts are constructed as 5- or 10-year age intervals for larger cohorts. Cohort refers to an aggregate of individuals sharing common characteristics in life trajectory and life events. Considering how people's

behaviour is subjected to the significance of historical events and zeitgeist, the defining spirit or mood of a particular period of time (Mannheim 1952) and not simply as a product of numerical years, we decided to modify standard 10-year age intervals by setting the boundary of cohorts in accordance with important historical events in the history of modern China, such as the Sino-Japanese War and Cultural Revolution, among others. This produced seven cohorts.

The first cohort/generation named 'Silent Gen' comprises people born before 1937, the year of the Marco Polo Bridge Incident when the Sino-Japanese War fully exploded; the second cohort 'War Gen' comprises of people born between 1937 and 1948; the third cohort 'Boomers' are those born after the founding of the People's Republic of China (PRC) in 1949 until 1958; the fourth cohort 'Maoists' comprises those born between 1959 and 1965, a time which featured the Great Leap Forward and numerous other socialist projects; the fifth cohort 'Gen Red' are those born during the Cultural Revolution that lasted from 1966 to 1977; the sixth cohort 'Gen Market' are those born since the Open-up Reform in 1978 until 1989; the last cohort 'Millennials' combine all post-1990 births. We restricted the analysis to people older than 16 years of age and below 80 years old, so there are relatively few cases in the cohort of Millennials because the latest survey was conducted in 2015.

Figure 2.4 plots smoking prevalence rates on an age scale in order to compare smoking patterns of the seven different cohorts. There are diverging and converging trends in smoking as shown differentially by cohort groups. Overall, there is a

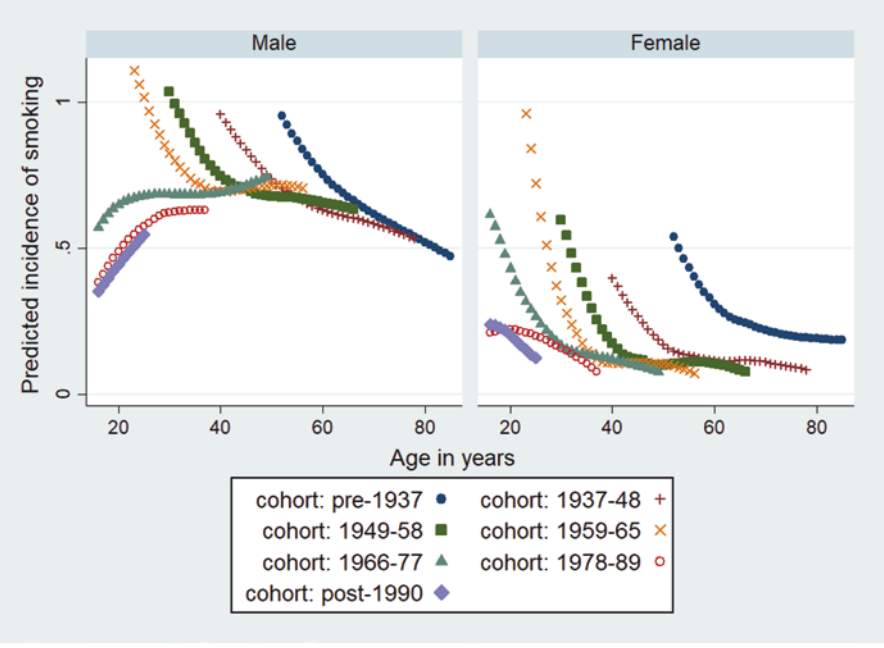

Fig. 2.4 Predicted smoking rate by gender and age for different birth cohorts. (Credit: Authors)

decline in smoking over one's life course. Older individuals tend to smoke less or be non-smokers. The shape that these trajectories merging together at the later ages in the life course resembles of the tail of a Chinese phoenix. A Chinese phoenix has a long and splendid tail made of feathers of different strings of colour, each representing a unique tribe of ancient China. At the end of the tail, each feather is unique and drags long and loosely from other feathers, but all feathers gradually join at the body of the tail. This 'phoenix tail' pattern holds particularly true for women, as all cohort groups show a falling trajectory of smoking with age. In contrast, younger male cohorts, Millennials, Gen Market and Gen Red, show upward trajectories of smoking as they age. Nevertheless, smoking prevalence among these groups is still lower than older cohorts at the same age, except for older members of the Gen Red generation (1966–1977) whose rates start to begin to exceed those of the War Gen (1937–1948), Boomers (1949–1958) and Maoist (1959–1965) generations once they reach 50 years of age. The three younger cohorts are still in their prime age for work and may be more obliged to conform to the smoking norm at workplaces and in the hierarchy of seniority. Women, on the other hand, are much less required to conform to such norms regarding drinking and smoking with the predicted smoking rate among Millennials being much less than other groups when they were the same age.

Contrary to the expectations of modernisation theories and some feminist scholarship, there is not a converging trend in smoking that merges the gender patterns of smoking over the course of a surging modernity in China. This expectation argues that women utilise the liberty afforded to them through equal rights and a cultural liberation of values and will slowly imitate men in all spheres of life and work. However, in the age, cohort and period trend of smoking, women of all cohort groups showed declining trend in smoking and still considerably distinguish themselves from men. In the Republic era (1911–1945), female smoking was promoted as a westernised, luxurious and labour-free lifestyle. Figure 2.4 suggests that possibility that older cohorts of Chinese women clung to smoking due to the particular historical context at the time of their birth and the gender roles and expectations they absorbed from a mixture of Confucian ethics and modernisation impulses. Almost all cohorts smoke more than their next-generation cohort. For example, female members, around 50 years of age, of the Silent Gen (pre-1937) cohort showed a higher probability of smoking compared to women of similar ages in later cohorts.

As Zhang et al. (2019) found, there is also evidence that older generations of men tend to smoke more than their younger counterparts. The Silent Gen born prior to 1937 have higher smoking likelihood at the age around 50, compared to Gen War, Boomers, Maoists and Gen Red, who were old enough to give us data at 50 years of age. Although Gen Market and Millennials were not senior enough at the time of the latest survey, we can reasonably expect they will not reach a level of smoking as high as the Silent Gen, given the lower starting level of smoking of these younger cohorts. If the female cohort pattern can be likened to a chorus, in which singers sing the same melody in synchrony, albeit at different pace, the male cohort pattern looks very similar to a polyphony, in which each singer has his own key. We can see

in Fig. 2.4 that not only do the youngest three male cohorts show a surge in smoking during their early adulthood from 18 to 45, some cohorts have overall higher prevalence of smoking too, and these cohorts are not necessarily older. For example, 'Maoists' have higher smoking rate than Boomers after about 45, and Boomers have higher smoking rate than Gen War after 60. Although Boomers have higher smoking rate than 'Maoists' at the age of 30, their trajectories up to this time point almost are parallel to one another. This means that if we could magically ship Boomers back in the time and make them younger for 10 years, they would share the same smoking trajectory with 'Maoists'.

2.4.2.2 Period Effects

This retrospection leads to the possibility that some changes in smoking rates may not be a cohort effect. Instead, due to progress in public health knowledge, the socially defined popularity of smoking, intensifying modernisation and other structural-temporal factors that widely affect all populations rather than a few cohorts, people may show decreasing (or increasing) trends in smoking in later survey waves. Thus we should examine how the smoking rate for males and females changes across surveys, for different cohorts. The wave effect plotted in Fig. 2.5 largely confirms our suspicion: some older cohorts would not have smoked more

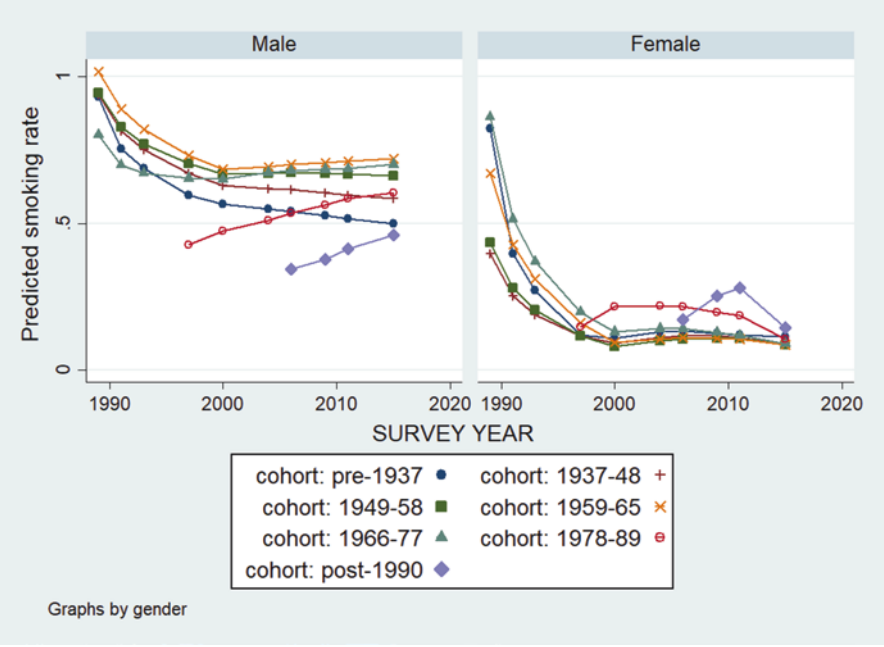

Fig. 2.5 The predicted smoking rate as time period passes, for different cohorts and separately by gender. (Credit: Authors)

were they were shifted temporally to an earlier time point, if age is not considered. When survey wave replaces age on the X-axis in Fig. 2.5, the male cohort that smoked the most is actually Maoists (1959–1965). Gen Red (1966–1977) and Boomers (1949–1958) smoked at similar levels after Maoists, followed by War Gen (1937–1948) and Silent Gen (<1937). Gen Market (1978–1989) and Millennials (1990–) still showed an increasing trend in smoking, and Gen Market had caught up with Silent Gen and War Gen at the most recent wave in 2015.

Interestingly, the overall period has featured a turning point of smoking. Before 1997, smoking was waning in all male cohorts, but rose after the year 2000. This trend is consistent with that of Zhang et al. (2019) who recorded that men born in recent decades were more likely to start smoking at younger ages and to smoke more cigarettes than those born in previous generations. For female cohorts, the initial gap in smoking between cohorts narrowed, with smoking largely declining over time. While Gen Market (1978–1989) and Millennials (1990–) had a higher level of smoking compared to older cohorts, by 2015 these differences had become minimal. This analysis suggests that younger female cohorts do not have a greater smoking rate. Instead, smoking prevalence among the youngest generations, with the partial exception of Millennials, saw no significant increase up to 2015, by which time all-female cohorts had similar smoking rates (Fig. 2.5). The main increase was seen among men. The youngest three generations of men, in particular Millennials and Gen Market and to a lesser extent Gen Red, reported an increasing smoking prevalence over time. Men may need to subscribe to the demanding smoking culture in China's job market and social hierarchy. The aspirant young men learn to smoke in order to join many smoking friendly social opportunities and use cigarettes for a variety of business and networking activities. The gender-divergent smoking pattern strongly reflects the context of Chinese society, with an extreme gap between male and female smoking rates. As far as the data of CHNS show, no foreseeable convergence of the gap can be expected in the near future.

2.4.3 Synopsis

Gender differences in prevalence are a marked feature of the smoking population in China. This was not always so, with older Chinese women being much more likely to smoke than their children. Despite economic development, much of China remains a male-dominated society, where smoking is seen as a symbol of men's status. Ethnographic studies have frequently noted that traditionally defined gender roles and expectations have prevented women from smoking (Mao et al. 2014). While socialist ideology liberated women by mobilising their labour force participation in the years after the 1949 Revolution, the pattern of greater equality in educational and employment opportunities did not persist following the economic reforms of the late 1970s (Gustafsson and Li 2000; Tu and Liao 2005). Thus female empowerment has not markedly improved with social and economic development

and one indicator of this, female smoking prevalence, has only shown minor changes over this period.

Cross-national research suggests that women are much more likely to smoke at a similar rate to men in countries that have experienced a growth in political freedoms and where fertility rates are higher. On the other hand, women are less likely to smoke when a greater proportion of men work relative to women, where levels of urbanisation are lower and where gender differences in educational attainment are greatest (Lillard & Christopoulou 2015). China has many of these characteristics and thus until some, or all, of these factors change, smoking prevalence, at least among younger women is likely to remain low. Nevertheless a recent meta-analysis suggested a positive association between income and smoking among younger Chinese women, many of whom are migrants (Ding et al. 2014) (see Chap. 6). This indicates that women may take up smoking if migration and rapid social change brings alteration in traditional gender norms (Morrow et al. 2002). While little research on the interaction of individual female and areal social characteristics exists in China, the experience of Korean women indicates that manual work is associated with higher smoking prevalence, with this association being strongest among those living in affluent urban areas (Park et al. 2010). As Mackay (1996) indicated over two decades ago, there can be no complacency about the lower level of tobacco use among women which is bound to change as their independence and resources increase with urbanisation and as tobacco companies increasingly target this group.

2.5 Socioeconomic Status and Smoking

While there are clear gender differences in smoking in China, socio-economic inequalities in smoking are also important. These are yet to approach the differences found in western countries, but it is likely that as China continues to urbanise and institute stronger tobacco control measures SES smoking inequalities will increase (see Chaps. 5 and 8).

2.5.1 Research on SES Differences in China

Many studies have explored the effects of SES on smoking prevalence and smoking intensity, but the use of different measures of SES and different contexts of research have produced quite variable results. In simple terms, socio-economic inequalities in smoking are often defined as differences in smoking prevalence and intensity by income, occupation or education, but often these interact in complex ways and do not necessarily have a consistent effect on smoking. Wang et al. (2018), for instance, found among Chinese people 45 years and older that occupation and education had the most significant effect, whereas the effects of income were small. Similarly Si

et al. (2018) found contradictory effects of household economic quantiles (annual household expenditure per capita) and individual educational attainment on tobacco consumption: those with a higher economic quantile, but who were less educated, consumed more tobacco than those with a lower economic quantile or with higher educational attainment. For these reasons, it is important to understand that SES may affect smoking through different mechanisms and via different causal pathways. Because of difficulties in defining SES, some studies have used composite measures of socio-economic position (e.g. Cai et al. 2019), a methodology common in western research. Depending on the variables used, such an approach may conflate the different effects of income and education on smoking prevalence.

In China, studies have shown that income and education have different effects upon smoking prevalence and consumption levels. Because China, as a middle-income country, is at a relatively early stage in the smoking transition, we might expect that both tobacco use prevalence and level of consumption would have a pro-rich distribution. This is evident in Kim et al. (2004) who showed that, compared to the USA, in China, as SES improved, lifestyles became less healthy with higher rates of smoking and drinking and diets which increased obesity. With respect to smoking, Table 2.1 provides some evidence of such trends, but shows that education has the most consistent effect in reducing both smoking prevalence and consumption levels, usually measured by cigarettes consumed per day. By contrast, income effects are more highly variable, even for the few studies which have examined SES differences in rural areas (Yang et al. 2008; Cai et al. 2019). The most consistent effect occurs for studies in urban settings (e.g. Yang et al. 2014; Chen et al. 2018), particularly those that focus on urban migrants (Chen et al. 2004; Yang et al. 2009; Liu et al. 2015).

These results need to be interpreted with caution but are strongly suggestive of the differential effects of urbanisation and migration on the social distribution of smoking, an issue discussed in detail in Chap. 6. Given the economic diversity of China, it is to be expected that the social distribution of smoking will not only reflect individual socio-economic factors but will also reflect community socio-economic development. However, only a few studies (Yang 2017; Zhang et al. 2019) have considered interactions between individual SES and community variables and how the SES distribution of smoking differs between different community contexts. There is also the problem of comparing studies that have used different methodologies, including controlling for different background factors.

From a theoretical point of view, we can also identify different explanatory frameworks such as the Marxian tradition which sees SES in terms of labour relations and a Weberian approach which pays greater attention to occupational groups' relative economic power in the market place as well as managerial concerns relating to differences in authority. Thus in broad terms there is an economic class effect that embodies way of life and collective opportunities and an income effect which relates to the purchasing power of labour. In this section we specifically focus on the issue of economic class. We define this in terms of control over the means of production and labour power. Class can also be closely linked to financial well-being, but by its very nature revolves around a range of valuable goods in addition to financial assets.

Table 2.1 Relationships between income and education and smoking prevalence and smoking intensity in China in studies published between 2004 and 2019

Study	Population[a]	Location	Smoking prevalence		Smoking intensity	
			Income	Education	Income	Education
Si et al. (2018)	China 2013 HRLS Adults 45+	China	**Positive***	*Negative*	**Positive***	*Negative*
Lee et al. (2019)	China 2011CHNS Adults >18	9 provinces/3 mega cities	*Negative*	*Negative*	ns	*Negative*
Yang (2017)	China 1989–2011 CHNS Adults	China			**Positive**	*Negative*
Liu et al. (2017)	China CCDRFS Adults >18	China	*Negative#*	*Negative***		
Wang et al. (2018)	2013 CHARLS Adults 45+	450 urban and rural communities	**Positive***	*Negative***	**Weak positive***	*Weak negative#*
Tian et al. (2013)	China CHNS 1993–2009 Adults	Urban and rural communities in 9 provinces	*Negative*	*Negative*	**Positive**	*Negative*
Chen et al. (2018)	China 2014 CLFDS Adults 35+	Urban China 22 cities	**Positive**	*Negative*		
Pan (2004)	Urban residents HIP	Urban China	ns	*Negative*	**Positive**	*Negative*
Mehta et al. (2014)	Government employees 18–61	6 cities		*Negative*		
Yang et al. (2014)	Survey 2011 Males >15	Hangzhou	**Positive**	*Negative*		
Xu et al. (2007)	Survey 2001 Adult males	Nanjing	*Negative*			
Wang et al. (2019a, b)	China 2013 NHSS Adults	Inner Mongolia	*Negative***	*Negative***		
Zhang et al. (2019)	China 2013–2014 CCRDFS Adults >18	China		*Negative***		
Yang et al. (2008)	Survey Rural males	Rural areas in 4 regions	**Positive**	*Negative*		
Cai et al. (2019)[b]	Survey Adults 35+	Rural areas in Yunnan	*Negative*	*Negative*	**Positive**	**Positive**

(continued)

Table 2.1 (continued)

Study	Population[a]	Location	Smoking prevalence		Smoking intensity	
			Income	Education	Income	Education
Chen et al. (2004)	Migrant workers 2002 MHBS	Beijing	**Positive****			
Yang et al. (2009)	Migrant workers >18	3 cities: Beijing, Shanghai, Chengdu	**Positive**	*Negative*		
Finch et al. (2010)	Survey female migrant workers	Beijing	Ns	*Negative*		
Liu et al. (2015)	Migrant workers	Shanghai	**Positive #**	Ns		

**Males and females; *Males only; Females only#

[a]*HRLS*, Health and Retirement Longitudinal Study; *NHSS*, National Health Service Survey; *CHNS*, China Health and Nutrition Survey; *CLFDS*, China Labour Force Dynamics Survey; *CCDRFS*, China Chronic Disease and Risk Factor Surveillance Survey; *HIP*, Household Income Project; *CHARLS*, China Health and Retirement Longitudinal Study; *MHBS*, Migrant Health Behaviour Survey. [b] The study used a measure of socio-economic position based on household assets, educational level and access to services

A higher class may be more educated, enjoy better prestige, jurisdictive power and cultural significance without necessarily being much richer. Wright (1997) has argued that in addition to the means of production, labour relationships must also take into account inequalities in authority of key managers within the private sector, state bureaucracies and state owned enterprises. With these caveats in mind, in the remainder of this section, we first provide a discussion of the importance of class in contemporary China. We then undertake a class-based analysis of smoking using data from 2012 to 2016 China Labor Dynamic Surveys (CLDS). Finally, in light of these results, we provide a brief synthesis of the importance of SES in smoking and the relevance of the smoking transition model to China.

2.5.2 Class in China, if It Exists

China is a country that uses authoritarian government and capitalist economic principles to guide economic development and fulfil national ambition. Even after the market reform in 1978, collective ownership or state ownership of enterprises and productive units comprised the bulk of the national economy, particularly in vital industrial sectors, such as aerospace and defence, education, and in natural resource extraction and processing. The Party Constitution of the Chinese Communist Party (CCP) repeatedly emphasises its leadership of the proletariat class, which was defined by orthodox Marxism as those do not privately own the means of production. At the same time, the history of the Chinese CCP and its strategies to secure

control of China deviated from the orthodoxy of Marxist ideals as practiced by the USSR. Unlike the Russian October Revolution, which first occurred in major cities before proceeding more slowly against the White Army in rural areas, the early military victories by the CCP took place mainly in the countryside. This had implications for smoking which was first promoted in rural areas by the newly established Red Army as a way of obtaining the loyalty of the peasantry to the CCP in its base areas (see Chap. 3).

New issues in the class structure of China emerged in the market era. China in the twenty-first century has a 'steaming' capitalism engine boosting its economy and generating a class structure similar to that in many capitalist societies. Since 1978 the growing number of high-skilled workers and managerial occupants in the labour market poses the question regarding the appropriate place of managers and stock-owning employees in the class relationship. In spite of rising income inequality in Chinese society (see Chap. 6), socialist collective ownership of national property and resources does not allow an explicit admission of the existence of opposing classes. A democratic society's unwillingness to admit there are disenfranchised groups within it is reflected in China's reluctance to acknowledge that it, too, is increasingly a class society. This unwillingness has caused academic problems. Textbooks used for high school politics affirm that, since class is a product of private property ownership and the PRC practices collective ownership, then for this very reason, there cannot be class conflict in China. To circumvent the issues of obvious inequality and conflicts between social groups, the official narrative concedes that China does have social strata (阶层*Jieceng*) in the absence of real classes. We should take this as an implicit acquiescence for the analysis of class in China.

2.5.3 An Economic Class Analysis of Smoking

2.5.3.1 Defining Classes

To help understand class in contemporary China and how smoking varies across economic groups, we used the China Labour Force Dynamics Survey (CLDS) to get a glimpse of the class structure in twenty-first-century China. The CLDS is conducted and coordinated by Sun Yat-sen University under Prof. Cai He and is the most well-known authoritative population-wise representative survey on labour conditions and the labour market in China. The CLDS used a rotating panel method to ensure that, even in the face of attrition during follow-ups, rotated new cases make the entire sample random and representative of the national population. We combined the three waves from 2012, 2014, and 2016 and explored a wide range of questions to construct different classes. For example, questions related to whether people were working, their type of work, whether they worked for others and had particular skills, the nature of work contracts and whether they managed others or had started a business and/or hired others. Based upon these different questions, we

derived nine different classes (Fig. 2.6) based upon the flow chart of questions adopted in the CLDS surveys.

CLDS first considers whether the person is currently working. If he/she is not working due to ageing (mostly for farmers without formal prior employment in a work unit), formal retirement (for those with a work unit prior to retirement) or health-related concerns, the person was defined as retired. This group makes up 13.9% of the sample. If the person is not currently formally employed for all other reasons (e.g. doing housework, giving birth, unemployed), he/she is in the status of non-employment (20.1%). This sector formed the reference group in our analyses.

If someone is undertaking agricultural work, defined in the survey as 'wunong' or literally transliterated as 'doing farms', they were coded as farmers. If the latter did not work the land but instead ran separate agricultural businesses, they were classified by interviewers as being self-employed or employers. Farmers, who actually tilled the land, were the second largest group comprising 28.8% sample.

CLDS also considers the question of whether the person works for others or for themselves. If they worked for others, but had no contract, they were defined as 'true proletariat', a class that is deprived of any means of production and likely to join the reserve army of the unemployed at any moment. Proletarians made up 9.8% of the sample. Next, the need for skill credentials in the current job sets apart skilled workers (7.2%) from unskilled workers (6.8%).

At the top of the pyramid were the self-employed, managers and bourgeoisie. Those who worked for themselves, but who did not own or start a business, were defined as self-employed. By contrast the bourgeoisie, which overall comprised 3.1% sample, referred to business owners who both employed (bourgeoisie) and did not employ (petite bourgeoisie) other workers. Managers who worked for others but, by virtue of their job, had responsibility for managing/employing other workers represented 4.1% of the sample.

Fig. 2.6 Classes based on the means of economic production and control over labour power. (Credit: Authors)

In addition to economic class, we also considered the effects of income on smoking. Detailed data on three different net income types (total income, salary income and revenue income generated from business profits, investment earnings and dividends) was obtained from the CLDS surveys. Since income is inextricably associated with social class, incorporating it is necessary to model both factors simultaneously in order to resolve their confounding relationship.

2.5.3.2 Class Gradients in Smoking?

Once the distribution of economic classes has been established, it is possible to analyse their links to smoking. Table 2.2 shows the age standardised odds ratios of smoking for males and females by different economic classes. Among men, compared to people in the non-employment category, who themselves have high rates of smoking (Wang et al. 2016), the highest odds of smoking are seen among farmers (2.67), the bourgeoisie who employed other workers (2.51) and proletarians (2.47), followed closely by the self-employed (2.36) and managers (2.34). Except for retirees, who may have given up smoking for health and ageing concerns, the lowest odds of smoking belong to unskilled (1.83) and skilled (1.79) contract workers and retired people (1.61).

Among females, the class gradient in smoking is less pronounced and the patterns slightly different. Compared to those without formal employment, the retired (2.20) and farmers (1.69) are the groups most likely to smoke, even after controlling for age. Compared to males and other female classes, proletarians are less likely to

Table 2.2 Logistic regression on smoking status and smoking intensity by social class

Smoking status					Smoking intensity[a]			
	Male		Female		Male		Female	
	O.R.	S.E.	O.R.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Class (ref = non-employment)								
Retired	1.61***	0.10	2.20***	0.28	2.67***	0.32	0.28***	0.06
Proletarians	2.47***	0.15	0.62*	0.15	4.09***	0.32	−0.11***	0.03
Farmers	2.67***	0.15	1.69**	0.28	5.19***	0.32	0.09	0.05
Contract non-skilled	1.83***	0.12	0.66	0.15	1.80***	0.33	−0.07*	0.04
Contract skilled	1.79***	0.12	0.56	0.17	1.78***	0.32	−0.11**	0.03
Self employed	2.36***	0.16	0.96	0.24	4.80***	0.37	−0.01	0.05
Managers	2.34***	0.17	0.61	0.23	3.28***	0.39	−0.07	0.05
Petite bourgeoisie	2.17***	0.21	0.71	0.36	3.62***	0.55	−0.06	0.08
Bourgeoisie	2.51***	0.26	1.11	0.52	4.84***	0.63	−0.05	0.07
Age	1	0.00	0.99	0.00	0.00	0.00	0.00	0.00
Wave	0.93***	0.01	0.96	0.04	−0.24***	0.06	−0.01	0.01

Note: significance level ***p < 0.001, **p < 0.01, *p < 0.05

[a]Average number of cigarettes smoked per day

smoke (0.62). In terms of the magnitude of the odds ratio, the female bourgeoisie (1.11) shows higher risk of smoking, but unlike males the difference was not significant.

The class pattern also holds true for smoking intensity (number of cigarettes smoked). All classes smoke more than the not employed, with farmers (5.19) and the bourgeoisie (4.84) being the heaviest smokers of all. Skilled contracted workers only smoke 1.78 more cigarettes, on par with non-skilled contract workers (1.80). For women, the same class pattern can only be sporadically seen. Female farmers and bourgeoises do not smoke significantly more than non-employed people. Retired women smoke more cigarettes than the non-employed, while proletarians, contract non-skilled workers and skilled workers all smoke fewer cigarettes on average.

There is a suspicion that the distribution of smoking across the class gradient actually hides behind the fact that income determines smoking intensity with class correlated closely with income. The regressions in Table 2.3 allow rejection of this possibility. Although the addition of net income reduces the effects of some classes, most classes remain significantly different in terms of smoking intensity. After controlling for income, contract skilled workers smoke no more intensely than those who are not formally employed, and the effect size of virtually all classes has dropped. Income is also independently positively associated with smoking more cigarettes, offering evidence for the existence of a pure income effect. Controlling

Table 2.3 Regression on smoking intensity by class and income variables

	Model 1		Model 2		Model 3	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Age	−0.00	0.00	−0.00	0.00	−0.00	0.00
Wave	0.10	0.05	0.01	0.06	0.08	0.05
Gender	−8.0***	0.18	−7.9***	0.18	−7.9	0.17
Class (ref = non-employment)						
Retired	1.23***	0.13	1.32***	0.17	1.35***	0.13
Proletarians	1.83***	0.18	1.66***	0.20	1.65***	0.18
Farmers	2.40***	0.15	2.35***	0.17	2.42***	0.16
Contract unskilled	0.61***	0.18	0.38*	0.18	0.37*	0.19
Contract skilled	0.58***	0.18	0.35	0.19	0.34	0.18
Self employed	2.58***	0.25	2.41***	0.27	2.37***	0.26
Managers	1.50***	0.31	1.23**	0.32	1.21***	0.31
Petite bourgeoisie	1.86***	0.35	1.64***	0.35	1.55***	0.38
Bourgeoisie	2.31***	0.51	2.01***	0.51	1.91***	0.52
Net income (log)			0.10***	0.02	0.07**	0.02
Salary income (log)					0.02	0.02
Revenue income (log)					0.03	0.02

Note: Significance level ***p < 0.001, **p < 0.01, *p < 0.05

for social class, each 1000 Yuan increase in annual income led to men, but not women, smoking 0.03 more cigarettes and a one percent increase in the likelihood of heavy smoking (Yang 2020). The significant income effect notwithstanding, classes still differ from each other in terms of smoking intensity, further strengthening the explanation that labour relationships determine outcomes in lifestyle, including smoking and other risky health behaviours.

2.5.4 Synopsis

The CLDS data suggests that the current socio-economic distribution of smoking in China partly reflects a pattern that we might expect in the early stages of the smoking transition. Among men, smoking prevalence was high among the bourgeoisie, but also among other groups prominent in the economy, such as the self-employed and managers. But the pattern is more complex than this. Farmers and the proletariat also had elevated smoking rates compared to those who were not employed. The proletariat no doubt encompassed groups such as migrants with unstable employment conditions and this would also be true of many farmers. Farmers' long history of being a disadvantaged group in China encourages many to classify them as part of the proletariat. However, the complexity in their means to economic production (Wright 1997) fundamentally places this large group in a 'contradictory position' in class relations; they may exert some control over their labour inputs, but not over the means of production, that is, the communally owned land they farm. As we will see in the following chapter, often the latter is very tenuous, being determined by state rather than individual market decisions. Among females the patterns were different. For females the group with the highest prevalence and who smoked most heavily were the retired. The only other group to record high prevalence were farmers.

Overall the data suggest that contrary to the social gradient in smoking in western countries, higher class status and upward income mobility are both associated with more smoking among Chinese men, but not among women. The analysis adds to existing research in China which has often shown a strong relationship between smoking prevalence and SES variables. The effects, however, are inconsistent between urban and rural areas with the research generally failing to link SES effects on smoking to broader contextual processes such as urbanisation (see Chap. 6) and changes in labour relations. Understanding such processes and how they shape social mobility and SES has the potential to provide more insightful interpretations of smoking and other forms of substance use (Yang 2017, 2020).

2.6 Ethnicity and Smoking

Within western countries, ethnicity has emerged as an important component in the smoking transition. The marked declines in smoking prevalence in the general population has not been typical of certain ethnic groups, particularly indigenous ones which have suffered from a legacy of nineteenth-century colonialism, discrimination and economic marginalisation. There are also gender differences, with some of the highest recorded prevalence rates being recorded for indigenous women living in the most deprived communities (Barnett et al. 2017). The causes of ethnic variations in smoking are complex (Dressler et al. 2005) and arise from a combination of socio-economic, cultural and discriminatory factors (Factor et al. 2011).

2.6.1 Race and Ethnicity in China

In the western imagination, China is often thought to be an ethnically or racially homogeneous country, perhaps inspired by the Orientalist discourse, as somewhere exotic, but with little diversity. In fact, there are more than 50 minority groups in China, with the presence of ethnic groups being institutionalised following the adoption of the Stalinist model of ethnic identification in the 1950s. Prior to this, the modern concept of ethnic nationality was foreign to Imperial ideologies. Admittedly, Manchu rulers recognised different subject groups with distinct cultural customs and languages within the Empire, but their differences were not an important matter compared to the division that separated the royal Manchu-Mongolian banner nobles from the subjected groups, including Han Chinese and all other nations (Perdue 2009).

The identification of ethnic identities did not take place until the Communists came into power in 1949 (Zhang 2015). Ethnic identification in China during the 1950s, and later, strongly relied on the Stalinist definition of nation which emphasised a historically stable community of people with a common vernacular language occupying a single piece of territory (Stalin 1913). With this territorial definition, Stalin rejected the political nationalism that seeks self-administration in the name of some broad cultural identity. The Communist ethnic identification project, therefore, differs from the identity politics in contemporary western democracies, with ethnic identification born out of the political goal of regional and group-based administration rather than expressing the cultural autonomy of individuals holding common identities. For this reason, the number of ethnic groups under the Communist project of ethnic identification is limited and finite, for the benefits of governance.

The 56 officially defined nationalities of China possess very rich, and diverse, histories and cultures, many with their own languages and religious beliefs (Zhang 2015). At least three minority groups can be considered racially Caucasian, or ‘white’ in anthropological senses: the Tajiks, Russians and Tartars. Several are racially mixed by a sustained influx, throughout history, of Caucasian and Mongoloid

makeups, such as Uyghurs, Salars, Kazakhs and Kirgiz. The Han majority make up 90% of the population. Due to wars, migration, and assimilation over the course of history, northern nationalities tend to share closer affinity in terms of language, with most ethnic minorities in northern China speaking some variants of the Altaic languages. The genetic and linguistic origins of the southern minorities are far more complicated, with groups of entirely different linguistic and genetic lineages overlapping and scattered among different ethnic groups. The southern ethnic groups comprise the Sino-Tibetan, Austroasiatic and Kra-Dai language families and Austronesian languages. Northern minorities tend to follow Islam and Tibetan Buddhism, whereas the southern ones tend to be Animists, Christians and Mahayana or Theravada Buddhists.

2.6.2 Ethnicity and Smoking Behaviour in China

As in the case of our exploration of gender differences, we used China Health and Nutrition Surveys between 1989 and 2015 to explore the association between ethnicity and smoking behaviour. The CHNS contains a broad range of health and biological information from a representatively chosen sample of Chinese residents from over ten provinces. Because of the attrition issue of panel surveys, we combined all respondents of the same age group from all survey waves into a pooled sample as a representative sample of a single age-group population, as the sampling at every single wave was representative. We retained the prime work-age group population from 25 to 54 years of age and tabulated their current smoking status by ethnic groups. Because racial and ethnic minorities are scattered and tend to have the 'small number problem' in large representative samples, we selectively merged with 'others' the ethnic groups with a sample size of fewer than 30 units in the currently defined prime work-age population sample and also merged together a few ethnic groups with proximate linguistic and cultural heritage. Thus, given the influence of Islam on smoking among Muslims (Ghouri et al. 2006), Uyghurs were merged with Hui (Dungan) to form a Muslim group (even though many may be only nominally Muslim today), Yao (Mien) were merged with Miao (Hmong) for their common linguistic family (known as the Hmong-Mien clan) and geographical proximity, and Dong (Kam) were merged with Zhuang as they both speak Kra-Dai languages and live in southern China (Buyi is another Kra-Dai-speaking ethnicity but retains its own group due to larger size in the sample), while the Sino-Tibetan-speaking Tibetans and Yi (Lolo) were collapsed into 'Others' due to small sample size.

This categorisation leaves us with ten major ethnic groups in the sample: Han, Mongolians (Altaic speakers), Muslims, Hmong-Mien, Kra-Dai, Buyi, Koreans, Manchu (Altaic speakers), Tujia (Sino-Tibetan speakers) and Others. In any classification, especially that involving 25 years of data, there will always be loss of information, typological discontent and ethnonymic errors, but the current classification does its best to retain the original volume of information, achieve

computational efficacy that may be hampered by the small number problem and also make the most historical and cultural sense of grouping different ethnicities together.

As we can see in Table 2.4, the smoking rate is significantly higher among some ethnic minority groups. Hui, Buyi, Korean and Tujia tend to have a greater proportion of smokers than what would be expected by chance. However, compared to other groups, the Han majority do not display a unique smoking pattern more than what would be expected by randomness. In other words, Han ethnic status is not associated with a higher prevalence of smoking.

The ethnic distribution of smoking is also quite idiosyncratic, as the groups that have a significantly larger share of smokers do not share cultural and geographical similarities. Hui is a Chinese-speaking Muslim nationality distributed all over China but especially in the north and northwest; the Koreans native to China live along the Chinese-Korean border and traditionally speak Korean, whereas Buyi are a southern minority group speaking a branch of Kra-Dai language affiliated with Thai, while Tujia live in southern China and speak a Sino-Tibetan language closely related to Chinese. Despite their documented native tongues, most of these minorities de facto speak Chinese or local Chinese varieties in their daily life. Still, here we can find that the groups with a higher proportion of smokers are distributed everywhere

Table 2.4 Current smoking status by major ethnicities*

	Non-smoker	Smoker
Han	32,518 *32,385*	14,362 *14,494*
Mongolian	63 *68*	35 *30*
Muslims (Hui)	82 *95*	55* *42*
Hmong-Mien	1068 *1079*	497 *484*
Kra-Dai	300 *306*	143 *137*
Buyi	790 *856*	449* *383*
Korean	28 *40*	31* *18*
Manchu	1017 *998*	428 *446*
Tujia	439 *487*	267* *218*
Others	426 *413*	172 *185*

*Observed frequency on top and the expected frequency by chance in italics. The asterisk denotes the significant cell-wise difference between expected frequency and observed frequency, based on Pearson's chi-square with one degree of freedom (two categories)

without a unique and easily identifiable geographical pattern. Their higher rate of smoking may be explained by socioeconomic status.

However, a regression on smoking status by the inclusion of net household income, per capita household income, the individual's completed years of education and gender do not show any reduced significance of the ethnicities that reported the elevated proportion of smokers (Table 2.5). Although net household income, higher education and being female are all associated with lower risk of smoking, being ethnically Hui (0.54, $p < 0.05$), Buyi (0.19, $p < 0.05$), Korean (1.63, $p < 0.001$) and Tujia (0.38, $p < 0.001$) still constitute a risk factor of smoking. Differences in socioeconomic status, therefore, cannot explain the ethnic difference in smoking.

There is one problem preventing a valid conclusion that the ethnic variation in smoking is indeed caused by ethnic and racial identities, even after controlling for all what we can gather about demographic and SES measures. Ethnic and racial minority groups are not uniformly distributed geographically. Instead, a large number of minorities often form habitual clusters while a smaller number are scattered across the entire country. The official description of the ethnic distribution in China during the first ethnic identification project claimed that the peculiarity of our country's ethnic distribution is 'large mixed living, small clustering'. Of course, this characteristic is not particularly Chinese at all, as it applies to almost all large multiethnic countries where minority groups are geographically widespread, while also retaining their traditional localities. In China, while every province has a palpable presence of minorities, larger shares of minority populations still live in the northern and western borderlands. This clustering phenomenon undermines the use of conventional theoretical frameworks to explain the observed ethnic disparities in terms

Table 2.5 Regression of ethnicity and socioeconomic status on smoking

	Coefficient	Standard error
Ethnicity (ref = Han):		
Mongolians	0.29	0.29
Muslims	0.54*	0.25
Hmong-Mien	0.06	0.08
Kra-Dai	0.04	0.14
Buyi	0.19*	0.09
Korean	1.63***	0.43
Manchu	0.01	0.08
Tujia	0.38***	0.11
Others	−0.04	0.12
Net household income	−0.001*	0.00
Per capita household income	0.00	0.00
Education	−0.21***	0.01
Female	−4.38***	0.04
Age	0.01***	0.002
Wave	−0.03***	0.002

*p < 0.05, **p < 0.01, ***p < 0.001

of smoking. This is because any observed variation might be attributed to nothing more than the clustering of sampling units by geographical proximity.

The confluence of geographical clustering and group-level traits raises the difficulty of how to tease apart group-level stereotypes and individual-level factors. Fortunately, we may be able to detect the geographical clustering effect in racial/ethnic disparities of smoking through a random effects model that allows estimates of rates and coefficients to vary randomly across different geographical units and thus account for the extent of clustering. Conventional regression assumes the identical independent distribution of sampled units, but such an assumption is not met for ethnic groups who naturally occupy clusters of space and cannot be considered even remotely independently distributed. By allowing intercepts and coefficients to vary across all clusters randomly, a random effects model can adjust for the inflated interval estimates and account for the clustering phenomenon. In the preceding analysis, some ethnic groups reported significantly higher likelihood of smoking, but once we allowed communities to have random intercepts (the starting default level of smoking) and accounted for clustering, this was only partly true. Smoking rates no longer significantly vary between Han and Muslims, between Han and Kra-Dai people or between Han and Buyi. There is virtually no difference between Han and these minority people in terms of the likelihood of smoking.

The ephemeral significant association between smoking and some ethnicities, as suggested by random-effect model, comes as a result of the clustering effect in which some specific communities with a very large number of ethnic minorities have inflated the estimates of smoking rate that has nothing to do with ethnicity per se but emanates from the peculiarities of that community. For example, Muslims were more likely to report smoking, but we now know that the Muslim-smoking effect is unstable after such an effect was allowed to randomly vary across communities. Muslims are widespread across China, but with the exception of Yunnan province, most are located in northern China's major cities and villages along business routes. The notable cities featuring larger shares of Muslims in the CHNS samples include Zhengzhou, Beijing, Jinan and Shenyang, whereas the southern provinces have very few living there. The demographic and SES characteristics of Muslims in these northern cities may provide a partial image of the pattern of Muslim smoking. When the wider geographical distribution of Muslims is accounted for, the significant association between being a Muslim and smoking disappeared. As a noticeable exception, there is still a significantly elevated risk of smoking among Koreans (2.73, $p < 0.01$), indicating that this is not an artificial statistical product caused by geographical concentration or the clustering effect, but is consistent across the sampled communities.